Sligo Bay Catchment Assessment 2010-2015 (HA 35)

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 Sligo Bay 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, 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 River Drowes and all streams entering tidal water in Sligo Bay and between Lenadoon Point and Aughrus Point, Co. Donegal. The catchment has a surface area of 1,866 km². The largest urban centre is Sligo. The other main urban centres are Ballymote, Collooney, Ballysadare and Manorhamilton. The total population is approximately 59,200, with a population density of 32 people per km². A small part of this catchment (109km²) is located within Northern Ireland.

The catchment is comprised of the smaller catchments, listed from west to east, of the Easkey, Ballysodare (fed by the Owenbeg, Owenmore and Unshin Rivers), Garavogue, Drumcliff, Grange and Drowes Rivers. Most of the lowland inland areas exhibit a steep topography with poorly draining conditions in the intervening areas. Conversely, apart from the Ox Mountains, which are underlain by metamorphic rocks, most of the uplands in this catchment including the Bricklieve Mountains, Knocknarea, and the Dartry Mountains are karstified limestones.and are largely devoid of surface drainage channels.

The Easkey River rises on the western flanks of the Ox Mountains, flowing through Lough Easkey and north to the sea at Easkey village. The coastal area between Dromore West and Ballysodare are drained by several small rivers including the Dunneill, Lugdoon and Dunmoran Rivers. The karstified drumlin landscape of the limestone area in central Sligo Plain is drained by the Ballysodare River system which is comprised of the Owenbeg River, the Owenmore River, and the Unshin River. At Colooney, the Ballysodare River cuts through a gap in the Ox Mountains and flows into Ballysodare Bay and out to sea to the south of Knocknarea and Strandhill.

The Garavogue River system begins in Glenade Valley, from where the Bonet River flows south, through the Dartry Mountains before flowing into Lough Gill near Dromahair. It then flows out of the western end of Lough Gill and through Sligo Town before flowing to sea through Sligo Harbour, past Coney Island and into Sligo Bay. An arterial drainage scheme was completed on the Bonet River by the OPW between 1982 and 1992.

The Drumcliff River runs west through Glencar Lough, before flowing via Drumcliff Bay to sea in Sligo Bay. The Grange River rises on the eastern flanks of Benbulben, draining Glendarragh and flowing northwest to the sea at Dernish Island north of Grange.

The Sligo Bay Drowse catchment comprises 13 sub-catchments (Figure 1) with 70 river water bodies, 18 lakes, six transitional, six coastal water bodies, and 25 groundwater bodies. There is no heavily modified water body in the catchment.

Table 1. List of subcatchments in the Sligo Bay catchment

Subcatchment ID	Subcatchment Name
35_1	CARROWGOBBADAGH_SC_010
35_2	Owenmore[Sligo]_SC_030
35_3	Grange[Sligo]_SC_010
35_4	Owenmore[Sligo]_SC_040
35_5	Owenmore[Sligo]_SC_020
35_6	Bonet_SC_020
35_7	Owenmore[Sligo]_SC_010
35_8	Bonet_SC_010
35_9	Unshin_SC_010
35_10	Bonet_SC_030
35_11	Dunmoran_SC_010
35_12	Easky_SC_010
35_13	Drumcliff_SC_010

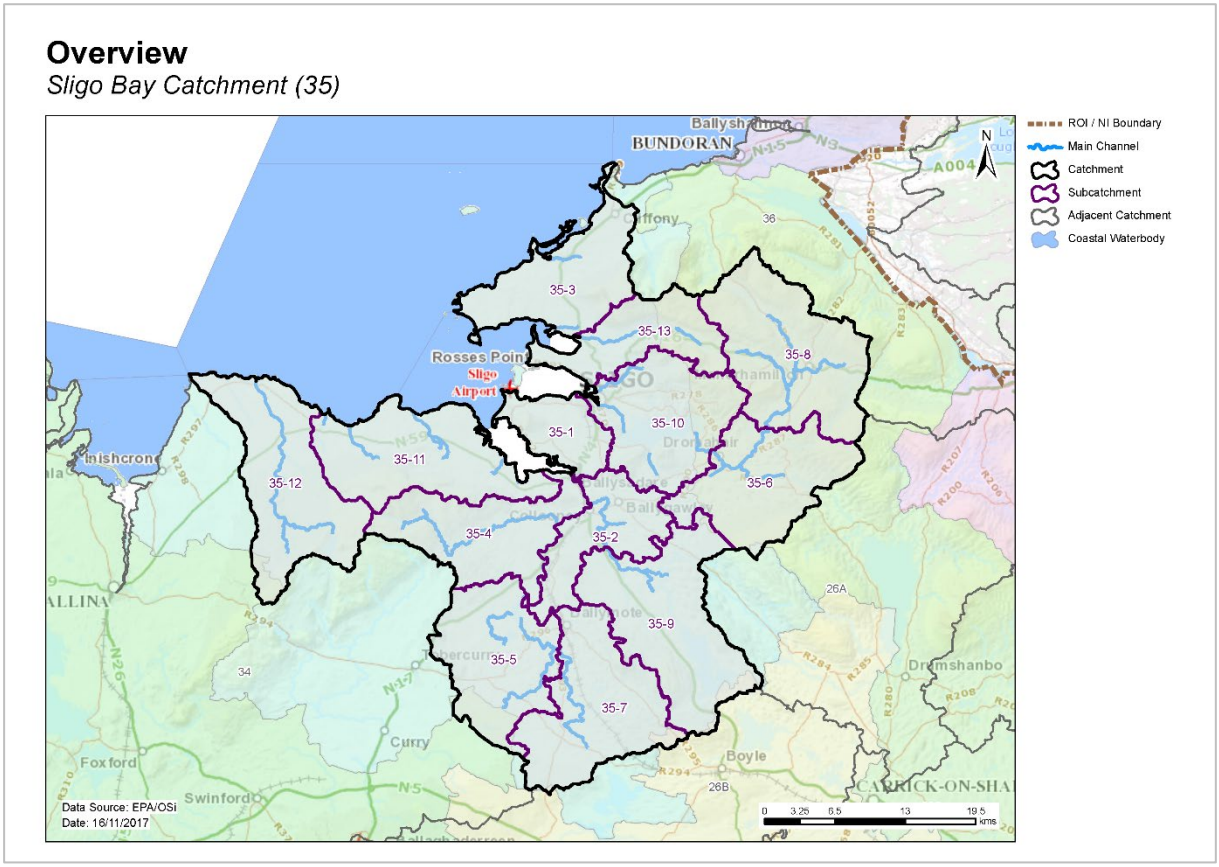

Figure 1. Location and subcatchments in the Sligo Bay Drowse catchment

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 46 (52%) surface water bodies at Good or High status, and 20 (23%) at less than Good status in 2015 and 22 (25%) of water bodies are unassigned (Table 2, Figure 2).
- Twelve surface water bodies have a high status environmental objective. In 2015, three of these water bodies were at High status, eight were at Good, and one was at less than Good (Appendix 1, Figure 3).
- The numbers of water bodies at each status class in 2007-09 and 2010-2015 are shown in Figure 4 (rivers) and 5 (lakes), with the catchment-wide changes illustrated in Figure 7.
- Since 2007-09 when WFD monitoring began, 10 water bodies have improved and 20 deteriorated.
- The variation in nutrient concentrations and loads in the Sligo Bay Drowse [Owenmore (Sligo)] main channel is illustrated in Appendix 2.

2.1.2 Transitional and Coastal (TraC)

- There were two (17%) TraC water bodies at Good or High status, and one (8%) at less than Good status in 2015 (Table 2 Figure 2). 9 (75%) TraC water bodies are unmonitored.
- One TraC water body Sligo Bay, has a high status objective and was meeting that status in 2015 (Appendix 1, Figure 3).
- The numbers of TraC water bodies at each status class in 2007-09 and 2010-2015 are shown Figure 6.

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

	Number of water bodies	2010-2015 Status						Risk Categories		
		High	Good	Mod	Poor	Bad	Un-assigned	*Not at Risk*	*Review*	*At Risk*
Rivers	70	4	39	12	3	0	12	35	14	21
Lakes	18	0	3	2	2	1	10	5	8	5
TraCs	12	1	1	1	0	0	9	7	4	1

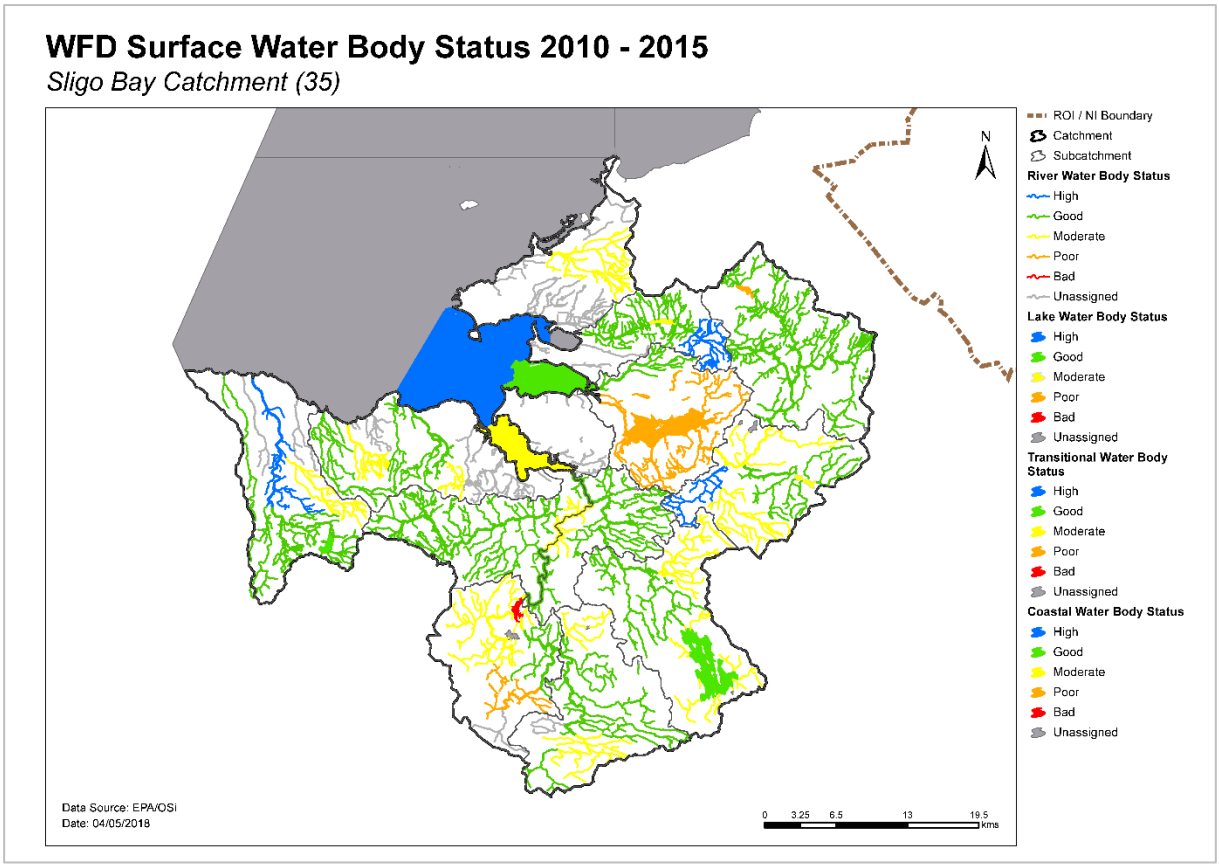

Figure 2. Surface water ecological status. (Note Sligo Bay and the Donegal Bay Southern coastal water bodies are not shown).

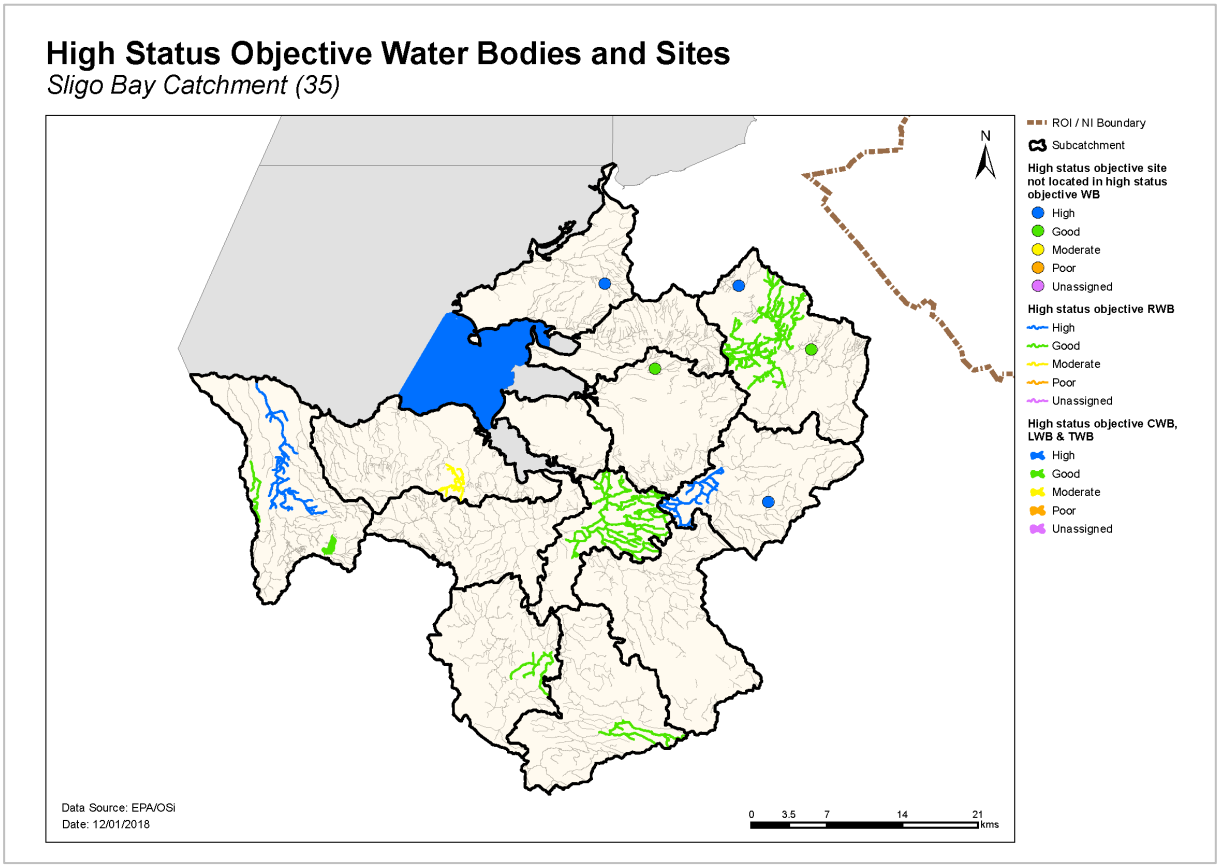

Figure 3. High ecological status objective water bodies and sites.

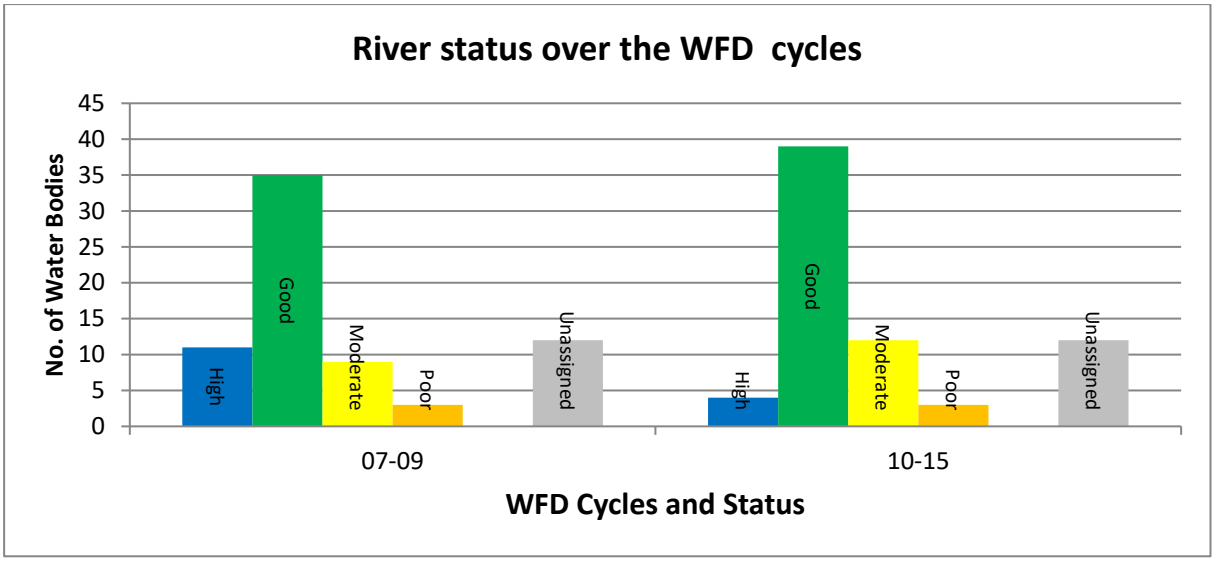

Figure 4. Number of rivers at each status class in 2007-09 and 2010-15

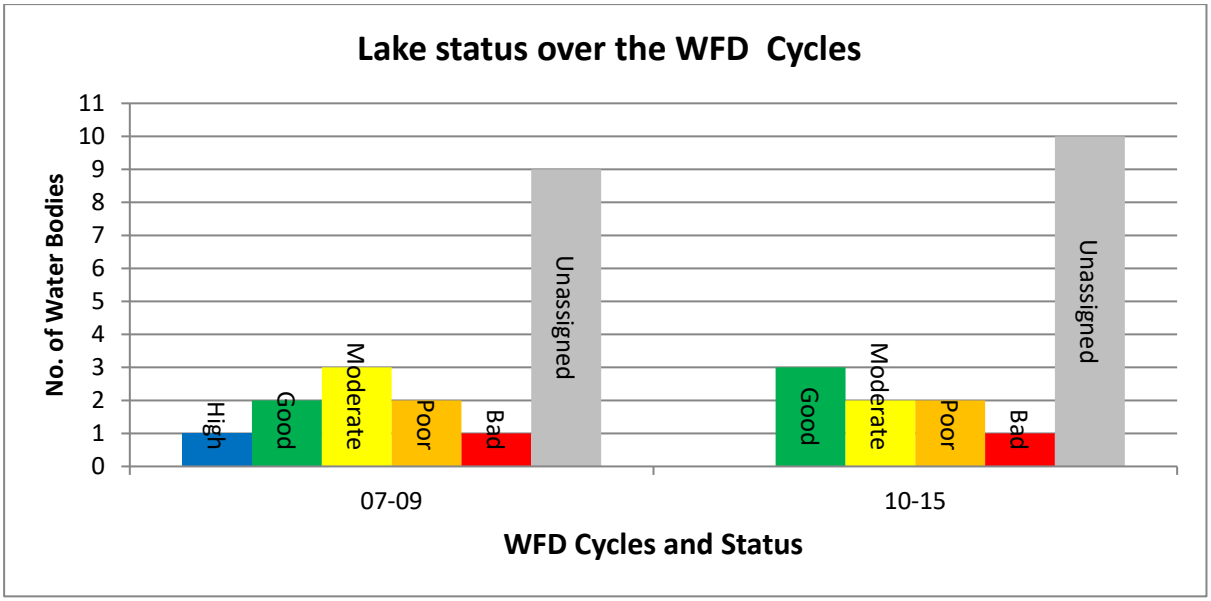

Figure 5. Number of lakes at each status class in 2007-09 and 2010-15

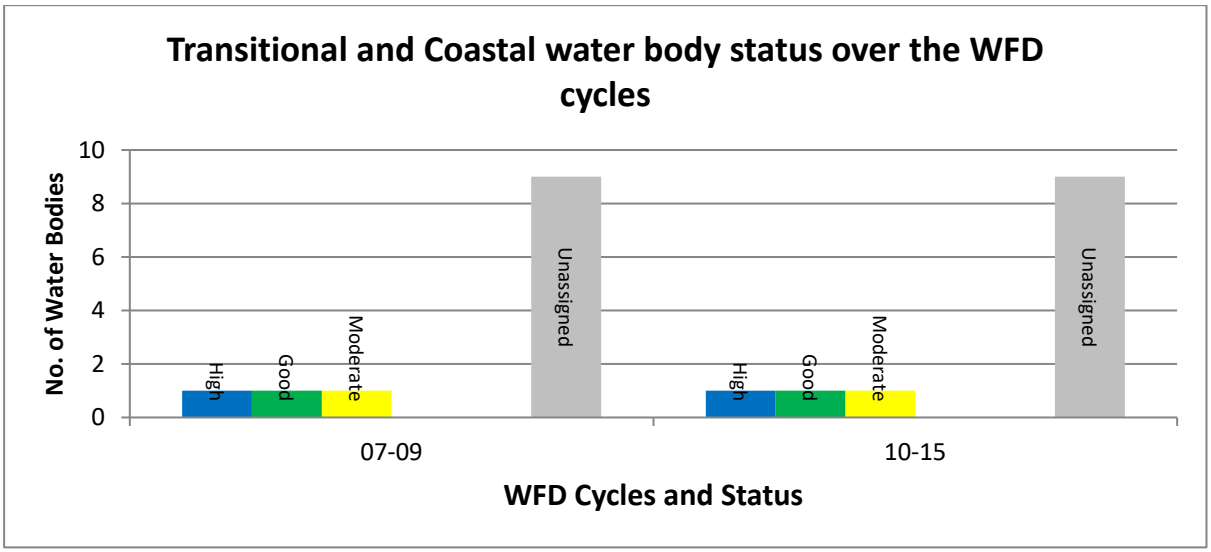

Figure 6. Number of TraC at each status class in 2007-09 and 2010-2015

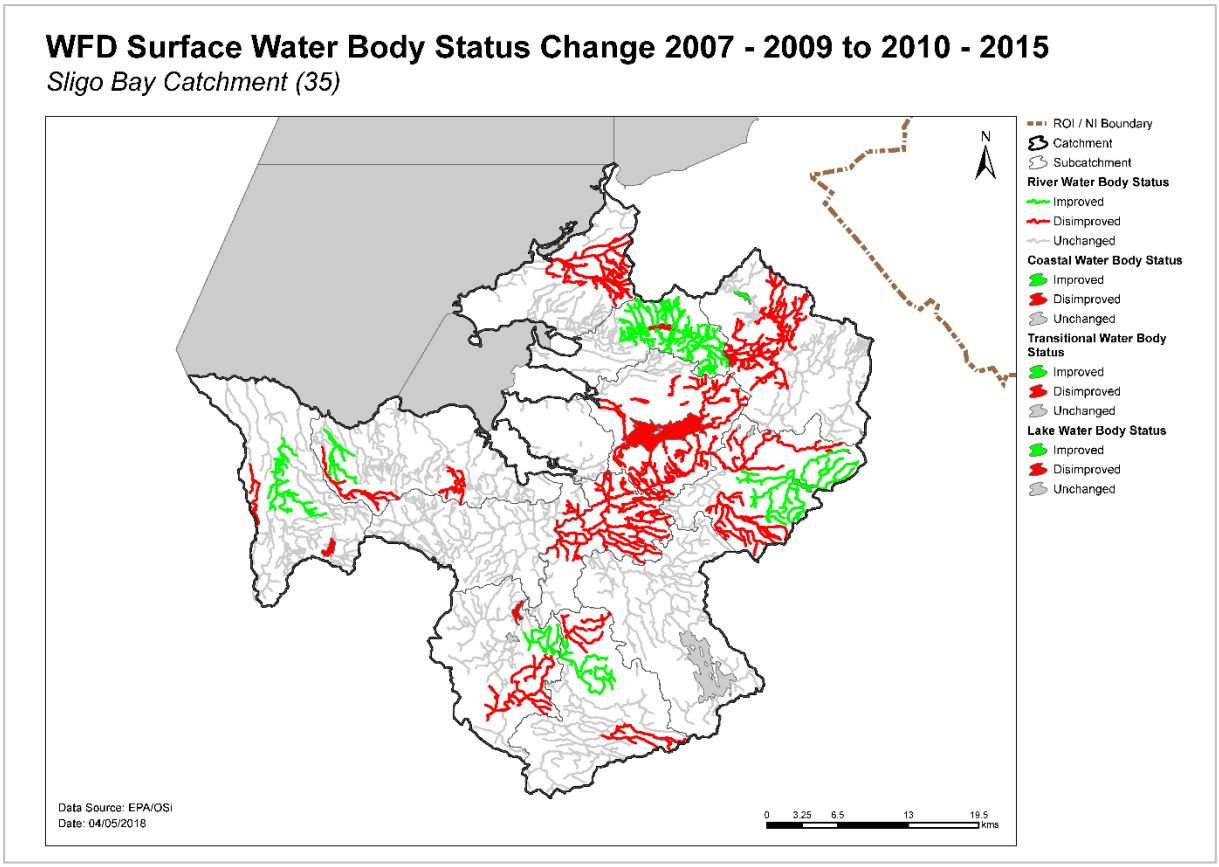

Figure 7 . Surface water body status change from 2007-09 to 2010-2015.

2.2 Groundwater status

- All 25 groundwater bodies were at Good status in 2015 (Table 3 and Figure 8).

Table 3. Summary of groundwater body status and risk

	Number of water bodies	2010-2015 Status		Risk Category		
		Good	Poor	*Not at Risk*	*Review*	*At Risk*
Groundwater	25	25	0	17	7	1

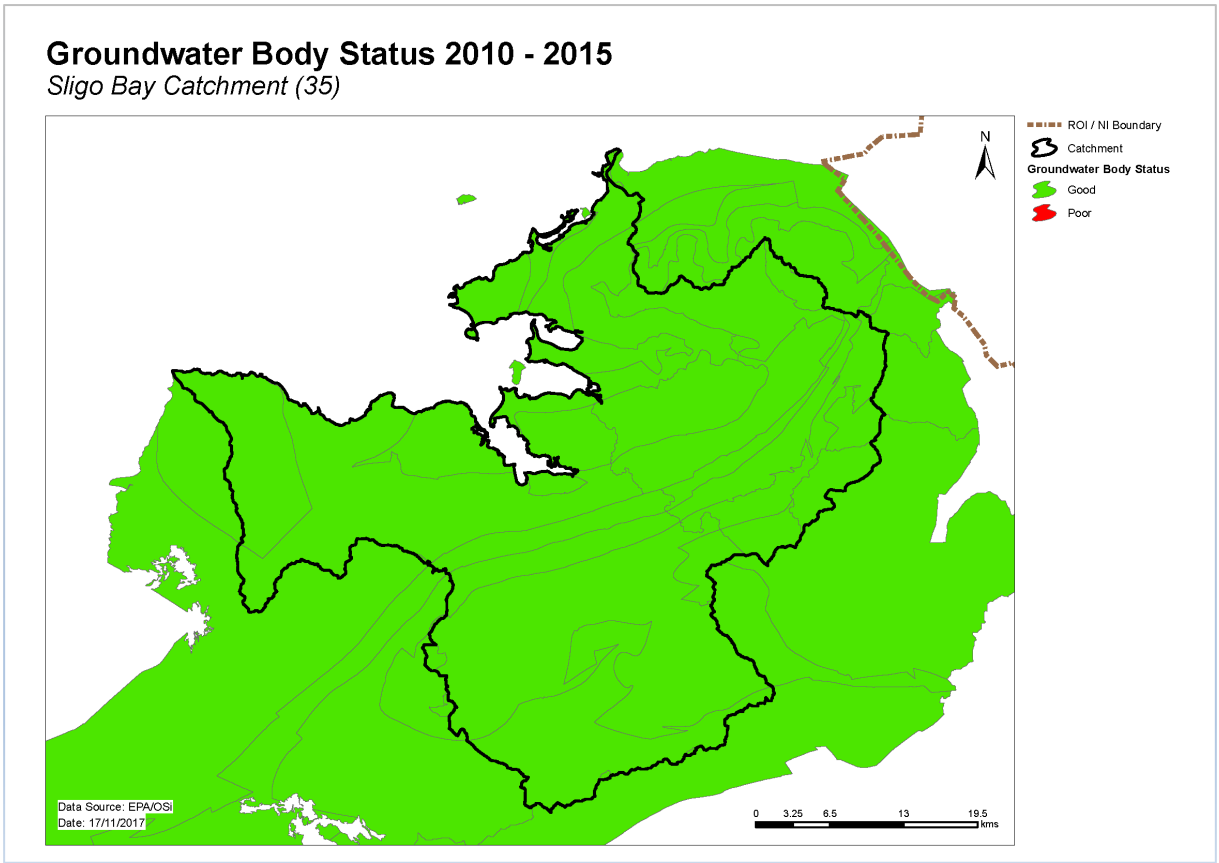

Figure 8. Groundwater body status

2.3 Risk of not meeting surface water environmental objectives

2.3.1 Rivers and lakes

- Thirty-five river water bodies and five lake water bodies are *Not at Risk* (Figure 9, Table 1) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- Fourteen river water bodies and eight lake water bodies are in *Review*. This applies to 16 water bodies where more information is required and five water bodies where measures have recently been implemented and improvements have not yet been realised.
- Twenty-one river water bodies and five 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)

- Seven TraC water bodies are *Not at Risk* (Figure 9, Table 2) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- Four TraC water bodies are in *Review* where more information and further assessment of data is required.
- One TraC water body in the catchment is *At Risk* of not meeting its water quality objective. Measures will be needed in these water bodies to improve the water quality outcomes.

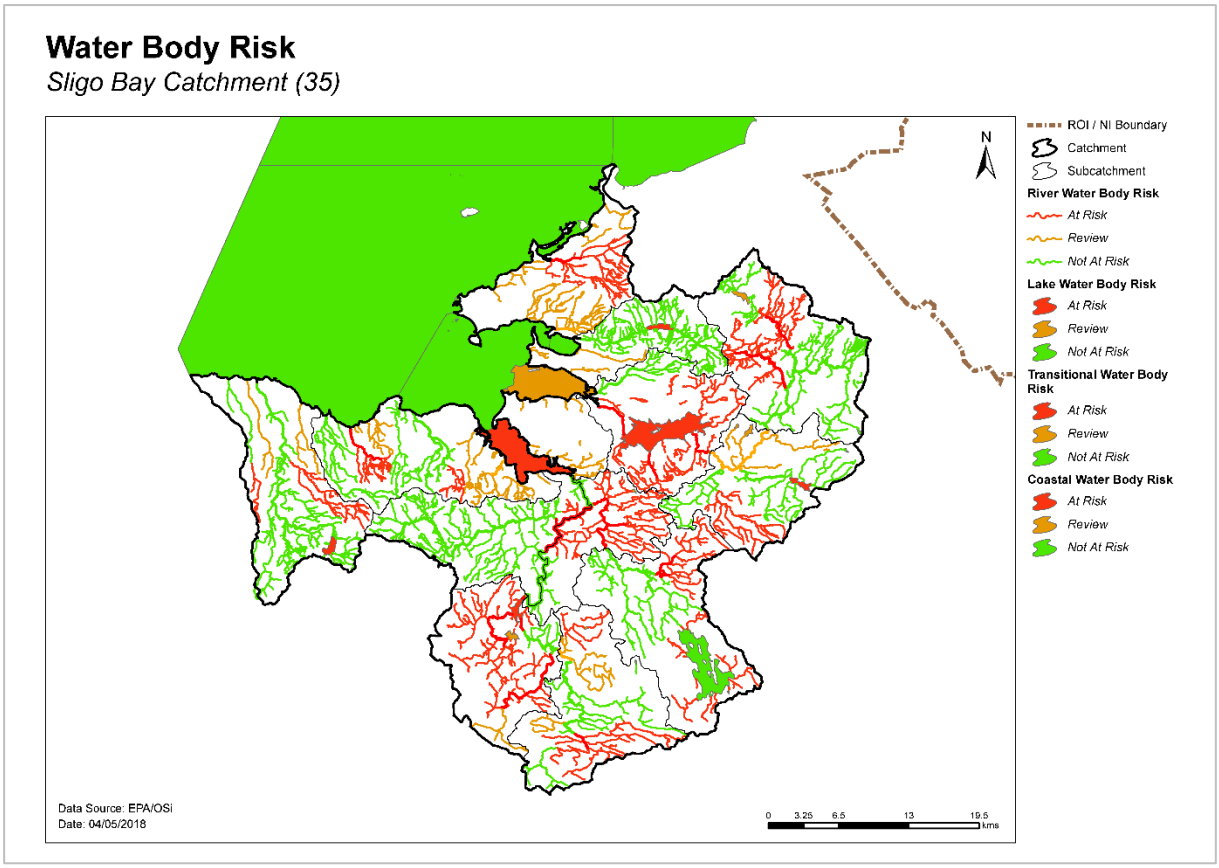

Figure 9. Surface water body risk.

2.4 Risk of not meeting groundwater body environmental objectives

- Seventeen groundwater bodies are *Not at Risk* (Figure 10, Table 3) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- Seven groundwater bodies are in *Review* because they are hydrologically linked to surface waters that are not meeting water quality objectives where it is considered likely that groundwater is a contributing source of phosphorus.
- One groundwater body IE_WE_G_0042 Carrowmore East is *At Risk* of not meeting its water quality objectives. Measures will be needed to improve the water quality outcomes. It is related to groundwater contribution of phosphate to surface waters also *At Risk* that are not meeting their water quality objectives. Table 4, Figure 10.

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
Carrowmore East	IE_WE_35G010200	Garavogue_010

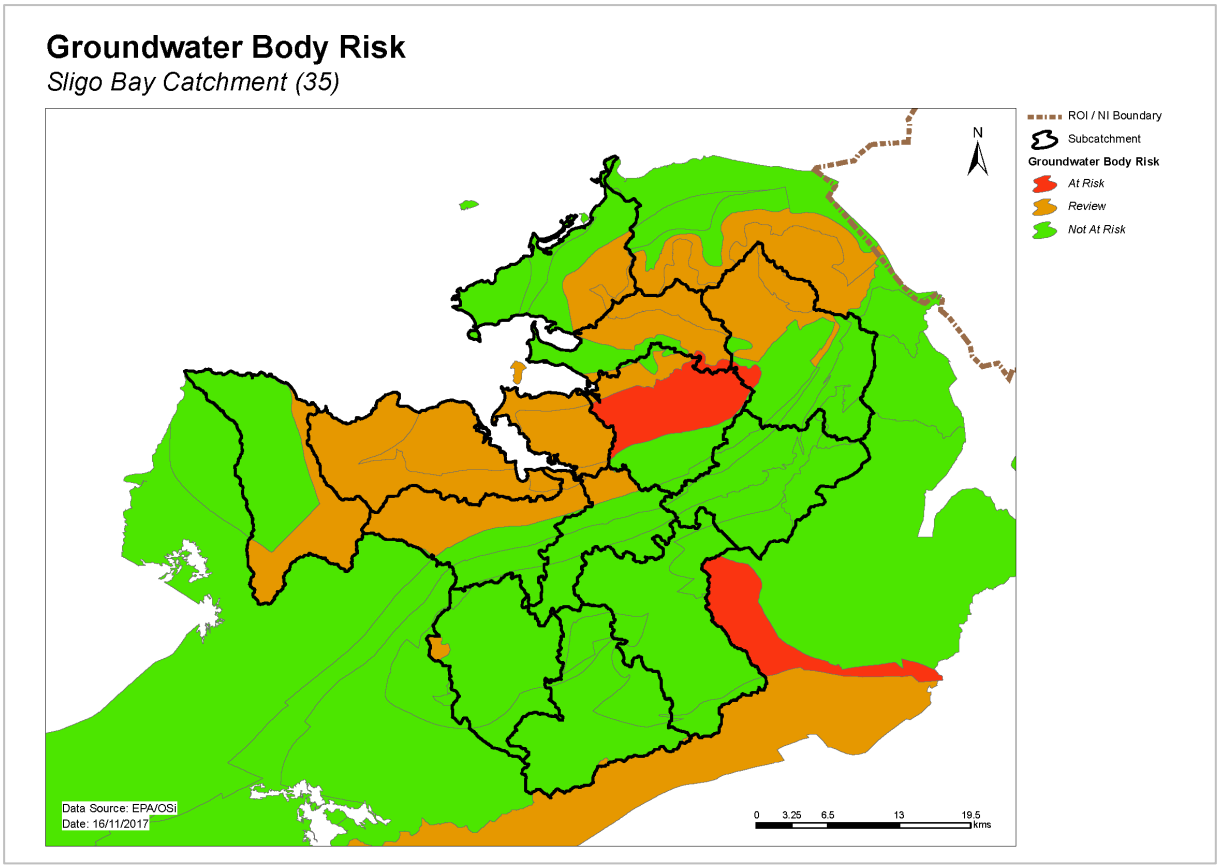

Figure 10. Groundwater body risk

2.5 Protected Areas

2.5.1 Drinking Water Protected Areas

- There are 23 abstractions in the Sligo Bay-Drowse Catchment comprising 11 group water schemes (Beltra, Bebulben, Calry No. 1 (Keeloguboy), Castlebaldwin, Castletown, Corrick, Culfadda, Drum East, Geevagh/Highwood and Lecarrow) and 8 public supplies (North Leitrim RWS, Kinlough & Tullaghan, Foxes Den PWS, Lough Easkey RWS, North Sligo RWS, Kilsellagh PWS, Riverstown PWS and Lough Gill PWS).
- Eleven of the abstractions are from six groundwater bodies (Glencar, Beltra Sligo, Drumcliff-Strandhill, Carrowmore East, Ballymote and Gorteen), four are from three lakes (Lough Gill, Lough Arrow and Lough Labe), and eight are from five river water bodies (Doonowney_010, Unshin_010, Garavogue_010, Easkey_010 and Grange (Sligo)_010)). The list of the public supplies and the associated water bodies is provided in Appendix 4.
- All sources were compliant with the standards for nitrate in 2015.
- Kilsellagh PWS from the Garavogue_010 was non-compliant for pesticides (MCPA and 2,4-D) All other sources were compliant with the standards for pesticides in 2015.
- All 22 of the drinking water protected areas had therefore met their objectives in 2015. Kilsellagh PWS was non-compliant for pesticides the source of which is Kilsellagh impoundment fed by a quarry, Blackbawn and Carrowlustia streams and a spring.

2.5.2 Bathing Waters

- There are no freshwater bathing waters in the catchment. There are three marine bathing water and both are in satisfactory condition. The list of the bathing waters and the associated water bodies is provided in Table 5.

Table 5. Bathing Waters in the catchment

Bathing Water		Water Body Intersection		Objective met?	
Name	Code	Name	Code	Yes	No
Dunmoran Beach	IEWEBWC450_0000_0200	Sligo Bay	IE_WE_450_000	✓	
Rosses Point Beach	IEWEBWC450_0000_0100	Sligo Bay	IE_WE_450_000	✓	
Streedagh Beach	IEWEBWC430_0000_0100	Donegal Bay Southern	IE_WE_430_0000	✓	

2.5.3 Shellfish Waters

- There are two designated shellfish areas in the Sligo Bay Drowse catchment. The shellfish areas are compliant with the relevant standards and there no water quality issues of concern. The list of the shellfish areas and the associated water bodies is provided in Table 6.

Table 6. Shellfish Waters in the catchment

Shellfish Area		Water Body Intersection		Objective met?	
Name	Code	Name	Code	Yes	No
Sligo Bay	IEPA2_0016	Garavogue Estuary	IE_WE_470_0100	✓	
		Sligo Bay	IE_WE_450_0000		
Drumcliff	IEPA2_0032	Drumcliff Estuary	IE_WE_480_0100	✓	
		Sligo Bay	IE_WE_450_0000		

2.5.4 Nutrient Sensitive Areas

- There are no designated Nutrient Sensitive Areas in the catchment.

2.5.5 Natura 2000 Sites

- There are 19 Special Areas of Conservation (SACs) in the catchment, not all of which have water quality and/or quantity conservation objectives for their qualifying interests.
- Seven water bodies (4 rivers, 3 lakes) have been prioritised for action as the water conservation objectives for their habitats and/or species are not being supported by ecological status (Appendix 5).
- There are seven Special Protected Areas (SPAs) in the catchment:
    - Sligo/Leitrim Uplands SPA (Chough, Peregrine)
    - Cummeen Strand SPA, Ballysadare Strand SPA, Drumcliff Bay SPA, Ballintemple and Ballygilgan SPA and Lough Arrow (waterbirds)
    - Aughris Head SPA (sea birds)
- As there no specific water quality and quantity supporting conditions identified in the site-specific conservation objectives for these SPAs, the intersecting water bodies are not assigned priority action for WFD protected area purposes in the second cycle.

2.6 Heavily modified water bodies

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

3 Significant issues in *At Risk* water bodies

- Excess nutrient loss, in particular phosphate, leading to eutrophication is a significant issue of concern in several water bodies.
- Hydromorphological issues are significant on the catchment. 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.
- Zebra Mussels are a significant issue in two lakes and one river and can impact ecology through modifications to lake bed morphology, altering the lake habitat.
- Impacts on Ballysadare Estuary transitional water body is shown by the presence of phytoplankton, which is indicative of excess nutrients.
- One groundwater body has a potential to contribute phosphates to surface waters that are *At Risk* of not meeting water quality objectives.

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 11 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 27 water bodies, 14 of which have multiple pressures. The significant pressures will be refined as further characterisation (Section 6) is carried out.
- The significant pressure affecting the greatest number of water bodies is agriculture, followed by forestry, urban waste water, hydromorphological pressures, domestic waste water, other, peat, diffuse urban, industry and mines and quarries (Figure 11).
- The significant pressures affecting the Ballysadare estuary are Urban Waste Water and Agriculture.

4.1.2 Groundwater

- The significant pressure affecting the IE_WE_G_0042 Carrowmore East groundwater body is diffuse agriculture due to the groundwater contribution of phosphate to the surface waters also *At Risk*.

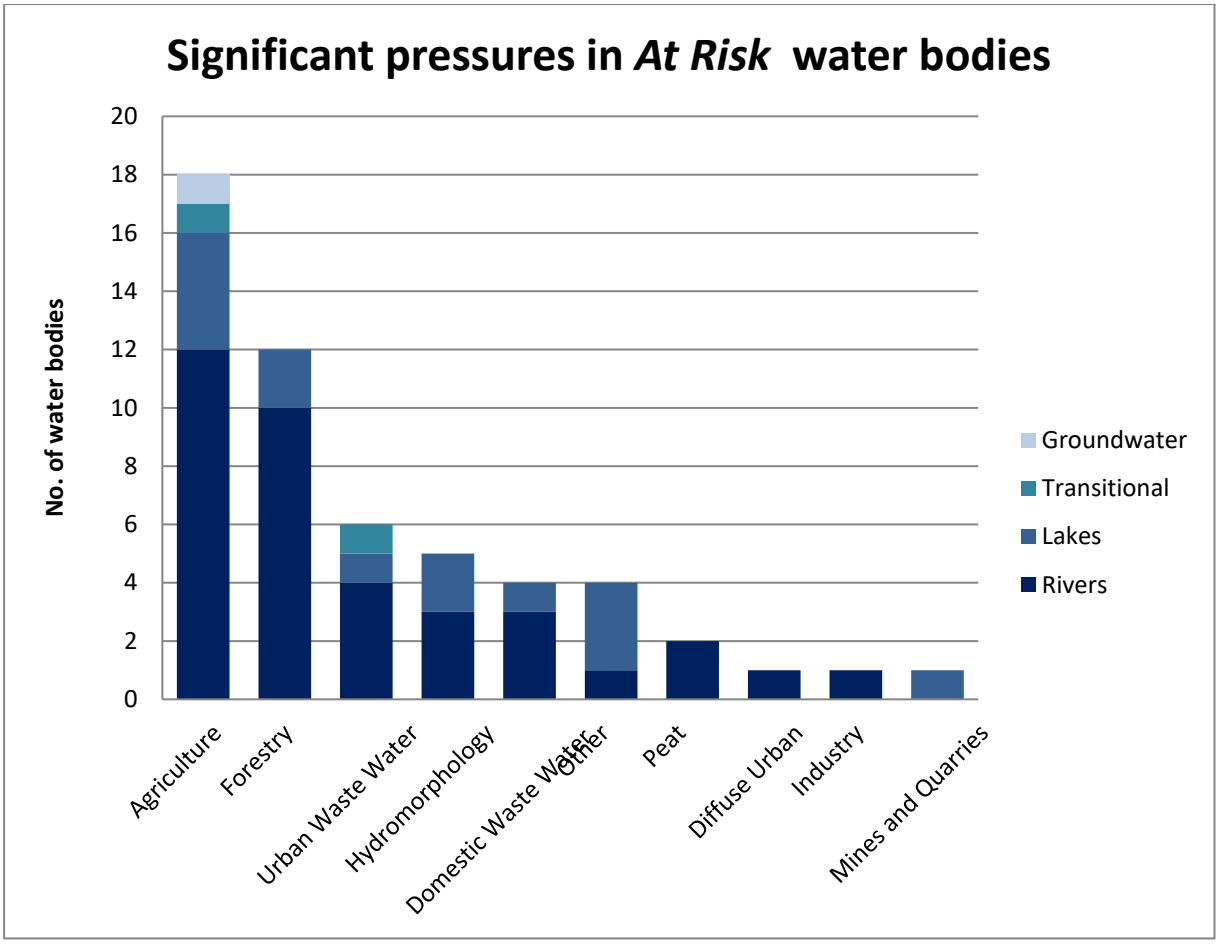

Figure 11. Significant pressures impacting on *At Risk* water bodies.

4.2 Pressure type

4.2.1 Agriculture

- Agriculture is a significant pressure in the catchment areas of 17 surface water bodies including Ballysadare Estuary; the water bodies affected by farming are shown in Figure 12. Agriculture is also the potential significant pressure in two groundwater bodies. The issues related to farming in this catchment are primarily phosphorus loss to surface waters from, for example, direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment can also be a problem from land drainage works, bank erosion from animal access or stream crossings.

- The significant pressure affecting the IE_WE_G_0042 Carrowmore East groundwater body is diffuse agriculture due to the groundwater contribution of phosphate to the surface waters also *At Risk*.

4.2.2 Forestry

- Forestry has been identified as a significant pressure in the catchment areas of 12 water bodies are shown in Figure 13. The significant issues are a combination of phosphorus loss to water and hydromorphological impacts from the release of sediment, primarily related to clearfelling and related activities.

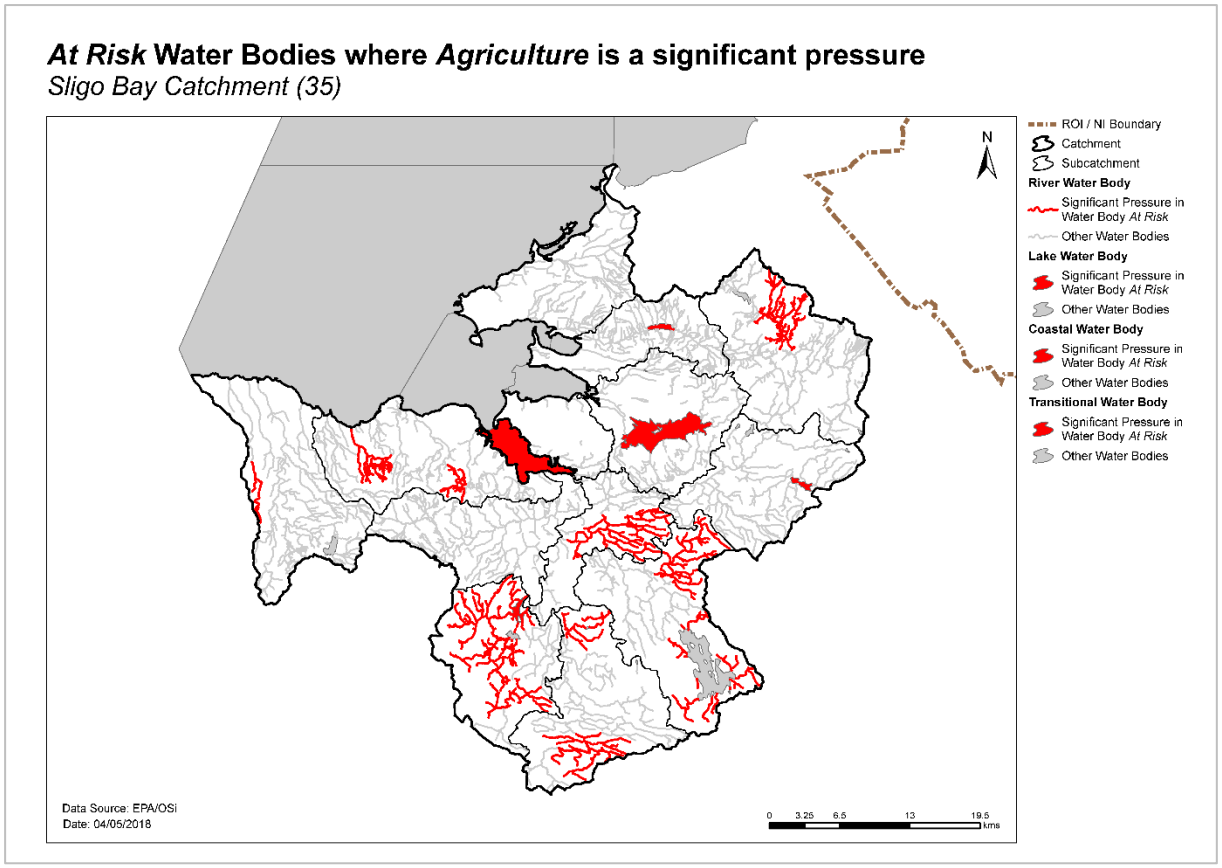

Figure 12. Water bodies that are *At Risk* and are impacted by agricultural activities.

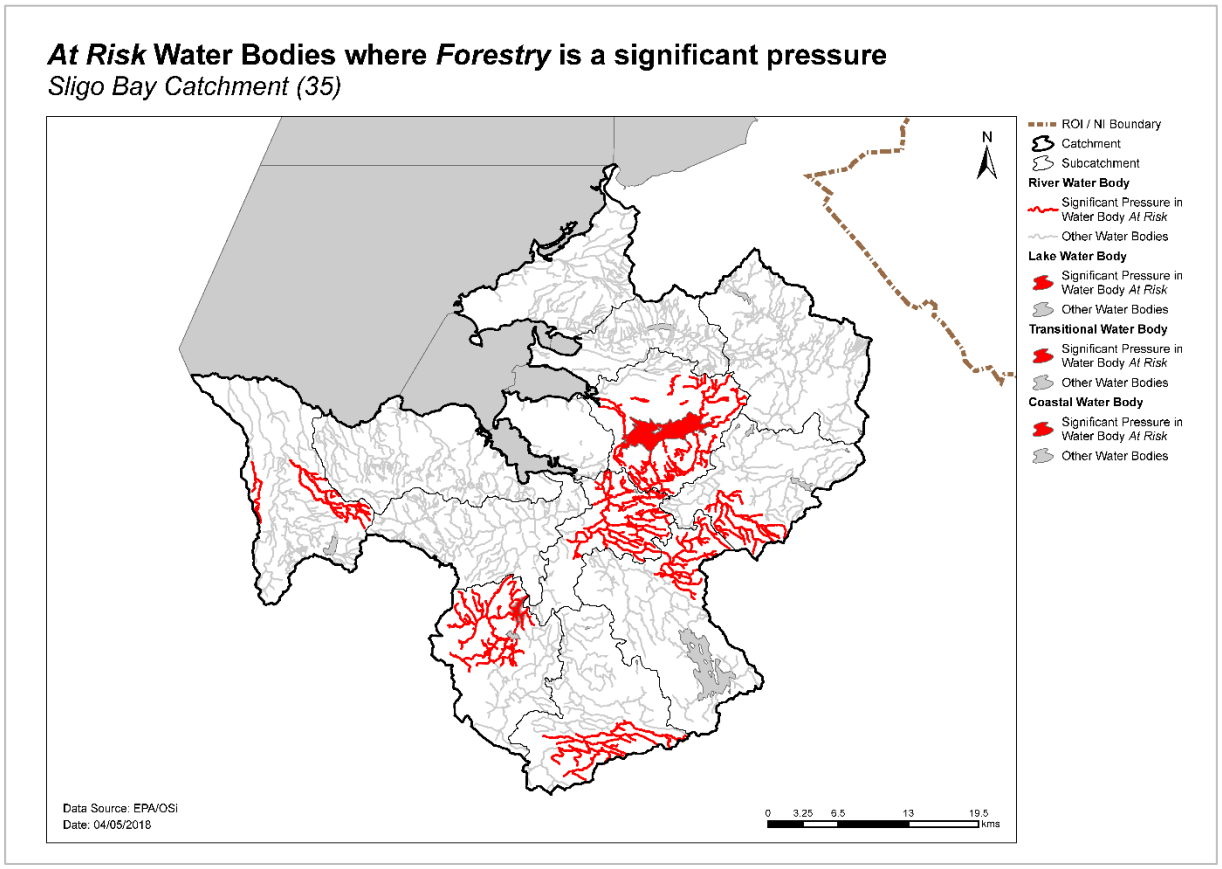

Figure 13. Water bodies that are *At Risk* and are impacted by forestry activities.

4.2.3 Urban Waste water Treatment Plants

- Urban Waste Water Treatment Plants (WWTPs) and agglomerations networks have been identified as a significant pressure in six *At Risk* water bodies; details are given in Table 7 and Figure 14. Two of these *At Risk* water bodies, Grange (Sligo)_010 and Owenmore (Sligo)_080, are impacted by WWTPs that are scheduled to be upgraded.

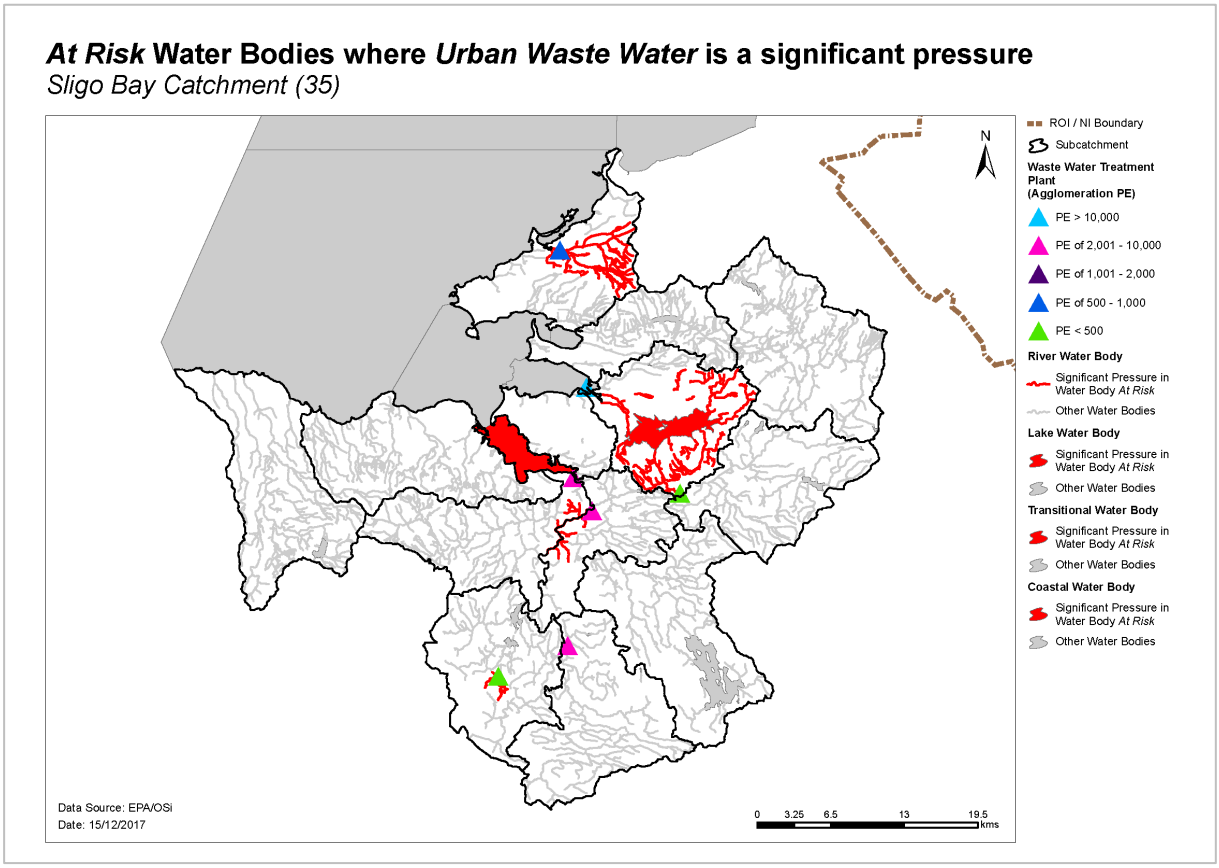

Figure 14. Water bodies that are *At Risk* and are impacted by Urban Waste Water.

Table 7. 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	10-15 Ecological Status	Expected Completion Date
Ballintogher A0309	< 500 p.e.	Lough Gill	Poor	*NA* [1]
Bunnanaddan A0305	< 500 p.e.	Bunnanaddan Stream_010	Poor	*NA* [1]
Sligo D0014	> 10,000 p.e.	*Garavogue_010* [2]	Poor	*NA* [1]
Grange D0381	500 to 1,000 p.e.	Grange (Sligo)_010	Moderate	2020
Collooney D0093	1,001 to 2,000 p.e.	Owenmore (Sligo)_080	Moderate	2021
Ballysadare D0095	2,001 to 10,000 p.e.	Ballysadare Estuary	*Unassigned* [3]	*NA* [1]

[1] *Currently not specified in improvement plans.*
[2] *The agglomeration network, rather than the WWTP, has been identified as a significant pressure impacting Garavogue_010.*
[3] *Ecological Status is not available for Ballysadare Estuary, however, following the outputs of the catchment characterisation process, this water body was deemed to be At Risk of not meeting its environmental objectives.*

4.2.4 Hydromorphology

- Historical channel modification exists in three river water bodies and two lake water bodies (Clooneen (Sligo)_030 and Shanvaus_010) within the Owenmore [Sligo] (35_5) and Bonet (35_8) subcatchments which has led to these water bodies been downgraded from High to Good ecological status. Land drainage within peaty soils may be impacting on the morphological conditions of a river water body (Killanummery_010) within the Bonet (35_6) subcatchment (Figure 15).

4.2.5 Domestic Waste Water

- Domestic waste water has been identified as a significant pressure in the catchment areas of four water bodies. Elevated nutrient concentrations and organic impacts are the significant issues due one-off housing with septic tank systems located on poorly draining soils. There are also issues with smaller sewage discharges along small tributaries. (Figure 16).

4.2.6 Other – Invasive Species

- *Invasive species*
  Invasive species (zebra mussel) have been identified as a significant pressure in three lakes and one river where biological and ecological impacts have been noted. Figure 17.

- *Waste*
  Illegal quarrying has been identified as a significant pressure in one river water body by the local authority a number of years ago.

4.2.7 Extractive Industry

- *Peat*
  Peat drainage and extraction have been identified as a significant pressure in two river water bodies.

4.2.8 Diffuse urban

- Diffuse urban pressures, caused by misconnections, leaking sewers and runoff from paved and unpaved areas, has been identified as a significant pressure in one water body, the Garavogue _010 which passes through Sligo town. Elevated concentrations of phosphorus and organic impacts are the significant issues. Figure 18

4.2.9 Industry

In the Unshin_050 river, which is a high status objective water body, elevated orthophosphate concentrations from an industrial discharge have been identified as a significant pressure (Figure 19).

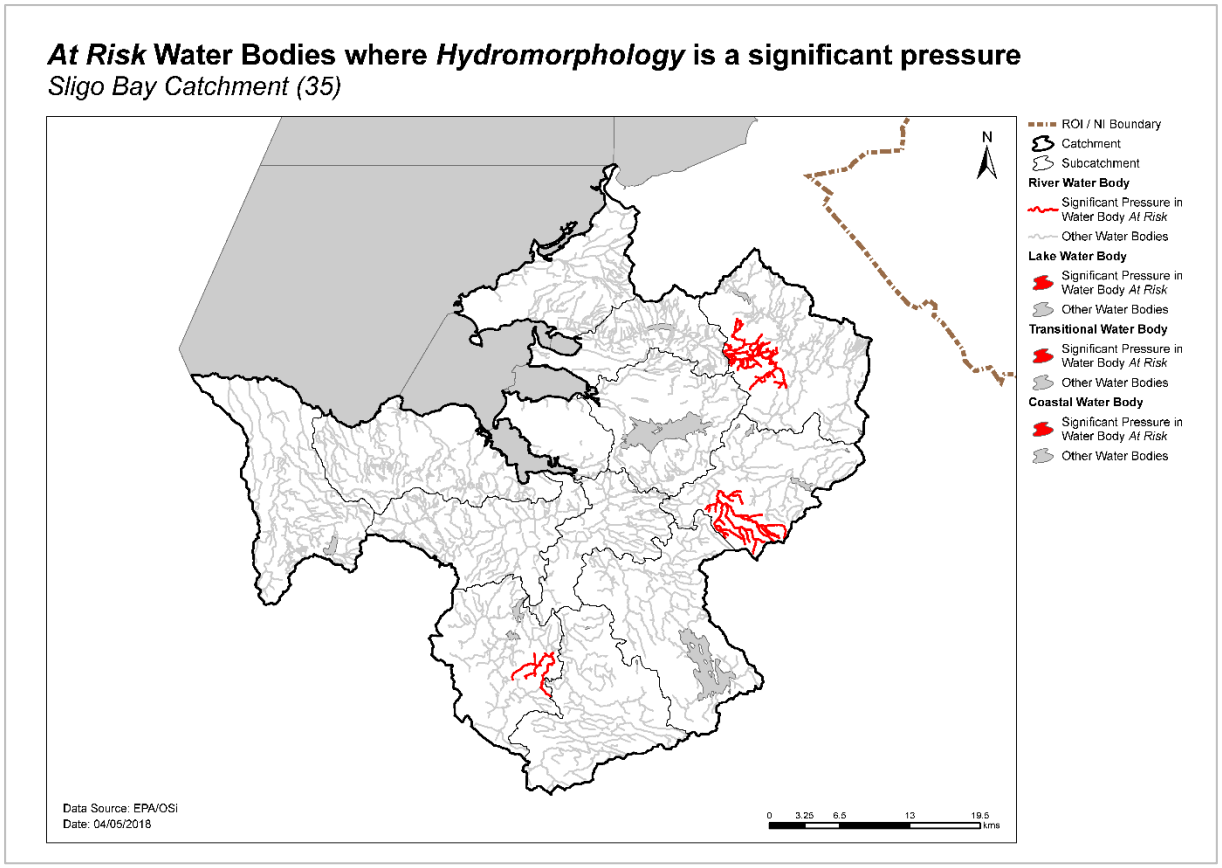

Figure 15. Water bodies that are *At Risk* and are impacted by Hydromorphological impacts.

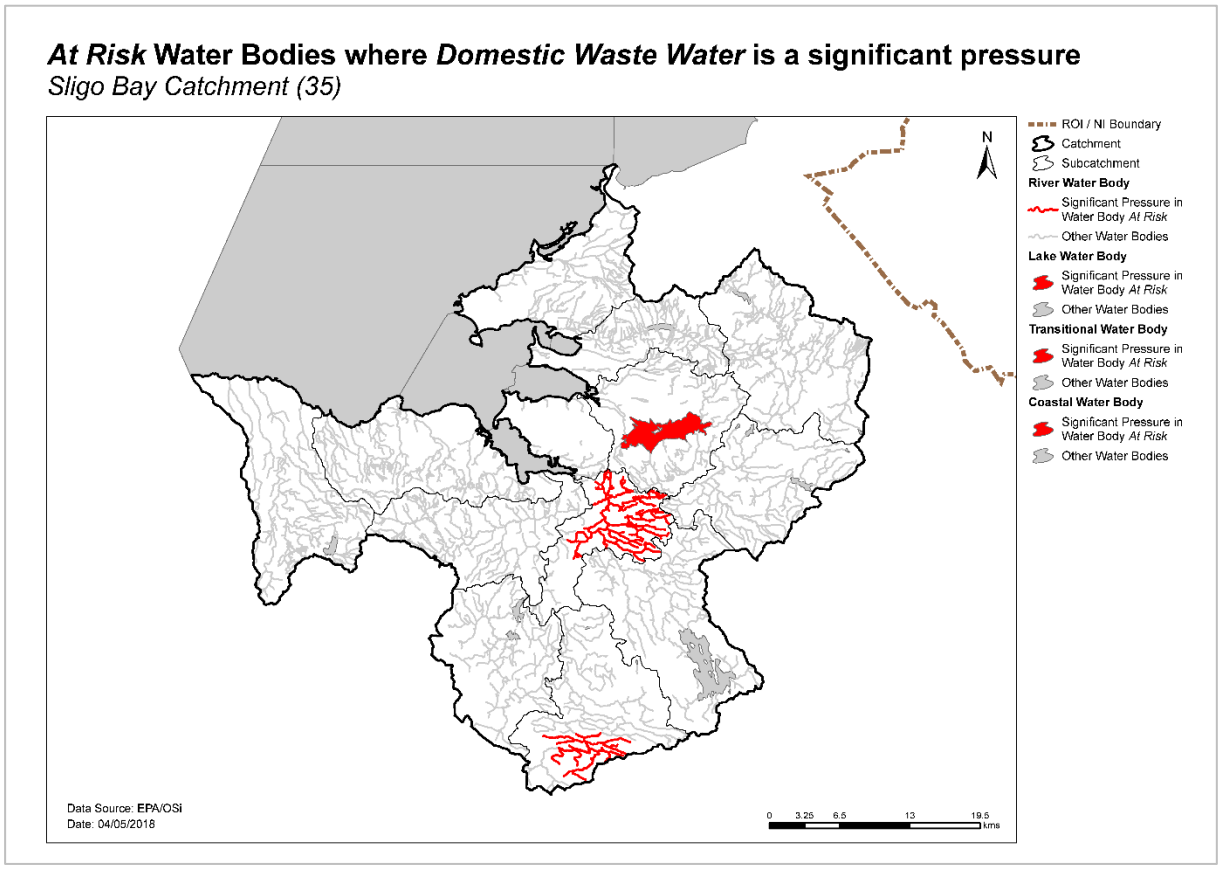

Figure 16. Water bodies that are *At Risk* and are impacted by Domestic waste water.

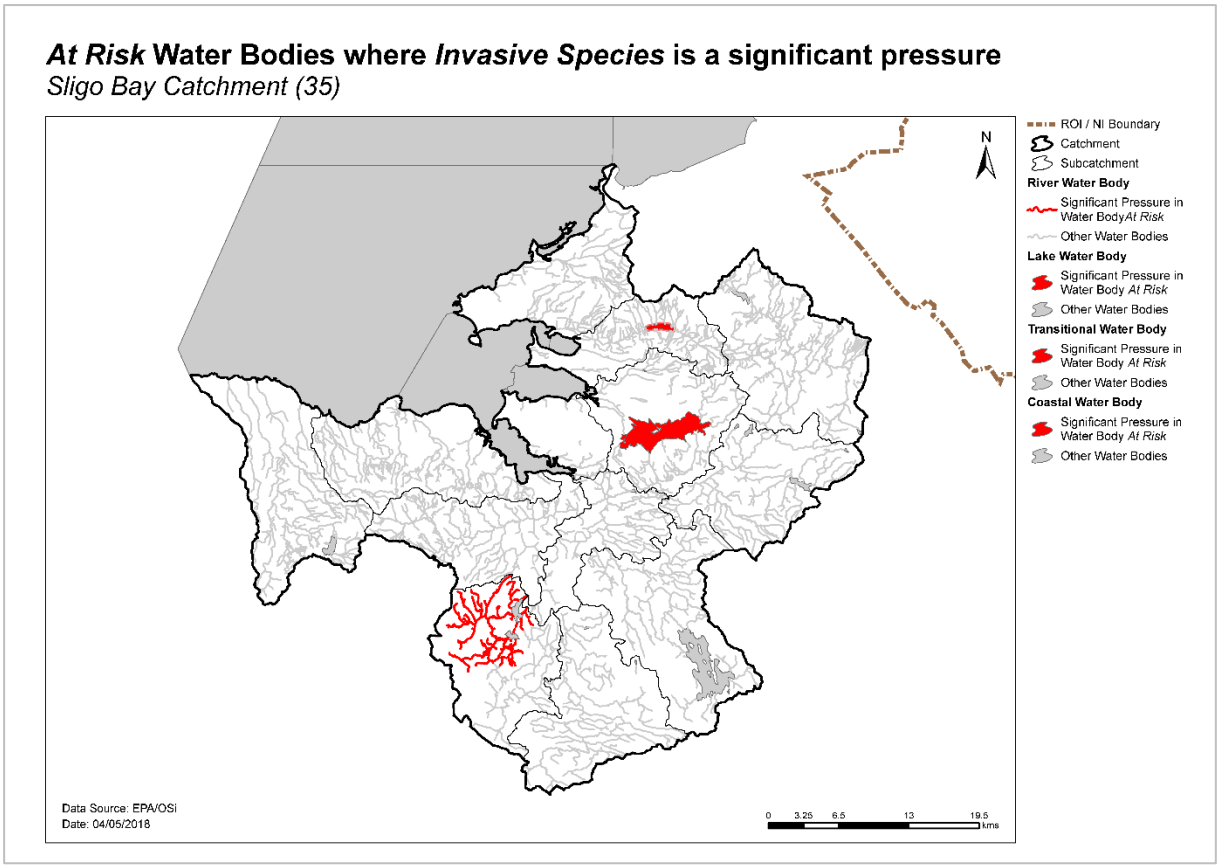

Figure 17. Water bodies that are *At Risk* and are impacted by Invasive Species pressures.

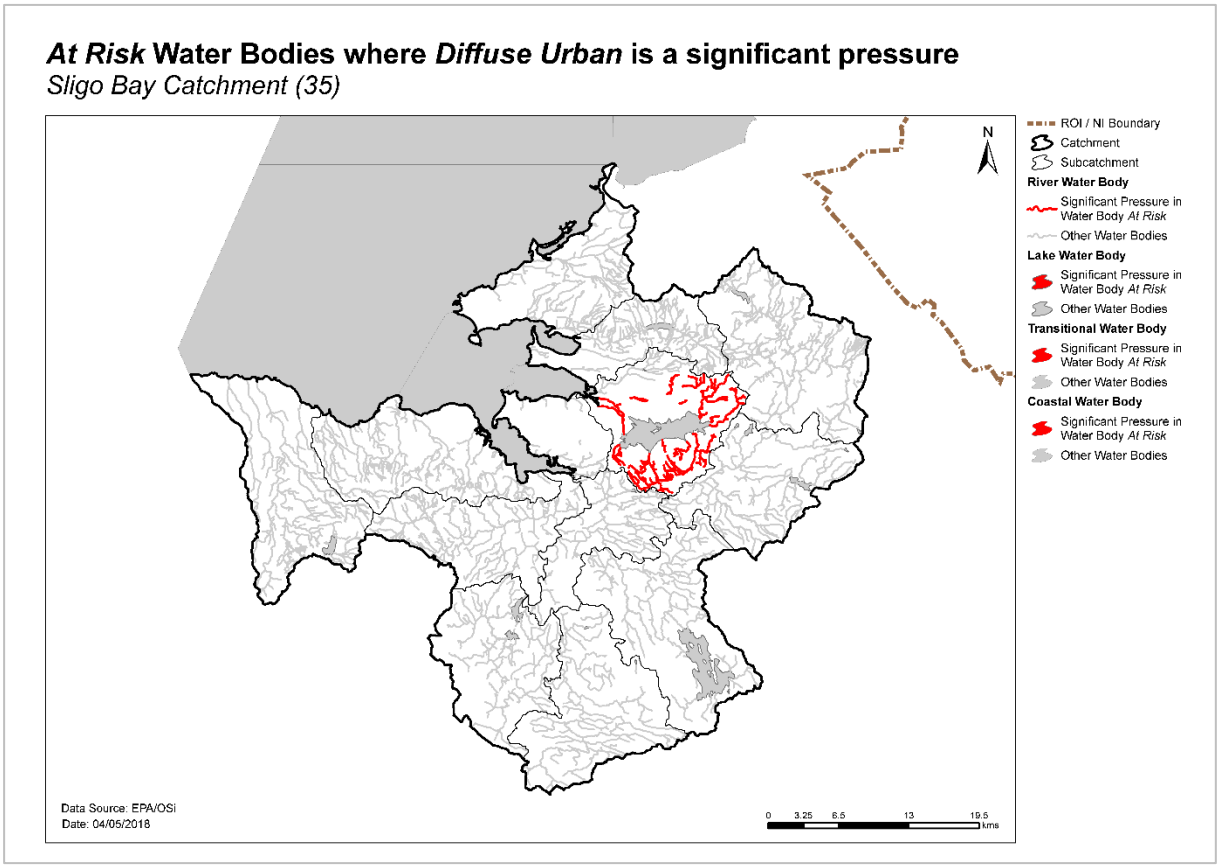

Figure 18. Water bodies that are *At Risk* and are impacted by Diffuse Urban pressures

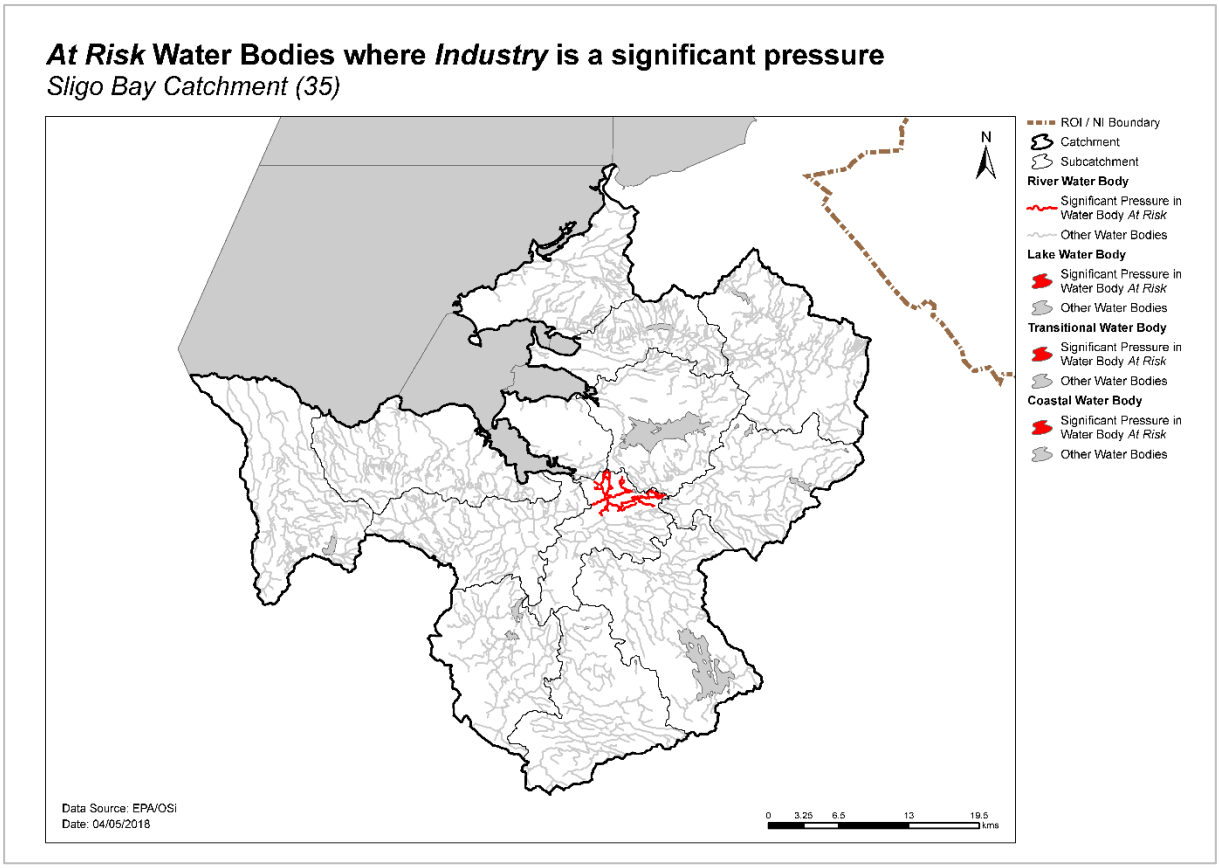

Figure 19. Water bodies that are *At Risk* and are impacted by Extractive Industries.

5 Load reduction assessment

5.1 River water body load reductions

- For water bodies where phosphorus monitoring data are available, the reduction in P load that would be required to bring the mean concentration back to the EQS of 0.035 mg/l as P, can be estimated using a simple method based on the average 2013 to 2015 concentration and the average flow, or the estimated 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.
- Of the 18 At Risk water bodies in the catchment, 11 had orthophosphate monitoring data. The mean P concentrations in each of these were satisfactory and therefore none required a reduction in P load.

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 in 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. Further assessment of the nutrient loads contributing to the Ballysadare estuary, and the load reductions needed for improvement, is required.

6 Further characterisation and local catchment assessments

- Further characterisation through local catchment assessments is needed in 26 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 (Table 9).
- Further characterisation through local catchment assessments is needed in 22 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.

Table 9. Local Catchment Assessment Allocation for *At Risk* and *Review* River and Lake Water Bodies in the Catchment.

Risk	IA 1	IA 2	IA 3	IA 4	IA 5	IA 6	IA 7	IA 8	IA 9	IA 10	Total
At Risk	7	0	0	0	0	0	10	7	4	1	30
Review	7	0	16	0	0	0	1	0	0	0	25
Note water bodies may have multiple categories of Local Catchment Assessments											

7 Catchment summary

- Of the 100 surface water bodies in the subcatchment, 27 are *At Risk*.

- The significant issues are excess nutrient loss, mainly phosphorus, leading to eutrophication and habitat degradation due to hydromorphology.

- The significant pressures relating to excess nutrients are primarily agricultural (diffuse and point), but also include forestry, waste water (urban and domestic). The significant issue relating to hydromorphology is forestry and includes release of fine sediment through clearfelling.

- Of the 25 groundwater bodies, one is *At Risk.* This groundwater body is an area of karstified limestone in the east of the catchment and is *At Risk* due to elevated phosphate concentrations in a monitored spring, with agriculture as the significant pressure in the overlying surface water bodies.

- In karstified limestone areas, the karst features represent a close interaction between surface water and groundwater. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa. The surface water bodies that may be impacted in these areas include one river (Garavogue_010) and one lake (Lough Gill).

- Ballysadare Estuary is *At Risk* due to its Moderate ecological status, driven by phytoplankton which indicates excess nutrients in the estuarine system. The nutrient sources contributing to Ballysadare Estuary include: riverine inputs from the freshwater environment, primarily Unshin_040 where a waste water treatment plant is the significant pressure; groundwater inputs via direct discharge from a karstified limestone aquifer to the estuary; and, groundwater inputs via surface water bodies in the east, where there is close interaction between surface and groundwater.

8 Areas for Action

The characterisation outcomes described above have highlighted that there is significant work to do in the catchment to protect and restore water quality, and meet the objectives of the WFD. During the development of the draft river basin management plan it became apparent that there would be a need to prioritise areas for collective action so that the best return on investment could be achieved. 190 Areas for action have been selected nationally in a process as described below. There are 5 areas for action in the Sligo Bay catchment.

8.1 Process of Selection

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

The recommended areas for action are an initial list of areas where action will be carried out in the second cycle. All water bodies that are *At Risk* still however, need to be addressed. As issues are

resolved, areas for action will be removed from the list and new areas will be added. If additional monitoring shows that new issues have arisen, new areas may become a priority and may need to be added to the work programme.

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

8.2 Outcomes of process

The outcomes for the Sligo Bay Blackwater catchment are summarised below.

- Five recommended areas for actions (Table 10, Figure 20) were selected.
- These are the Unshin, Owenmore/ Templehouse lake, Upper Bonet, Lough Gill, and Glencar lake.
- These include 13 *At Risk* and four *Review* river and lake water bodies.
- Six 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 11. Actions taken to improve surface water will need to take account of the groundwater contribution to surface water.

A remaining thirty-six *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 21. These include:

- thirty-one river and lake water bodies – 13 *At Risk* and 18 *Review*, and
- five transitional and coastal water bodies – one *At Risk* and four *Review.*

Table 10. Recommended Areas for Action in the Sligo Bay Blackwater Catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Unshin	4	35_2	Sligo	• Three deteriorated water bodies. • Two of the deteriorated water bodies have a High Ecological Status objective while the other has a Protected Area objective that is not being met. • The two deteriorated High Ecological Status objective water bodies recently dropped in status to Good in the 2013-2015 monitoring cycle. • Possibility of Quick win
Owenmore/ Templehouse lake	7	35_5	Sligo	• Three deteriorated water bodies. • One of the deteriorated water bodies has a High Ecological Status objective while another has a Protected Area objective that is not being met. • There is also another At Risk water body in this action area that is not meeting its Protected Area objective. • There is an Unassigned/Review water body that has a Protected Area objective that is included. • Starting at the headwaters. • Multiple pressures which can be investigated at the same time.
Upper Bonet	3	35_8	Leitrim	• Two deteriorated water bodies both of which have a High Ecological Status objective. • The deteriorated High Ecological Status objective water bodies recently dropped in status to Good in the 2013-2015 monitoring cycle. • Important salmon spawning grounds. • Build on improvements in the Manorhamilton WWTP. • Multiple pressures which can be investigated at the same time. • Possibility of quick win.
Lough Gill	2	35_10	Leitrim/ Sligo	• Two deteriorated water bodies. • Both deteriorated water bodies have a High Ecological Status objective as well as a Protected Area objective that is not being met. • Multiple pressures which can be investigated at the same time. • Previous Water Quality management plan which may inform and focus investigation. • River water body has only deteriorated at one of the two monitoring stations downstream of Lough Gill and so investigation area can be easily targeted. • Possible mix of short and long term challenges.
Glencar lake	1	35_13	Leitrim/ Sligo	• Deteriorated lake water body. • All other water bodies in the subcatchment are at least Good status. • Amenity value and visitor attraction.

Table 11. 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_WE_G_0044	Drumcliff-Strandhill	Review	IE_WE_35_139	Glencar	Glencar lake
IE_WE_G_0042	Carrowmore East	At risk	IE_WE_35G010200	Garavogue_010	
IE_WE_G_0042	Carrowmore East	At risk	IE_WE_35_158	Gill SO	Lough Gill
IE_WE_G_0104	GWDTE-Turloughmore Sligo (SAC000637)	Review	IE_WE_35O060500	Owenmore (Sligo)_060	Owenmore/ Templehouse lake
IE_WE_G_0048	Collooney	Review	IE_WE_35O060900	Owenmore (Sligo)_080	
IE_WE_G_0048	Collooney	Review	IE_WE_35U010600	Unshin_050	
IE_WE_G_0048	Collooney	Review	IE_WE_35_107	Dargan	Unshin
IE_WE_G_0042	Carrowmore East	At risk	IE_WE_35S011100	Shanvaus_010	
IE_WE_G_0059	Glenade	Review	IE_WE_35B060100	Bonet_020	
IE_WE_G_0060	Glencar	Review	IE_WE_35B060100	Bonet_020	
IE_WE_G_0060	Glencar	Review	IE_WE_35S011100	Shanvaus_010	
IE_WE_G_0060	Glencar	Review	IE_WE_35_156	Glenade	Upper Bonet

9 Environmental Objectives

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

9.1 Surface Water

- Assuming resources are available and actions are taken in the recommended areas for action, of the thirteen *At Risk* surface water bodies, it is predicted that five (38%) will improve by 2021 and eight (62%) will achieve their objective by 2027.
- For the four *Review* surface water bodies, the absence of information on these water bodies means that there is no scientific basis to quantify an environmental objective date, and therefore a 2027 date is set for this water body, see Table 12.

Table 12. Environmental objective dates for water bodies in the Areas for Action

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
At Risk	10	4	6
Review	1	0	1
Lakes			
At Risk	3	1	2
Review	3	0	3
Total	17	5	12

- Forty-seven surface water bodies have met their 2015 environmental objective for ecological status. Two of the 47 *Not at Risk* surface 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 14 *At Risk* surface water bodies, a 2027 date is applied to all 14 of the water bodies.
- For the 22 *Review* surface water bodies, the absence of information on these water bodies means that there is no scientific basis to quantify an environmental objective date and therefore a 2027 date is applied, see Table 13.

Table 13. Environmental objectives dates in the *At Risk* and *Review* surface water bodies not included in Areas for Action

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
At Risk	11	0	11
Review	13	0	13
Lakes			
At Risk	2	0	2
Review	5	0	5
TraCs			
At Risk	1	0	1
Review	4	0	4
Total	36	0	36

9.2 Groundwater

- All 25 groundwater bodies in the catchment are Good status and, therefore, have met their environmental objectives

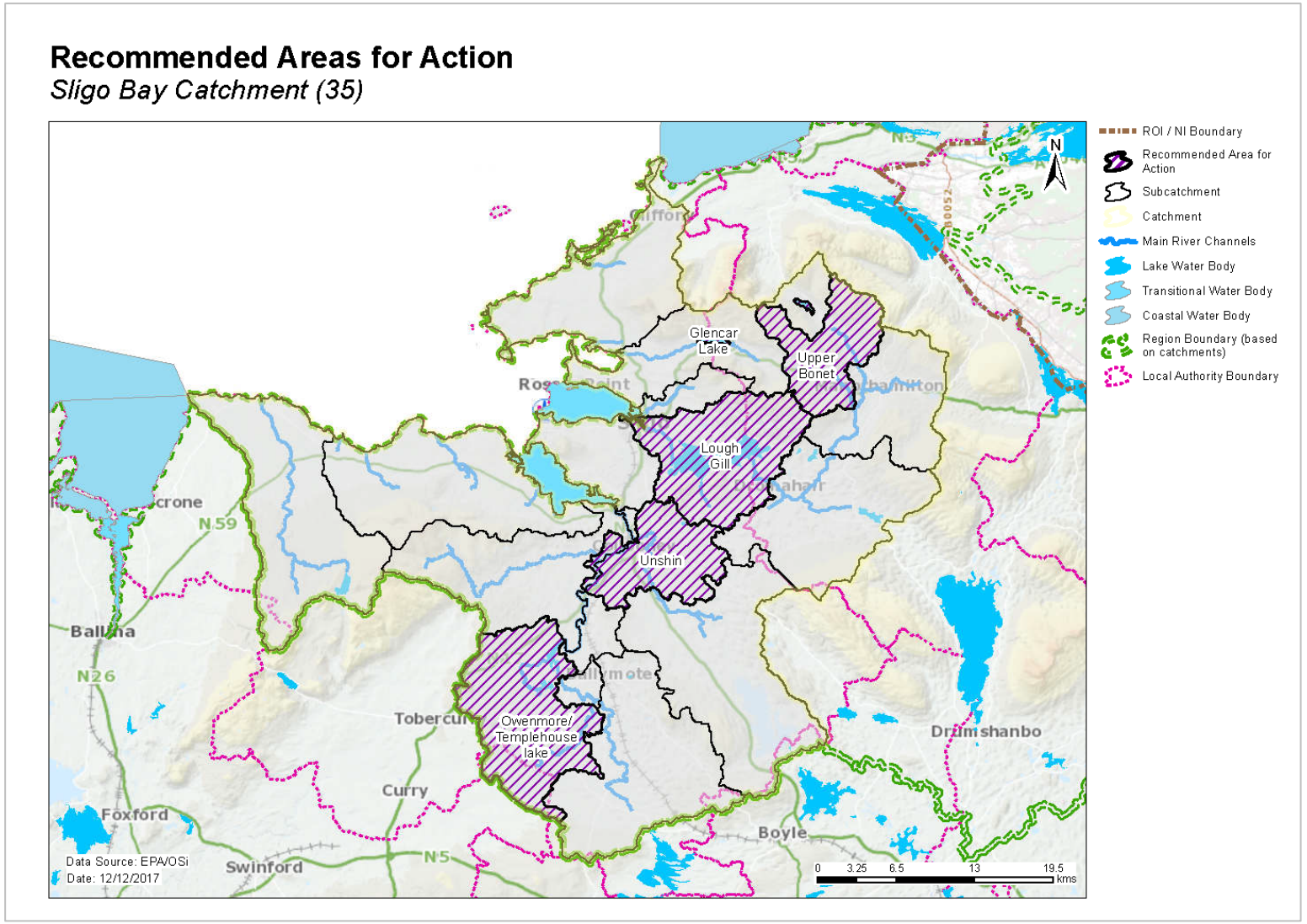

Figure 20. Location of Recommended Areas for Action in the Sligo Bay Catchment

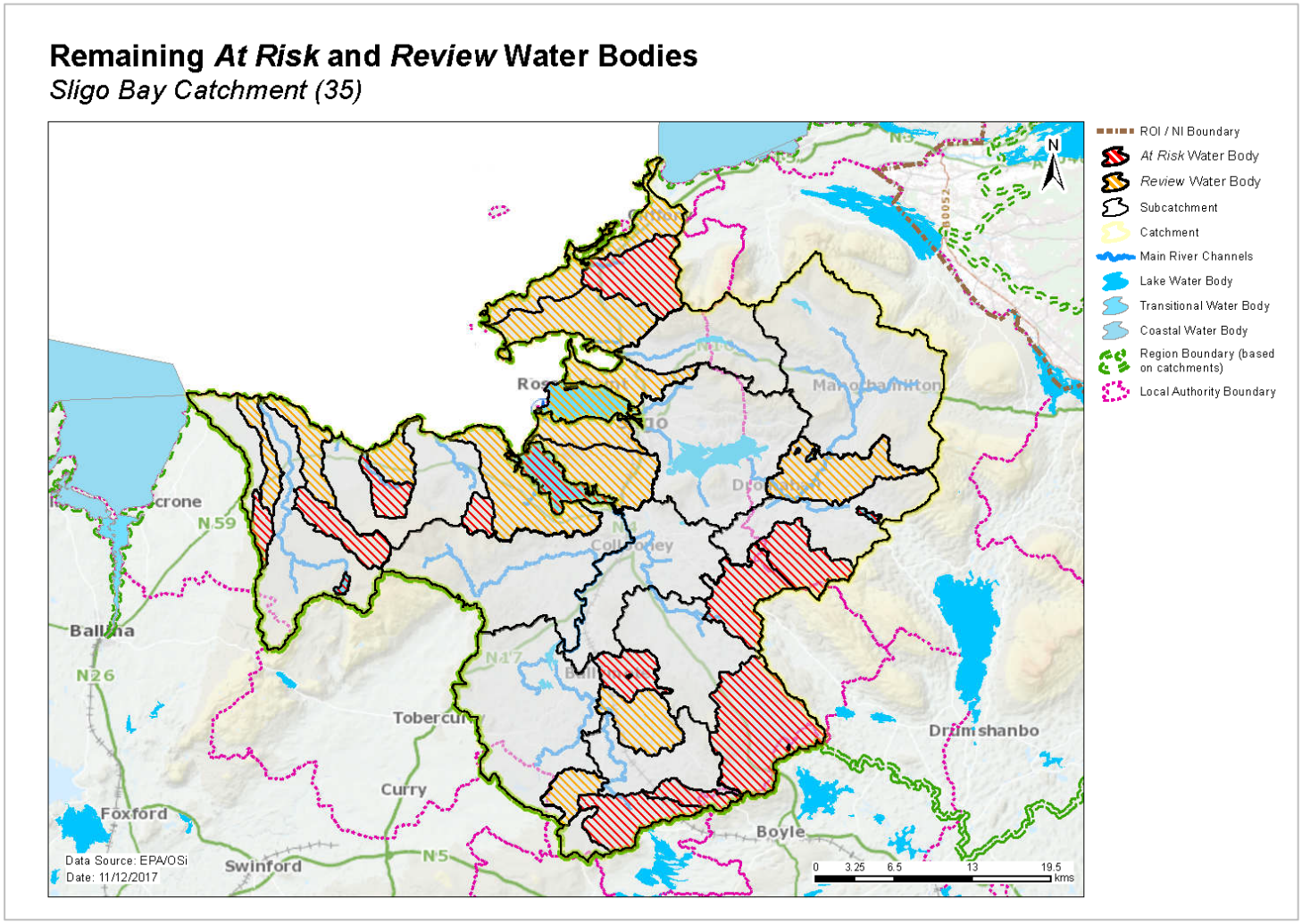

Figure 21. Location of *At Risk* and *Review* water bodies located outside Recommended Areas for Action in the Sligo Bay Catchment

10 Acknowledgements

This Sligo Bay and Drowse Catchment Assessment (Version 2) has been produced by the Catchment Science & Management Unit, EPA, with the assistance of the following:

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- Hydrometric & Groundwater Section, EPA.
- Informatics Section, EPA.
- Laboratories, EPA.
- Office of Environmental Enforcement, EPA.
- DAFM Agriculture.
- DAFM Forest Service.
- Coillte.
- Teagasc.
- Health Service Executive.
- National Parks and Wildlife Service.
- Loughs Agency.
- National Federation of Group Water Schemes.
- Office of Public Works.

Appendix 1 High ecological status objective water bodies

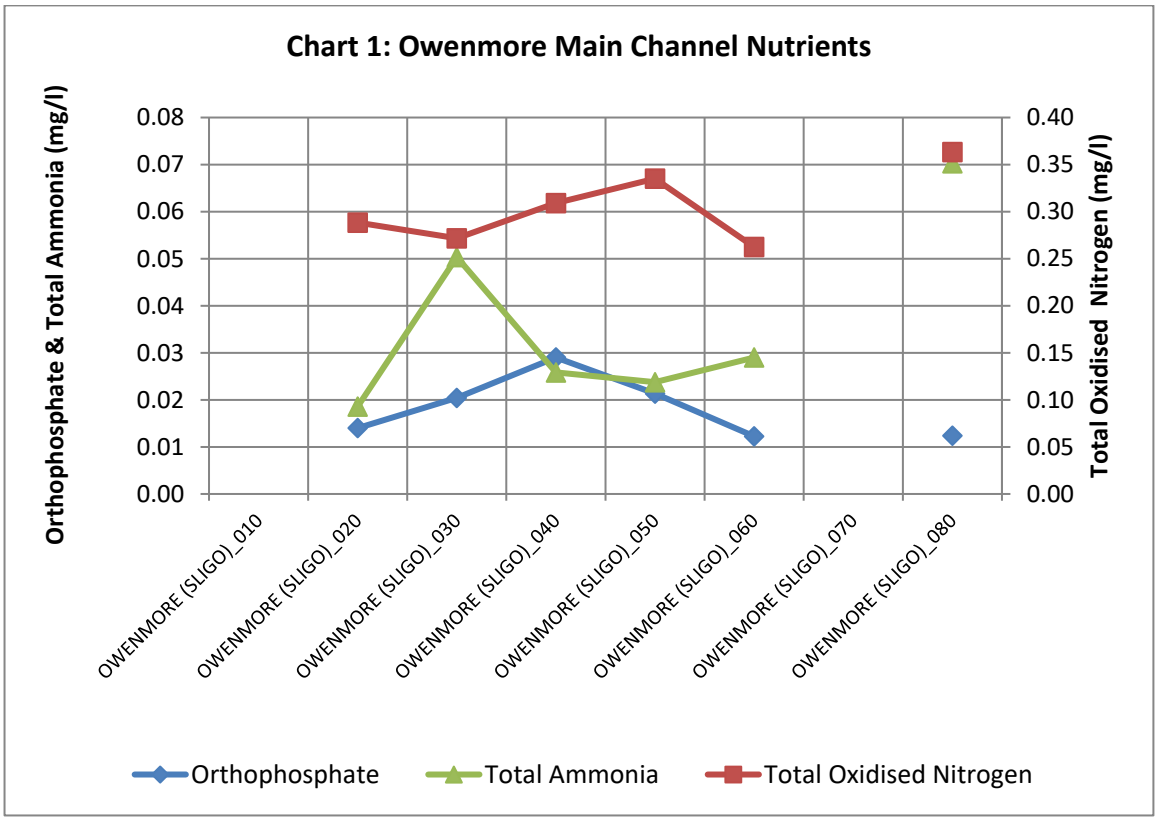
Water body/ Site	Type	Codes	2015 Status
EASKY_030	River	IE_WE_35E010100	High
EASKY_040	River	IE_WE_35E010200	High
FINNED_010	River	IE_WE_35F010100	Good
UNSHIN_040	River	IE_WE_35U010500	Good
UNSHIN_050	River	IE_WE_35U010600	Good
CLOONEEN (SLIGO)_030	River	IE_WE_35C010600	Good
KILLANUMMERY_020	River	IE_WE_35K030900	High
LISKEAGH_010	River	IE_WE_35L021100	Good
BONET_020	River	IE_WE_35B060100	Good
SHANVAUS_010	River	IE_WE_35S011100	Good
DUNMORAN_010	River	IE_WE_35D161000	Moderate
Easky	Lake	IE_WE_35_136	Good
Sligo Bay	Coastal	IE_WE_450_0000	High

Appendix 2 Catchment Scale Nutrient concentrations and in-stream loads

The results of the in-stream water quality assessment for the Sligo Bay & Drowse main channel are illustrated in Chart 1. Sampling points extend downstream from the headwater (Owenmore (Sligo)_010), with each concentration representing the 2013 to 2015 average.

Average orthophosphate concentrations throughout the main channel were moderately low ranging from 0.012 to 0.029mg/l. The Environmental Quality Standard (EQS) of 0.035mg/l was not exceeded at any monitoring point along the main channel.

Total oxidised nitrogen (TON) concentrations were uniformly low (range: 0.26 to 0.36mg/l) throughout the channel. Minor peaks in concentration fell within the margin of error of analysis (0.10mg/l). Spikes in ammonia were apparent at Owenmore (Sligo)_030 (0.05mg/l) and Owenmore (Sligo)_080 (0.07mg/l), with Owenmore (Sligo)_080 exceeding the EQS for good status (0.065mg/l). The spikes in stream concentration at Owenmore (Sligo)_080 contained 6 relative outliers in the temporal dataset. Total ammonia concentrations were below the EQS for 75% of the sampling period, with elevated concentrations occurring in autumn of 2014 and 2015.



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
35_1	IE_WE_35K420630	Knappagh 35_010	River	Review	Unassigned	Unassigned	N		2027	
35_1	IE_WE_35K430740	Knocknahur_010	River	Review	Unassigned	Unassigned	N		2027	
35_1	IE_WE_460_0300	Ballysadare Estuary	Transitional	At Risk	Moderate	Moderate	N	Ag,UWW	2027	
35_1	IE_WE_470_0100	Garavoge Estuary	Transitional	Review	Good	Good	N		2027	
35_2	IE_WE_35_107	Dargan	Lake	Review	Unassigned	Unassigned	N		2027	Unshin
35_2	IE_WE_35O060900	Owenmore (Sligo)_080	River	At Risk	Good	Moderate	N	UWW	2027	Unshin
35_2	IE_WE_35U010500	Unshin_040	River	At Risk	High	Good	Y	Ag,DWW,For	2021	Unshin
35_2	IE_WE_35U010600	Unshin_050	River	At Risk	High	Good	Y	DWW,For,Ind	2021	Unshin
35_3	IE_WE_35B520940	Breaghwy 35_010	River	Review	Unassigned	Unassigned	N		2027	
35_3	IE_WE_35C940920	Cartonkillerdoo_010	River	Review	Unassigned	Unassigned	N		2027	
35_3	IE_WE_35D120800	Doonowney_010	River	Review	Unassigned	Unassigned	N		2027	
35_3	IE_WE_35G040200	Grange (Sligo)_010	River	At Risk	Good	Moderate	N	UWW	2027	
35_5	IE_WE_35_154	Cloonacleigha	Lake	Review	Unassigned	Unassigned	N		2027	Owenmore/ Templehouse lake
35_5	IE_WE_35C010200	Clooneen (Sligo)_010	River	Review	Unassigned	Unassigned	N		2027	Owenmore/ Templehouse lake
35_5	IE_WE_35_157	Templehouse	Lake	At Risk	Poor	Bad	N	Ag,For	2027	Owenmore/ Templehouse lake
35_5	IE_WE_35B080200	Bunnanaddan Stream_010	River	At Risk	Poor	Poor	N	Ag,UWW	2027	Owenmore/ Templehouse lake
35_5	IE_WE_35C010500	Clooneen (Sligo)_020	River	At Risk	Good	Poor	N	Ag,Peat	2027	Owenmore/ Templehouse lake
35_5	IE_WE_35C010600	Clooneen (Sligo)_030	River	At Risk	High	Good	Y	Hymo	2027	Owenmore/ Templehouse lake
35_5	IE_WE_35O060500	Owenmore (Sligo)_060	River	At Risk	Moderate	Moderate	N	Ag,For,Other	2027	Owenmore/ Templehouse lake
35_6	IE_WE_35_131	Anarry	Lake	Review	Moderate	Unassigned	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
35_6	IE_WE_35_142	Carrigeencor	Lake	Review	Unassigned	Unassigned	N		2027	
35_6	IE_WE_35_188	Nacroagh	Lake	Review	Unassigned	Unassigned	N		2027	
35_6	IE_WE_35_155	Belhavel	Lake	At Risk	Poor	Moderate	N	Ag	2027	
35_6	IE_WE_35B060630	Bonet_050	River	Review	Good	Moderate	N		2027	
35_6	IE_WE_35K030600	Killanummery_010	River	At Risk	Good	Moderate	N	For,Hymo	2027	
35_7	IE_WE_35_132	Bellanascarrow	Lake	Review	Unassigned	Unassigned	N		2027	
35_7	IE_WE_35K580820	Kilshalvy_010	River	Review	Unassigned	Unassigned	N		2027	
35_7	IE_WE_35B040100	Ballymote Stream_010	River	At Risk	Good	Moderate	N	Ag	2027	
35_7	IE_WE_35L021100	Liskeagh_010	River	At Risk	High	Good	Y	For	2027	
35_7	IE_WE_35O060050	Owenmore (Sligo)_020	River	At Risk	Moderate	Moderate	N	Ag,DWW,For	2027	
35_7	IE_WE_35O060250	Owenmore (Sligo)_040	River	Review	Poor	Good	N		2027	
35_8	IE_WE_35_156	Glenade	Lake	Review	Bad	Poor	N		2027	Upper Bonet
35_8	IE_WE_35B060100	Bonet_020	River	At Risk	High	Good	Y	Ag	2021	Upper Bonet
35_8	IE_WE_35S011100	Shanvaus_010	River	At Risk	High	Good	Y	Hymo	2021	Upper Bonet
35_9	IE_WE_35_120	Arkedy	Lake	Review	Unassigned	Unassigned	N		2027	
35_9	IE_WE_35D021400	Douglas (Sligo)_010	River	At Risk	Moderate	Moderate	N	Ag,For	2027	
35_9	IE_WE_35U010100	Unshin_010	River	At Risk	Moderate	Moderate	N	Ag	2027	
35_10	IE_WE_35_158	Gill SO	Lake	At Risk	Moderate	Poor	N	Ag,DWW,For,M+Q,Other,UWW	2027	Lough Gill
35_10	IE_WE_35G010200	Garavogue_010	River	At Risk	Good	Poor	N	DU,For,UWW	2027	Lough Gill
35_11	IE_WE_35B300790	Barnabrack_010	River	Review	Unassigned	Unassigned	N		2027	
35_11	IE_WE_35K350910	Kilrusheighter_010	River	Review	Unassigned	Unassigned	N		2027	
35_11	IE_WE_35D161000	Dunmoran_010	River	At Risk	High	Moderate	Y	Ag	2027	
35_11	IE_WE_35L010400	Lugdoon Stream_010	River	At Risk	Moderate	Moderate	N	Ag	2027	
35_11	IE_WE_460_0100	Portavaud West, Ballysadare Bay	Transitional	Review	Unassigned	Unassigned	N		2027	
35_11	IE_WE_460_0200	Portavaud East, Ballysadare Bay	Coastal	Review	Unassigned	Unassigned	N		2027	
35_11	IE_WE_460_0400	Tanrego Intake	Transitional	Review	Unassigned	Unassigned	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
35_12	IE_WE_35B030500	Ballybeg (Sligo)_010	River	Review	Unassigned	Unassigned	N		2027	
35_12	IE_WE_35C660850	Carrownrush_010	River	Review	Unassigned	Unassigned	N		2027	
35_12	IE_WE_35_136	Easky	Lake	At Risk	High	Good	Y	Other	2027	
35_12	IE_WE_35B090500	Buncrowey_010	River	At Risk	Moderate	Moderate	N	For	2027	
35_12	IE_WE_35F010100	Finned_010	River	At Risk	High	Good	Y	Ag,For,Peat	2027	
35_13	IE_WE_35C980970	Cregg 35_010	River	Review	Unassigned	Unassigned	N		2027	
35_13	IE_WE_35_139	Glencar	Lake	At Risk	Good	Moderate	N	Ag,Other	2021	Glencar lake

Ag: Agriculture

DWW: Domestic Waste Water

For: Forestry

Hymo: Hydromorphology

Ind: Industry

M+Q: Mines and Quarries

Peat: Peat Drainage and Extraction

DU: Diffuse Urban

UWW: Urban Waste Water

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
1700PUB0012	North Leitrim Regional Water Supply Scheme	Lough Gill (LWB)	IE_WE_35_158
1700PUB4000	KTWSS - WSZ 1 Kinlough & Tullaghan	Glencar (GWB)	IE_WE_G_0060
2700PRI1022	Beltra GWS	Beltra Sligo (GWB)	IE_WE_G_0043
2700PRI1023	Benbulben GWS	Drumcliff-Strandhill (GWB)	IE_WE_G_0044
2700PRI1024	Calry No.1 (Keelogyboy) GWS	Carrowmore East (GWB)	IE_WE_G_0042
2700PRI1025	Castlebaldwin GWS	Lough Arrow (LWB)	IE_WE_35_159
2700PRI1026	Castletown GWS 1	Drumcliff-Strandhill (GWB)	IE_WE_G_0044
	Castletown GWS 2	Doonowney_010 (RWB)	IE_WE_35D120800
2700PRI1028	Corrick GWS (Ballinafad)	Ballymote (GWB)	IE_WE_G_0037
	Corrick GWS (Ballinafad)	Unshin_010 (RWB)	IE_WE_35U010100
2700PRI1029	Culfadda GWS	Ballymote (GWB)	IE_WE_G_0037
2700PRI1032	Drum East GWS	Drumcliff-Strandhill (GWB)	IE_WE_G_0044
2700PRI1033	Geevagh/Highwood GWS	Lough Arrow (LWB)	IE_WE_35_159
2700PRI1034	Keash/Ballymote GWS	Lough Labe (LWB)	IE_WE_35_237
2700PRI0050	Lecarrow GWS	Gorteen (GWB)	IE_WE_G_0028
2700PUB2701	Foxes Den Public Water Supply	Garavogue_010 (RWB)	IE_WE_35G010200
2700PUB2704	Lough Easkey Regional Water Supply	Easkey_010 (RWB)	IE_WE_35E010010
2700PUB2705	North Sligo Regional Water Supply	Grange (Sligo)_010 (RWB)	IE_WE_35G040200
	North Sligo Regional Water Supply	Grange (Sligo)_010 (RWB)	IE_WE_35G040200
	North Sligo Regional Water Supply	Drumcliff-Strandhill (GWB)	IE_WE_G_0044
2700PUB2706	Kilsellagh Public Water Supply	Garavogue_010 (RWB)	IE_WE_35G010200
2700PUB2708	Riverstown Public Water Supply	Ballymote (GWB)	IE_WE_G_0037
2700PUB2711	Lough Gill (Carns Hill) PWS	Garavogue_010 (RWB)	IE_WE_35G010200

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

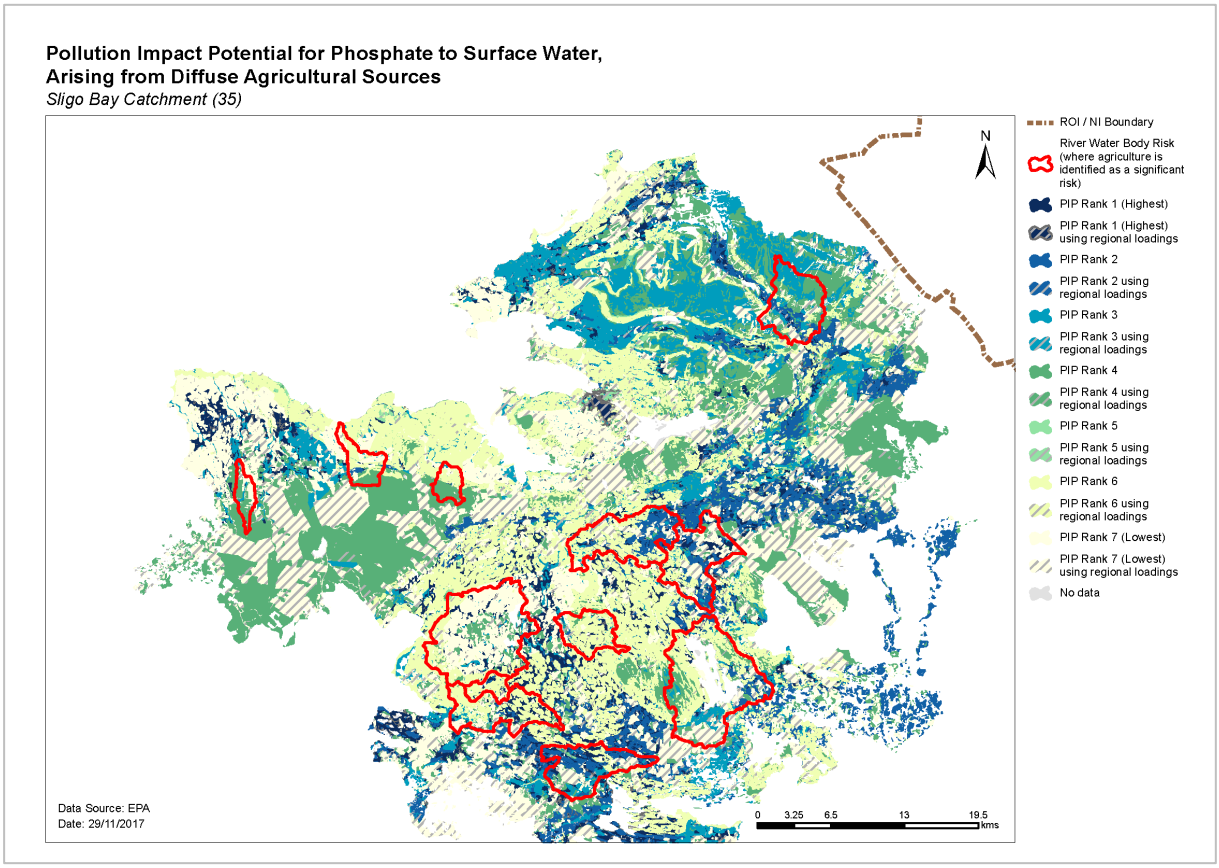
SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Boleybrack Mountain SAC 002032	Potential 3160	High/Good?	Lake	Lackagh	Unassigned (NAR)	No	IE_WE_35_96	Yes
			Lake	Kip	Unassigned (NAR)	No	IE_WE_35_98	Yes
Ballysadare Bay SAC 000622	2190	Good GW level	Groundwater	Drumcliff-Strandhill	Good (R)	No	IE_WE_G_0044	Yes
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC 000627	7220	Good GW level	Groundwater	Rosses Point	Good (NAR)	No	IE_WE_G_0053	Yes
Lough Gill SAC 001976	3150	Good	Lake	Gill SO	Poor (AT RISK)	Yes	IE_WE_35_158	No
	1106	Good	Lake	Gill SO	Poor (AT RISK)	Yes	IE_WE_35_158	No
			River	Bonnet_010	Good (NAR)	No	IE_WE_35B060050	No
			River	Bonnet_020	Good (AT RISK - HES obj)	No	IE_WE_35B060100	No
			River	Bonnet_030	Good (NAR)	No	IE_WE_35B060200	No
			River	Bonnet_040	Good (NAR)	No	IE_WE_35B060400	No
			River	Bonnet_050	Moderate (R)	Yes	IE_WE_35B0604630	No
	1092	At least Moderate	River	Bonnet_010	Good (NAR)	No	IE_WE_35B060050	No
			River	Bonnet_020	Good (AT RISK - HES obj)	No	IE_WE_35B060100	No
			River	Bonnet_030	Good (NAR)	No	IE_WE_35B060200	No
			River	Bonnet_040	Good (NAR)	No	IE_WE_35B060400	No
			River	Bonnet_050	Moderate (R)	No	IE_WE_35B0604630	No
			River	Shanvaus_010	Good (AT RISK - HES obj)	No	IE_WE_35S011100	No
			River	Killanummery_020	High (NAR - HES obj)	No	IE_WE_35K030900	No
			River	Garavogue_010	Poor (AT RISK)	Yes	IE_WE_35G010200	No
			River	Owenmore (Manorhamilton_010)	Good (AT RISK)	No	IE_WE_35O080220	No
			River	Owenmore (Manorhamilton_020)	Good (NAR)	No	IE_WE_35O080400	No

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Ox Mountains Bogs SAC 002006	3110	At least Good	Lake	Easkey	Good (AT RISK - HES obj)	No	IE_WE_35_136	Yes
Knockalongy And Knockachree Cliffs SAC 001669	None							
Streedagh Point Dunes SAC 001680	None							
Ben Bulben, Gleniff And Glenade Complex SAC 000623	7220	Good GW level	Groundwater	Glencar GWB	Good (R)	No	IE_WE_G_0060	No
			Groundwater	Largydonnell	Good (NAR)	No	IE_NW_G_045	No
			Groundwater	Drumcliff-Strandhill	Good (R)	No	IE_WE_G_0044	No
	7320	Good GW level	Groundwater	Glencar GWB	Good (R)	No	IE_WE_G_0060	No
			Groundwater	Largydonnell	Good (NAR)	No	IE_NW_G_045	No
			Groundwater	Drumcliff-Strandhill	Good (R)	No	IE_WE_G_0044	No
Bunduff Lough And Machair/Trawalua/Mullaghmore SAC 000625	21A0	Good GW level	Groundwater	Grange East GWB	Good (NAR)	No	IE_WE_G_0062	Yes
			Groundwater	Tullaghan-Lough Melvin	Good (NAR)	No	IE_NW_G_014	Yes
	7230	Good GW level	Groundwater	Grange East GWB	Good (NAR)	No	IE_WE_G_0062	Yes
			Groundwater	Tullaghan-Lough Melvin	Good (NAR)	No	IE_NW_G_014	Yes
Union Wood SAC 000638	None							
Unshin River SAC 001898	1106	Good	River	Unshin_010	Moderate (AT RISK)	Yes	IE_WE_35U010100	No
			River	Unshin_020	Good (NAR)	No	IE_WE_35U010200	No
			River	Unshin_030	Good (NAR)	No	IE_WE_35U010400	No
			River	Unshin_040	Good (AT RISK - HES obj)	No	IE_WE_35U010500	No
			River	Owenbeg (Coolaney)_010	Good (NAR)	No	IE_WE_35O010030	No
			River	Owenbeg (Coolaney)_020	Good (NAR)	No	IE_WE_35O010070	No

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Unshin River SAC 001898	1106	Good	River	Owenbeg (Coolaney)_030	Good (NAR)	No	IE_WE_35O010400	No
			River	Owenmore (Sligo)_080	Moderate (AT RISK)	Yes	IE_WE_35O060900	No
			River	Ballysodare_010	Good (NAR)	No	IE_WE_35B050100	No
			Lake	Arrow	Good (NAR)	No	IE_WE_35_159	No
Templehouse And Cloonacleigha Loughs SAC 000636	3140	At least Good	Lake	Templehouse Lough	Bad (AT RISK)	Yes	IE_WE_35_157	No
			Lake	Cloonacleigha Lough	Unassigned (R)	No	IE_WE_35_154	No
Flughany Bog SAC 000497	None							
Cloonakillina Lough SAC 001899	None							
Doocastle Turlough SAC 000492	3180	Good GW level/quality	Groundwater	Ballymote GWB	Good (NAR)	No	IE_WE_G_0037	No
Bricklieve Mountains & Keishcorran SAC 001656	3180	Good GW level/quality	Groundwater	Ballymote GWB	Good (NAR)	No	IE_WE_G_0037	No
	1092	At least Moderate	Lake	Labe	Unassigned (NAR)	No	IE_WE_35_237	No
Lough Arrow SAC 001673	3140	At least Good	Lake	Arrow	Good (NAR)	No	IE_WE_35_159	No
Glenade Lough SAC 001919	3150	At least Good	Lake	Glenade	Poor (R)	Yes	IE_WE_35_156	No
	1833	At least Good	Lake	Glenade	Poor (R)	Yes	IE_WE_35_156	No
	1092	At least Moderate	Lake	Glenade	Poor (R)	Yes	IE_WE_35_156	No
Arroo Mountain SAC 001403	7220	Good GW level	Groundwater	Glenaniff	Good (R)	No	IE_NW_G_043	Yes
			Groundwater	Glenade GWB	Good (NAR)	No	IE_WE_G_0059	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