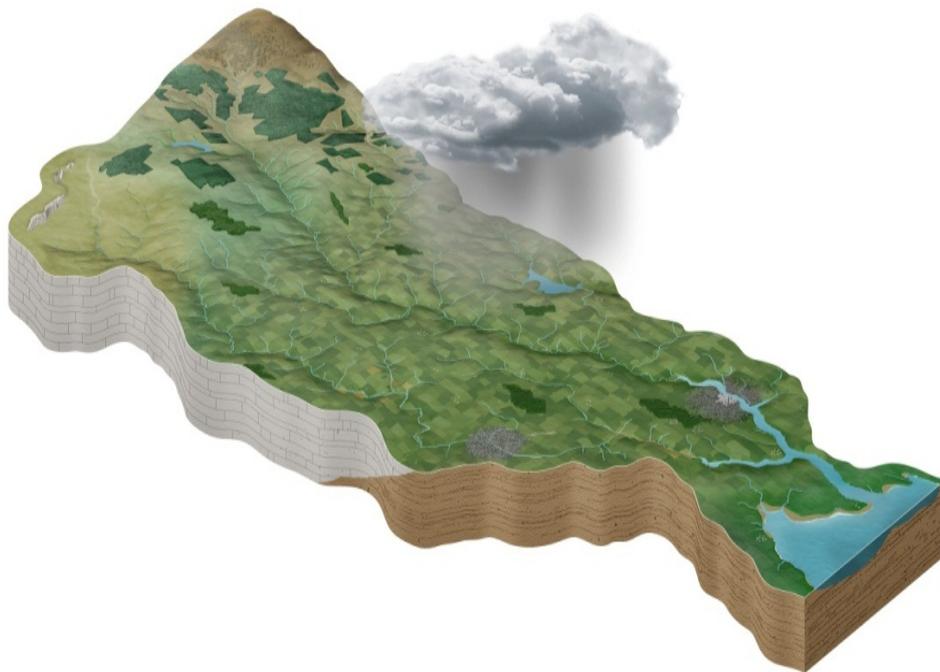


Ballyteigue-Bannow Catchment Assessment 2010-2015 (HA 13)



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 Ballyteigue-Bannow 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 Greenore Point and Railway Bridge, Great Island, Co. Wexford, draining a total area of 654km². There are no large urban centres in the catchment. The only urban centres in this catchment are Lady’s Island, Kilmore Quay, Bridgetown, Wellingtonbridge, Duncannon, and Campile. The total population of the catchment is approximately 26,600, with a population density of 41 people per km². The catchment has an undulating topography and is underlain by a series of volcanic and metamorphic rocks.

This small catchment is characterised by several short rivers flowing from the northern boundary of the catchment to the sea along the southern coast. The parts of the catchment adjacent to Waterford Harbour and the Hook Head Peninsula are drained by a series of small streams including the Carrowanree, Curraghmore and Graigue Great. From west to east the main rivers in the catchment are the Tintern Abbey Stream, the Owenduff, the Corock and the Mulmontry, all of which flow into Bannow Bay before reaching the sea at Ballyteige Bay. To the east, the Duncormick, Longbridge and Bridgetown Rivers flow into an estuarine channel behind Ballyteige Beach before reaching the sea also in Ballyteige Bay. The catchment east of Kilmore Quay is drained by the small rivers and streams flowing into the brackish Tacumshin and Lady’s Island lakes, which discharge to the sea via constantly shifting dune systems along the southern edge of the lakes.

The Ballyteige-Bannow catchment comprises five subcatchments (Table 1, Figure 1) with 30 river water bodies, six transitional water bodies, three coastal water bodies and four groundwater bodies.

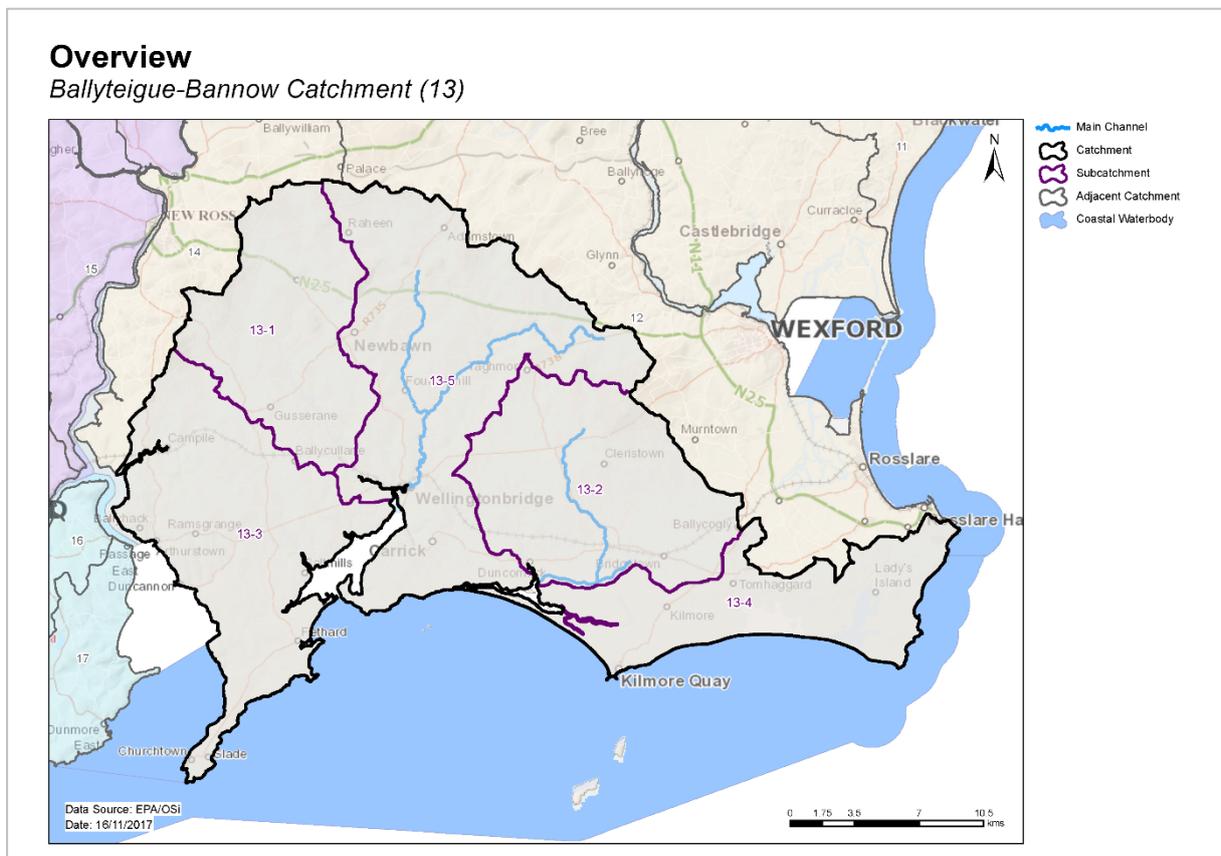


Figure 1. Subcatchments in the Ballyteige-Bannow catchment

Table 1. List of subcatchments in the Ballyteigue-Bannow catchment

Subcatchment ID	Subcatchment Name
13_1	Owenduff [Wexford]_Sc_010
13_2	Bridgetown [Wexford]_Sc_010
13_3	Curraghmore_Sc_010
13_4	Kisha_Sc_010
13_5	Corock_SC_010

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 eight (27%) river water bodies at Good status, and nine (30%) at less than Good status in 2015 (Table 2, Figure 2). Thirteen (43%) river water bodies are unassigned. There are no lake water bodies in the Ballyteigue-Bannow catchment.
- ◆ No river water bodies have a high ecological status objective.
- ◆ The numbers of river water bodies at each status class in 2007-09 and 2010-15 are shown in Figure 3.
- ◆ Since 2007-09 when WFD monitoring began, four water bodies have an improved status whereas six have deteriorated (Figure 5).
- ◆ The variation in nutrient concentrations and loads in the Owenduff (Wexford) and Bridgetown (Wexford) main channels are illustrated in Appendix 1.

2.1.2 Transitional and coastal (TraC)

- ◆ There are ten transitional and coastal (TraCs) water bodies in the Ballyteigue-Bannow catchment (Figure 2, Table 2).
- ◆ There are no water bodies with a high ecological status objective.
- ◆ The numbers of TraC water bodies at each status class in 2007-09 and 2010-15 are shown in Figure 4.
- ◆ Since 2007-09 when WFD monitoring began, one water body has an improved status and one has deteriorated (Figure 5).
- ◆ Note that the coastal water body Southwestern Irish Sea (HAs 11;12) is shared with three other catchments (HAs 10,11,12).

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

	Number of water bodies	2010-15 Status						Risk Categories		
		High	Good	Mod	Poor	Bad	Unassigned	Not at Risk	Review	At Risk
Rivers	30	0	8	6	3	0	13	7	13	10
TraC	10	0	3	1	0	1	5	3	5	2

WFD Surface Water Body Status 2010 - 2015

Ballyteigue-Bannow Catchment (13)

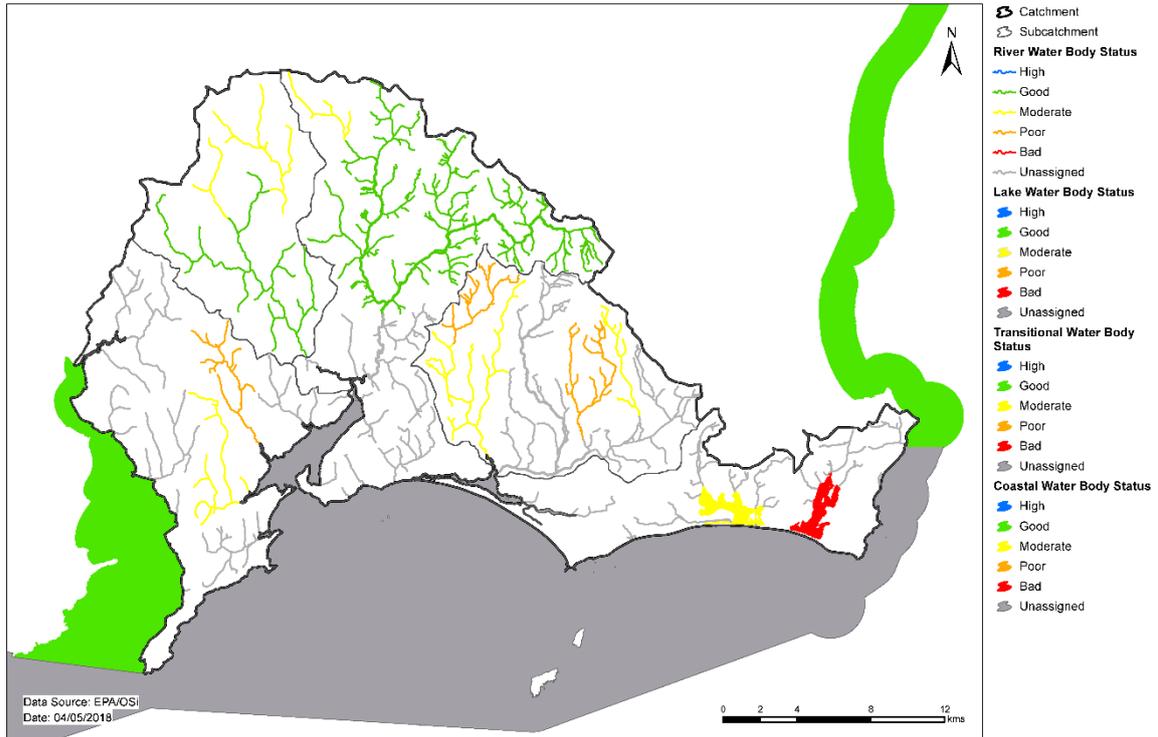


Figure 2. Surface water ecological status

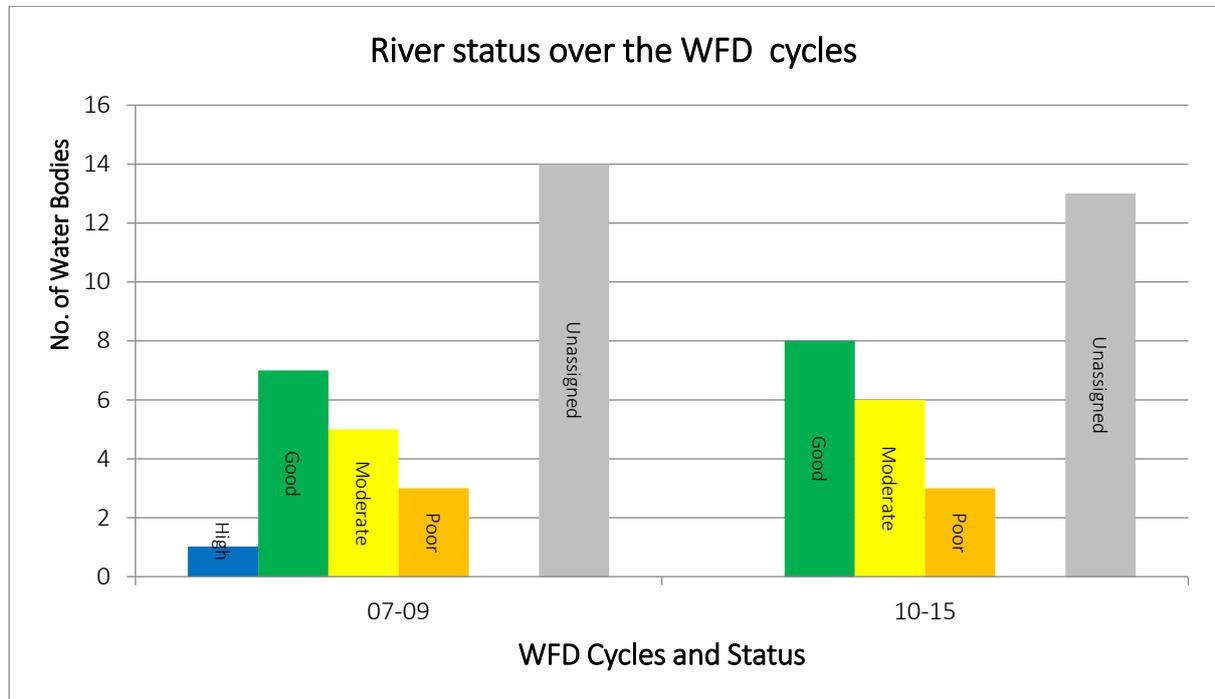


Figure 3. Number of rivers at each status class in 2007-09 and 2010-15

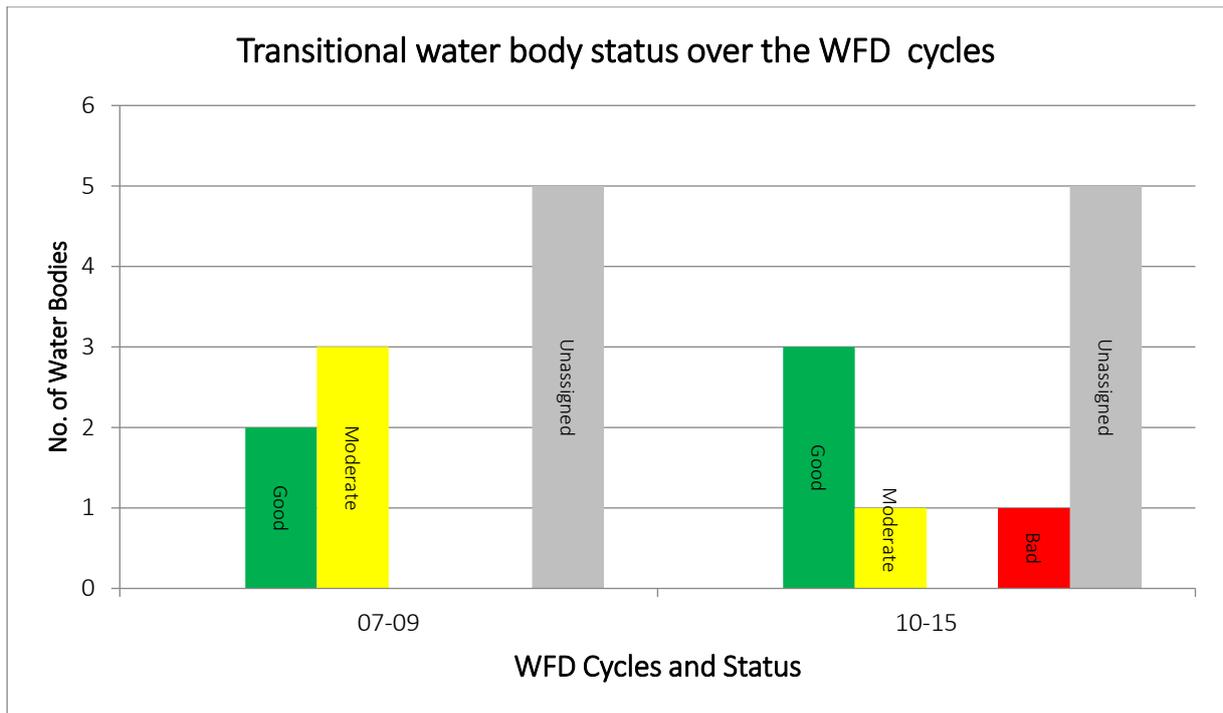


Figure 4. Number of TraC at each status class in 2007-09 and 2010-15

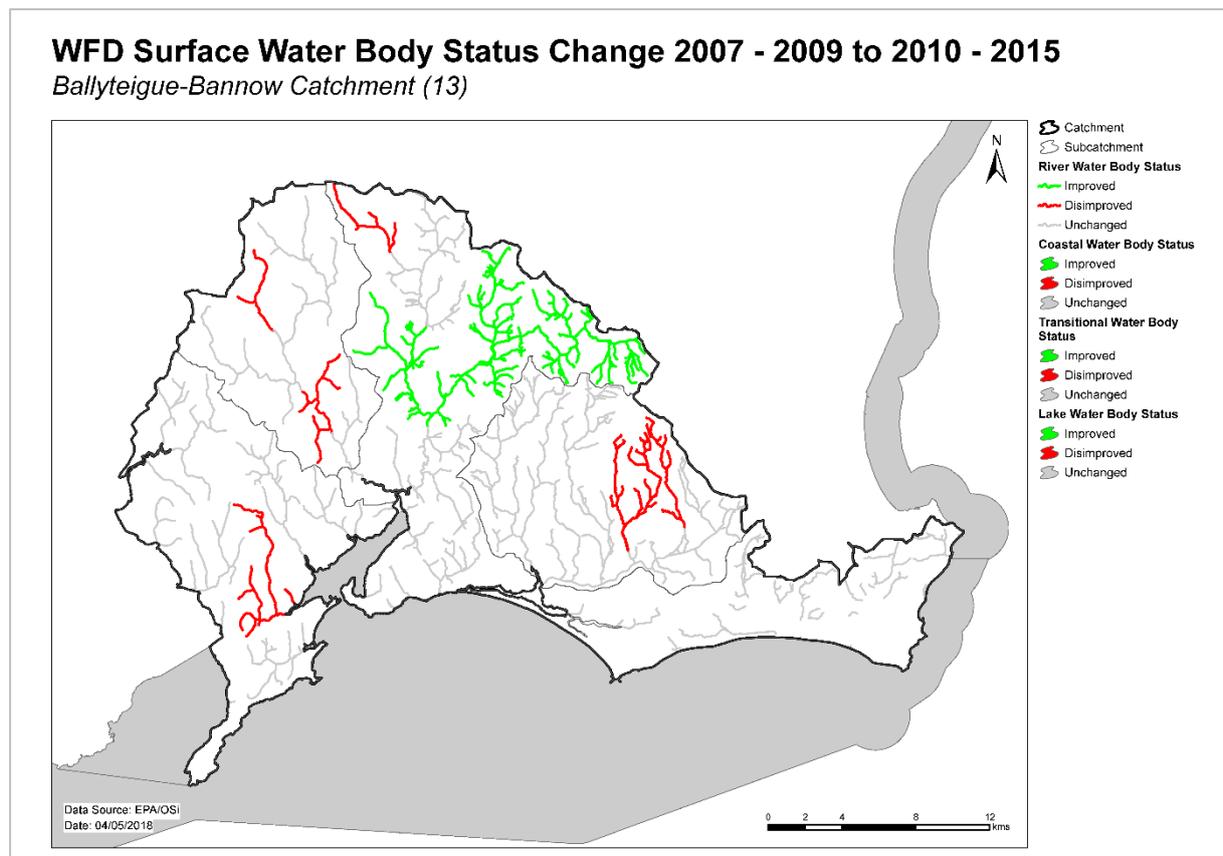


Figure 5. Surface water body status change from 2007-09 to 2010-15

2.2 Groundwater status

- ◆ There were four groundwater bodies at Good status in 2015 (Table 3).

- ◆ All four, Adamstown, Bridgetown, Fardystown and Fethard, have remained at Good status between 2007-12 and 2010-15.

Table 3. Summary of groundwater body status and risk categories

	Number of water bodies	2010-15 Status		Risk Categories		
		Good	Poor	Not at Risk	Review	At Risk
Groundwater	4	4	0	2	2	0

2.3 Risk of not meeting surface water environmental objectives

2.3.1 Rivers

- ◆ There are seven *Not at Risk* river water bodies (Figure 5, Table 2) and these require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ There are 13 river water bodies in *Review*. This includes water bodies where more information is required.
- ◆ Ten river 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 2.

2.3.2 Transitional and coastal (TraC)

- ◆ There are three *Not at Risk* TraC water bodies which requires no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ There are five TraC water bodies in *Review*.
- ◆ Two TraC water bodies in the catchment are *At Risk* of not meeting their water quality objectives – Lady's Island Lake and Tacumshin Lake. Measures will be needed in these water bodies to improve the water quality outcomes. Both lagoons are currently under a joint EPA and NPWS project.

Water Body Risk

Ballyteigue-Bannow Catchment (13)

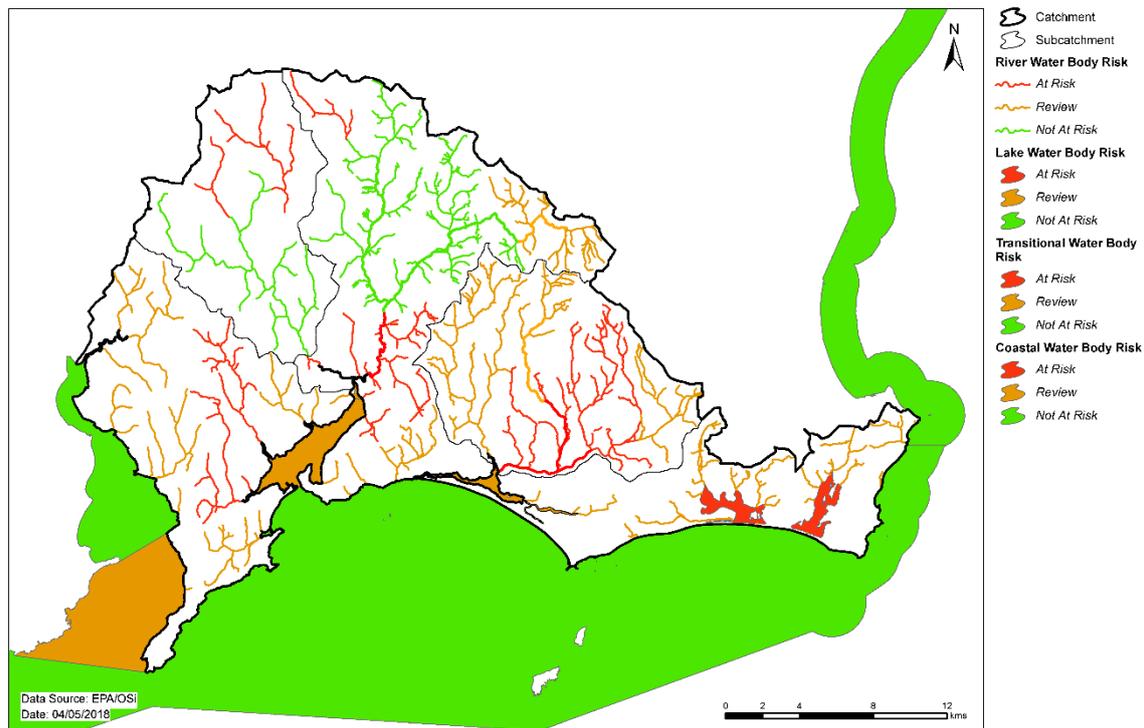


Figure 5. Surface water body risk

2.4 Risk of not meeting groundwater environmental objectives

- ◆ Two groundwater bodies, Bridgetown and Fardystown, are *Not at Risk* (Figure 6, Table 4) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ Two groundwater bodies are in *Review*. Both Adamstown and Fethard are in *Review* due to being hydrologically linked to surface waters where there is potential for the groundwaters to be a contributing source of phosphorus. Adamstown is also in *Review* due to elevated nitrate concentrations (Figure 6).
- ◆ There are no *At Risk* groundwater bodies.

2.5 Protected areas

2.5.1 Drinking water protected areas

- ◆ There are 12 abstractions in the Ballyteigue-Bannow catchment comprising six public supplies and one private (Appendix 3).
- ◆ Ten of the abstractions are from three groundwater bodies (Adamstown, Fardystown and Fethard) and the remaining two are from two rivers (Mulmontry_020 and Owenduff (Wexford)_030). The list of the public supplies and the associated water bodies is provided in Appendix 4.
- ◆ All drinking water sources were compliant with the standards for nitrate and pesticides in 2015.

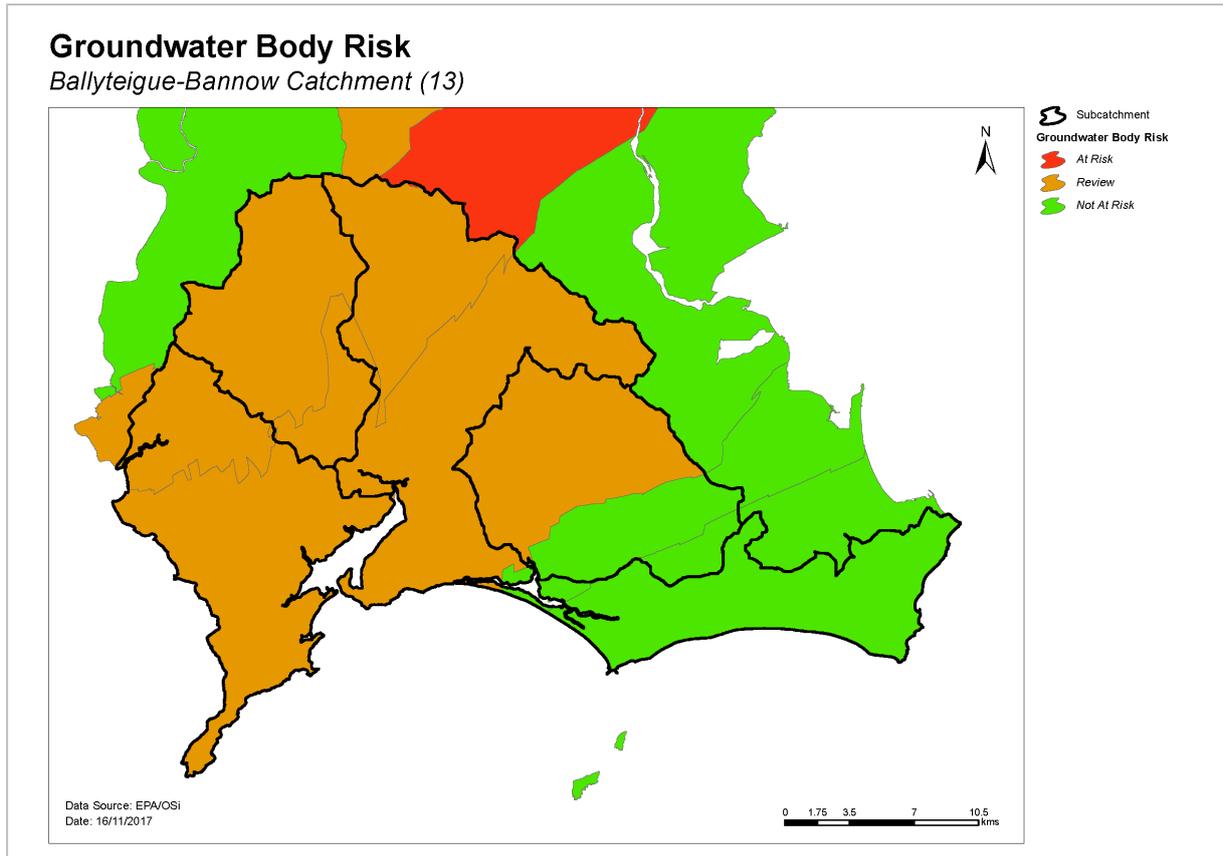


Figure 6. Groundwater body risk

2.5.2 Bathing waters

- ◆ There is one designated bathing waters in the catchment.
- ◆ Duncannon beach was classified as having poor water quality (based on the assessment of bacteriological results) during 2011-2014 and 2012-2015.

Table 4. Designated bathing waters in the catchment

Bathing water		Water body intersection		Objective met?	
Name	Code	Name	Code	Yes	No
Duncannon	IESEBWT100_0100_0100	Barrow Suir Nore Estuary	IE_SE_100_0100		✓

2.5.3 Shellfish areas

- ◆ There are three designated shellfish areas in the catchment (Table 5). Bannow Bay falls within the catchment, and Waterford Harbour is adjacent to the catchment boundary however several rivers from HA 13 discharge to it.
- ◆ Two of the three are compliant with the environmental objective for shellfish waters.

Table 5. Designated shellfish areas in the catchment

Shellfish area		Water body intersection		Objective met?	
Name	Code	Name	Code	Yes	No
Bannow Bay	IEPA2_0002	Bannow Bay	IE_SE_090_0000		✓
Waterford Harbour (Cheekpoint/Arthurstown/Creadan)	IEPA2_0056	Barrow Suir Nore Estuary	IE_SE_100_0100	✓	
Waterford Harbour (Cheekpoint/Arthurstown/Creadan)	IEPA2_0056	Waterford Harbour	IE_SE_100_0000	✓	

2.5.4 Nutrient sensitive areas

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

2.5.5 Natura 2000 sites

- ◆ There are eight Special Areas of Conservation (SACs) in the catchment (Appendix 4), not all of which have water quality and/or quantity conservation objectives for their qualifying interests.
- ◆ Three transitional water bodies (Ballyteige channels, Lady's Island Lake and Tacumshin Lake) have been prioritised for action as the water conservation objectives for their habitats and/or species are not being supported by ecological status (Appendix 4).
- ◆ There are four Special Protected Areas (SPAs) in the catchment:
 - Ballyteige Burrow SPA (004020)
 - Bannow Bay SPA (004033)
 - Lady's Island Lake SPA (004009)
 - Tacumshin Lake SPA (004092)

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

2.6 Heavily modified water bodies

- ◆ There are no designated heavily modified water bodies (HMWB) in the catchment.
- ◆ There are no artificially modified water bodies (AWB) in the catchment.

3 Significant issues in *At Risk* water bodies

- ◆ Excess phosphate leading to eutrophication is a concern in several water bodies. While excess ammonia is also of concern, it is only for a limited number of water bodies.
- ◆ Alteration of hydromorphological (or physical) conditions (primarily the input of excessive fine sediment) and poor habitat quality are issues for a small number of surface water bodies.
- ◆ Lady's Island Lake and Tacumshin Lake are lagoons that are both *At Risk* and remain at Bad status and Moderate status respectively; both are impacted by hydromorphology impacts. Deteriorated dissolved oxygen conditions and elevated nutrients is also a significant issue in Lady's Island lake. Tacumshin Lake has poor fish status and elevated nutrients as the significant issues.
- ◆ There are no significant issues for the groundwater bodies in the Ballyteigue-Bannow catchment.

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 7 shows a breakdown of the number of *At Risk* river and transitional water bodies in each significant pressure category.

4.1.1 Rivers, lakes, transitional and coastal

- ◆ There are no *At Risk* lake, coastal or groundwater bodies in the Ballyteigue-Bannow catchment. Significant pressures have been identified by the initial characterisation process in 12 water bodies, nine of which have multiple pressures. The significant pressures will be refined as further characterisation is carried out.
- ◆ The significant pressure affecting the greatest number of river water bodies is agriculture followed by domestic waste water, hydromorphology, diffuse urban, forestry, other and urban waste water (Figure 7).
- ◆ The significant pressure affecting the transitional water bodies are agriculture and hydromorphology (Figure 7).

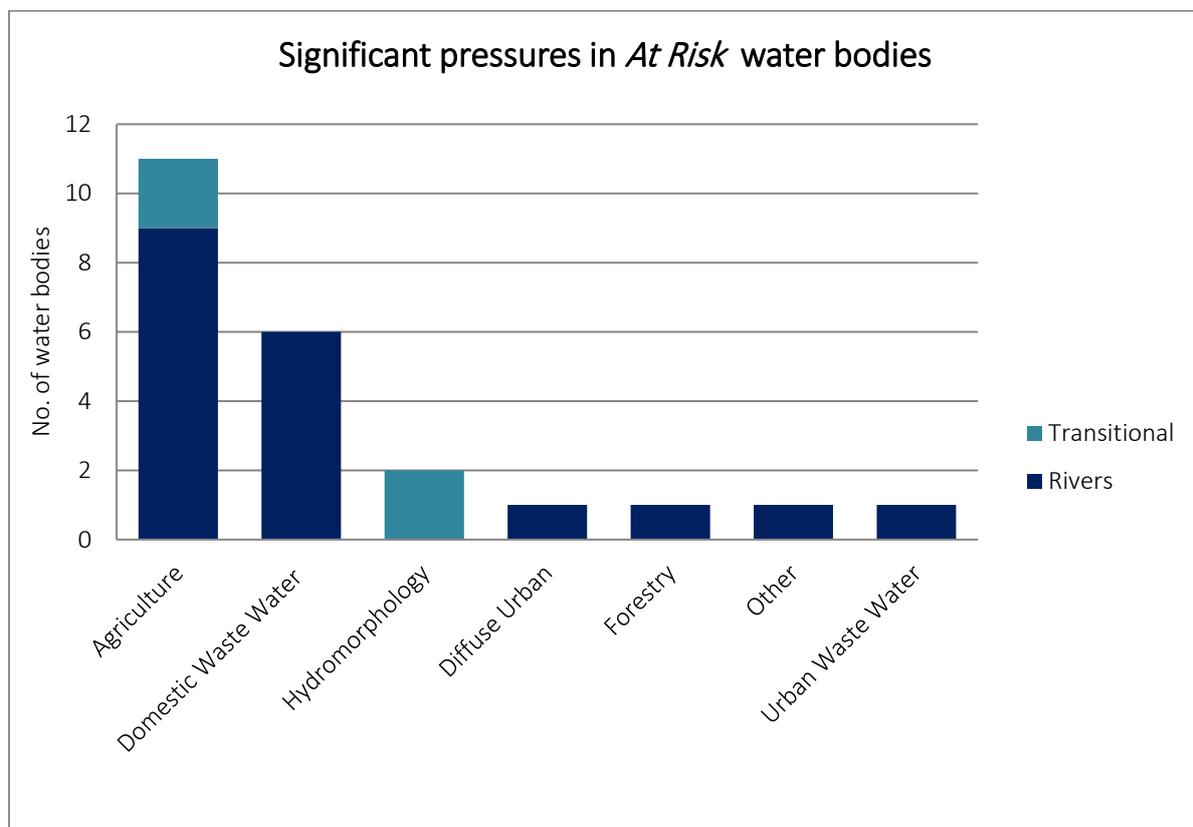


Figure 7. Significant pressures impacting on *At Risk* river water bodies

4.2 Pressure type

4.2.1 Agriculture

- ◆ Agriculture is a significant pressure in nine river water bodies across several subcatchments and two transitional water bodies (Lady's Island Lake and Tacumshin Lake); the water bodies affected by farming are shown in Figure 8. The issues related to farming in this catchment are diffuse 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 pollution impact potential map showing areas of relative risk for phosphorus loss from agriculture to surface water is given in Appendix 5.

4.2.2 Domestic waste water

- ◆ Domestic waste water has been identified as a significant pressure in six river water bodies (Figure 9). This is due to high densities of unsuitable domestic waste water systems in close proximity to the water bodies, especially when sited on poorly draining soils. The significant issues are a combination of excess nutrients entering surface waters. Exceedances of EQS for baseline concentrations of phosphate and ammonia have been noted.

4.2.3 Hydromorphology

- ◆ Both Lady's Island Lake and Tacumshin Lake are lagoons that are both *At Risk* are impacted by hydromorphology pressures. Figure 10.

4.2.4 Diffuse urban

- ◆ Diffuse urban has been identified as a significant pressure in one river water body, Cleristown Stream_010 (Figure 11). This water body is impacted by excess nutrients from unfinished housing estates.

4.2.5 Forestry

- ◆ Forestry has been identified as a significant pressure in one river water body –Tintern Abbey Stream_010 (Figure 12). The significant issues are a combination of general forestry activities and clearfelling, which have resulted in siltation and excess nutrients in surface water bodies.

4.2.6 Other

- ◆ *Unknown Anthropogenic*
One *At Risk* water body, Begerin Stream_010 has unknown anthropogenic pressures (Figure 13).

4.2.7 Urban waste water treatment plants

- ◆ Urban Waste Water Treatment Plants (WWTPs) have been highlighted as a significant pressure in one *At Risk* water body, Corock_040. This water body is impacted by Wellingtonbridge WWTP (A0245), which is currently not specified in improvement plans.

At Risk Water Bodies where Agriculture is a significant pressure
 Ballyteigue-Bannow Catchment (13)

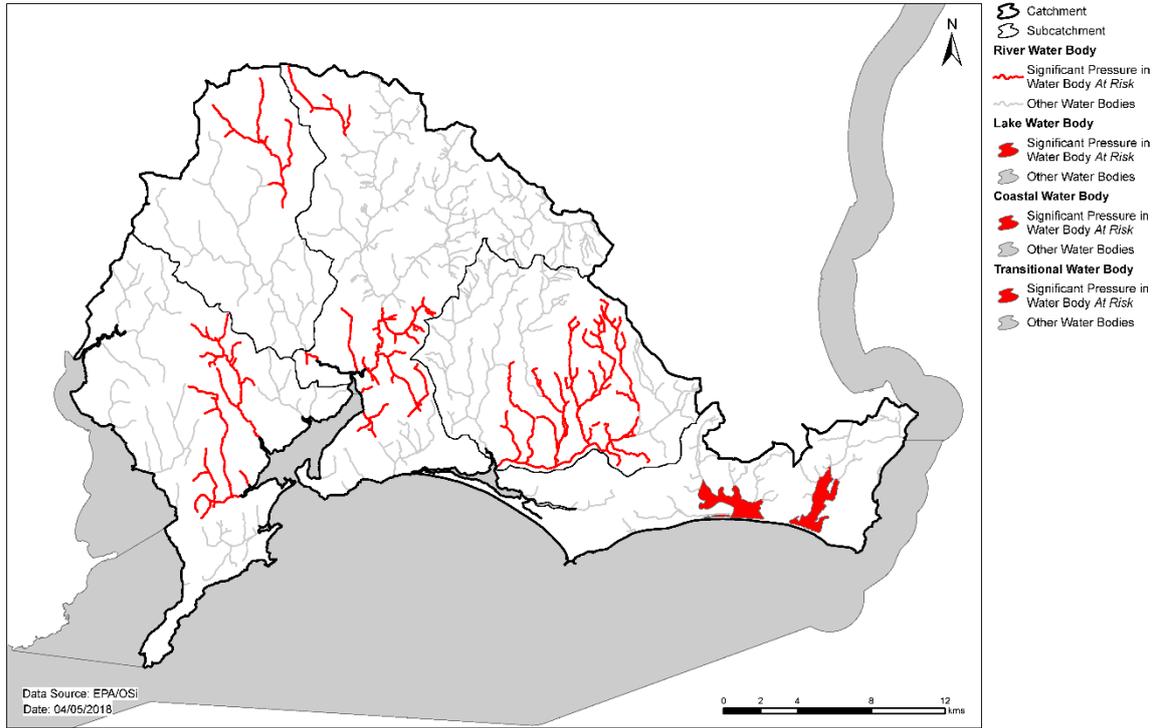


Figure 8. Water bodies that are At Risk and are impacted by agricultural activities

At Risk Water Bodies where Domestic Waste Water is a significant pressure
 Ballyteigue-Bannow Catchment (13)

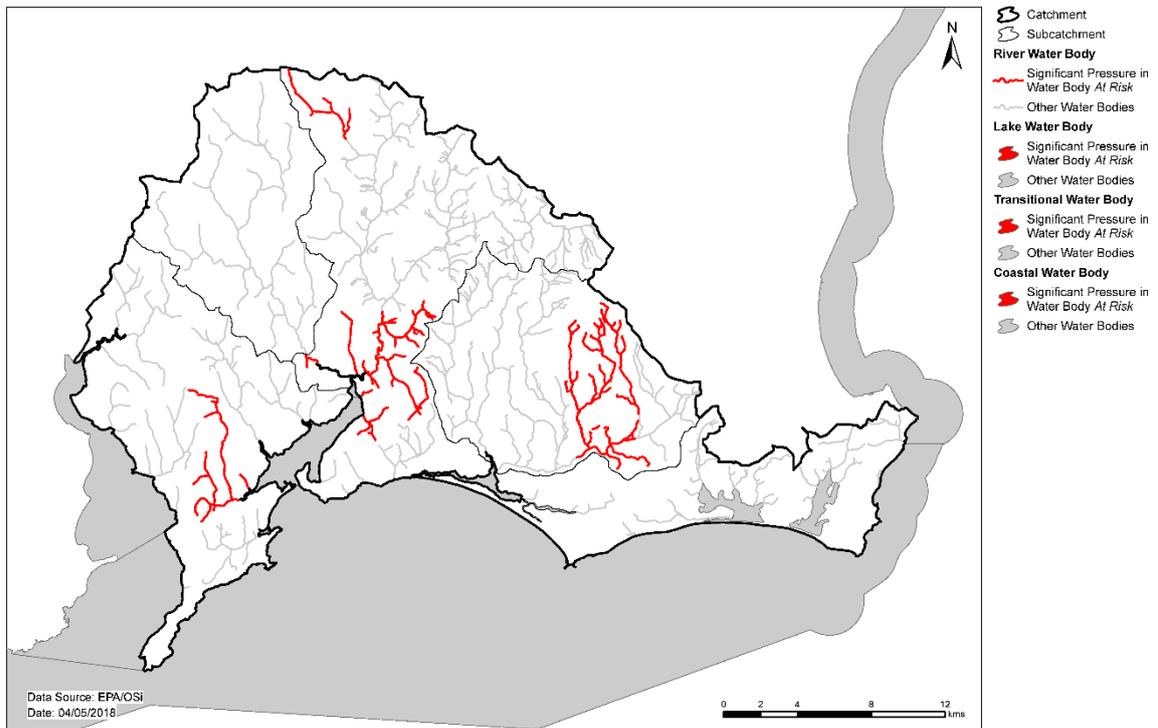


Figure 9. Water bodies that are At Risk and are impacted by domestic waste water

At Risk Water Bodies where Hydromorphology is a significant pressure
 Ballyteigue-Bannow Catchment (13)



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

At Risk Water Bodies where Diffuse Urban is a significant pressure
 Ballyteigue-Bannow Catchment (13)



Figure 11. Water bodies that are *At Risk* and are impacted by diffuse urban pressures

At Risk Water Bodies where Forestry is a significant pressure
 Ballyteigue-Bannow Catchment (13)

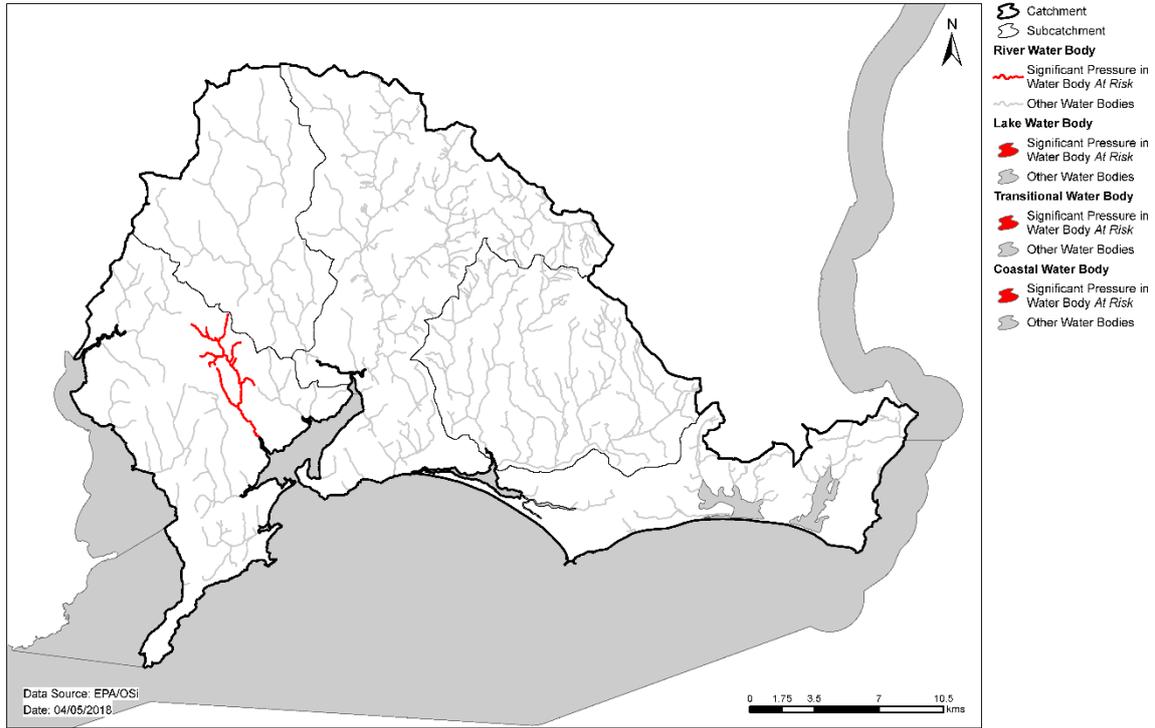


Figure 12. Water bodies that are *At Risk* and are impacted by forestry activities

At Risk Water Bodies where Other Anthropogenic Pressures is a significant pressure
 Ballyteigue-Bannow Catchment (13)

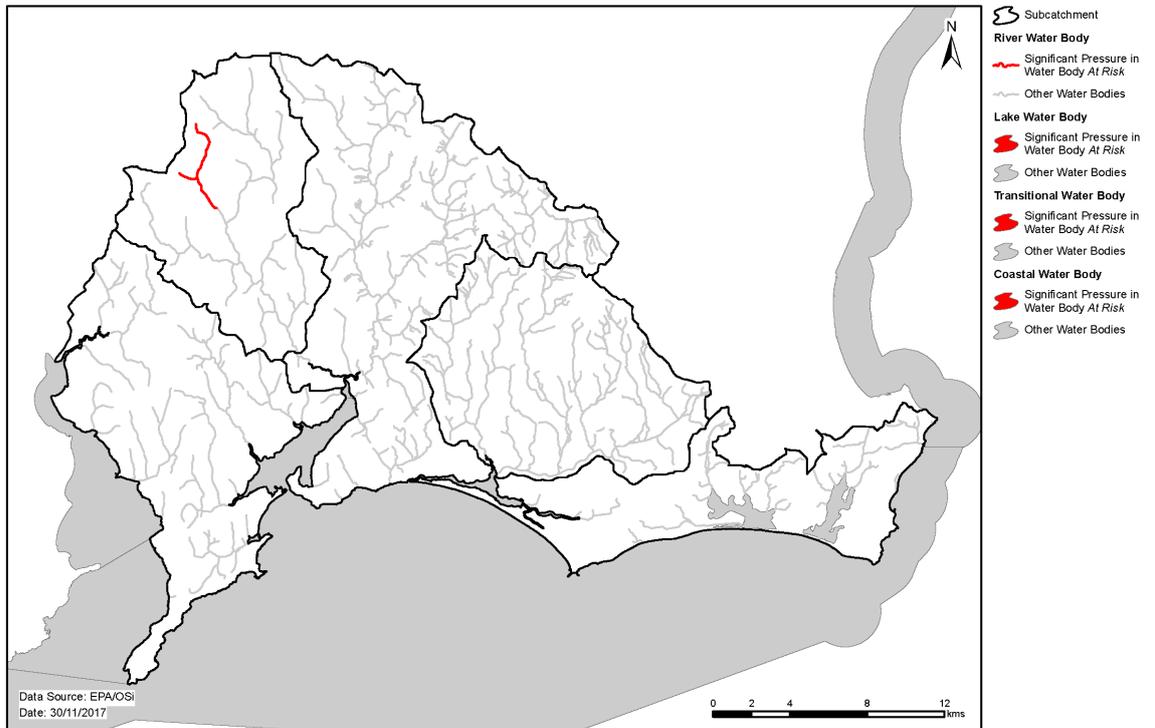


Figure 13. Water bodies that are *At Risk* and are impacted by other anthropogenic pressures

At Risk Water Bodies where Urban Waste Water is a significant pressure Ballyteigue-Bannow Catchment (13)

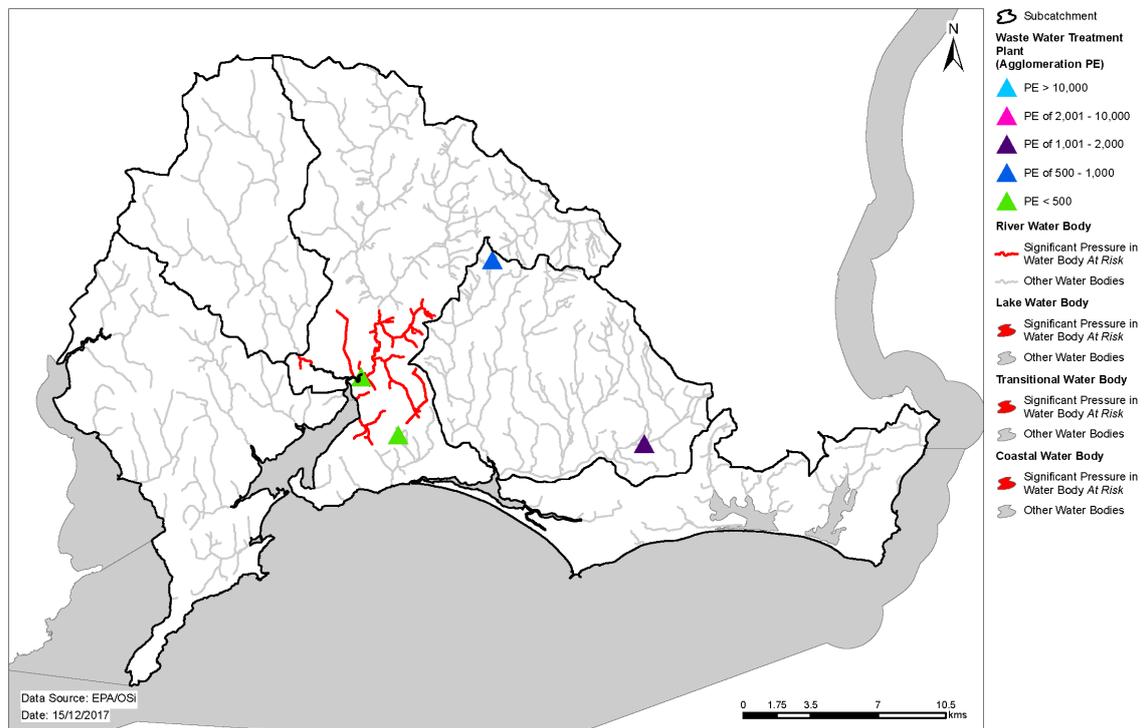


Figure 14. Water bodies that are *At Risk* and are impacted by urban waste water

5 Load reduction assessment

5.1 River water body load reductions

- ◆ The results of the main channel assessment for both the Bridgetown (Wexford) and Owenduff (Wexford) rivers indicate that reductions are required for both TON and orthophosphate (Appendix 1).
- ◆ 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.
- ◆ The available data for the Ballyteigue-Bannow catchment indicate that orthophosphate load reduction is required in two river water bodies (Table 6).
- ◆ The nitrate assessment is aimed at reducing the nitrate loading to the associated TraC water bodies. For water bodies where nitrate monitoring data are available, the reduction in TON load that would be required to bring the annual concentrations back to 2.60 mg/l can be estimated. In the Ballyteigue-Bannow catchment, the available data indicate that load reductions are required in 9 river water bodies (Table 7).

Table 6. Relative phosphate load reductions required in monitored water bodies that are *At Risk*.

WATER BODY	P Load Reduction Required
Corock_040	Low
Bridgetown (Wexford)_030	Low

Table 7. Relative nitrate load reductions required in monitored water bodies.

WATER BODY	N Load Reduction Required
Owenduff (Wexford)_010	High
Heathpark Stream_010	High
Corock_040	Med
Carrowanree_010	Low
Corock_010	High
Owenduff (Wexford)_020	Med
Mulmontry_020	High
Mulmontry_010	Low
Mulmontry_030	Low

5.2 TraC load reductions

Some 18 estuaries in Ireland have been monitored on a continual basis since 1990 as part of Ireland's commitment under the Convention for the Protection of the Marine Environment of the North-East Atlantic (the Ospar Convention). This has shown that generally over the long term, nutrients have decreased but further reduction will be required in many cases to support Good Ecological Status. However, many estuaries have not been monitored to the same degree, and where monitoring data is insufficient, an ongoing programme of modelling has been undertaken to estimate potential nutrient load removal from contributing sub-catchments.

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

Lady's Island Lake and Tacumshin Lake have elevated nutrients. They are part of a coastal lagoons project and nutrient reductions will be further considered when the project is complete.

6 Further characterisation and investigative assessments

- ◆ Further characterisation through Local catchment assessments is needed in 10 of the *At Risk* river water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified.
- ◆ Further characterisation through local catchment assessments is needed in 13 of the *Review* water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified.
- ◆ Brief details on the 10 IA assessment scenarios are given in Appendix 6.

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

Risk	IA 1	IA 2	IA 3	IA 5	IA6	IA 7	IA 8	IA 9	Total
<i>At Risk</i>	2	0	0	0	1	10	0	0	13
<i>Review</i>	3	0	8	0	1	2	0	0	14
Note water bodies may have multiple categories of Local Catchment Assessments									

7 Catchment summary

- ◆ Of the 40 river and TraC water bodies, 12 are *At Risk* of not meeting their WFD objectives. There are no lake water bodies in the Ballyteigue-Bannow catchment.
- ◆ Excess phosphorus leading to eutrophication is a concern in several water bodies. While excess ammonium is also of concern, it is only for a limited number of water bodies.
- ◆ Hydromorphological (or physical) conditions (primarily the input of excessive fine sediment) and poor habitat quality are issues for a small number of surface water bodies.
- ◆ None of the groundwater bodies are *At Risk*.

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

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

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

8.2 Outcomes of process

The outcomes for the Ballyteigue-Bannow catchment are summarised below.

- ◆ Three recommended areas for actions (Table 9, Figure 15) were selected.
- ◆ These are the Wexford Coastal Lagoons, Bannow and Waterford Harbour.
- ◆ These include:
 - 14 river water bodies – six *At Risk* and eight *Review*, and
 - Four transitional and coastal (TraC) water bodies – two *At Risk* and two *Review*.
- ◆ Two groundwater bodies, that are in *Review* due to groundwater contribution of nutrients to surface water bodies, intersect with three 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 12 *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 16. These include:

- ◆ nine river water bodies – four *At Risk* and five *Review*, and
- ◆ three *Review* transitional water bodies.

Table 9. Recommended Areas for Action in the Ballyteigue-Bannow catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Wexford coastal lagoons	4	13_4	Wexford	<ul style="list-style-type: none"> • Bad status (Lady's island lake). • Building on ongoing research and work with Wexford CoCo. • Lady's island lake is an important heritage site and is the start of the Norman way on the ancient east trail. • Tacumshan Lake recently transferred to state ownership (NPWS). • Nature reserves, SAC, SPA, RAMSAR.
Bannow	11	13_5 13_1 13_3	Wexford	<ul style="list-style-type: none"> • Bannow bay is failing to meet its Protected Area objective for shellfish. • Three deteriorated water bodies. • Building on ongoing work by Wexford County Council. • Active community groups. • Strong coast watch group. • Potential to work with local CLAM (coordinated local aquaculture management) scheme. • Most important sea trout fishery in the south of the county. • Important sea angling. • Important wild fowl in the bay. Preserving zoster grass, which geese feed on, and preventing it from being swamped by algae. • Two potential 'quick wins'.
Waterford Harbour	3	13_3	Wexford	<ul style="list-style-type: none"> • Waterford Harbour Shellfish area has recently downgraded. Locals have commented on die off of the local mussel population. • Building on planned Irish Water works at Duncannon, Arthurstown, Ballyhack). • Building on completed and ongoing work by Wexford County Council. • Discharges into designated bathing area (Duncannon). • Important habitats, including the second largest Honeycomb coral habitat in Europe and wild shellfish fisheries.

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_SE_G_001	Adamstown	Review	IE_SE_13B050050	BEGERIN STREAM_010	Bannow
			IE_SE_13C010020	COROCK_010	
			IE_SE_13H010020	HEATHPARK STREAM_010	
			IE_SE_13T010900	TINTERN ABBEY STREAM_010	
IE_SE_G_065	Fethard	Review	IE_SE_13B040500	BATTLESTOWN STREAM_010	
			IE_SE_13B350700	BALLYMADDER_010	
			IE_SE_13B390600	BALLYCULLANE 13_010	
			IE_SE_13C010300	COROCK_040	
			IE_SE_13G060990	GRAIGUE GREAT_010	
			IE_SE_13H010020	HEATHPARK STREAM_010	
			IE_SE_13M010200	MULMONTY_010	
			IE_SE_13T010900	TINTERN ABBEY STREAM_010	
IE_SE_G_001	Adamstown	Review	IE_SE_13C220990	CARROWANREE_010	Waterford Harbour
			IE_SE_13C230990	CURRAGHMORE 13_010	

9 Environmental Objectives

9.1 Surface Water

- ◆ Assuming resources are available and actions are taken in the recommended areas for action, of the eight *At Risk* surface water bodies, it is predicted that 2 (25%) will improve by 2021 and 6 (75%) will achieve their objective by 2027. For the ten *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 these water bodies, see Table 11.

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

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
<i>At Risk</i>	6	2	4
<i>Review</i>	8	0	8
TraCs			
<i>At Risk</i>	2	0	2
<i>Review</i>	2	0	2
Total	18	2	16

- ◆ Ten surface water bodies have met their 2015 environmental objective. Two of the ten met their 2015 environmental objective for ecological status but failed to meet their protected area objectives.

- ◆ As action is not yet planned to be taken in the remaining four *At Risk* surface water bodies, a 2027 date is applied to all four water bodies. For the eight *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 these water bodies, see Table 12.

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

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
<i>At Risk</i>	4	0	4
<i>Review</i>	5	2	3
TraCs			
<i>At Risk</i>	0	0	0
<i>Review</i>	3	0	3
Total	12	2	10

9.2 Groundwater

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

10 Acknowledgements

This Ballyteigue-Bannow Catchment Assessment (Version 3) has been produced by the Catchment Science & Management Unit, EPA, with the assistance of the following:

- Wexford County Council
- Inland Fisheries Ireland.
- Local Authorities Waters & Communities Office.
- Irish Water.
- RPS Group.
- Ecological Monitoring & Assessment Unit, EPA.
- Hydrometric & Groundwater Section, EPA.
- Informatics Section, EPA.
- Laboratories, EPA.
- Office of Environmental Enforcement, EPA.
- Department of Housing, Planning and Local Government.
- DAFM Agriculture.
- DAFM Forest Service.
- Coillte.
- Teagasc.
- Geological Survey Ireland.
- National Federation of Group Water Schemes.
- National Parks and Wildlife Service.
- Waterways Ireland.
- Board Iascaigh Mhara.
- Marine Institute.
- Sea Fisheries Protection Authority.

Recommended Areas for Action Ballyteigue-Bannow Catchment (13)

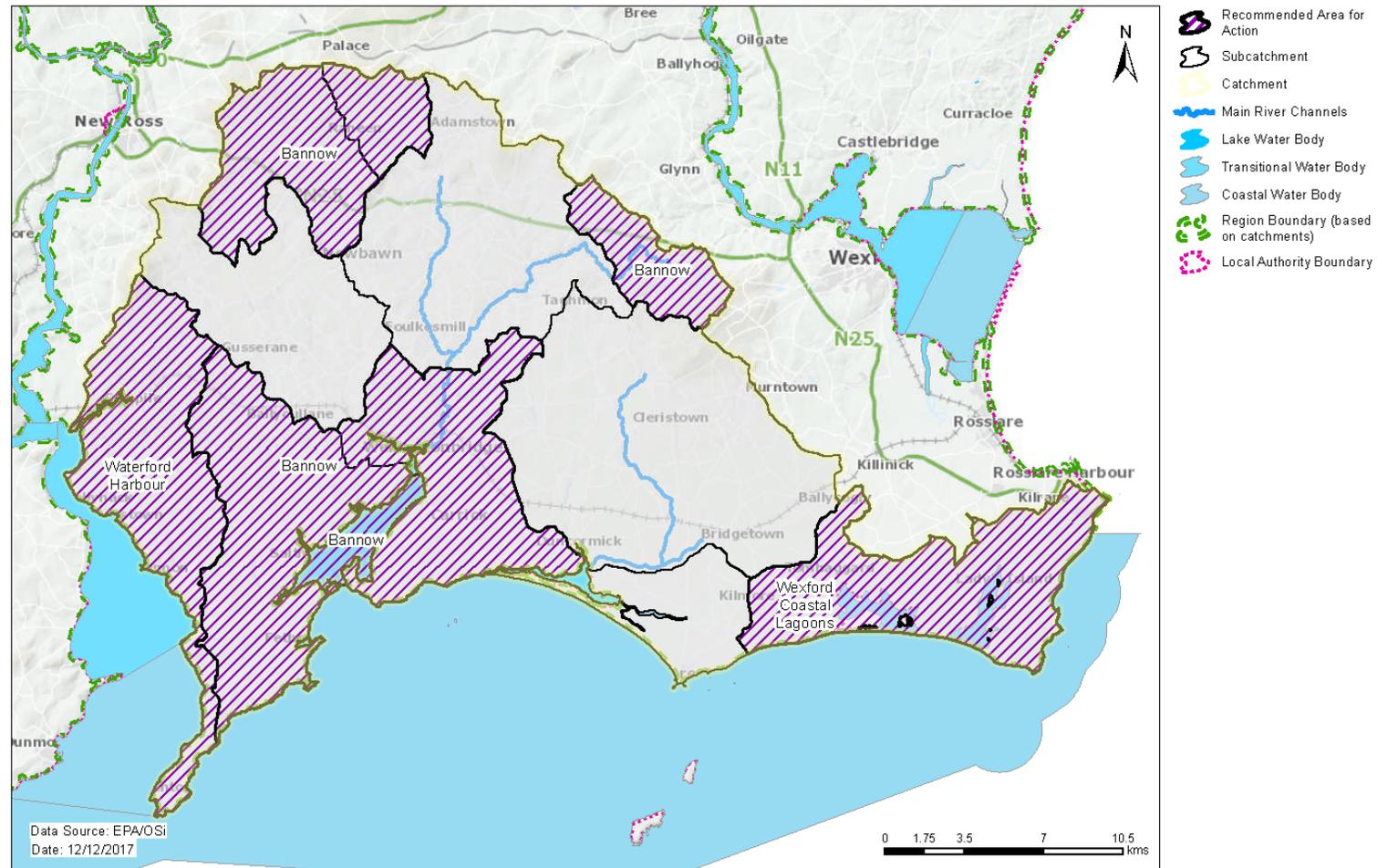


Figure 15. Location of Recommended Areas for Action in the Ballyteigue-Bannow Catchment

Remaining *At Risk* and *Review* Water Bodies

Ballyteigue-Bannow Catchment (13)

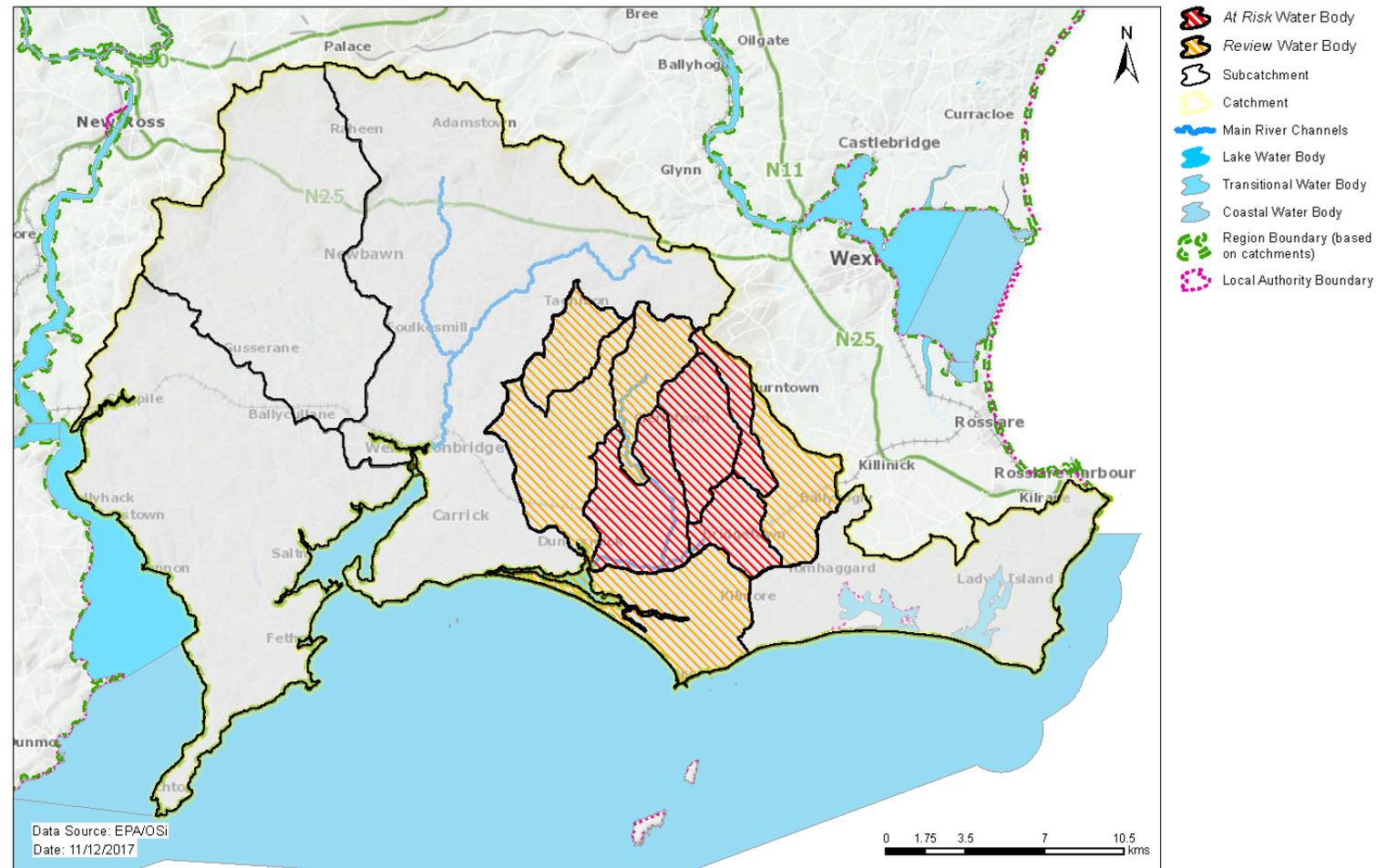


Figure 16. Location of *At Risk* and *Review* water bodies located outside Recommended Areas for Action in the Ballyteigue-Bannow Catchment

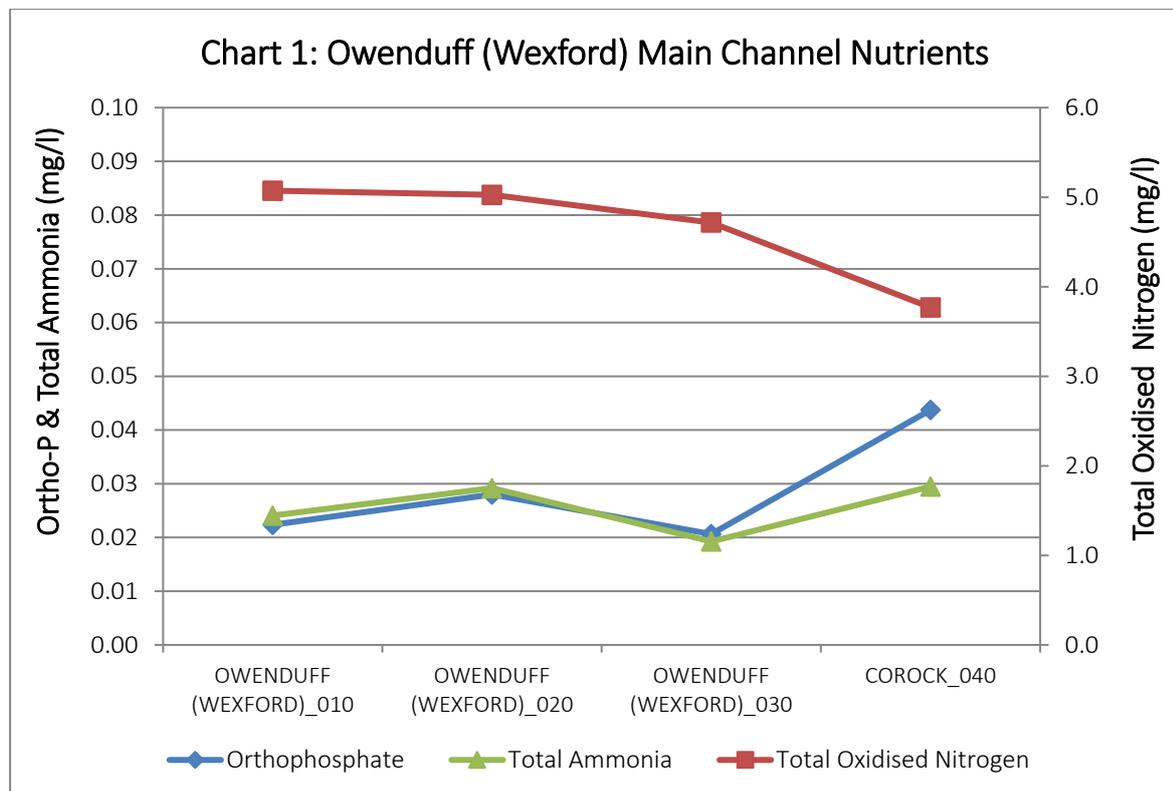
Appendix 1 Catchment scale nutrient concentrations and in-stream loads

The results of the water quality assessment for the Owenduff (Wexford) main channel are illustrated in Chart 1.

The results show that orthophosphate concentrations throughout the main channel are low and become slightly elevated (0.044mg/l) towards the sub-catchment outlet, where it converges into the Corock_040. Listed pressures for the Corock_040 include the Wellingtonbridge and Environs Waste Water Treatment Plant (WWTP).

Like orthophosphate, ammonia is similar in concentrations and trend, but remain below the Environmental Quality Standard (EQS) for good status (0.065mg/l).

The TON concentrations are elevated above the 2.6mg/l drinking water threshold along the main channel, and are highest in the headwaters decreasing gradually downstream from 5.82mg/l to 3.77mg/l.



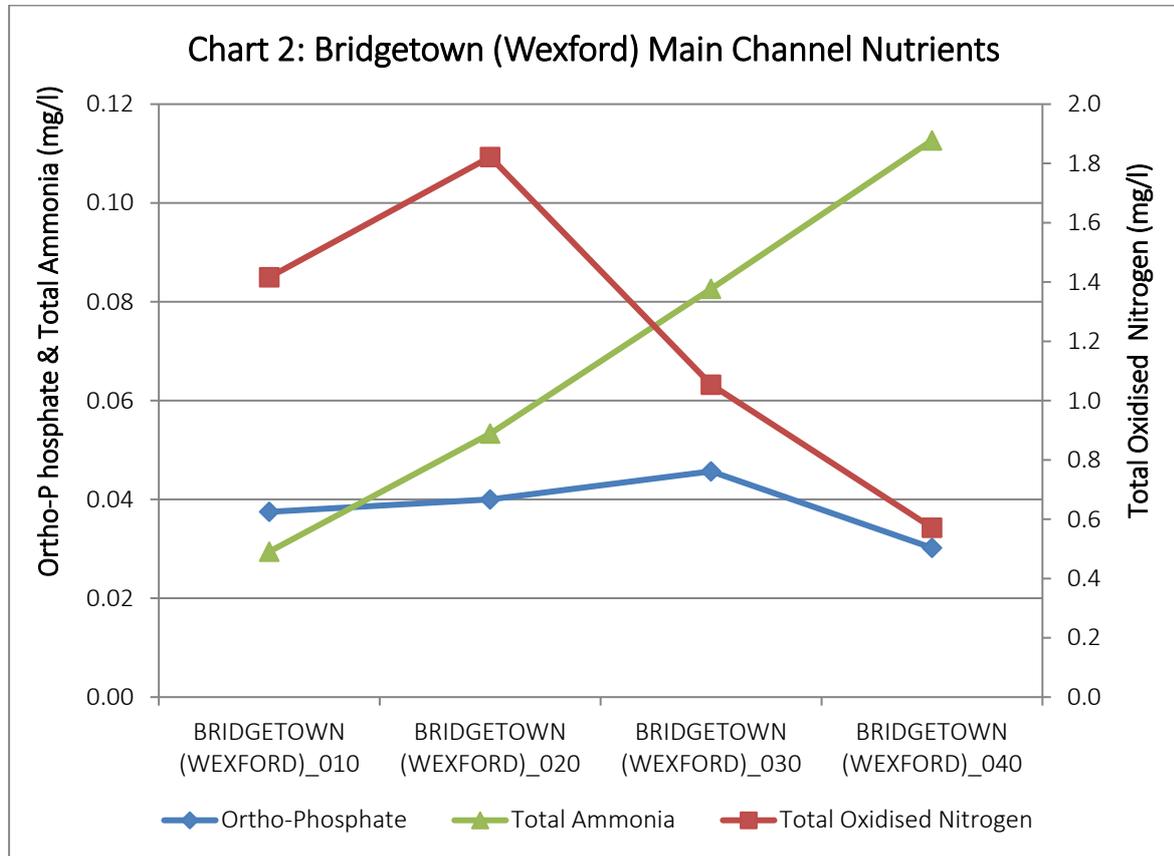
The results of the water quality assessment for the Bridgetown (Wexford) main channel are illustrated in Chart 2.

The results show that orthophosphate concentrations throughout the main channel are marginally elevated ranging from 0.030 to 0.046mg/l.

Ammonia concentrations increase steadily downstream along the main channel, from 0.029 to 0.113mg/l. The two water bodies towards the catchment outlet (Bridgetown (Wexford)_030 to Bridgetown (Wexford)_040) exceed the Environmental Quality Standard (EQS) for good status

(0.065mg/l). Listed significant pressures for the main channel are a combination of diffuse agriculture and septic tank systems on poorly draining soils.

The TON concentrations are highest in the headwaters of the main channel decreasing downstream from 1.82mg/l to 0.57mg/l. The Bridgetown (Wexford)_020 is the receiving water for the Bridgetown & Environs Waste Water Treatment Plant (WWTP).



Appendix 2 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
13_1	IE_SE_13B050050	Begerin Stream_010	River	At risk	Good	Moderate	N	Other	2021	Bannow
13_1	IE_SE_13H010020	Heathpark Stream_010	River	At risk	Moderate	Moderate	N	Ag	2027	Bannow
13_2	IE_SE_13B010090	Bridgetown (Wexford)_020	River	Review	Unassigned	Unassigned	N		2027	
13_2	IE_SE_13B010200	Bridgetown (Wexford)_030	River	At risk	Unassigned	Unassigned	N	Ag,DWW	2027	
13_2	IE_SE_13B010400	Bridgetown (Wexford)_040	River	At risk	Unassigned	Unassigned	N	Ag	2027	
13_2	IE_SE_13B010080	Bridgetown (Wexford)_010	River	At risk	Good	Moderate	N	Ag,DWW	2027	
13_2	IE_SE_13L110540	Longbridge_010	River	Review	Unassigned	Unassigned	N		2027	
13_2	IE_SE_13C040400	Cleristown Stream_010	River	At risk	Good	Poor	N	Ag,DU,DWW	2027	
13_2	IE_SE_13D010260	Duncormick_010	River	Review	Poor	Poor	N		2021 (measures planned)	
13_2	IE_SE_13D010350	Duncormick_020	River	Review	Moderate	Moderate	N		2021 (measures planned)	
13_2	IE_SE_080_0100	Bridgetown Estuary	Transitional	Review	Unassigned	Unassigned	N		2027	
13_2	IE_SE_080_0200	Ballyteige Channels	Transitional	Review	Unassigned	Unassigned	N		2027	
13_3	IE_SE_13B390600	Ballycullane 13_010	River	Review	Unassigned	Unassigned	N		2027	Bannow
13_3	IE_SE_13C220990	Carrowanree_010	River	Review	Unassigned	Unassigned	N		2027	Waterford Harbour
13_3	IE_SE_13C230990	Curraghmore 13_010	River	Review	Unassigned	Unassigned	N		2027	Waterford Harbour
13_3	IE_SE_13B040500	Battlestown Stream_010	River	At risk	Good	Moderate	N	Ag,DWW	2027	Bannow
13_3	IE_SE_13G060990	Graigue_Great_010	River	Review	Unassigned	Unassigned	N		2027	Bannow

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
13_3	IE_SE_13T010900	Tintern Abbey Stream_010	River	At risk	Poor	Poor	N	Ag,For	2027	Bannow
13_3	IE_SE_090_0000	Bannow Bay	Coastal	Review	Unassigned	Unassigned	N		2027	Bannow
13_3	IE_SE_090_0100	Corock Estuary	Transitional	Review	Unassigned	Unassigned	N		2027	
13_3	IE_SE_100_0000	Waterford Harbour	Coastal	Review	Good	Good	N		2027	Waterford Harbour
13_4	IE_SE_13B330460	Ballyteige_Burrow_010	River	Review	Unassigned	Unassigned	N		2027	
13_4	IE_SE_13G050890	Grogan_Burrow_010	River	Review	Unassigned	Unassigned	N		2027	Wexford coastal lagoons
13_4	IE_SE_13K140950	Kisha_010	River	Review	Unassigned	Unassigned	N		2027	Wexford coastal lagoons
13_4	IE_SE_060_0100	Lady's Island Lake	Transitional	At risk	Moderate	Bad	N	Ag,Hymo	2027	Wexford coastal lagoons
13_4	IE_SE_070_0100	Tacumshin Lake	Transitional	At risk	Moderate	Moderate	N	Ag,Hymo	2027	Wexford coastal lagoons
13_5	IE_SE_13B350700	Ballymadder_010	River	Review	Unassigned	Unassigned	N		2027	Bannow
13_5	IE_SE_13C010300	Corock_040	River	At risk	Unassigned	Unassigned	N	Ag,DWW,UWW	2027	Bannow
13_5	IE_SE_13C010020	Corock_010	River	At risk	Good	Moderate	N	Ag,DWW	2021	Bannow
13_5	IE_SE_13M010200	Mulmontry_010	River	Review	Poor	Good	N		2027	Bannow

Ag: Agriculture

M+Q: Mines and Quarries

DWW: Domestic Waste Water

Peat: Peat Drainage and Extraction

For: Forestry

DU: Diffuse Urban

Hymo: Hydromorphology

UWW: Urban Waste Water

Ind: Industry

Note: Significant Pressures for Review water bodies have not been included as they will need to be confirmed as part of a LCA

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 3 Drinking water supplies in the catchment

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
3300PUB1298	Woodview Drive Borehole*	Adamstown	IE_SE_G_001	Yes	n/a
3300PUB0120	Carrigbyrne 1				
	Carrigbyrne 2				
3300PRI2352	Adamstown Group				
3300PUB1312	Ballinamona Borehole*	Fardystown	IE_SE_G_064	Yes	n/a
3300PUB1314	Churchlands Borehole*				
	Tannerhill Borehole*				
	Tagunnan Borehole*				
3300PUB1316	Hardygregan Borehole*	Fethard	IE_SE_G_065	Yes	n/a
	Monastery Avenue Borehole*				
3300PUB1317	River*	Mulmontry_020	IE_SE_13M010400	Yes	n/a
	Owenduff River*	Owenduff (Wexford)_030	IE_SE_13O010240	Yes	n/a

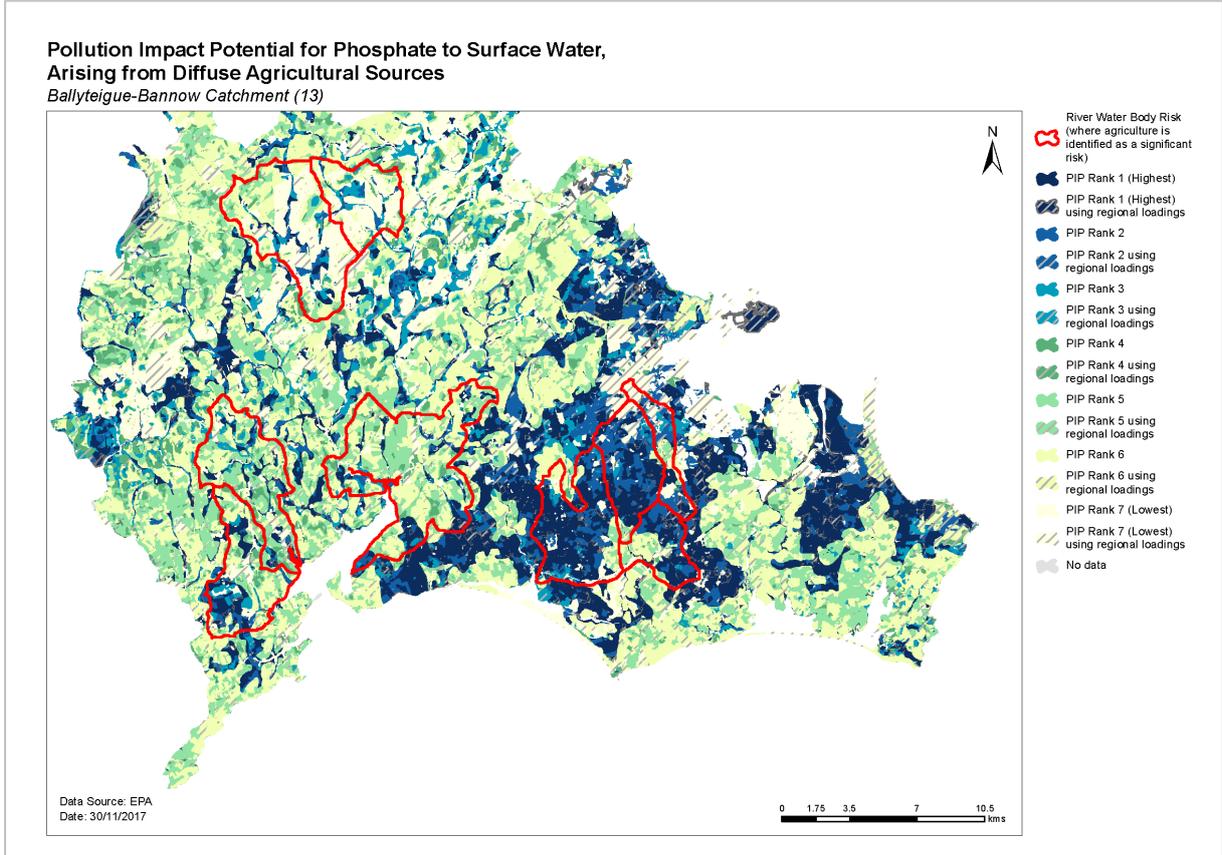
* No scheme name provided in spreadsheet, just scheme code. Abstraction location has been substituted.

Appendix 4 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?
Ballyteige Burrow SAC 000696	1150	Good	Transitional	Ballyteige channels	Unassigned (R)	Yes	IE_SE_080_0200	Yes
Bannow Bay SAC 000697	none							
Carnsore Point SAC 002269	none							
Hook Head SAC 000764	none							
Lady's Island Lake SAC 000704,	1150	Good	Transitional	Lady's Island Lake	Bad (AT RISK)	Yes	IE_SE_060_0100	No
River Barrow and River Nore SAC 002162	none							
Saltee Islands SAC 000707	none							
Tacumshin Lake SAC 000709	1150		Transitional	Tacumshin Lake	Moderate (AT RISK)	Yes	IE_SE_070_0100	No

Appendix 5 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 6 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