Donegal Bay North Catchment Assessment 2010-2015 (HA 37)

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 Donegal Bay North 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 all streams entering tidal water between Kildoney Point and Rossan Point, Co. Donegal, draining a total area of 804 km². The largest urban centre in the catchment is Donegal Town. The other main urban centre in this catchment is Killybegs. The total population of the catchment is approximately 18,600 with a population density of 23 people per km².

The Glen (Carrick) River rises on the southern side of Slievelooey and flows south, being joined by the Owenteskiny River near Meenaneary, before flowing through Carrick and making its way to sea at Donegal Bay via Teelin Bay. The Ballaghdoo and Glenaddragh Rivers drain the uplands of Mulnanaff and Crownarad before flowing through Kilcar and into Donegal Bay. The Stragar River drains the part of the catchment to the north of Killybegs, flowing south and into Donegal Bay via Killybegs Harbour. The Oily River flows south from the western edge of the Bluestack Mountains, and to the sea at McSwyne's Bay.

The tributaries of the Eany (water), the Eany More and Eany Beg, drains the southern slopes of the western half of the Bluestack Mountains. The river past Inver, where it flows out into Donegal Bay via Inver Bay.

The Eske River drains the central and eastern southern side of the Bluestack Mountains. The Corabber River rises on Binmore, flowing into Belshade Lough and then south into Lough Eske. The Lowerymore River flows from Croaghnageer, turning southeast and then southwest, flowing through the Barnesmore Gap and into the southern end of Lough Eske. The Eske River leaves the southern end of Lough Eske, flowing southwest between drumlins and then through Donegal Town where it becomes tidal and flows into a wide estuary, eventually making its way to Donegal Bay between Murvagh Beach and Hassan's Island. The southern part of the catchment is drained by the Ballintra River which flows west from Farbreagagh Hill, through The Pullans and past Ballintra, before making its way into the Eske Estuary behind Murvagh.

The Donegal Bay North catchment comprises five sub-catchments with 50 river water bodies, 12 lakes, four transitional, six coastal water bodies and eight groundwater bodies. There is one heavily modified water body (HMWB) in the catchment - Killybegs Harbour due to port facilities.

Table 1. List of subcatchments in the Donegal Bay North catchment

Subcatchment ID	Subcatchment Name
37_1	Ballintra_SC_010
37_2	Eske_SC_010
37_3	Stragar_SC_010
37_4	Glen[Carrick]_SC_010
37_5	Eany[Water]_SC_010

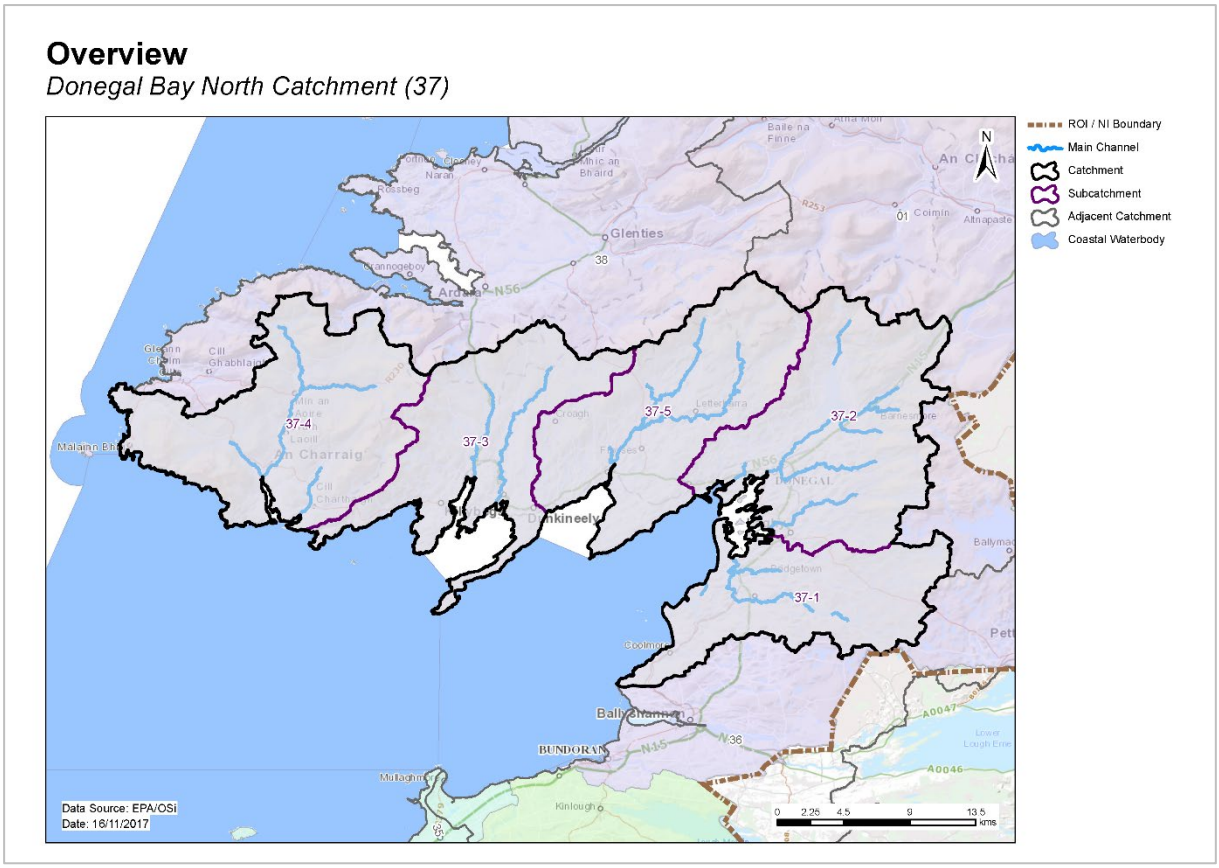

Figure 1. Subcatchments in the Donegal Bay North catchment

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 20 (32%) river and lake water bodies at Good or High status, and 19 (31%) at less than Good status in 2015 (Table 2). Twenty-three (37%) river and lakes are unmonitored.
- There are nine river water bodies with a High Ecological Status objective. In 2015, three of these water bodies were at High status and six were at Good (Appendix 1, Figure 3).
- The numbers of water bodies at each status class in 2007-2009 and 2010-2015 are shown in Figure 4 (rivers) and Figure 5 (lakes).
- Since 2007-09 when WFD monitoring began. Five river water bodies have improved and 16 have deteriorated; one lake and 15 river water bodies. (Figure 7).
- The variations in nutrient concentrations and loads in the Donegal Bay North (Eske, Eany Water and Glen Carrick Rivers) main channels are illustrated in Appendix 2.

2.1.2 Transitional and Coastal (TraC)

- There were three (30%) TraC water bodies at Good or High status, and two (20%) at less than Good status in 2015 (Table 2). Five (50%) TraC water bodies are unmonitored.
- One TraC water body, North-western Atlantic Seaboard, has a High Ecological Status objective. In 2015 it was at High status. (Appendix 1, Figure 3).

- Note that the coastal water body North-western Atlantic Seaboard (HAs 37;38) is shared with five other catchments (HAs 35,36,38,39 and 40).
- The numbers of TraC water bodies at each status class in 2007-09 and 2010-2015 are shown in Figure 6.

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

	Number of water bodies	2010-2015						Risk		
		High	Good	Mod	Poor	Bad	Un-assigned	*Not at Risk*	*Review*	*At Risk*
Rivers	50	4	16	8	10	0	12	18	7	25
Lakes	12	0	0	1	0	0	11	9	2	1
TraCs	10	1	2	1	1	0	5	7	1	2

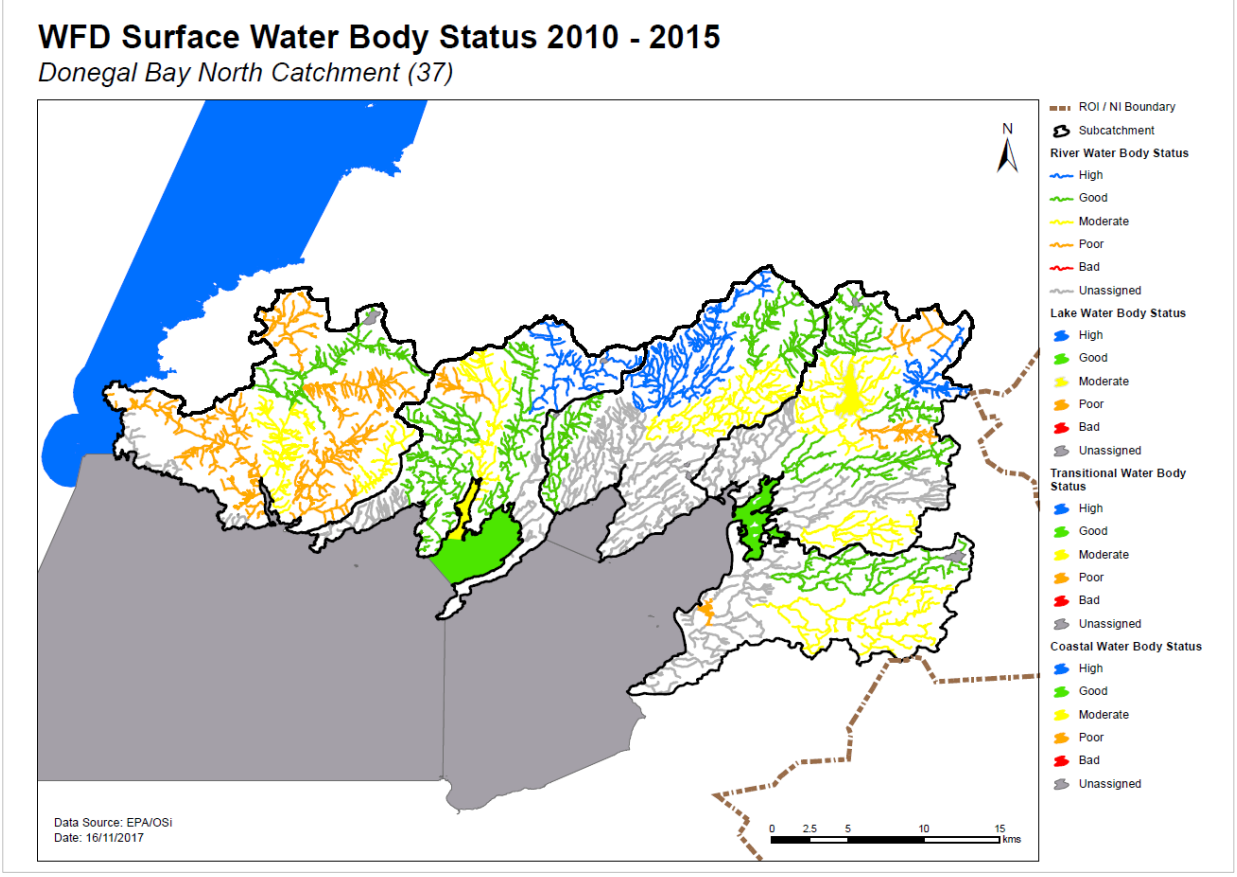

Figure 2. Surface water ecological status

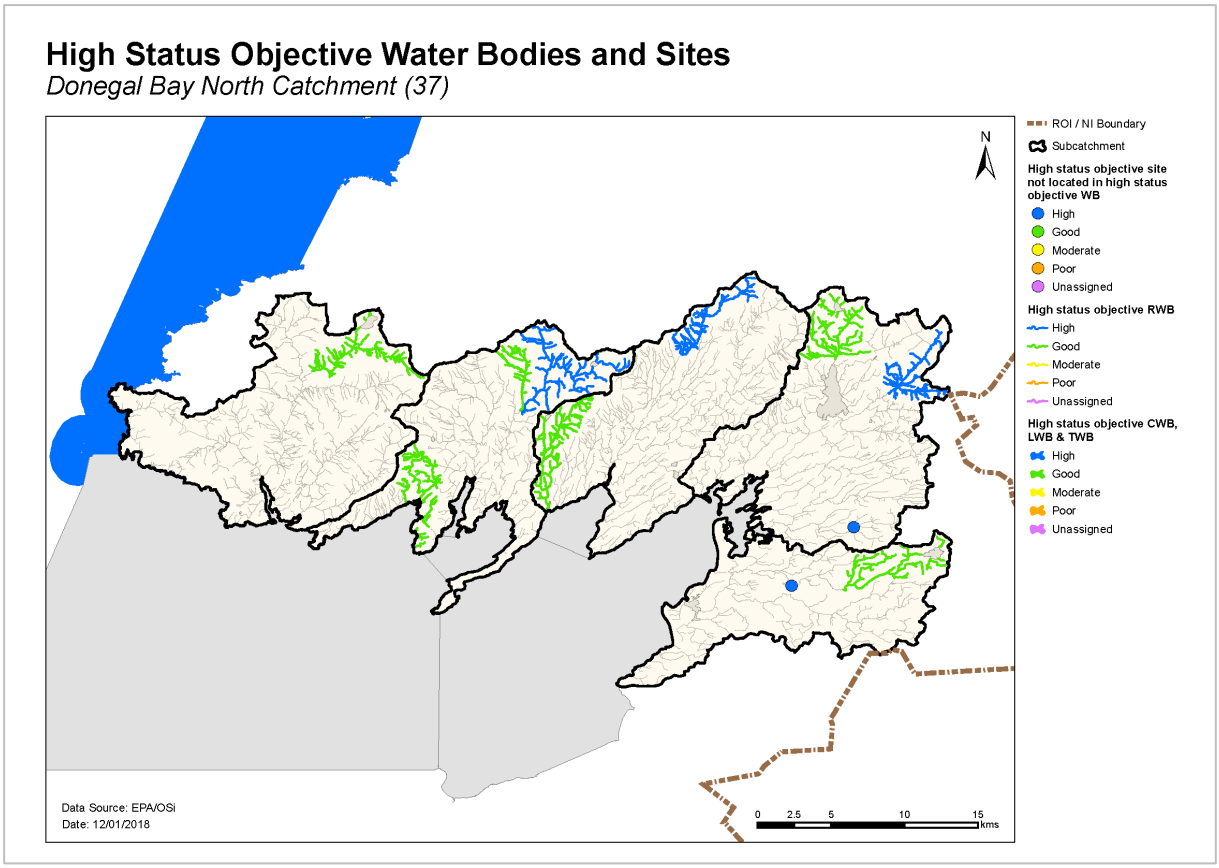

Figure 3. High ecological status objective water bodies and sites.

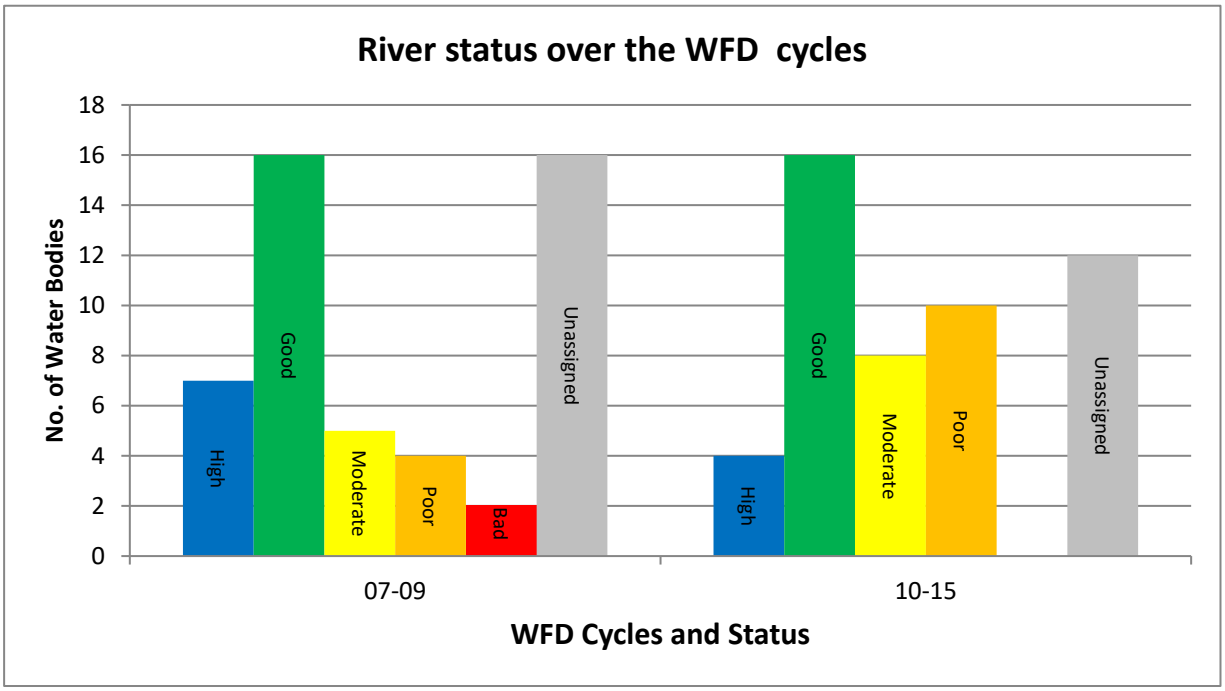

Figure 4. Number of rivers at each status class in 2007-2009 and 2010-2015

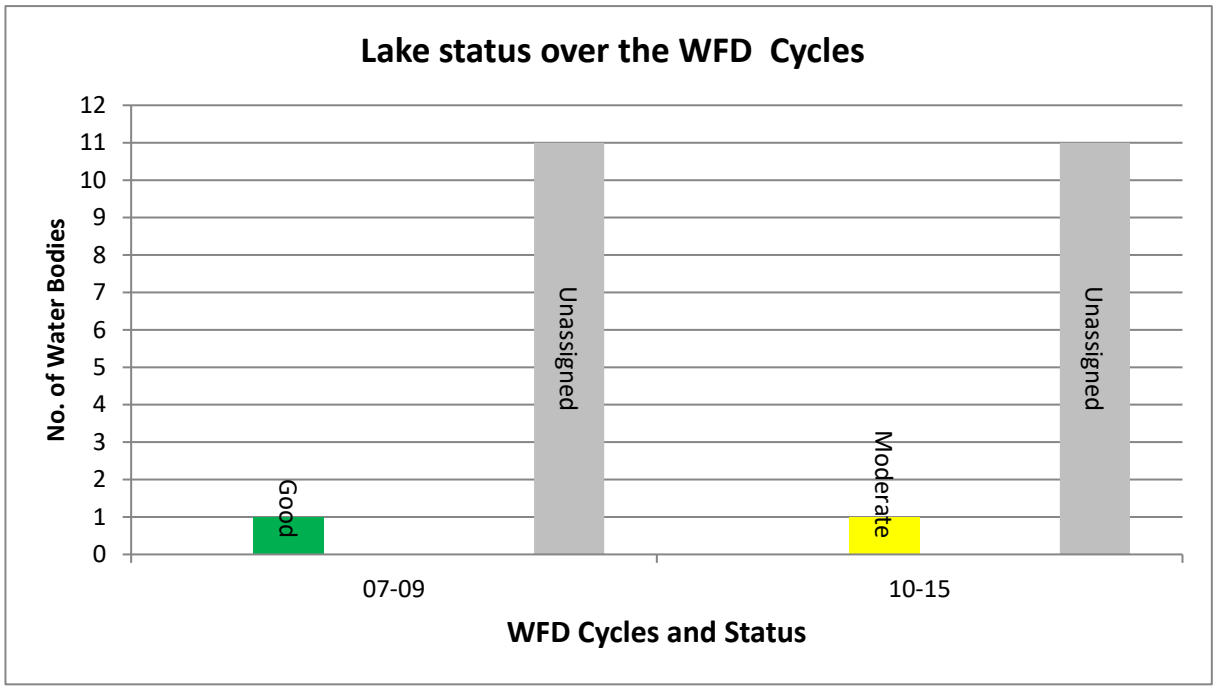

Figure 5. Number of lakes at each status class in 2007-2009 and 2010-2015

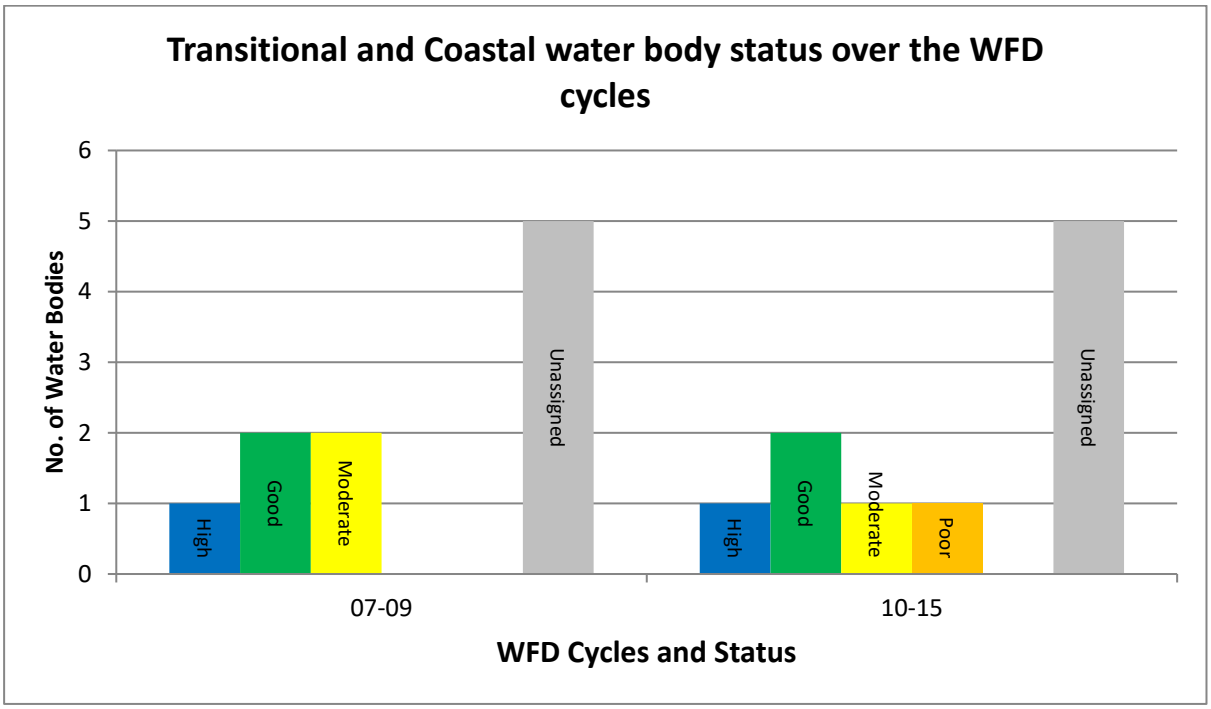

Figure 6. Number of transitional and coastal water bodies at each status class in 2007-2009 and 2010-2015

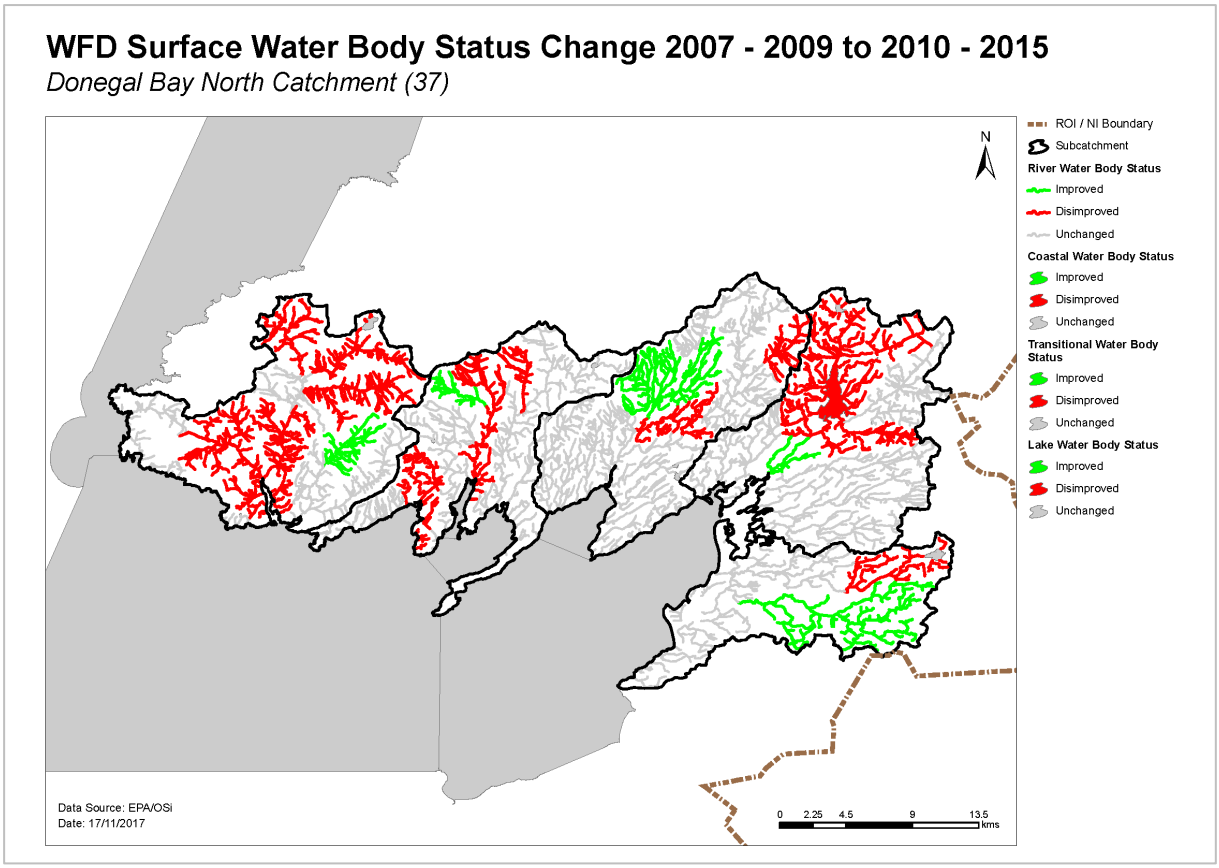

Figure 7. Surface water body status change from 2007-09 to 2010-2015.

2.2 Groundwater status

- There were 7 (87%) groundwater bodies at Good status and one (13%) at Poor status in 2015 (Table 3, Figure 8).
- The n numbers of ground water bodies at each status class in 2007-2009 and 2010-2015 are shown in Figure 9.

Table 3. Summary of groundwater body status and risk

	Number of water bodies	2010-2015		Risk		
		Good	Poor	*Not at Risk*	*Review*	*At Risk*
Groundwater	8	7	1	5	2	1

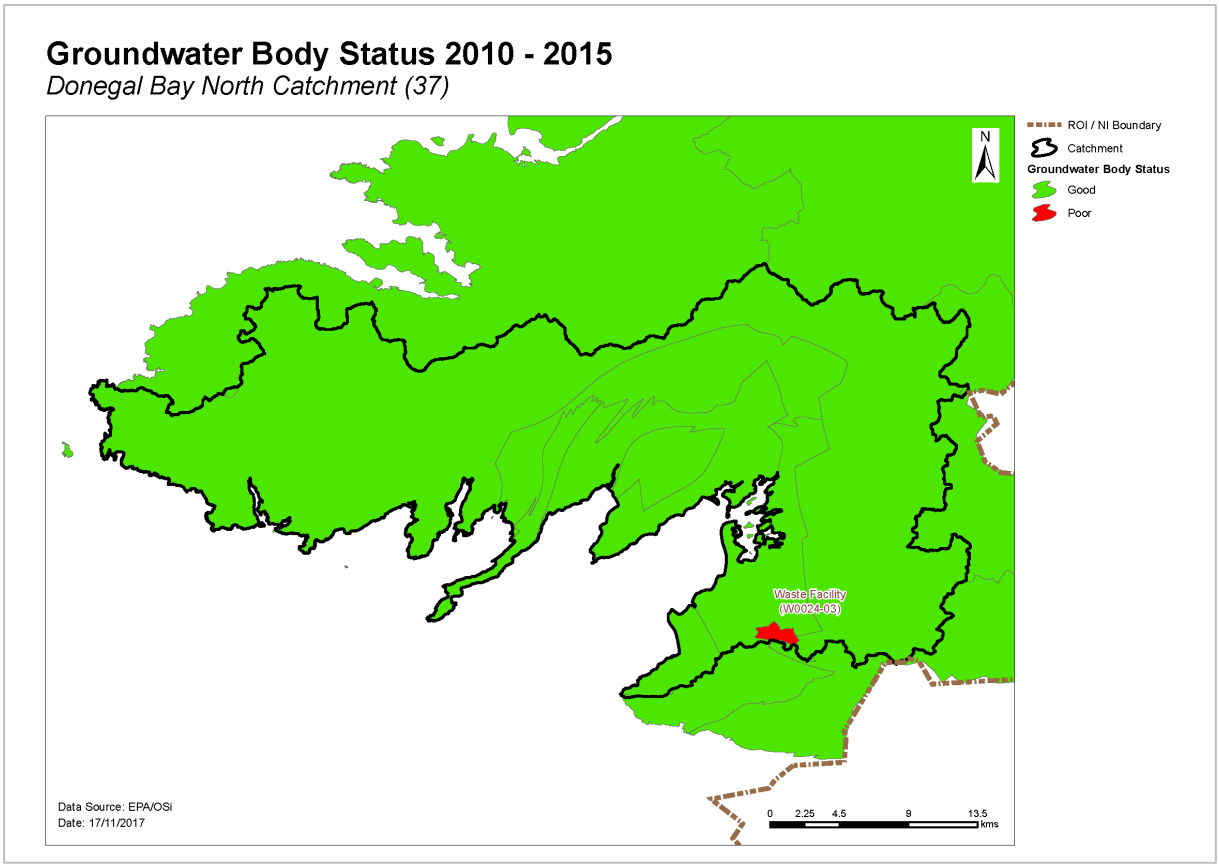

Figure 8. Groundwater body status

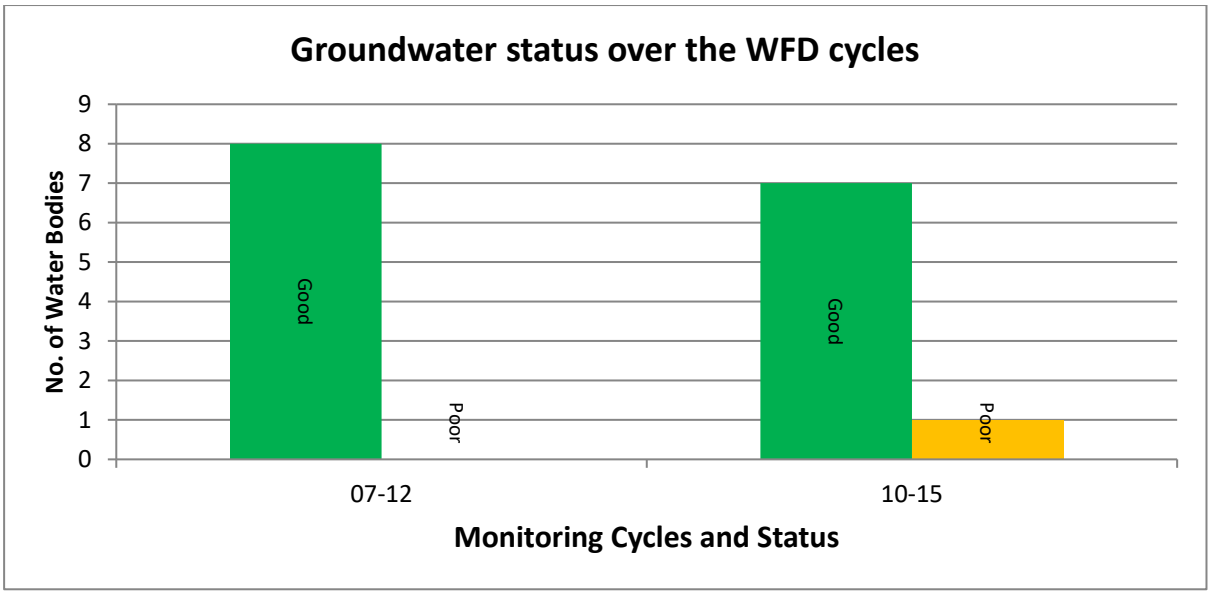

Figure 9. Number of groundwater bodies at each status class in 2007-12 and 2010-15

2.3 Risk of not meeting surface water environmental objectives

2.3.1 Rivers and lakes

- There are 18 river water bodies and nine lake water bodies *Not at Risk* (Figure 10, Table 2) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- There are seven river water bodies and two lake water bodies in *Review*. This includes eight river water bodies and one lake water body where more information is required and one lake water body where measures have recently been implemented and improvements have not yet been realised.
- There are 25 river water bodies and one lake water body in the catchment *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 seven TraC water bodies *Not at Risk* (Figure 10, Table 2) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- There is one TraC water body in *Review*. McSwines Bay is at Good ecological status but revised to *Review* due to the presence of pressures, including several fish farms.
- There are two TraC water bodies in the catchment *At Risk* of not meeting their water quality objectives. Measures will be needed in these water bodies to improve the water quality outcomes.

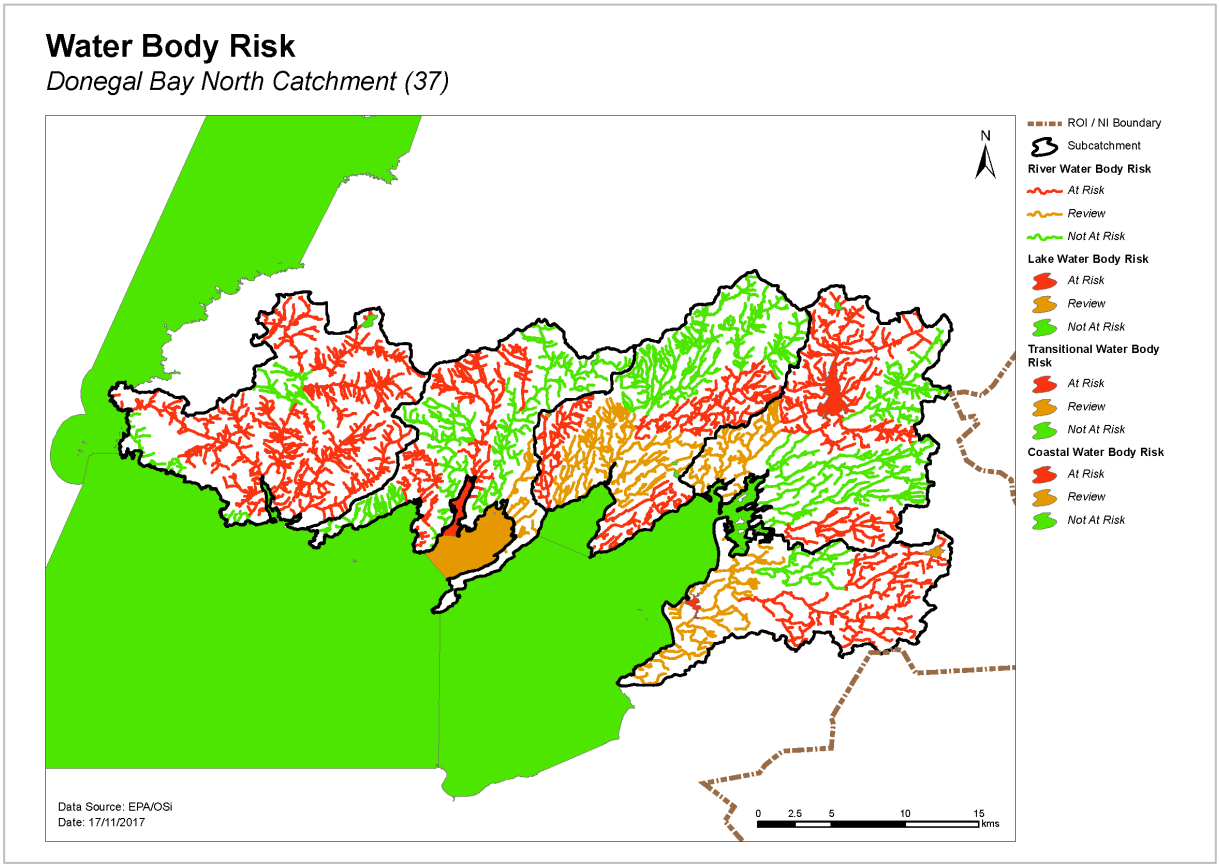

Figure 10. Surface water body risk.

2.4 Risk of not meeting groundwater body environmental objectives

- There are five groundwater bodies *Not at Risk* (Figure 11, Table 3) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- There are two groundwater bodies in *Review* where more information is required.
- There is one groundwater body IE_NW_G_100 (Waste Facility (W0024-03), in this catchment which is *At Risk* of not meeting its water quality objectives. Measures will be needed in this water body to improve the water quality outcomes.

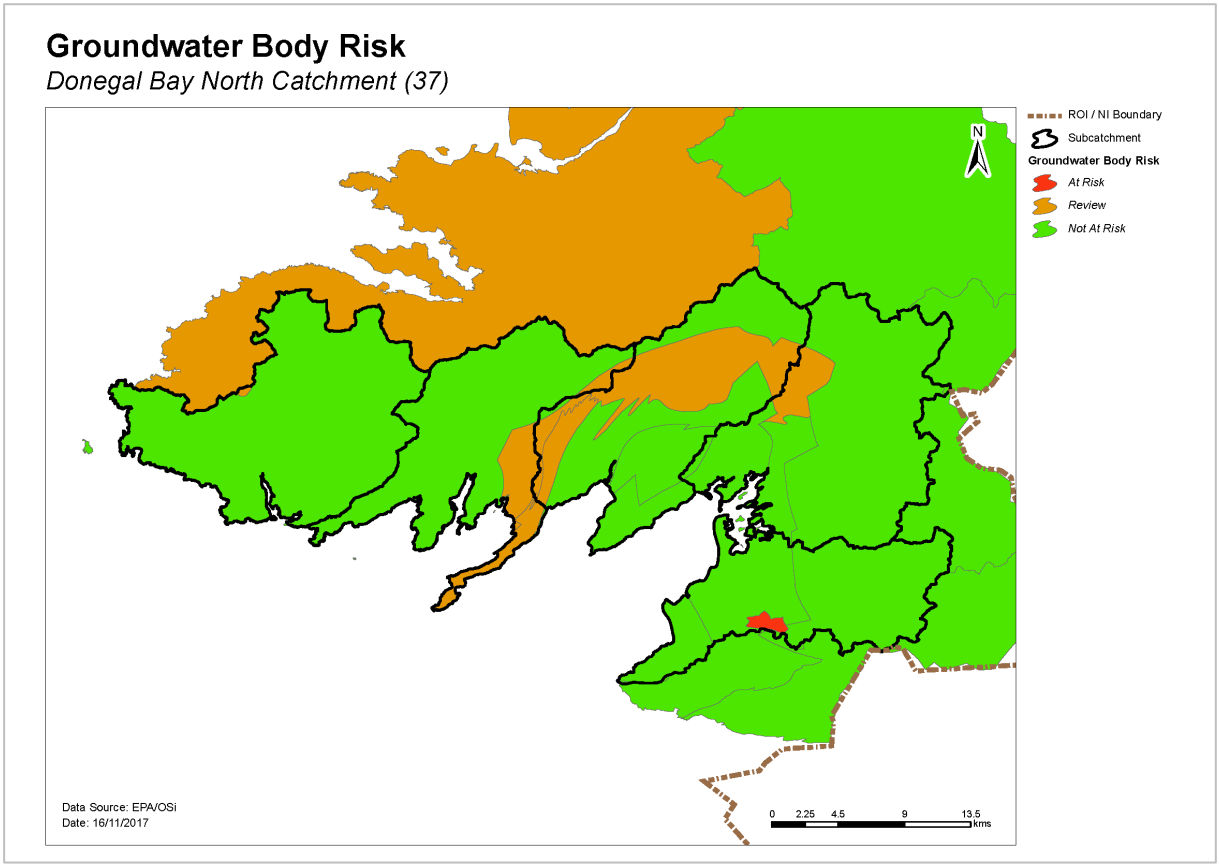

Figure 11. Groundwater body risk

2.5 Protected Areas

2.5.1 Drinking Water Protected Areas

- There are six drinking water abstractions in the Donegal Bay North Catchment comprising five public supplies (Killybegs x2, Donegal River Eske and Frosses-Inver x2) and one private supply (Harveys Point Hotel).
- All six of the abstractions are from separate water bodies including two groundwater bodies (Donegal South and Donegal-Balllintra) and four from lakes (Eske, Aroshin, Glencoagh and St Peter's). 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.
- Donegal, River Eske was non-compliant for pesticides (MCPA) in 2015. All other sources were compliant with the standards for pesticides in 2015.

- Five of the six drinking water protected areas had therefore met their objectives in 2015. However, due to pesticides above threshold in the River Eske it did not meet the protected area objective. The water treatment plant here has pesticide treatment (e.g. PAC) but exceedances are still recorded post-treatment.

2.5.2 Bathing Waters

- There are no designated freshwater bathing waters in the Donegal Bay North catchment. There are three designated marine bathing water and all three are in satisfactory condition. The list of the bathing waters and the associated water bodies is provided in Table 4.

Table 4. Bathing Waters in the catchment

Bathing Water		Water body Intersection		Objective met?	
Name	Code	Name	Code	Yes	No
Fintra	IENWBWC070_0000_0100	Donegal Bay Northern	IE_NW_070_0000	✓	
Murvagh	IENWBWC010_0000_0100	Donegal Bay (Erne)	IE_NW_010_0000	✓	
Rossnowlagh	IENWBWC010_0000_0200	Donegal Bay (Erne)	IE_NW_010_0000	✓	

2.5.3 Shellfish Waters

- There are three designated shellfish area in the coastal waters that the Donegal Bay North catchment discharges into. One of the three shellfish areas is compliant with the relevant standards. The remaining two shellfish areas, Donegal Bay and McSwynes Bay, failed microbial compliance in 2015. The percentage compliance with E. coli 230 MPN $100g^{-1}$ was less than 75%. The list of designated shellfish areas and the associated water bodies are provided in Table 5.

Table 5. Shellfish Waters in the catchment

Shellfish Area		Water body Intersection		Objective met?		Comment
Name	Code	Name	Code	Yes	No	
Inver Bay	IEPA2_0034	Inver Bay	IE_NW_060_0000	✓		
		Donegal Bay (Erne)	IE_NW_010_0000			
Donegal Bay	IEPA2_0033	Inner Donegal Bay	IE_NW_050_0100		✓	Based on the Shellfish Pollution Reduction Programme, Mountcharles WWTP and septic tanks are the significant pressures.
		Donegal Bay (Erne)	IE_NW_010_0000			
McSwynes Bay	IEPA2_0035	McSwines Bay	IE_NW_080_0000		✓	Based on the WFD characterisation, agriculture is the significant pressure.

2.5.4 Nutrient Sensitive Areas

- There is one designated nutrients sensitive area (NSA) in catchment, Killybegs. Details of the NSA are summarised in Table 6, below.

Table 6. Nutrient Sensitive Areas in the catchment

Nutrient Sensitive Area		Agglomeration		Objective met?		Comment
Name	Code	Name	Code	Yes	No	
Killybegs	IEGBNICA_NW_2001_0037	Killybegs	D0011		✓	Killybegs WWTP is scheduled for upgrade in 2018 but this will not include tertiary treatment.

2.5.5 Natura 2000 Sites

- There are 14 Special Areas of Conservation (SACs) in the catchment, not all of which have water quality and/or quantity conservation objectives for their qualifying interests.
- Four water bodies (2 rivers, 1 lake, 1 transitional) 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 five Special Protected Areas (SPAs) in the catchment:
    - Donegal Bay SPA
    - Durnesh Lough SPA
    - Lough Nillan Bog SPA
    - Pettigo Plateau Nature Reserve SPA
    - West Donegal Coast 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 two river water bodies that are designated as Freshwater Pearl Mussel rivers (under Freshwater pearl mussel regulations (S.I. 296 2009)) but are not located within SACs. One of these water bodies (Lowerymore_010) 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 is one designated heavily modified water body (HMWB) in the catchment - Killybegs Harbour due to port facilities. It was classified as having Moderate Ecological Potential in 2010-2015.
- There are no designated artificial water bodies (AWBs) in the catchment.

3 Significant issues in *At Risk* water bodies

- Excess nutrient loss, mostly phosphorus, is the dominant issue in the rivers and lakes in the catchment.
- Chemical toxicity is a major issue of concern in the catchment with many areas where sheep dip is causing a significant pressure and some cases where pesticides such as MCPA are exceeding EQS values.
- Hydromorphological pressures are also of concern but in a lesser number of water bodies resulting in reduced habitat quality.
- 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*, by water quality or survey data, significant pressures have been identified.
- The significant pressures affecting the greatest number of water bodies are agriculture. This is followed by, forestry, other, urban waste water, domestic waste water, industry, mines and quarries and hydromorphological pressures (Figure 12).

4.1.1 Rivers, lakes, transitional and coastal

- Figure 12 shows a breakdown of the number of *At Risk* water bodies in each significant pressure category. Significant pressures have been identified during the initial characterisation process in 28 surface water bodies, five of which have multiple pressures. 25 river water bodies, one lake, transitional and coastal water body. The significant pressures will be refined as further characterisation is carried out.
- The significant pressures affecting the Killybegs Harbour are industry (fish processing) and Urban Waste Water and for Durnesh Lough, the significant pressure has yet to be identified.

4.1.2 Groundwater

- The significant pressure affecting the IE_NW_G_100, groundwater body is a waste facility . The key parameter of concern is ammonia.

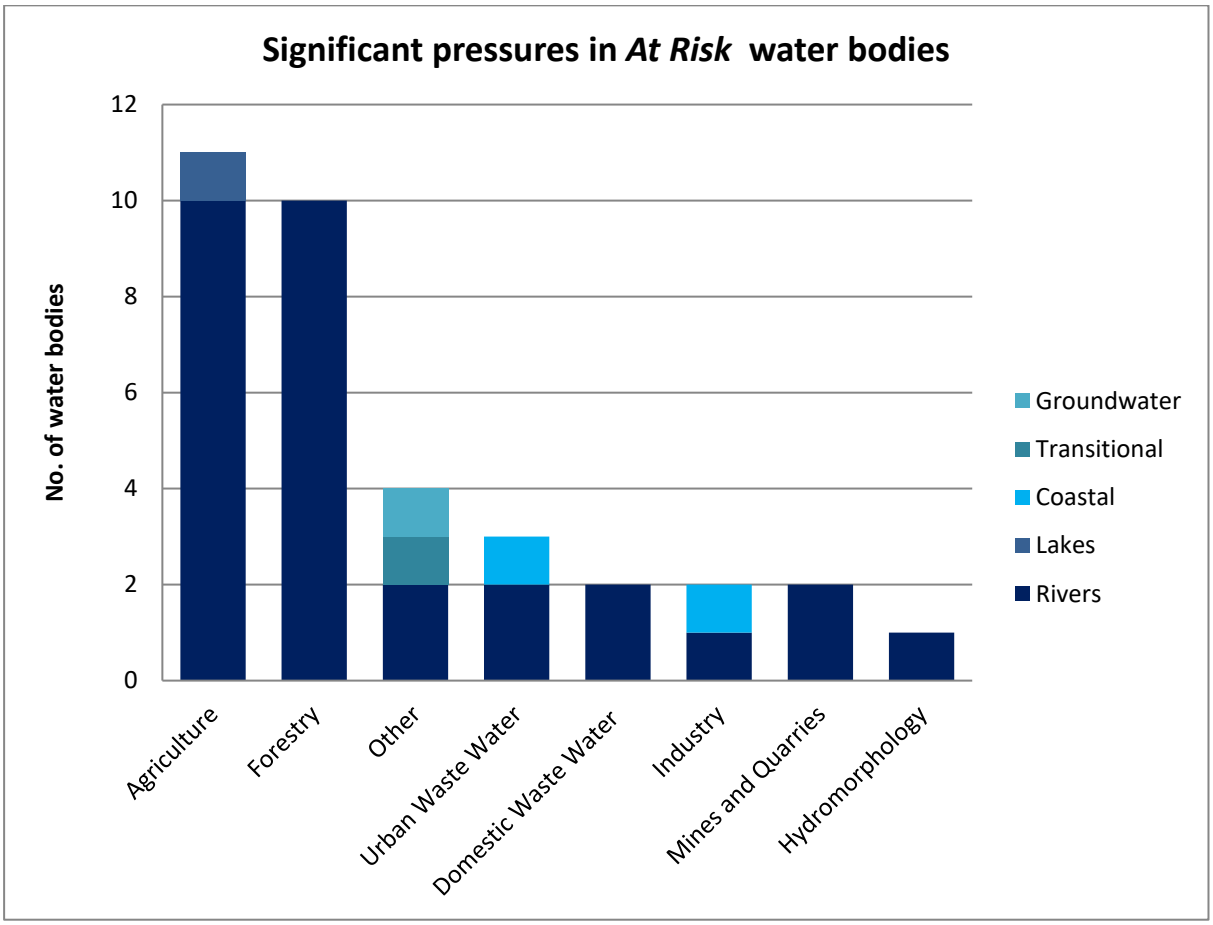

Figure 12. Significant pressures impacting on *At Risk* water bodies

4.2 Pressure type

4.2.1 Agriculture

- Agriculture is a significant pressure in 10 river water bodies and one lake water body (Eske); the water bodies affected by farming are shown in Figure 13. The primary issue related to farming in this catchment is diffuse phosphorus loss to water bodies in areas underlain by poorly draining soils and subsoils. There is also evidence of toxicity due to sheep dip (Cypermethrin) in several water bodies, with chemical impact is also noted in one additional water body due to MCPA use. Sediment is also an issue from land drainage works, bank erosion from animal access or stream crossings

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

4.2.2 Forestry

- Forestry has been identified as a significant pressure in 10 river water bodies (Figure 14). The significant issues are associated with forestry activities such as clearfelling, road construction and planting with associated sediment and nutrient losses which has habitat and morphological impacts. Acidification is also noted as an issue in several water bodies associated with recent planting activity. Significant forest fires have been noted in three water bodies along with post-fire works to include tidy up of fire breaks, which leads soils vulnerable to erosion.

4.2.3 Other significant pressures

Unknown Anthropogenic

- Two *At Risk* river water bodies and one transitional water body have unknown pressure Figure 15.

Waste

- The significant pressure affecting the *At Risk* IE_NW_G_100, groundwater body is a waste facility. The key parameter of concern is ammonia.

4.2.4 Urban Waste water Treatment Plants

- Urban Waste Water Treatment Plants (WWTPs) have been identified as a significant pressure in three *At Risk* water bodies; details are given in Table 7 and Figure 16. Killybegs WWTP, which impacts Killybegs Harbour, is scheduled to be upgraded in 2018, while Ballintra WWTP, which impacts Ballintra_010, is scheduled to be upgraded by 2021.

Table 7. Waste Water Treatment Plants identified as Significant Pressures in *At Risk* water bodies and expected completion dates for associated upgrade works, where applicable.

Facility name	Facility Type	Water body	10-15 Ecological Status	Expected Completion Date
Ballintra A0294	< 500 p.e.	Ballintra_010	Moderate	2021
Letterbarra Housing Scheme A0478	< 500 p.e.	Eany Water_010	Moderate	*NA* [1]
Letterbarra No. 2 Housing Scheme A0476	< 500 p.e.	Eany Water_010	Moderate	*NA* [1]
Killybegs D0011	>10,000 p.e.	Killybegs Harbour	Moderate	2018

[1] *Currently not specified in improvement plans.*

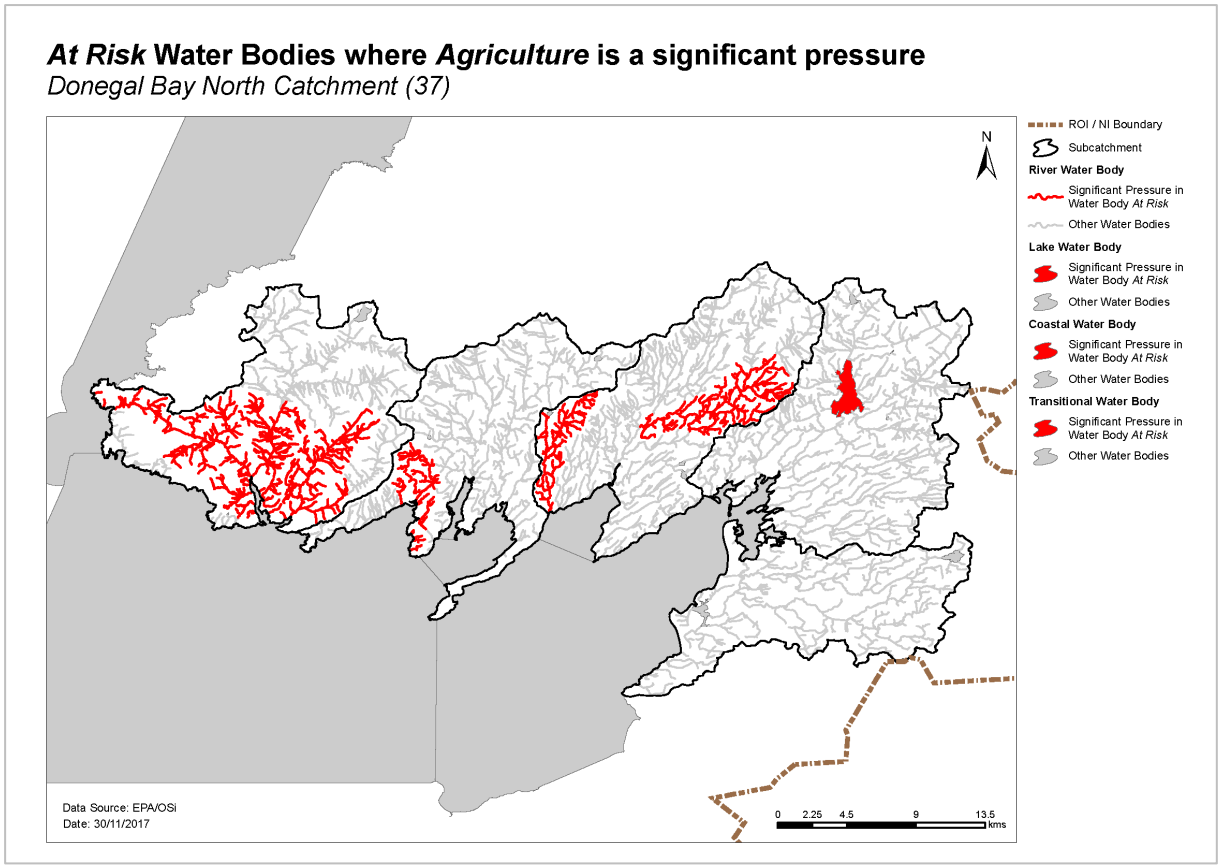

Figure 13. Water bodies that are At Risk and are impacted by agricultural activities

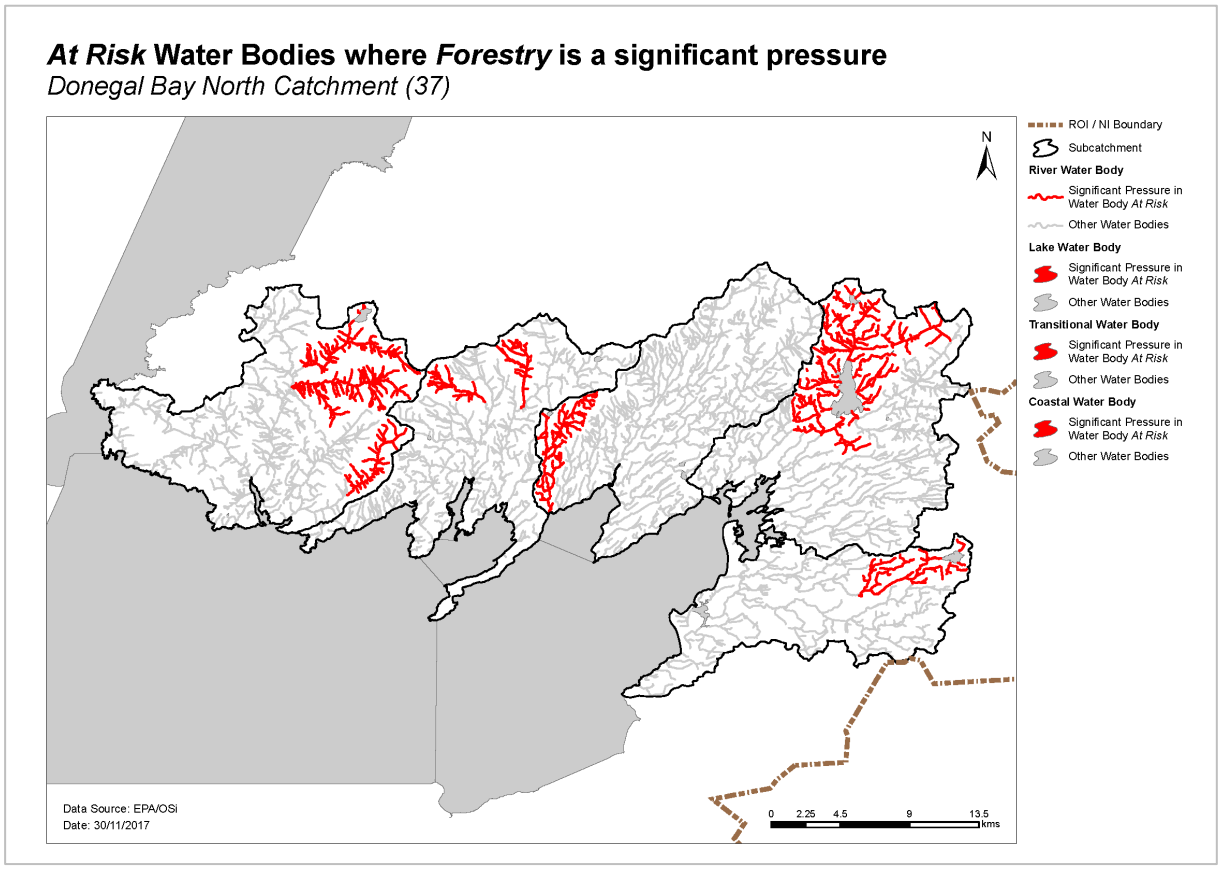

Figure 14. Water bodies that are At Risk and are impacted by forestry activities

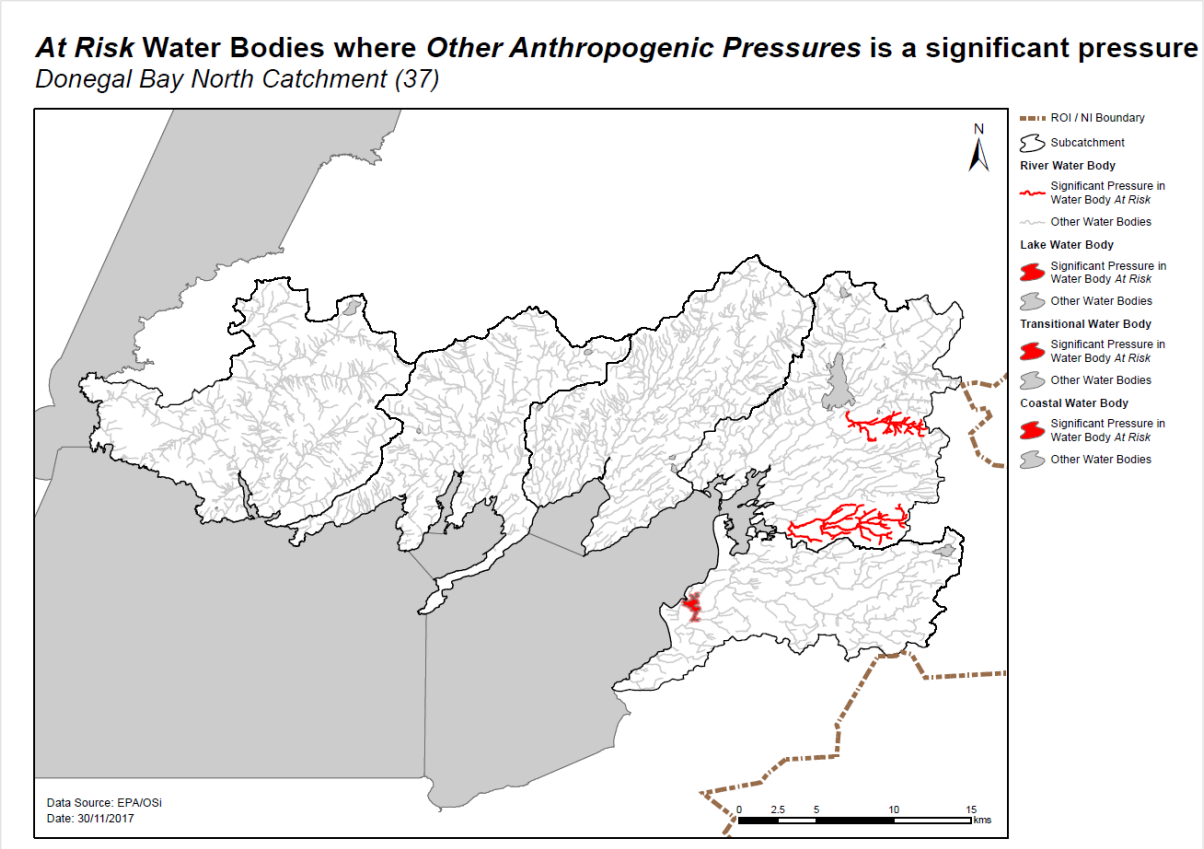

Figure 15. Water bodies that are At Risk and are impacted by Unknown Anthropogenic pressures

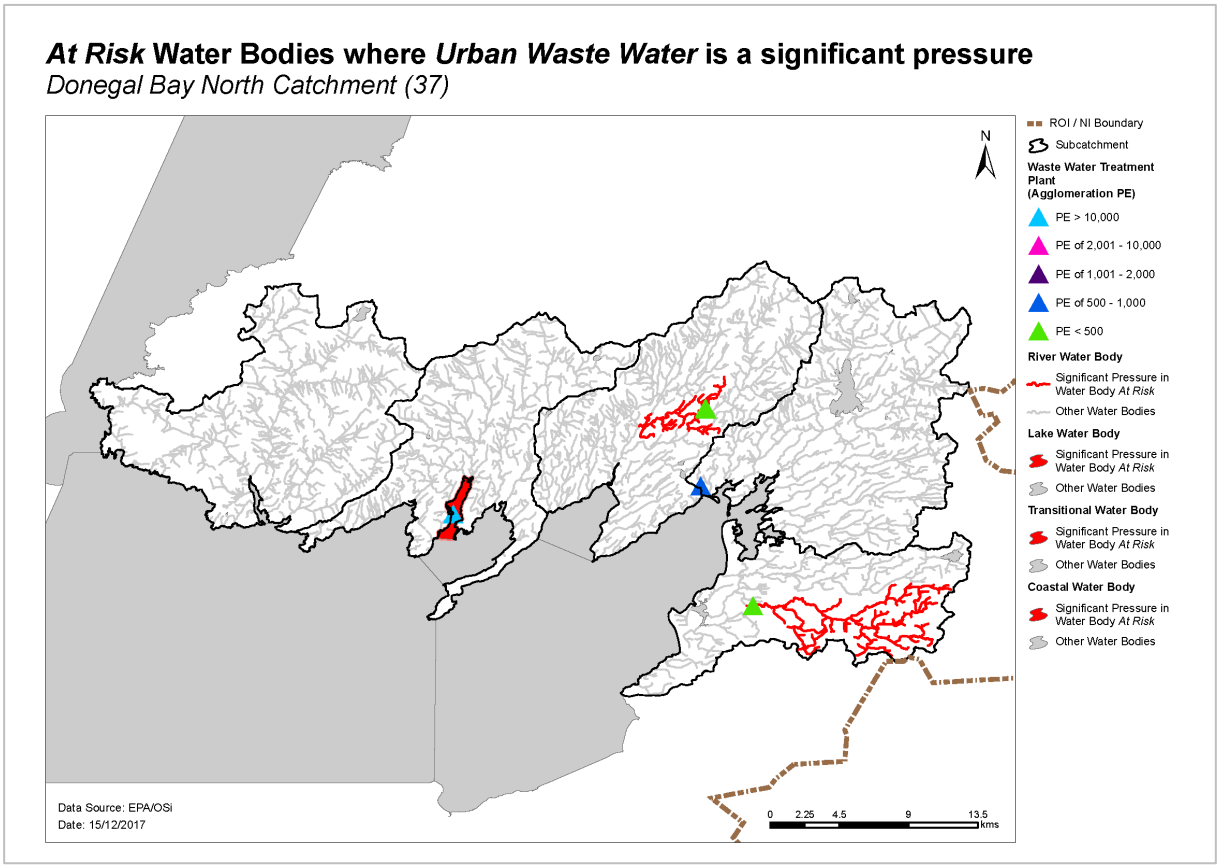

Figure 16. Water bodies that are At Risk and are impacted by urban waste water

4.2.5 Domestic Waste Water

- Domestic waste water has been identified as a significant pressure in two water bodies (Figure 17). Significant issues have arisen in one water body from the discharge from a housing scheme which has resulted in elevated ammonia concentrations. The assimilative capacity of the receiving body (Mountcharles_010) is also an issue.

4.2.6 Industry

- Industry has been identified as a significant pressure in two water bodies, Stragar_010 and Killybegs Harbour, with nutrients and organic impacts being the main issues of concern. These water bodies are impacted by discharged from local industry. Figure 18

4.2.7 Extractive Industry

- Quarries have been identified as a significant pressure in two river water bodies, Glen(Carrick)_010 and Eany Water_010 (Figure 19). The significant issues arise from several sandstone quarries at a few different sites that are transient short-term operations that have no mitigation measures. The pressure is a combination of chemical, hydrological and morphological.

4.2.8 Hydromorphology

- Erosion within a river water body of the Glen [Carrick] (37_4) subcatchment (Figure 20) is contributing to excessive levels of siltation; this is exacerbated by the landscape setting (i.e. steep topography and high rainfall).

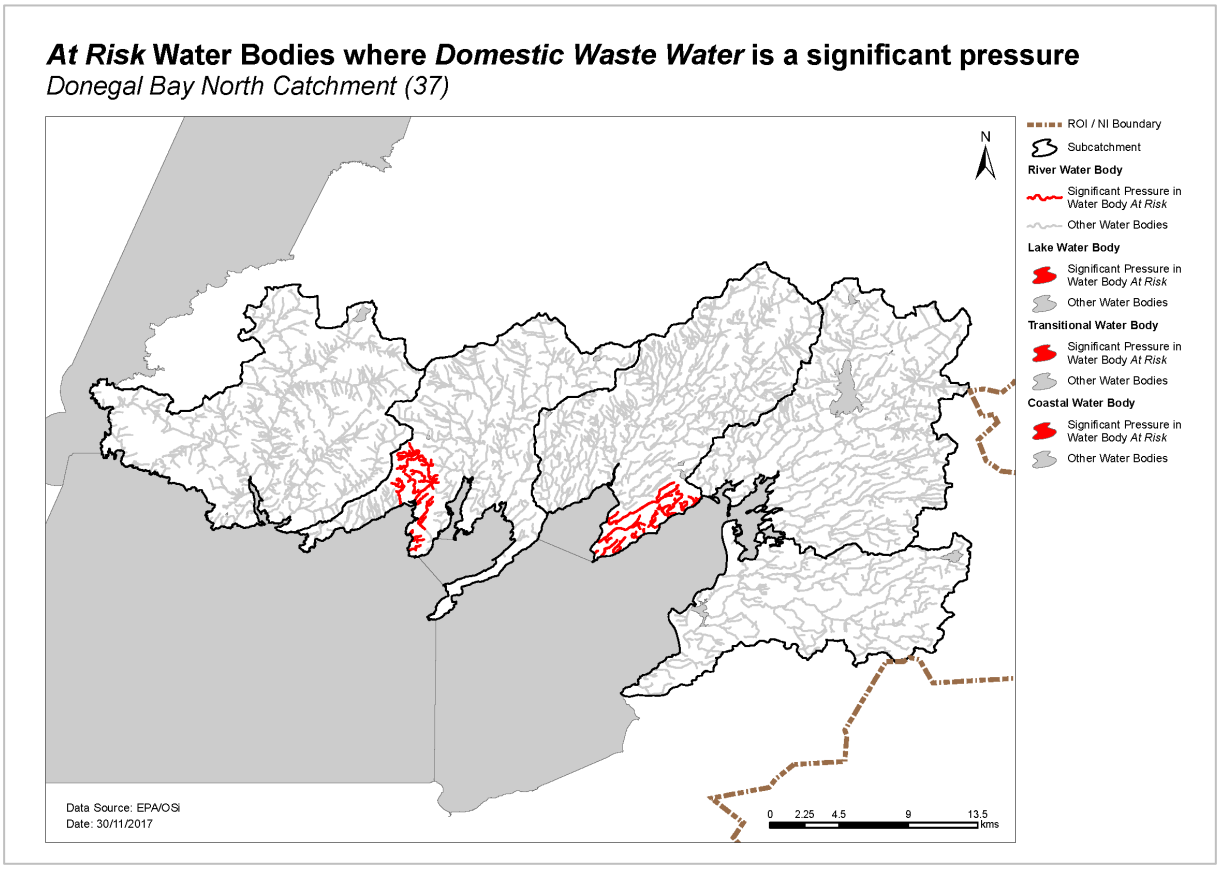

Figure 17. Water bodies that are At Risk and are impacted by domestic waste water

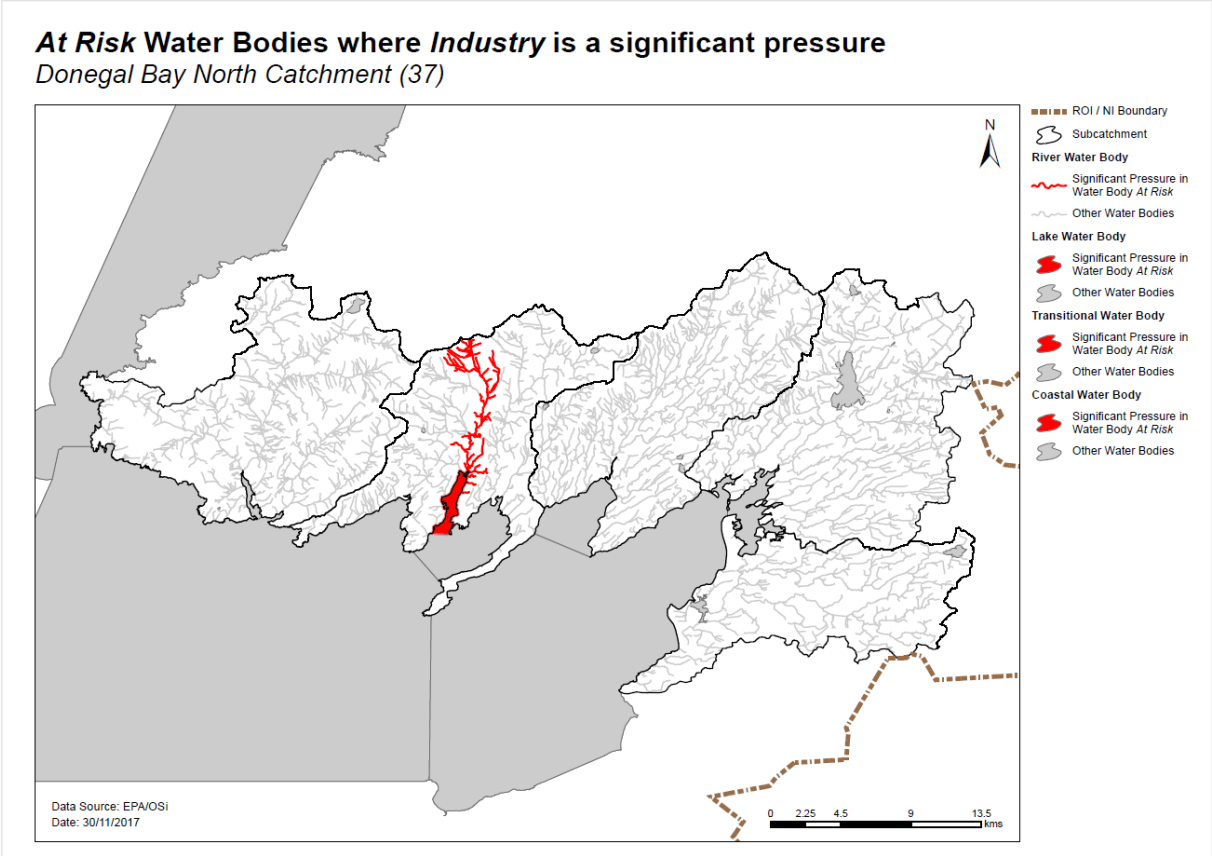

Figure 18. Water bodies that are At Risk and are impacted by Industry

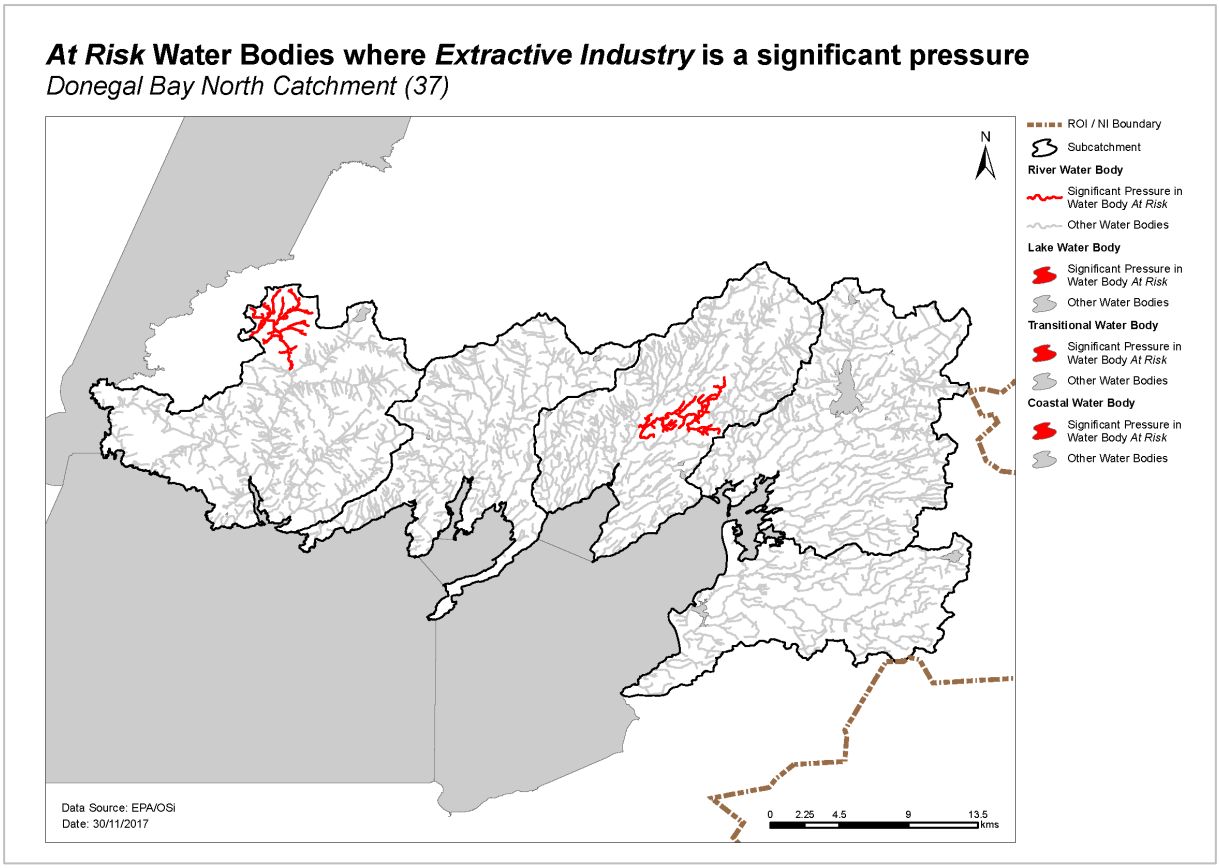

Figure 19. Water bodies that are At Risk and are impacted by Extractive Industry

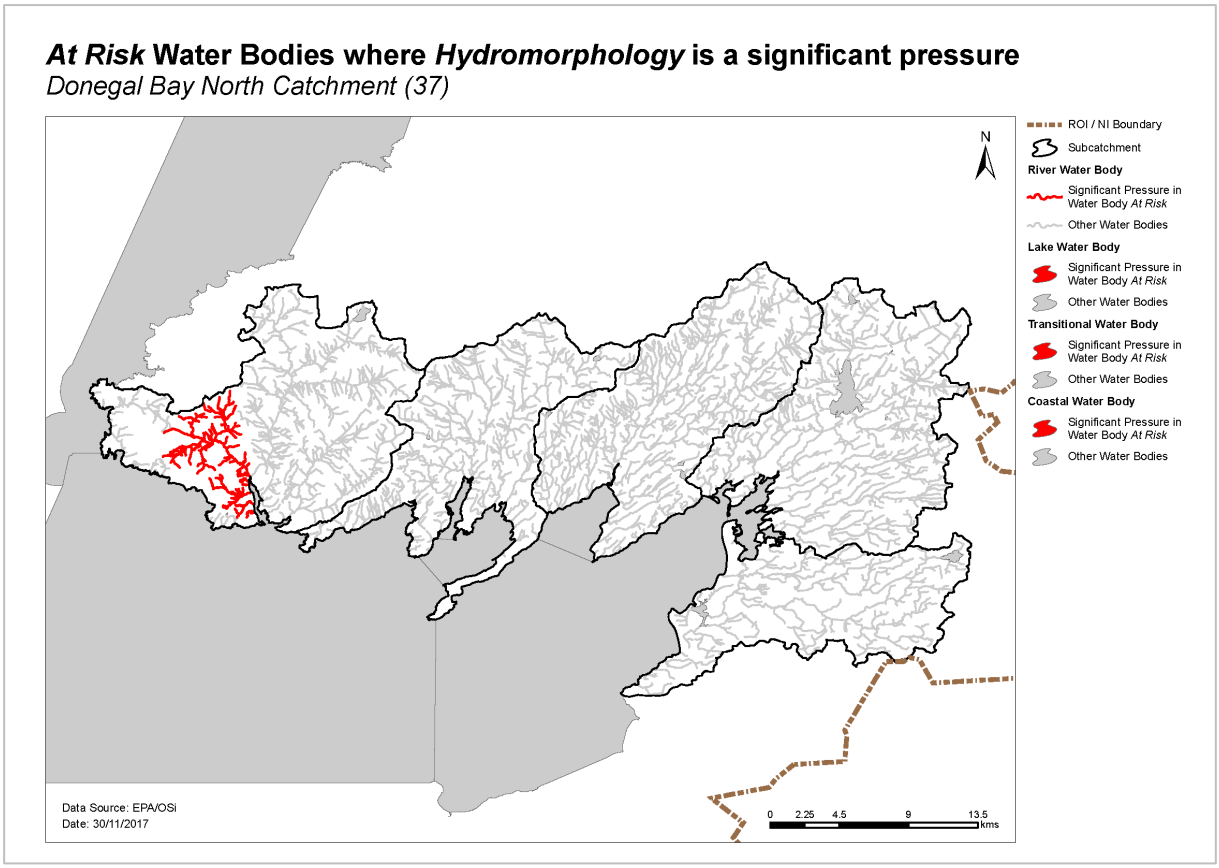

Figure 20. Water bodies that are At Risk and are impacted by hydromorphology pressures

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.
- Water chemistry data were available for 14 of the 24 river water bodies that were *At Risk* within this catchment. All of these had satisfactory mean P concentrations and therefore do not appear to require 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.

6 Further characterisation and local catchment assessments

- Further characterisation through local catchment assessments is needed in 26 (10 of which have an IA1) of the river and lake water bodies *At Risk* 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 assessment is needed in nine of the *Review* river and lake water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified.
- Brief details on the 101 assessment scenarios are given in Appendix 7.

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

Risk	IA 1	IA 2	IA 3	IA 4	IA 5	IA 6	IA 7	IA 8	IA 9	IA 10	Total
At Risk	10	0	0	1	6	0	3	6	0	0	26
Review	2	0	7	0	1	0	0	0	0	0	10
Note water bodies may have multiple categories of Local Catchment Assessments											

7 Catchment summary

- Of the 50 river water bodies in the catchment, 25 are *At Risk* are *At Risk* of not meeting their WFD objective.
- One of the 12 lake water bodies is *At Risk* of not meeting it's WFD objective.
- Six of the *At Risk* water bodies are High Ecological Status (HES) objective water bodies that are not meeting their HES objectives.
- The significant issue in the *At Risk* water bodies is excess nutrient loss, mostly phosphorus, and the associated pressures are primarily agriculture (point and diffuse sources) and forestry. Chemical toxicity, associated with sheep dip, is also an issue in this catchment.
- Two of the ten transitional and coastal water bodies, Killybegs Harbour and Durnesh Lough, are *At Risk* and one, McSwines Bay, is at *Review.*
- Killybegs Harbour is at Moderate status due to oxygenation conditions. However brown algae is also evident which indicates excess phosphorus in the estuarine system. The source of nutrient is a combination of both the riverine inputs from the freshwater environment and direct inputs from urban waste water treatment and an industrial facility. Killybegs Harbour is also a designated Nutrient Sensitive Area. Durnesh Lough is *At Risk* due to Poor fish status.
- There is one *At Risk* Groundwater body in the catchment. The significant issue is ammonia and the significant pressure is a landfill.

8 Areas for Action

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

- Three recommended areas for actions (Table 9, Figure 21) were selected.
- These are the Donegal SW & Murlins, Laghy Stream - Bridgetown and Lough Eske.
- These include 18 *At Risk* and three *Review* river and lake water bodies.
- 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 10. Actions taken to improve surface water will need to take account of the groundwater contribution to surface water.

A remaining 17 *At Risk* and *Review* surface water bodies were not included in the recommended areas for action for the second cycle. The distribution of these is presented in Figure 22. These include:

- fourteen river and lake water bodies, eight *At Risk* and six *Review*, and
- three transitional and coastal water bodies, two *At Risk* and one *Review.*

Table 9. Recommended Areas for Action in the Donegal Bay North Catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Donegal SW & Murlins	10	37_4,	Donegal	• Eight deteriorated Water bodies. • One of the deteriorated water bodies has a High Ecological Status objective that is not being met. • Assess and develop strategies to mitigate toxic impacts that are likely to be from sheep dip • Long term challenge requiring cross agency approach.
Laghy Stream - Bridgetown	6	37_1, 37_2 (part)	Donegal	• One deteriorated High Ecological Status objective water body. • Starting at the headwaters • Multiple Pressures that can be examined at the same time. • Assessing water quality of unassigned water bodies feeding into Durnesh Lough. • Recent deterioration in two water bodies so might represent a quick win scenario.
Lough Eske	5	37_2	Donegal	• Five Deteriorated water bodies. • One of the deteriorated river water bodies is a High Ecological Status objective water body. • All deteriorated water bodies in this area for action have dropped in status in the last monitoring cycle and so there may be possibilities for quick wins. • Same pressures in several the river water bodies feeding into the lake so similar investigations possible. • MCPA in drinking water abstraction from Lough Eske linked with agricultural activity around the lake. • Possibility to improve SAC.

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

Groundwater bodies			Intersecting surface water bodies		Recommended Area for Action
Code	Name	Risk	Code	Name	
IE_NW_G_070	Inver-Banagher Hill	Review	IE_NW_37E050200	Eske_010	Lough Eske
			IE_NW_37_188	Eske	

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 18 *At Risk* surface water bodies, it is predicted that 10 (56%) will improve by 2021 and the remaining seven (44%) will achieve their objective by 2027.

- For the three *Review* surface water bodies, the absence of information on this water body 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 11.

Table 11. 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	17	9	8
Review	2	0	2
Lakes			
At Risk	1	1	0
Review	1	0	1
Total	21	10	11

- Thirty-four surface water bodies have met their 2015 environmental objective. Two of the 34 water bodies met their environmental objective for ecological status but failed to meet its protected area objectives.
- As action is not yet planned to be taken in the remaining 10 *At Risk* surface water bodies, a 2027 date is applied to all.
- For the seven *At Review* surface water bodies, the absence of information on these water bodies means that there is no scientific basis to quantify an environmental objective date and therefore a 2027 date is applied, see Table 12.

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

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
At Risk	8	0	8
Review	5	0	5
Lakes			
At Risk	0	0	0
Review	1	0	1
TraCs			
At Risk	2	0	2
Review	1	0	1
Total	17	0	17

9.2 Groundwater

- Seven of the eight groundwater bodies are currently Good status and, therefore, have met their environmental objectives.
- The one groundwater body, Waste Facility (W0024-03), in the Donegal Bay North catchment that is less than Good status has an environmental objective date of 2027.

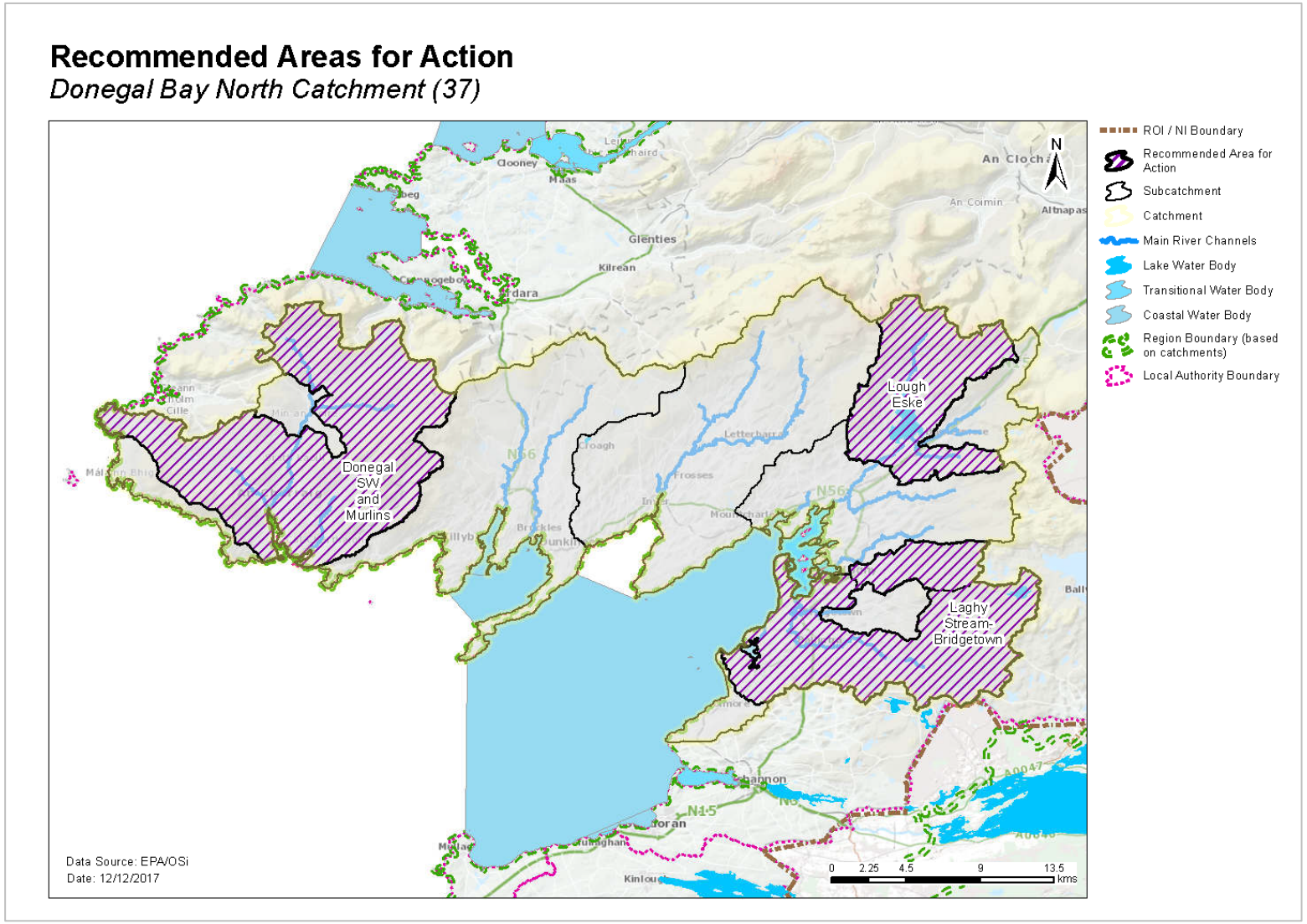

Figure 21. Location of Recommended Areas for Action in the Donegal Bay North Catchment

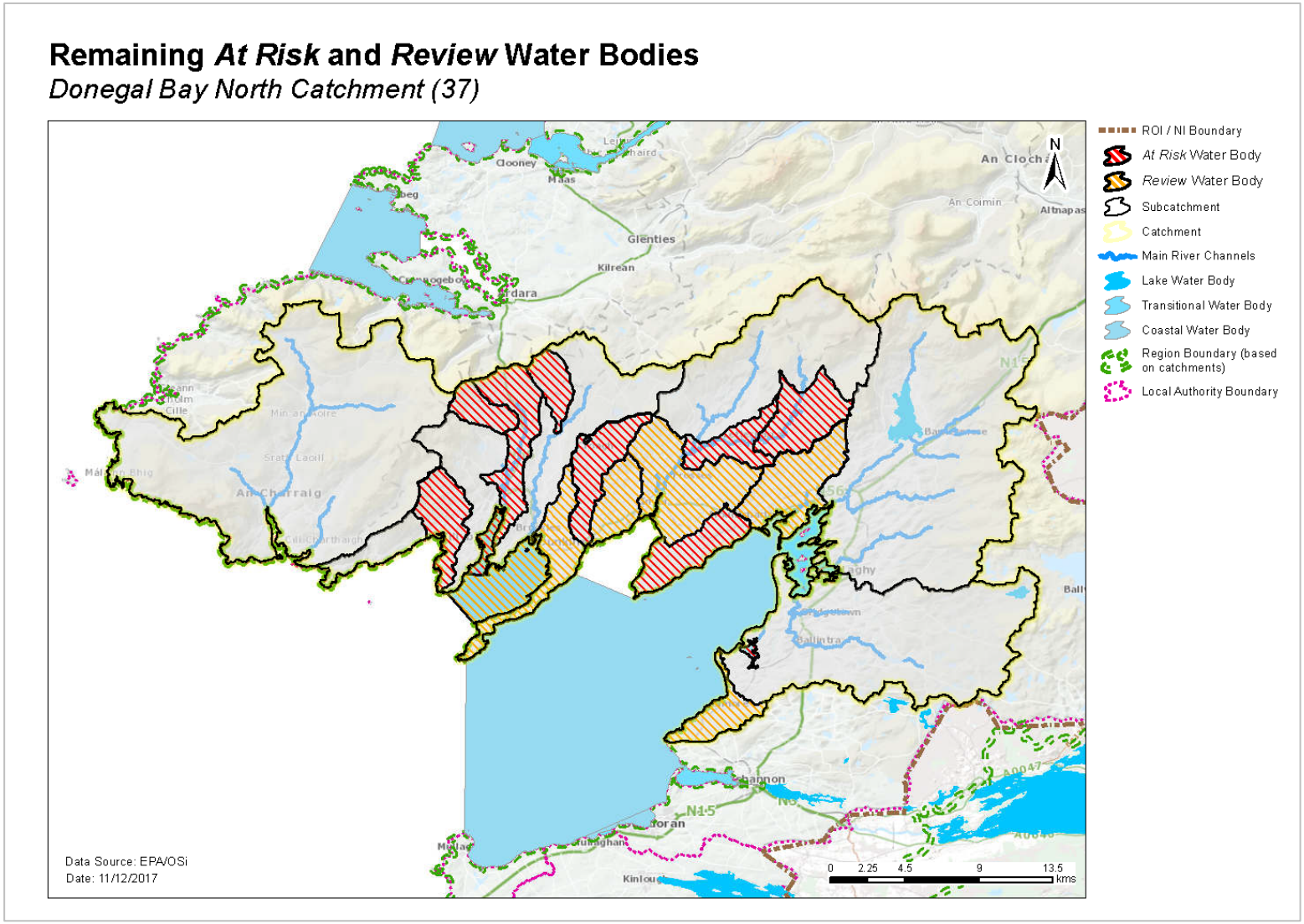

Figure 22. Location of *At Risk* and *Review* water bodies located outside Recommended Areas for Action in the Donegal Bay North Catchment

10 Acknowledgements

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

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- Inland Fisheries Ireland.
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- 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

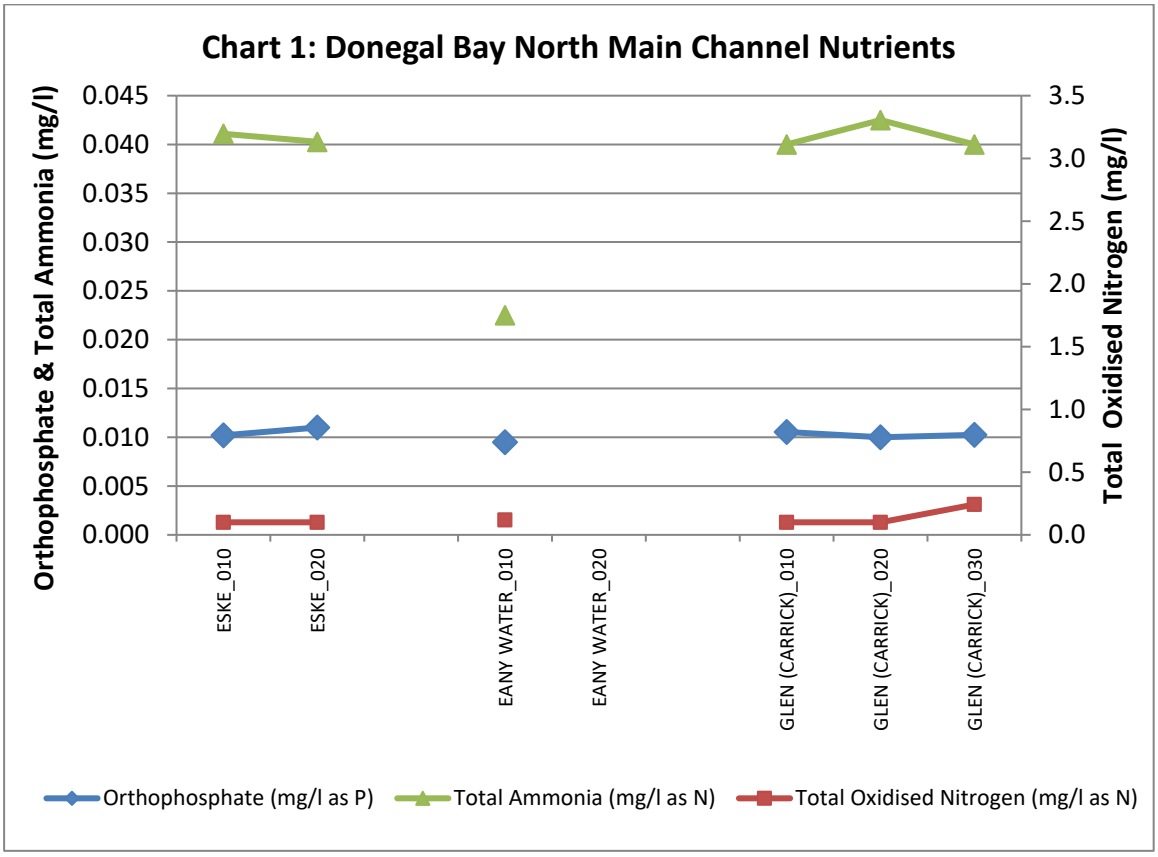
Water body/ Site	Type	Codes	2015 Status
BRIDGETOWN (DONEGAL)_010	River	IE_NW_37B030030	Good
CORABBER_010	River	IE_NW_37C010100	Good
LOWERYMORE_020	River	IE_NW_37L010300	High
FINTRAGH_010	River	IE_NW_37F010100	Good
OILY_010	River	IE_NW_37O010050	High
TULLINTEANE 37_010	River	IE_NW_37T010400	Good
OWENTESKINY_010	River	IE_NW_37O020600	Good
BUNLACKY_010	River	IE_NW_37B040300	Good
EANYBEG WATER_010	River	IE_NW_37E010200	High
North-western Atlantic Seaboard (HAs 37;38)	Coastal	IE_NW_100_0000	High

Appendix 2 Catchment Scale Nutrient concentrations and in-stream loads

The results of the in-stream water quality assessment for the Donegal Bay North catchment main channels are illustrated in Chart 1.

The orthophosphate concentrations for the Eske, Eany Water and Glen (Carrick) Rivers are well below the EQS (0.035mg/l) at all water bodies where data is available, ranging from 0.009 to 0.011mg/l.

Total Oxidised Nitrogen (TON) concentrations only marginally exceed the limits of detection along the three rivers. Ammonia concentrations in the Eske and Glen (Carrick) Rivers range from 0.040 to 0.043mg/l. In the Eany Water, concentrations are lower with a value of 0.023mg/l at EANTWATER_010. The EQS drinking water thresholds for TON (2.6mg/l) and ammonia (0.065mg/l) are not exceeded at any of the main channel water bodies where data is available.



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
37_1	IE_NW_37_197	Dunragh	Lake	Review	Unassigned	Unassigned	N		2027	Laghy Stream - Bridgetown
37_1	IE_NW_37B030620	Bridgetown (Donegal)_030	River	Review	Unassigned	Unassigned	N		2027	Laghy Stream - Bridgetown
37_1	IE_NW_37B090770	Ballymagrorty_Scotch_010	River	Review	Unassigned	Unassigned	N		2027	Laghy Stream - Bridgetown
37_1	IE_NW_37B020200	Ballintra 37_010	River	At Risk	Poor	Moderate	N	UWW	2027	Laghy Stream - Bridgetown
37_1	IE_NW_37B030030	Bridgetown (Donegal)_010	River	At Risk	High	Good	Y	For	2021	Laghy Stream - Bridgetown
37_1	IE_NW_37C330730	Cool_More_010	River	Review	Unassigned	Unassigned	N		2027	
37_1	IE_NW_040_0100	Durnesh Lough	Transitional	At Risk	Moderate	Poor	N	Other	2027	
37_2	IE_NW_37_188	Eske	Lake	At Risk	Good	Moderate	N	Ag	2021	Lough Eske
37_2	IE_NW_37L370150	Leitrim Hill Stream_010	River	Review	Unassigned	Unassigned	N		2027	
37_2	IE_NW_37C010100	Corabber_010	River	At Risk	High	Good	Y	For	2021	Lough Eske
37_2	IE_NW_37C060400	Clogher (Donegal)_010	River	At Risk	Moderate	Poor	N	Other	2027	Lough Eske
37_2	IE_NW_37E050200	Eske_010	River	At Risk	Good	Moderate	N	For	2027	Lough Eske
37_2	IE_NW_37L010100	Lowerymore_010	River	At Risk	Good	Poor	N	For	2021	Lough Eske
37_2	IE_NW_37L020600	Laghy Stream_010	River	At Risk	Moderate	Moderate	N	Other	2021	Laghy Stream - Bridgetown
37_3	IE_NW_37B260880	Bogside_010	River	Review	Unassigned	Unassigned	N		2027	
37_3	IE_NW_37F010100	Fintragh_010	River	At Risk	High	Good	Y	Ag,DWW	2027	
37_3	IE_NW_37R010200	Roechrow_010	River	At Risk	Bad	Poor	N	For	2027	
37_3	IE_NW_37S020300	Stragar_010	River	At Risk	Good	Moderate	N	Ind	2027	
37_3	IE_NW_37T010400	Tullinteane 37_010	River	At Risk	High	Good	Y	For	2027	
37_3	IE_NW_080_0000	Mcswines Bay	Coastal	Review	Good	Good	N		2027	
37_3	IE_NW_085_0000	Killybegs Harbour	Coastal	At Risk	Moderate	Moderate	N	Ind,UWW	2027	
37_4	IE_NW_37B010075	Ballaghdoo_010	River	At Risk	Bad	Poor	N	Ag	2027	Donegal SW & Murlins
37_4	IE_NW_37B010200	Ballaghdoo_020	River	At Risk	Poor	Poor	N	Ag	2027	Donegal SW & Murlins
37_4	IE_NW_37C030700	Crow_010	River	At Risk	Good	Poor	N	For	2021	Donegal SW & Murlins
37_4	IE_NW_37C050200	Cloghanmore_010	River	At Risk	Poor	Poor	N	Ag	2027	Donegal SW & Murlins
37_4	IE_NW_37G010045	Glen (Carrick)_010	River	At Risk	Good	Poor	N	M+Q	2021	Donegal SW & Murlins
37_4	IE_NW_37G010200	Glen (Carrick)_030	River	At Risk	Good	Moderate	N	Ag	2021	Donegal SW & Murlins
37_4	IE_NW_37G020100	Glenaddragh_010	River	At Risk	Moderate	Moderate	N	For	2021	Donegal SW & Murlins
37_4	IE_NW_37G020200	Glenaddragh_020	River	At Risk	Poor	Poor	N	Ag	2027	Donegal SW & Murlins

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
37_4	IE_NW_37O020600	Owenteskiny_010	River	At Risk	High	Good	Y	For	2021	Donegal SW & Murlins
37_4	IE_NW_37O030500	Owenwee (Carrick)_010	River	At Risk	Good	Poor	N	Ag,Hymo	2027	Donegal SW & Murlins
37_5	IE_NW_37_194	Croagh	Lake	Review	Unassigned	Unassigned	N		2027	
37_5	IE_NW_37D460520	Drumnakilly_010	River	Review	Unassigned	Unassigned	N		2027	
37_5	IE_NW_37E030350	Eany Water_020	River	Review	Unassigned	Unassigned	N		2027	
37_5	IE_NW_37M070870	Mountcharles_010	River	At Risk	Unassigned	Unassigned	N	DWW	2027	
37_5	IE_NW_37E020150	Eanymore Water_020	River	At Risk	Unassigned	Moderate	N	Ag	2027	
37_5	IE_NW_37E030300	Eany Water_010	River	At Risk	Good	Moderate	N	Ag,M+Q,UWW	2027	
37_5	IE_NW_37B040300	Bunlacky_010	River	At Risk	Unassigned	Good	Y	Ag,For	2027	

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
0600PUB1094	Killybegs	Donegal South (GWB)	IE_NW_G_047
	Killybegs	Lough Aroshin (LWB)	IE_NW_37_147
0600PUB1098	Donegal, River Eske	Donegal-Ballintra (GWB)	IE_NW_G_071
0600PRI3167	Harveys Point Hotel	Lough Eske (LWB)	IE_NW_37_188
0600PUB1096	Frosses-Inver	Glencoagh Lough (LWB)	IE_NW_37_195
	Frosses-Inver	St. Peter's Lough (LWB)	IE_NW_37_208

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

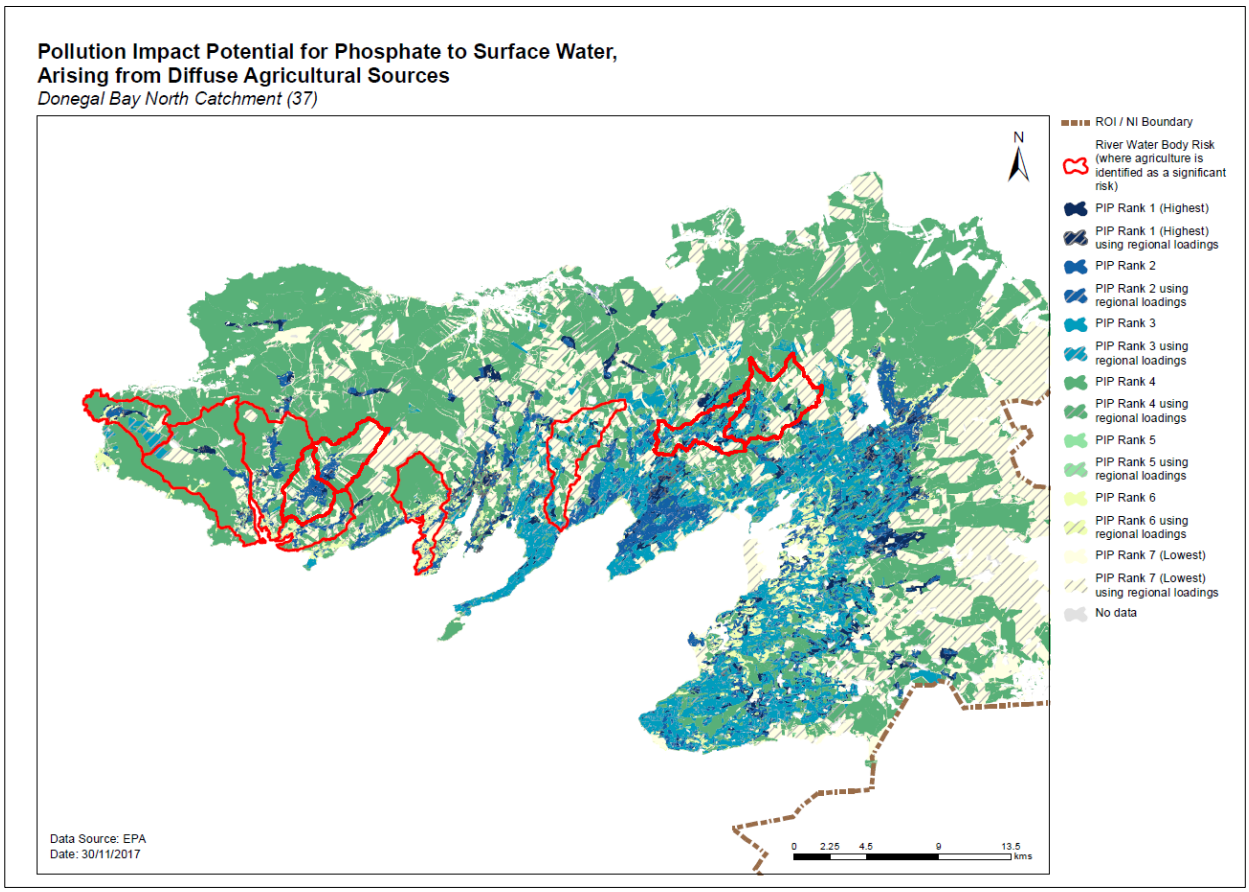
Note that additional water dependent species have been added that are not qualifying interests within the SACs (i.e. Arctic char (Salvelinus alpinus) has been added to Lough Eske And Ardnamona Wood SAC). River water bodies that are designated as Freshwater Pearl Mussel rivers (under Freshwater pearl mussel regulations (S.I. 296 2009)) 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?
Dunragh Loughs/Pettigo Plateau SAC 001125	none							
Donegal Bay (Murvagh) SAC 000133	2190	Good GW level	Groundwater	Donegal-Ballintra GWB	Good (NAR)	No	IE_NW_G_071	Yes
Durnesh Lough SAC 000138	1150	At least Good	Transitional	Durnesh Lough	Poor (AT RISK)	Yes	IE_NW_040_0100	Yes
Ballintra SAC 000115	none							
Tamur Bog SAC 001992	none							
River Finn SAC 002301	3110	At least Good	Lake	Belshade	Unassigned (NAR)	No	IE_NW_37_180	No
	1029 (19 of 27 catchments of S.I. 296 2009)	Good	River	Corabber_010	Good (AT RISK - HES obj)	No	IE_NW_37C010100	No
Lough Eske And Ardnamona Wood SAC 000163	3110	At least Good	Lake	Eske	Moderate (AT RISK)	Yes	IE_NW_37_188	No
	7220	Good GW level	Groundwater	Donegal South	Good (NAR)	No	IE_NW_G_047	No
	1106	Good	River	Clogher (Donegal)_010	Poor (AT RISK)	Yes	IE_NW_37C060400	No
			River	Corabber_010	Good (AT RISK - HES obj)	No	IE_NW_37C010100	No
			River	Drummeny_010	Good (NAR)	No	IE_NW_37D010400	No
			River	Eske_010	Moderate (AT RISK)	Yes	IE_NW_37E050200	No
			River	Eske_020	Good (NAR)	No	IE_NW_37E050400	No
			River	Lowerymore_030	Good (NAR)	No	IE_NW_37L010400	No
			Lake	Eske	Moderate (AT RISK)	Yes	IE_NW_37_188	No
	1029 (19 of 27 catchments of S.I. 296 2009)	Good	River	Clogher (Donegal)_010	Poor (AT RISK)	Yes	IE_NW_37C060400	Yes
			River	Corabber_010	Good (AT RISK - HES obj)	No	IE_NW_37C010100	Yes
			River	Drummeny_010	Good (NAR)	No	IE_NW_37D010400	Yes

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Lough Eske And Ardnamona Wood SAC 000163	1029 (19 of 27 catchments of S.I. 296 2009)	Good	River	Eske_010	Moderate (AT RISK)	Yes	IE_NW_37E050200	Yes
			River	Eske_020	Good (NAR)	No	IE_NW_37E050400	Yes
			River	Lowerymore_030	Good (NAR)	No	IE_NW_37L010400	Yes
	Artic char (not listed)	Good	River	Clogher (Donegal)_010	Poor (AT RISK)	Yes	IE_NW_37C060400	No
			River	Corabber_010	Good (AT RISK - HES obj)	No	IE_NW_37C010100	No
			River	Drummeny_010	Good (NAR)	No	IE_NW_37D010400	No
			River	Eske_010	Moderate (AT RISK)	Yes	IE_NW_37E050200	No
			River	Eske_020	Good (NAR)	No	IE_NW_37E050400	No
			River	Lowerymore_030	Good (NAR)	No	IE_NW_37L010400	No
			Lake	Eske	Moderate (AT RISK)	Yes	IE_NW_37_188	No
Croaghonagh Bog SAC 000129	none							
Lough Nillan Bog (Carrickatlieve) SAC 000165	Potential 3110	At least Good	Lake	Tamur	Unassigned (NAR)	No	IE_NW_37_149	No
St. John's Point SAC 000191	none							
Slieve League SAC 000189	none							
Slieve Tooey/Tormore Island/Loughros Beg Bay SAC 000190	none							
Meenaguse/Ardbane Bog SAC 000172	none							
Meenaguse Scragh SAC 001880	none							
Freshwater Pearl mussels (Not within SACs)	1029 (19 of 27 catchments of S.I. 296 2009)	Good	River	Lowerymore_010	Poor (AT RISK)	Yes	IE_NW_37L010100	Yes
			River	Lowerymore_020	High (NAR - HES obj)	No	IE_NW_37L010300	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