



SANITARY SURVEY AND SAMPLING PLAN FOR KILLALA BAY, Co. MAYO AND Co. SLIGO – JULY 2026



**AN t-ÚDARÁS UM
CHOSAINT
IASCAIGH MHARA**

**SEA-FISHERIES
PROTECTION
AUTHORITY**

DISCLAIMER

Under EU Regulation 2019/627, which lays down uniform practical arrangements for the performance of official controls on products of animal origin intended for human consumption, a sanitary survey relevant to bivalve mollusc production in Killala Bay was undertaken in 2026. The sanitary survey evaluates pollution sources and environmental factors so that the authorities can design a suitable hygiene-classification zoning and monitoring plan using the best available information and supporting evidence. Aqualicense Limited undertook the desktop component of this work on behalf of the SFPA; SFPA conducted the shoreline survey.

STATEMENT OF USE

This sanitary survey has been prepared by Aqualicense for the specific purpose of informing shellfish classification in accordance with regulatory requirements. The report draws on data provided by the Sea-Fisheries Protection Authority (SFPA) through the shoreline survey, as well as other publicly available sources, including state and semi-state bodies, and interprets that data within the context of this assessment.

Every effort has been made to ensure that the data used are the most accurate and up-to-date available at the time of preparation. However, Aqualicense does not independently verify third-party datasets and cannot accept responsibility for any errors, omissions, or inaccuracies arising from such sources.

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ABBREVIATIONS

ABBREVIATION	DEFINITION
AER	Annual Environmental Report
BMPA	Bivalve Mollusc Production Area
BIM	Bord Iascaigh Mhara
CD	Chart Datum
cfu/100 mL	Colony-Forming Units per 100 millilitres
COP	Code of Practice
CSO	Central Statistics Office or Combined Sewer Overflow
DAFM	Department of Agriculture, Food and the Marine
DWWTS	Domestic Waste Water Treatment System
<i>E. coli</i>	<i>Escherichia coli</i>
ED	Electoral Division
ELV	Emission Limit Values
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GPS	Global Positioning System
GSI	Geological Survey of Ireland
IE	Industrial Emissions
IFI	Inland Fisheries Ireland
IPC	Integrated Pollution Control
I-WeBS	Irish Wetland Bird Survey
LAT	Lowest Astronomical Tide
ms⁻¹	Meters per second
MHWS	Mean High Water Springs
MHWN	Mean High Water Neaps
MPN	Most Probable Number
NAP	Nitrates Action Programme
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
PE	Population Equivalent
PSU	Practical Salinity Unit
QI	Qualifying Interest
RMP	Representative Monitoring Point
SAC	Special Area of Conservation
SFPA	Sea Fisheries Protection Authority
SPA	Special Protection Area
SPR	Source-Pathway-Receptor

ABBREVIATION	DEFINITION
SWO	Storm Water Overflow
UWWTP	Urban Waste Water Treatment Plant
WFD	Water Framework Directive
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

Faecal contamination in shellfish waters poses a significant public health risk, particularly for filter-feeding bivalve molluscs such as oysters and mussels, which can accumulate harmful bacteria and increase the risk of foodborne illness. To mitigate these risks, Article 56 of the EU Commission Implementing Regulation 2019/627 mandates that a sanitary survey be conducted before classifying a shellfish production or relay area (European Commission, 2019).

In line with regulatory requirements, Aqualicense has been contracted by the Sea-Fisheries Protection Authority (SFPA) to prepare this sanitary survey report. Its purpose is to ensure compliance with the relevant legislation, refine or confirm the delineation of the Bivalve Mollusc Production Area (BMPA), and identify appropriate Representative Monitoring Point(s) (RMP). This assessment provides the necessary evidence base to support reclassification and ongoing monitoring of the area to ensure that public health protections are maintained.

This report presents the findings of the survey for Killala Bay, Co. Mayo and Co. Sligo, undertaken to support the classification of waters within the Killala Bay Bivalve Mollusc Production Area (BMPA). Although aquaculture licences have been granted by the Department of Agriculture, Food and the Marine (DAFM) for the commercial cultivation of Pacific oyster, an inactive wild common cockle fishery is also present within the BMPA. Please note that the inclusion of cockle in this sanitary survey does not indicate classification but is included to potentially allow for future exploitation, should this fishery be classified at a future date. Any future classification will be subject to all required steps of the DAFM *Protocol for Opening a New Fishery for Bivalve Molluscs*¹.

This is the first sanitary survey being carried out on Killala Bay, at the request of the SFPA under the requirements of Regulation (EU) 2019/627. This assessment provides the necessary evidence base for classification and ongoing monitoring of the area to ensure that public health protections are maintained.

This report encompasses the following key components:

1. A desk-based assessment of the Killala Bay BMPA, hydrodynamics and the seasonal potential for faecal contamination sources using a Source-Pathway-Receptor (SPR) model;
2. A field-based shoreline survey conducted by SFPA officers to confirm known risks and identify additional sources;
3. A bacteriological survey of selected inflows and runoff points;
4. A recommendation on the extent of the BMPA (geographic delineation) based on hydrodynamics, contributing catchment influence, and aquaculture activity; and

1

<http://www.fishingnet.ie/media/fishingnet/content/inshorefisheriesmanagement/Protocol%20for%20Opening%20a%20New%20Fishery%20for%20Bivalve%20Molluscs%202022%20081122.pdf>

5. Species and location specific recommendations to support the development of appropriate sampling plans for the Representative Monitoring Points (RMPs) within the BMPA; and development of a species-specific sampling plan in line with EU and SFPA requirements.

The desk-based study employed a Source-Pathway-Receptor model to assess contamination risks within Killala Bay BMPA. This assessment was based on the defined "contributing catchment", which identified river networks and associated sub-basins draining into the BMPA. This approach allowed for the identification of potential pollution sources, their transport pathways, and their circulation within the BMPA, considering seasonality and microbial loads. Each key step and findings of the SPR model is outlined below.

1. The first step in the desk-based study was to characterise the Bivalve Mollusc Production Area (BMPA), i.e. the receptor. The BMPA spans approximately 25.6 km² within Killala Bay, Co. Mayo and Co. Sligo. There are three licensed sites (T10-325A, T10-326A, T10-309A) for Pacific oyster within Killala Bay BMPA, in addition to an inactive and unclassified fishery for wild common cockle. All shellfish production (and potential future cockle production) occurs in waters to the south of Bartragh Island.
2. The desk-based study examined the movement of pollutants, hydrological pathways to, and hydrodynamics within the BMPA. It also assessed the influence of weather patterns on hydrography and hydrodynamics.
 - a. The findings indicate that the primary source of freshwater inflow, and consequently potential contamination, is via the inflow of the Moy Estuary at the southernmost point of the BMPA.
 - b. Areas of greatest groundwater vulnerability were identified along southern shores of the BMPA and adjacent to the Moy Estuary.
 - c. Tidal circulation in the BMPA is semi-diurnal with spring-neap variability. Strong flood and ebb currents occur in intertidal areas and at the Moy Estuary mouth, weakening in the deeper water of the outer BMPA. Ebb flows carry water from the Moy Estuary to the east of Bartragh Island, while flood tides enter via the western channel. Pollutant persistence in the inner BMPA is most likely during neap tide conditions.
 - d. Seasonal variations in surface water run-off were also noted, with heavy rainfall events in autumn and winter likely to influence microbial loads entering the BMPA.
3. An inventory of potential pollutants was compiled, identifying key sources of pollutants as Urban Waste Water Treatment Plants, Domestic Waste Water Treatment Systems as well as high levels of agriculture within the contributing catchment. The risk associated with agriculture is seasonally influenced by summer stocking densities and rainfall driven runoff with stronger winds potentially increasing resuspension in the intertidal shallow flats.

Overall SPR Model Conclusion

From the overall SPR model, it was determined that the key area of concern for organic pollutants is the inner BMPA, primarily west of the inactive/unclassified cockle fishery and the licensed

oyster sites closest to the Moy Estuary inflow (Pacific oyster site T10-326). The risk is primarily associated with neap tides, where residence time of the water and therefore pollutants within the inner BMPA is increased. Due to tidal exchange, the shoreward portions of the inactive/unclassified cockle fishery and all licensed sites may be at greater risk due to inflows and run off in the vicinity of Killala town and the inner BMPA.

Sanitary Survey and Bacteriological Results

The shoreline survey of the Killala Bay BMPA was carried out by SFPA personnel over a three-day period between 20 and 22 April 2026. A total of 59 observations were recorded, each georeferenced and supported by photographic evidence. Observations included: freshwater inflows, field drains, larger drainage channels, streams, pipes, runoff points, soakage areas, lagoon drainage, stormwater infrastructure, agricultural pressures and wildlife activity. Evidence of possible localised enrichment was recorded at several locations, including algal growth associated with flowing water drains, pipes and shoreline discharge points. The survey was undertaken during dry weather with no rainfall recorded in the 24 hrs before or during the survey period. This may have reduced the visibility of intermittent or rainfall-dependent discharges.

Of the 59 shoreline observations, 17 were sampled for bacteriological analysis where contamination was suspected. *E. coli* was detected in all samples with concentrations ranging from 10-720 cfu/100 mL. The highest concentrations were associated with active flow features, including streams, drains and pipes, several of which were also associated with visible algal growth or enrichment. Lower results were generally associated with lagoon, marsh or lower flow features. The bacteriological results indicate that faecal contamination was present in sampled shoreline pathways at the time of sampling, with active freshwater inputs, drainage features and land-based runoff representing the main local route of entry to the BMPA.

Overall, the shoreline and bacteriological findings support the desk-based assessment, which identified the Moy Estuary, shoreline drainage features and local runoff pathways as the main routes by which faecal contamination may enter the BMPA. *E. coli* was detected in all targeted samples, indicating contamination within sampled pathways at the time of sampling. However, the results should be interpreted in the context of targeted sampling and dry shoreline survey conditions. Seasonal factors such as rainfall, river flow, and agricultural activity remain important considerations for future monitoring and sampling design.

Conclusions and RMP Recommendations

Considering the findings of the desk-based study, SPR assessment, shoreline survey and bacteriological analysis provide a comprehensive understanding of the contamination dynamics within the Killala Bay BMPA. The findings indicate that contamination risk is primarily associated with contributing catchment derived inputs, delivered through the Moy Estuary, with additional localised contributions from shoreline drains, streams, pipes, agricultural runoff and other discharge pathways.

Overall, contamination risk within the BMPA is spatially variable and episodic. The greatest risk is associated with active freshwater inputs and drainage features where proximity to shellfish production areas increases the likelihood of contamination reaching the BMPA. Rainfall, river

flow, tidal state and reduced flushing within the inner BMPA are factors influencing the movement and persistence of potential contamination.

In conclusion, a sanitary survey has been completed following EU Regulation 2019/627. Based on the desk-based study, shoreline survey, and bacteriological monitoring, one fixed RMP was identified for Pacific oyster within licensed site T10-309A. For any future classification of a wild common cockle fishery, a fixed RMP is not considered appropriate due to the intermittent nature of harvesting and distribution of natural stocks. A season-specific, fishery-representative RMP should therefore be identified and approved by SFPA in advance of any proposed fishing period.

Species-specific sampling plans were developed for the Killala Bay BMPA's microbiological monitoring programme, which will inform the annual review of classifications.

1 INTRODUCTION

The presence of faecal contamination in the marine environment can result in the accumulation of harmful microorganisms in shellfish, posing a public health risk. Bivalve molluscs such as oysters, mussels, and clams are filter feeders, meaning they draw in and process large volumes of water, which can lead to the concentration of microbial contaminants. *Escherichia coli* (*E. coli*) is a key indicator organism used to assess faecal contamination, as its presence suggests potential pollution from human or animal waste. If such contamination includes pathogenic bacteria or viruses, it can increase the risk of foodborne illness for consumers.

To mitigate these risks, the European Union has established a regulatory framework governing the classification and monitoring of shellfish production and relaying areas. EU Regulation 2019/627 outlines the requirements for sanitary surveys. Article 56 of the Regulation mandates that competent authorities (i.e. the SFPA in an Irish context) conduct a sanitary survey before classifying a production or relaying area. This survey must include:

- a) *an inventory of the sources of pollution of human or animal origin likely to be a source of contamination for the production area;*
- b) *an examination of the quantities of organic pollutants released during the different periods of the year, according to the seasonal variations of human and animal populations in the catchment area, rainfall readings, waste-water treatment, etc.;*
- c) *determination of the characteristics of the circulation of pollutants by virtue of current patterns, bathymetry and the tidal cycle in the production area;*

Furthermore, under the SFPA Code of Practice (SFPA, 2025b), a sanitary survey may include four elements:

- 1. A desk-based study to identify pollution sources
- 2. A shoreline survey to confirm initial findings of the desk-based study
- 3. A bacteriological survey
- 4. Data assessment

In addition, ongoing monitoring is required under Article 57, ensuring that sampling programmes are informed by sanitary surveys and designed to produce representative data on water quality and potential contamination risks. Article 58 further stipulates that authorities must establish procedures to ensure that both sanitary surveys and monitoring programmes accurately reflect the conditions within shellfish production areas.

Killala Bay has previously been classified as a Bivalve Mollusc Production Area. This report examines all potential sources of faecal contamination, pathways, circulation and seasonal variations, with particular consideration of the mixed rural and urban context of the area. This report aims to inform classification decisions and provide the necessary evidence for effective monitoring in line with EU regulatory requirements.

2 DESK-BASED STUDY

2.1 INTRODUCTION TO THE GENERAL AREA

Killala Bay is a north-facing, triangular bay located at the mouth of the River Moy Estuary. The towns of Inishcrone/Enniscrone (County Sligo, henceforth Enniscrone) and Killala (County Mayo) lie along the eastern and western shores of the bay, respectively.

The innermost part of the bay is partially separated from open coastal waters by Bartragh Island and the Enniscrone beach and dune system. Bartragh Island is a long, sandy island situated in the south-western sector of the bay, while the Enniscrone dune system extends westwards as a peninsula along the south-eastern margin.

Killala Bay extends from Kilcummin Head in the west to Lenadoon Point in the east and covers an area of approximately 89 km². The BMPA (covering 25.6 km²) is located in the innermost section of the bay, south of Ross Point and Enniscrone Point.

Non-bivalve aquaculture does not occur within the BMPA. Commercial inshore fishing has previously targeted cockle and does target lobster (Marine Institute, 2025). Further discussion of bivalve aquaculture and fisheries is provided in Table 2-1 below.

2.2 CHARACTERISATION OF THE BIVALVE MOLLUSC PRODUCTION AREA

Key characteristics of the BMPA are outlined in Table 2-1.

Table 2-1 – Characteristics of the Bivalve Mollusc Production Area

Criteria	Description
Location and extent	The Bivalve Mollusc Production Area (BMPA) is within Killala Bay, Co. Mayo and Co. Sligo. It covers an area of c. 25.6 km ² .
Bivalve species	Common cockle (<i>Cerastoderma edule</i>) Pacific oyster (<i>Magallana gigas</i>)
Aquaculture or wild stocks	Aquaculture T10-325A: Pacific oyster, 2.1 ha T10-326A: Pacific oyster, 0.6 ha T10-309A: Pacific oyster, 8.2 ha Wild Stocks Inactive/Unclassified fishery for wild common cockle, covering an area of 466 ha between Bartragh Island and the mainland. Production locations are depicted in Figure 2-1.
Seasonality of harvest	T10-325A/T10-326A/T10-309A: No fixed seasonality.
Growth and harvesting techniques	T10-325A/T10-326A/T10-309A: Bag and trestle and hanging bags and baskets.

Criteria	Description
	Historic reports for Cockle Fishery: Hand harvesting (rake).
Any conservation controls (e.g. closed season)	No conservation controls are employed on the currently classified production of Pacific oysters. Please note that conservation controls may be required if seeking classification of the cockle fishery (subject to completion of all steps under the DAFM <i>Protocol for Opening a New Fishery for Bivalve Molluscs</i>). Cockle classification may be contingent on defined conservation measures as determined required under that protocol. As cockles are included in the current sanitary survey in order to allow for any potential future classification of this species once all required steps under the DAFM protocol have been satisfied, conservation controls for this species cannot be known at the time of writing.
Existing classification data	The most recent annual classification at Killala Bay BMPA is Class B for all Pacific oyster beds. (SFPA, 2025a).
Norovirus data	No Norovirus data is available for Killala Bay



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Location of bivalve aquaculture sites
within the BMPA



Legend

- Bivalve Mollusc Production Area (BMPA)
- Pacific Oyster Aquaculture Sites
- Cockle Fishery (Inactive/Unclassified)

Map Scale: 1:45,000

Coordinate System: IRENET95 / Irish Transverse Mercator

0 750 1,500 m



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Project Manager: Maeve Guilfoyle, Senior Ecologist



Figure 2-1 – Location of bivalve aquaculture sites within the BMPA

2.2.1 BIVALVE MOLLUSC PRODUCTION AREA DELINEATION PROCESS

The process for defining a Bivalve Mollusc Production Area (BMPA) boundary is that the SFPA proposes the BMPA boundary by assessing the maximum area suitable for aquaculture that can be effectively covered by a localised sanitary survey. This is done in consultation with key stakeholders involved in aquaculture development and licensing, such as Bord Iascaigh Mhara, (BIM), industry representatives, and the Department of Agriculture, Food and the Marine (DAFM). The BMPA utilised at this stage of the sanitary survey was confirmed by the SFPA on 23rd January 2026.

The BMPA boundary is then finalised based on the findings of the sanitary survey, ensuring it encompasses both the potential shellfish production area and the zones that may impact it through pollutant inputs. This approach ensures that the designated Representative Monitoring Point(s) (RMPs) provide reliable representation of the microbiological quality within the BMPA.

2.3 ASSESSMENT METHODOLOGY

The desk-based study will follow SFPA guidelines within the Code of Practice (SFPA, 2025b) and align with Regulation (EU) 627/2019, Article 56. It forms the first part of the sanitary survey, informing the shoreline and bacteriological surveys (if required).

A Source-Pathway-Receptor (SPR) model is applied to systematically identify and describe potential routes by which faecal contamination may be transferred from sources within the contributing catchment and coastal environment to shellfish growing areas. The use of the SPR framework provides a structured and precautionary basis for the identification and screening of contamination pressures while focusing the assessment on relevant and plausible linkages affecting the overall BMPA.

The SPR model is applied here as a qualitative screening tool, consistent with its intended use and established regulatory practice. The evidence base comprises a review of a combination of desk-based information, published literature, historical information and professional judgement, to cautiously determine the presence of credible source-pathway- receptor linkages, rather than quantify risk.

Numerical scoring or weighted ranking is not applied, as this could imply a level of precision or comparability that is not supported by the available data and may obscure uncertainty. Pathways identified as plausible and potentially significant are considered in the context of subsequent requirements, such as targeted field investigations, shoreline surveys, sampling design and any further data gathering needed to confirm or refine initial conclusions. This ensures that follow up work is directed toward those sources and transport routes that are most likely to influence the BMPA, in accordance with the staged sanitary survey process.

This assessment applies the SPR model to evaluate the ecological risk associated with faecal contamination within the BMPA (i.e. the receptor):

- **Source:** Faecal contaminants originate from identifiable inputs including but not limited to agricultural runoff, waste water treatment plant effluents, combined sewer overflows,

and diffuse urban or wildlife sources. These inputs introduce microbiological pollutants such as *E. coli*, enteric viruses, and protozoan cysts into the aquatic environment.

- **Pathway:** Contaminants are transported via hydrological and tidal processes, surface water flows, and stormwater conveyance systems. Transport dynamics are influenced by rainfall events, land use, contributing catchment topography, and the retention or resuspension of faecal material in sediments. Temporal variation is considered to identify peak contamination windows.
- **Receptor:** Shellfish species, particularly filter feeders, accumulate faecal contaminants present in the water column. These organisms serve as biological indicators and direct receptors of microbial loading. The receptor area in this instance is the entire BMPA, within which aquaculture activities are possible.

If any element (source, pathway, receptor) is absent, no impact occurs, allowing targeted evaluation for the BMPA.

Key SPR components are indicated in Figure 2-2.

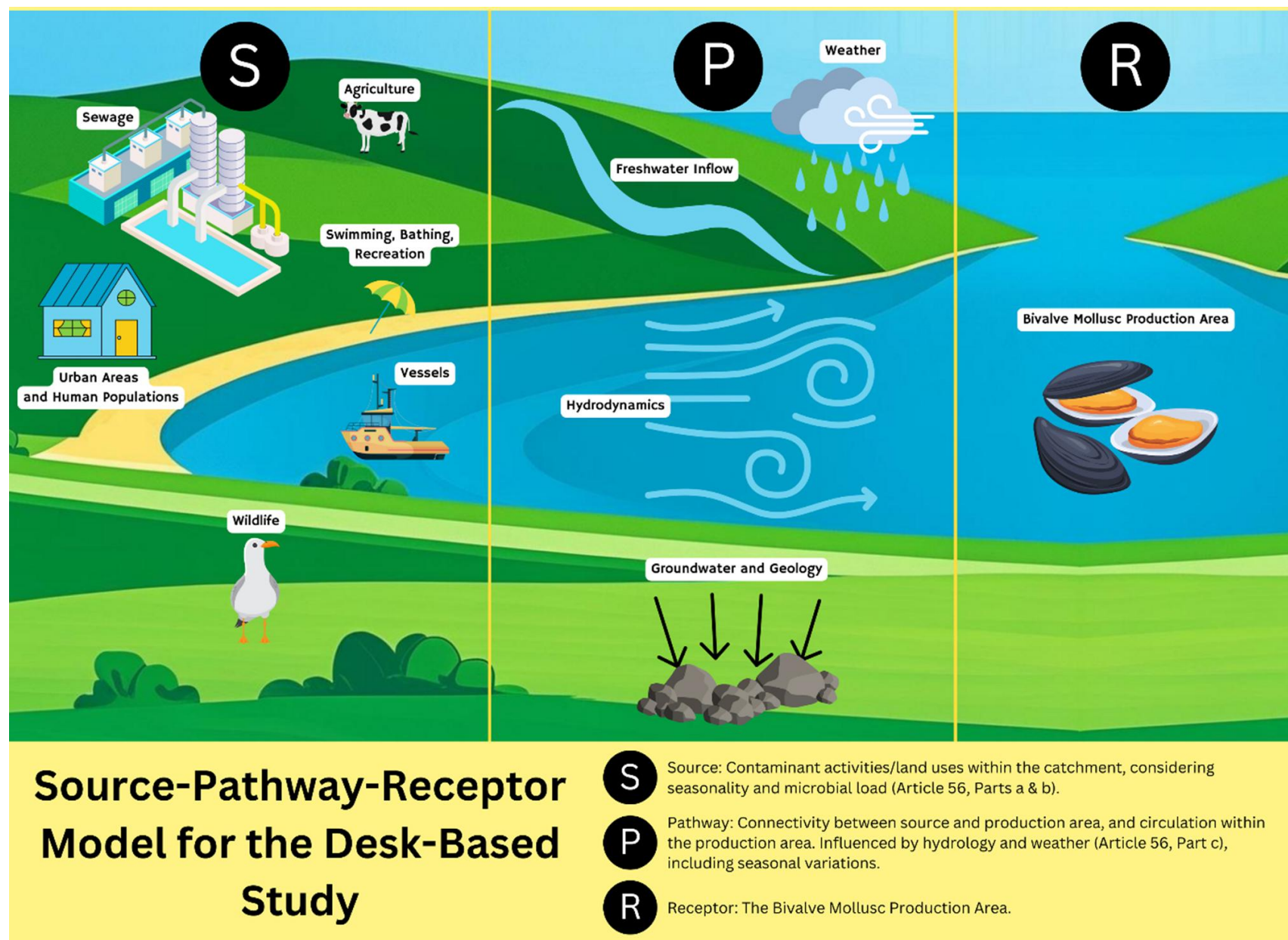


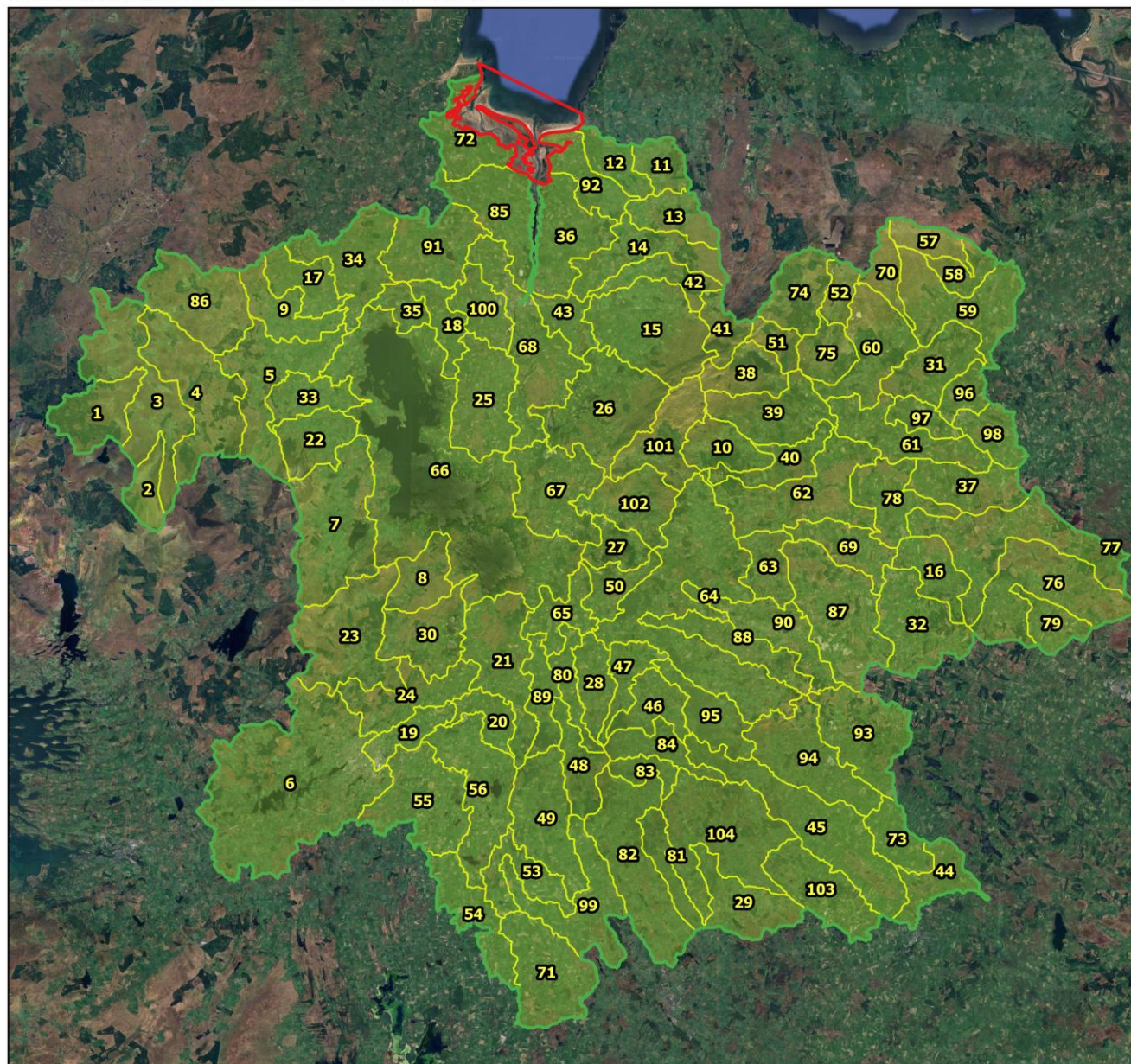
Figure 2-2 – Key elements to be considered in this desk-based study under the SPR model

2.3.1 CONTRIBUTING CATCHMENT

The first step in assessing sources and pathways was to define the “contributing catchment”, the area of land from which there is a hydrological connection to the proposed BMPA. A catchment is broadly defined as “*an area of land that drains into a river, lake or other body of water*” (EPA, 2025b). While the EPA identifies catchments and sub-catchments for Water Framework Directive (WFD) monitoring, these are at too large a scale for the specific requirements of a sanitary survey.

For the purposes of this assessment, a tailored “contributing catchment” was delineated. This was achieved by first identifying all river networks (EPA, 2022) entering the proposed BMPA and then including the EPA-defined sub-basins (EPA, 2022) through which these rivers flow to capture the full extent of land draining into the BMPA.

The defined contributing catchment covers an area of 2,149 km². The contributing catchment contains 104 sub-basins, which are identified in Figure 2-3 and Appendix 1 – WFD river sub-basins comprising the contributing catchment.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Location of contributing catchment and
EPA mapped river sub-basins with
respect to the BMPA



Legend

- Bivalve Mollusc Production Area (BMPA)
- Contributing Catchment
- EPA River Sub-Basins

Map Scale: 1:330,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Figure 2-3 – Location of contributing catchment and EPA mapped river sub-basins with respect to the BMPA

2.4 CHARACTERISTICS OF CIRCULATION OF POLLUTANTS

Prior to identifying pollution sources and their seasonality, an examination of pollutant circulation within the BMPA was conducted. This analysis provided the foundation for the detailed pathway assessments presented in subsequent sections of this desk-based study.

This section describes the movement of pollutants within the BMPA, outlining the hydrological pathways leading to the BMPA and the hydrodynamic processes operating within it. It also considers the influences of weather patterns, particularly their seasonal influences on hydrography and pollutant dispersion. These insights directly inform the delineation of the BMPA and placement of RMPs.

2.4.1 FRESHWATER INFLOWS

The contributing catchment consists of 104 river sub-basins (Figure 2-3). These sub-basins and associated watercourses have been categorised based on their points of inflow to the BMPA (Figure 2-5). Assessing these inflows is the first step in understanding the entry of pollutants and provides the basis for further examination of pollutant circulation within the BMPA.

A total of 11 inflow points drain the contributing catchment to the BMPA. The inflow with the largest catchment area is Inflow 5, which drains 101 sub-basins. Inflow 5 (Moy Estuary) enters the BMPA at its southernmost point. Inflows 2, 3, 4 and 6 also drain into the channel of the Moy Estuary upstream of Inflow 5. Inflows are generally distributed along all shores of the BMPA, with a cluster of three inflows (Inflow 9, 10 and 11) to the northeast of the BMPA (Figure 2-5).

94 hydrometric gauges are present within the contributing catchment, of which 29 are active. The nearest active gauge is at the Ballina (34061) station, c 7.4 km upstream of the Inflow 5. At the time of writing (February 2026), data are not publicly available for flow at this station due to uncertainty of flood flow estimates (OPW, 2025).

While flow data are not available, a proxy for flow data can be derived by estimating the rate of change of river height (m h^{-1}). This calculation can be conducted two ways with the available OPW data:

1. Calculate the absolute difference between sequential mean daily levels and derive change in height per hour,
2. Calculate the absolute difference in maximum and minimum recorded daily levels and derive change in height per hour.

As the second method produces greater rates of change, it is considered the conservative, “worst-case scenario” particularly under storm conditions. This approach was adopted for the sanitary survey. The change in river height (i.e. proxy flow rate) was extrapolated from the difference in maximum and minimum daily height data reported at the Ballina station from 4th February 2008 to 3rd February 2026.

A key limitation of this approach is that it does not represent a true flow rate due to lack of topographic data. However, the rate of change of river height provides valuable insight into the

variation of the rivers, particularly when comparing seasonal patterns. Figure 2-4 presents this scenario.

The mean flow rate under worst-case scenario conditions was 0.0310 m/hr at the Ballina station during the 2008 to 2026 period. Maximum flow rate was greatest in summer and autumn, and lowest in winter. This indicates that under worst-case scenario conditions (extreme precipitation events), freshwater influxes to the Killala Bay are likely to be greatest in summer and autumn, followed by spring and winter (Figure 2-4).

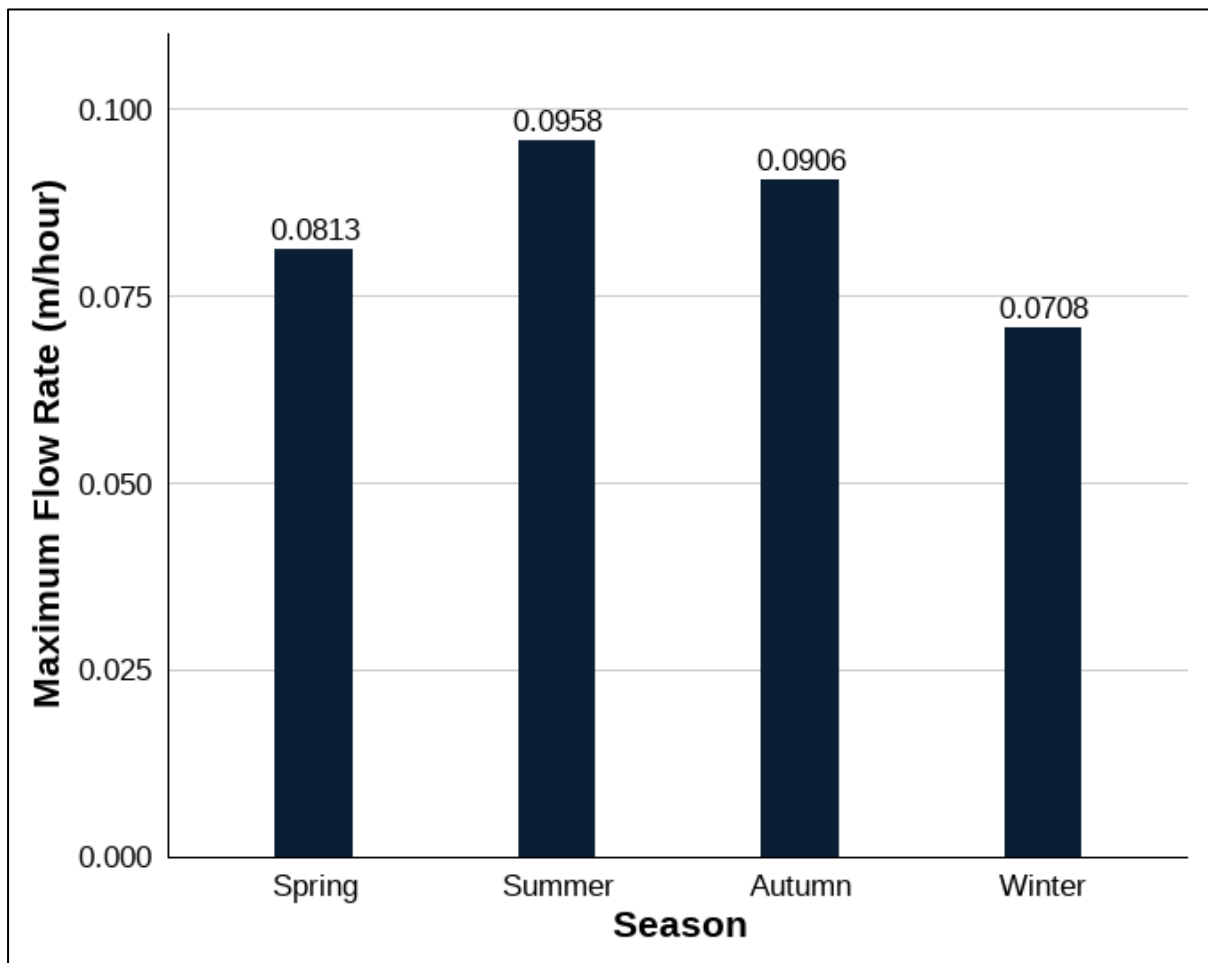


Figure 2-4 – Maximum flow rate (difference between maximum and minimum daily height) at the Ballina hydrometric station between 4th February 2008 and 3rd February 2026

Water level data is also available for Enniscrone Pier (Station 34060) however due to its location in marine rather than estuarine waters, these data are not directly comparable with the Ballina station. Water level data are not available for any other the other points of inflow around the BMPA. In the absence of comparative flow data with other inflow points, catchment size is used to infer volumes of freshwater entering the BMPA.

As previously discussed, Inflow 5 (the Moy Estuary) drains the largest area and number of sub-basins (2,102 km² and 101 sub-basins). As discussed above, the Inflows 2, 3, 4, and 6 also drain to the Moy Estuary, further increasing volumes of water entering in the southern central section of the BMPA. Further smaller inflow points are also present in the east and west of the BMPA.

The Water Framework Directive (WFD) aims to protect and enhance the quality of rivers, lakes, transitional waters, coastal waters, and groundwater. WFD monitoring assesses biological, physicochemical, and hydro-morphological parameters to determine waterbody status. While not all WFD parameters are directly relevant to sanitary surveys, some, such as the assessment of nutrients (nitrogen and phosphorus) and dissolved oxygen, serve as key indicators of organic pollution, including faecal contamination. WFD monitoring also identifies pressures on water quality, such as nutrient enrichment, wastewater discharges, and diffuse pollution, which are further explored in Section 2.5 to assess their relevance as pollutant sources.

The WFD status of the Moy Estuary transitional waters at Inflow 5 is classified as “Moderate” (Table 2-2). All inflows on the western side of the BMPA are also classified as “Moderate” (i.e. Inflow 7, 8, 9, 10 and 11). Similarly, Inflow 2 and 3 to the east are classified as “Moderate” and discharge into the “Moderate” transitional waters of the Moy Estuary. Inflow 1 is classified as “Good”. Two additional “Good” waterbodies drain to the Moy Estuary (Inflow 4 and 6), where they meet “Moderate” transitional waters. This will be discussed in more detail in Section 2.5 in respect of individual pollution sources.

Table 2-2 – Locations of freshwater inflow to the BMPA

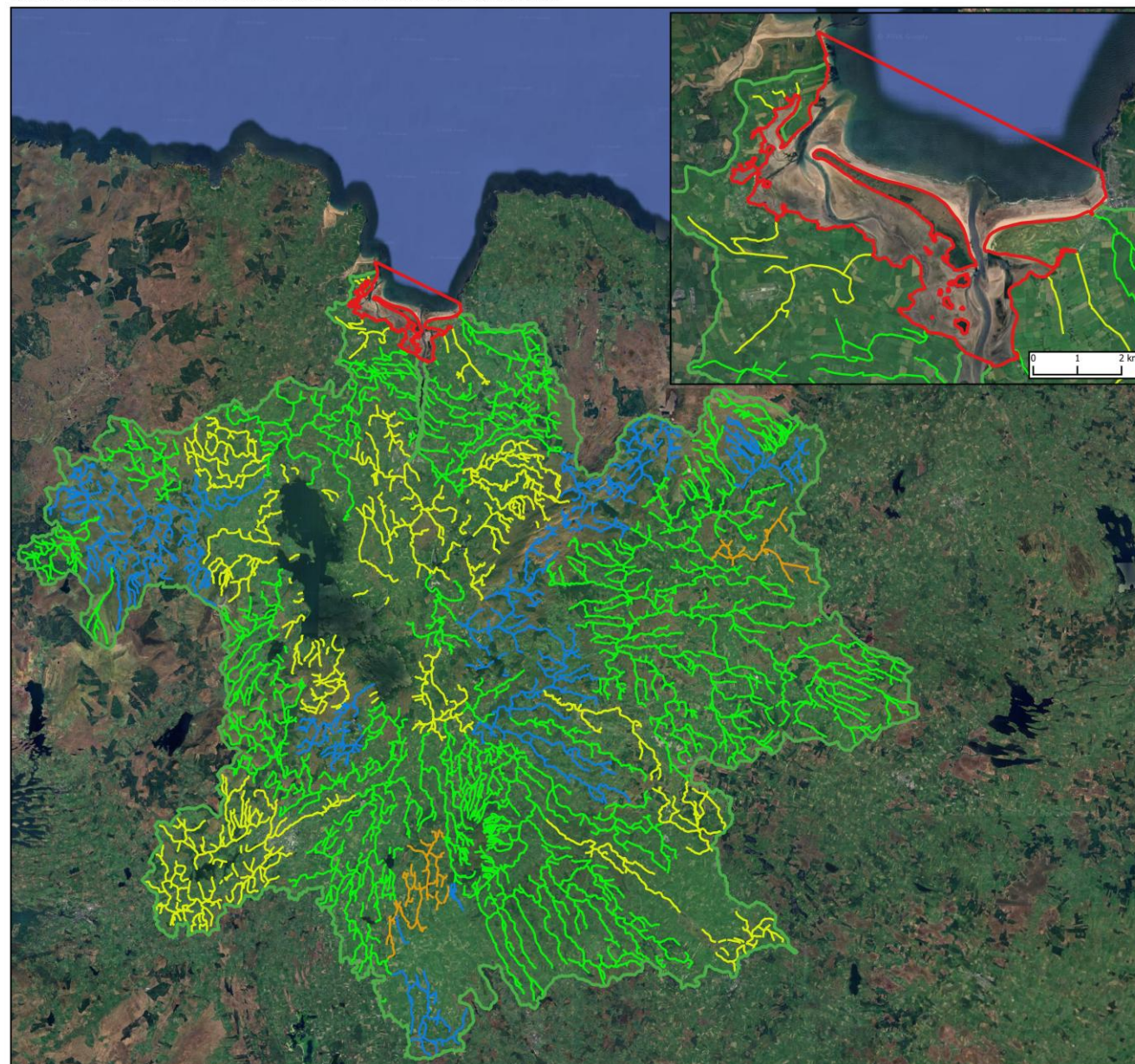
Inflow Point	River Sub-basin (EPA Code)	River Name (EPA Code)	WFD Status 2019-2024 at Inflow Point
1	BELLAWADDY_020 (IE_WE_34B050300) BELLAWADDY_010 (IE_WE_34B050150)	Bellawaddy (34B05) and associated tributaries	Good
2	Scurmore_010 (IE_WE_34S610980)	Scurmore (34S61) and associated tributaries	Moderate
3	Scurmore_010 (IE_WE_34S610980)	Bartragh (34B95)	Moderate
4	DOOYEAGHNY_or_CLOONLOUGHAN_010 (IE_WE_34D310990)	Rinrow 34 (34R41`)	Good
5	BAR DEELA_010 (IE_WE_34B020200) DEEL (CROSSMOLINA)_010 (IE_WE_34D010006) DEEL (CROSSMOLINA)_020 (IE_WE_34D010010) DEEL (CROSSMOLINA)_030 (IE_WE_34D010025) DEEL (CROSSMOLINA)_040 (IE_WE_34D010120) CASTLEBAR_010 (IE_WE_34C010180) ADDERGOOLE_010 (IE_WE_34A010600) ATTIAPPLETON_010 (IE_WE_34A120980) ABBEYTOWN_010 (IE_WE_34A350930) BELLANAMEAN_010 (IE_WE_34B040500) BRUSNA (NORTH MAYO)_010 (IE_WE_34B070200) BRUSNA (NORTH MAYO)_020 (IE_WE_34B070600) BEHY (NORTH MAYO)_010 (IE_WE_34B080400) BLACK (SLIGO)_010 (IE_WE_34B120180) BALLAGHAMUCK_010 (IE_WE_34B180860) BALLYMANAGH_010 (IE_WE_34B400840) CASTLEBAR_020 (IE_WE_34C010300) CASTLEBAR_030 (IE_WE_34C010400) CASTLEBAR_040 (IE_WE_34C010500) CASTLEHILL_010 (IE_WE_34C020460) CLYDAGH (CASTLEBAR)_010 (IE_WE_34C050100) CLYDAGH (CASTLEBAR)_020 (IE_WE_34C050200)	Moy 34 (34M02) and associated tributaries	Moderate (Transitional Waterbody)

Inflow Point	River Sub-basin (EPA Code)	River Name (EPA Code)	WFD Status 2019-2024 at Inflow Point
	CORROY_010 (IE_WE_34C060200) CARROWKERIBLY LOUGH STREAM_010 (IE_WE_34C070600) CALLOW LOUGHS STREAM_010 (IE_WE_34C080300) CARROWARD_010 (IE_WE_34C090700) CLOONLAVIS_010 (IE_WE_34C100300) CRUMLIN (LOUGH CULLIN)_010 (IE_WE_34C110300) CORSALLAGH STREAM_010 (IE_WE_34C120400) CHARLESTOWN STREAM_010 (IE_WE_34C280100) CREEVY_010 (IE_WE_34C700920) DEEL (CROSSMOLINA)_050 (IE_WE_34D010300) DEEL (CROSSMOLINA)_060 (IE_WE_34D010400) DOOYEAGHNY_or_CLOONLOUGHAN_010 (IE_WE_34D310990) DRUMBAUN_010 (IE_WE_34D360920) EIGNAGH_010 (IE_WE_34E010100) EIGNAGH_020 (IE_WE_34E010200) EIGNAGH_030 (IE_WE_34E010300) GLENREE_010 (IE_WE_34G010020) GLENREE_020 (IE_WE_34G010060) GLENREE_030 (IE_WE_34G010200) GLORE (MAYO)_010 (IE_WE_34G020010) GLORE (MAYO)_020 (IE_WE_34G020200) GWEESTION_010 (IE_WE_34G030100) GWEESTION_020 (IE_WE_34G030200) LITTLE (STRADE)_010 (IE_WE_34L020500) LOUGHNAMINOO STREAM_010 (IE_WE_34L040200) LOUGH MUCK STREAM_010 (IE_WE_34L050600) LENYVEE_010 (IE_WE_34L060300) LOUGHANABOLL_010 (IE_WE_34L070100)		

Inflow Point	River Sub-basin (EPA Code)	River Name (EPA Code)	WFD Status 2019-2024 at Inflow Point
	MANULLA_010 (IE_WE_34M010100) MANULLA_020 (IE_WE_34M010225) MANULLA_030 (IE_WE_34M010300) MANULLA_040 (IE_WE_34M010500) MOY_010 (IE_WE_34M020010) MOY_020 (IE_WE_34M020050) MOY_030 (IE_WE_34M020100) MOY_040 (IE_WE_34M020300) MOY_050 (IE_WE_34M020400) MOY_060 (IE_WE_34M020470) MOY_070 (IE_WE_34M020500) MOY_080 (IE_WE_34M020650) MOY_090 (IE_WE_34M020750) MOY_100 (IE_WE_34M020800) MOY_110 (IE_WE_34M020850) MOY_120 (IE_WE_34M021100) MULLAGHANOE_010 (IE_WE_34M030300) MAD_010 (IE_WE_34M040100) MEANDER_010 (IE_WE_34M050400) MOYNE_010 (IE_WE_34M190890) NORTH COOLNAHA_010 (IE_WE_34N190740) OWENAHAR_010 (IE_WE_34O010050) OWENAHAR_020 (IE_WE_34O010100) OWENGARVE (SLIGO)_010 (IE_WE_34O030050) OWENGARVE (SLIGO)_020 (IE_WE_34O030100) OWENGARVE (SLIGO)_030 (IE_WE_34O030200) OWENLOBNAGLAUR_010 (IE_WE_34O040200) OUGHTAGH_010 (IE_WE_34O050400)		

Inflow Point	River Sub-basin (EPA Code)	River Name (EPA Code)	WFD Status 2019-2024 at Inflow Point
	POLLAGH_010 (IE_WE_34P010100) POLLAGH_020 (IE_WE_34P010200) POLLAGH_030 (IE_WE_34P010260) POLLAGH_040 (IE_WE_34P010300) RATHROEEN STREAM_010 (IE_WE_34R010200) SHANVOLAHAN_010 (IE_WE_34S010400) SONNAGH (MOY)_010 (IE_WE_34S020100) SPADDAGH_010 (IE_WE_34S030200) STRADE_010 (IE_WE_34S040800) SWINFORD_010 (IE_WE_34S050300) SLIEVECLAUR_010 (IE_WE_34S060400) TRIMOGE_010 (IE_WE_34T010200) TRIMOGE_020 (IE_WE_34T010300) TRIMOGE_030 (IE_WE_34T010500) TUBBERCURRY_010 (IE_WE_34T020050) TUBBERCURRY_020 (IE_WE_34T020200) TUBBERCURRY STREAM_010 (IE_WE_34T030400) TULLYMORE (Mayo)_010 (IE_WE_34T560640) TULLYEGAN_010 (IE_WE_34T830920) YELLOW (FOXFORD)_010 (IE_WE_34Y010100) YELLOW (FOXFORD)_020 (IE_WE_34Y010400) YELLOW (KNOCK)_010 (IE_WE_34Y020155) YELLOW (KNOCK)_020 (IE_WE_34Y020400)		
6	RATHROEEN STREAM_010 (IE_WE_34R010200)	Newtownwhite (34N04) and associated tributaries	Good
7	MOYNE_010 (IE_WE_34M190890)	Moyne 34 (34M19) and associated tributaries	Moderate
8	MOYNE_010 (IE_WE_34M190890)	Townplots_West (34T37) and associated tributaries	Moderate
9	MOYNE_010 (IE_WE_34M190890)	Unnamed watercourse	Moderate

Inflow Point	River Sub-basin (EPA Code)	River Name (EPA Code)	WFD Status 2019-2024 at Inflow Point
10	MOYNE_010 (IE_WE_34M190890)	Unnamed watercourse	Moderate
11	MOYNE_010 (IE_WE_34M190890)	Unnamed watercourse	Moderate



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Riverine inputs to the BMPA



Legend

- ▭ Bivalve Mollusc Production Area (BMPA)
- ▭ Contributing Catchment

River Waterbodies WFD Status

- High
- Good
- Moderate
- Poor

Map Scale: 1:400,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Project Manager: Maeve Guilfoyle, Senior Ecologist



Figure 2-5 – Riverine inputs to the BMPA

2.4.1.1 GEOLOGY AND GROUNDWATER

The movement of microbial pollutants, such as *E. coli*, within a catchment is influenced by the underlying geological conditions. In particular, groundwater vulnerability, determined by factors such as the depth to the water table, subsoil permeability and the nature of the bedrock, plays a critical role in assessing the potential for contaminants to reach the groundwater and subsequently the marine environment. The EPA methodology classifies areas into vulnerability categories (e.g. low, moderate, high, extreme) based on their permeability to the groundwater table.

Pollutants can enter the marine environment via groundwater through two primary pathways. The first is via surface water, where groundwater inflow contributes to rivers, lakes, and other surface waters that eventually discharge into the marine environment. The second pathway is direct submarine groundwater discharge, where groundwater seeps directly into the sea from the seabed, including the intertidal zone (Arévalo-Martínez et al., 2023).

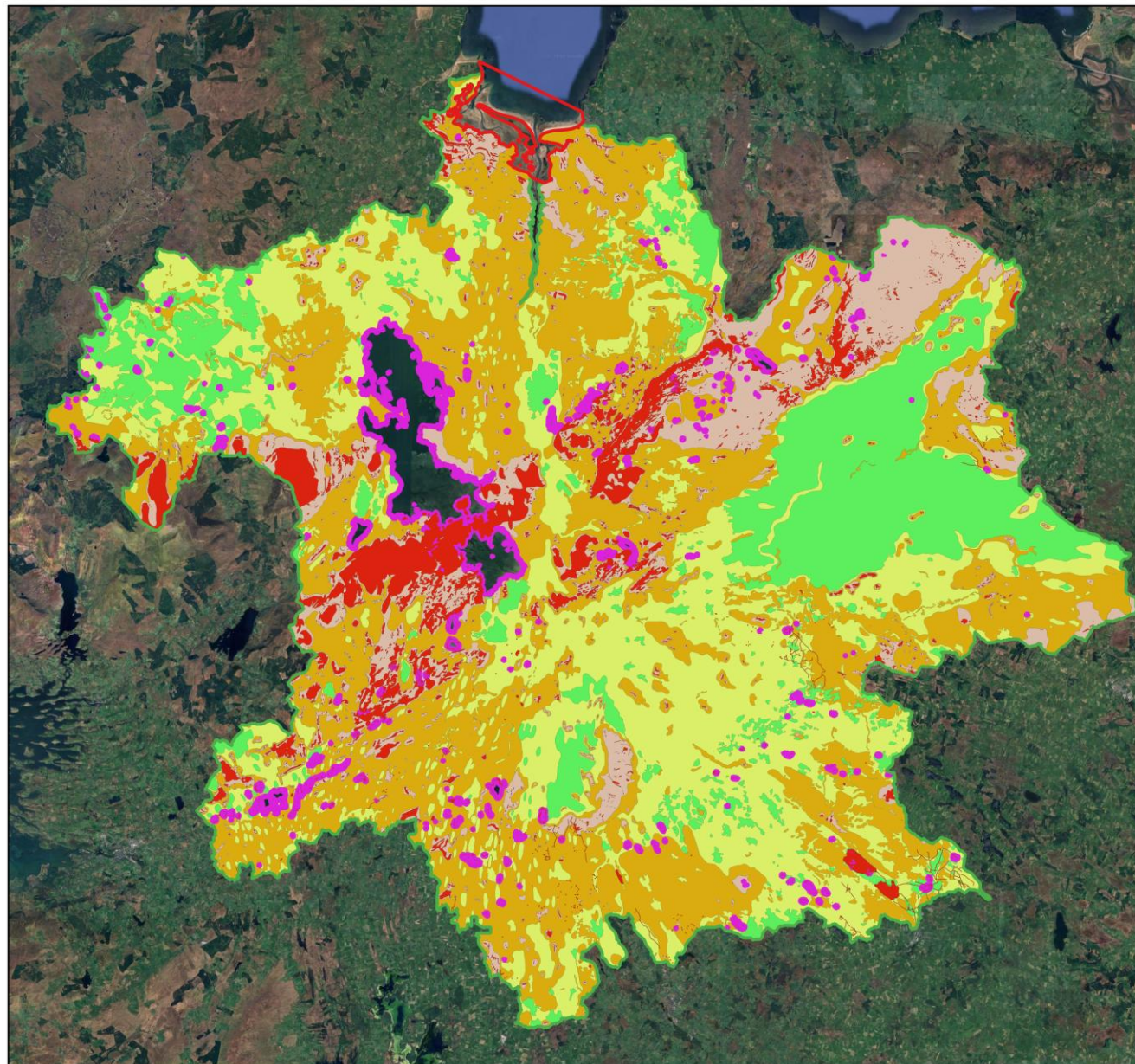
Further detail on groundwater conditions in relation to individual pollution sources is provided in Section 2.4.1.1. The contributing catchment overlies 22 groundwater bodies²:

- | | | |
|-----------------------------|--------------------------|------------------------------------|
| 1. Ballina Gravels Group 1, | 9. Clifden Castlebar, | 16. Gweestion-Moy Gravels Group 2, |
| 2. Ballina Gravels Group 2. | 10. Corrib Gravels, | 17. Kilkelly Charlestown, |
| 3. Ballina, | 11. Crossmolina Gravels, | 18. Killala South |
| 4. Ballymote, | 12. Deel, | 19. Laherdaun, |
| 5. Bellacorick-Killala, | 13. Easky West, | 20. Swinford Gravels, |
| 6. Beltra Lough North, | 14. Foxford, | 21. Swinford, |
| 7. Beltra Lough South, | 15. Gweestion-Moy | 22. Tobercurry. |
| 8. Clare-Corrib, | Gravels Group 1, | |

These groundwater bodies were all classified as having "Good" WFD status respectively from 2019-2024 (EPA, 2026).

An analysis of groundwater vulnerability (GSI, 2021) within the contributing catchment reveals 6.01% and 11.97% of the contributing catchment as having "Rock at or near Surface or Karst" and "Extreme" vulnerability respectively (Figure 2-6). Areas of such elevated groundwater vulnerability are present along the border of the BMPA, notably between Inflows 7 and 8, and Inflows 2 and 3 (Figure 2-5). Elevated groundwater vulnerability is also present along the River Moy Estuary to the south of the BMPA. These areas pose the highest risk for pollutant infiltration via groundwater, particularly where they intersect with surface water pathways.

² Groundwater bodies were not included for consideration if they covered an area of <0.01% of the contributing catchment. Such groundwater bodies were located on the perimeters of the contributing catchment and were determined to have negligible influence on the BMPA.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Groundwater vulnerability of the
contributing catchment



Legend

- Bivalve Mollusc Production Area (BMPA)
- Contributing Catchment
- Groundwater Vulnerability
- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

Map Scale: 1:330,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Figure 2-6 – Groundwater vulnerability of the contributing catchment

2.4.1.2 HYDRODYNAMICS

A site-specific hydrodynamic modelling study was completed in 2013 for Killala Bay and the Moy Estuary using TELEMAC hydrodynamic and dispersion modelling software (Aquafact Ltd, 2013). This two-dimensional, depth averaged model was developed to simulate tidal circulation and transport-dispersion within the entire Killala Bay. Simulations captured spring-neap tidal variability over a full lunar cycle (28 days) (Aquafact Ltd, 2013). Freshwater inflow data on the River Moy was represented by the OPW hydrometric gauge at Cartons, Ballina. Insights from this model have informed the discussion of hydrodynamics below. Additional insights have been drawn from Admiralty Chart 2715-W (UK Hydrographic Office, 2026) and from a surface water assessment report by Ryan Hanley Ltd (2023).

For the purposes of describing the BMPA within this section and subsequent sections, the BMPA is divided into the “inner BMPA” and “outer BMPA”. The inner BMPA represents the area to the south of Bartragh Island, with the outer BMPA representing the area to the north of Bartragh Island. (Figure 2-7). It is important to note that the distinction between the “inner BMPA” and “outer BMPA” is made strictly for descriptive purposes within the report. It does not represent an official sub-division or a proposal to alter the boundaries of the production area.

2.4.1.3 BATHYMETRY

A description of the bathymetry within the BMPA is inferred from TELEMAC modelling (Aquafact Ltd, 2013) and from Admiralty Chart 2715-W (UK Hydrographic Office, 2026). Bathymetry within the BMPA is characterised by extensive shallow and intertidal areas in the inner BMPA and estuarine margins, together with deeper channels that facilitate tidal exchange between the River Moy Estuary and the wider bay. Depths within the BMPA boundary varies considerably, consisting of broad swathes of intertidal shallow areas and depths of up to -9 m at lowest astronomical tide (LAT) (Figure 2-8).

2.4.1.4 TIDAL INFLUENCE

The TELEMAC hydrodynamic results (Aquafact Ltd, 2013) show tidal oscillations with a mean high-water spring (MHWS) range of approximately 3.4 m and a mean high-water neap (MHWN) range of approximately 1.40 m. These oscillations drive strong alternating flood and ebb flows within the intertidal and channelised areas of inner BMPA (south of Bartragh Island) and at the mouth of the Moy Estuary (Figure 2-9). Current velocities decrease in deeper open waters of the outer BMPA as depth increases. Circulation pathways are structured around Bartragh Island with the principal Moy Estuary outflow routed to the east of the island and inflow to inner BMPA occurring via the tidal channel to the west. These patterns define the main tidal exchange routes influencing water movements within the BMPA (Ryan Hanley Ltd, 2023).

2.4.1.5 TEMPERATURE AND SALINITY

Ambient salinity conditions in the entire Killala Bay are described using EPA coastal monitoring data from station MY120 Bartragh (1st Nav Buoy/Tall Green Perch) as reported in the receiving water (Ryan Hanley Ltd, 2023). Salinity monitoring data is not available at the spatial scale of the proposed BMPA itself. The report detailed a representative salinity of 26.8 PSU for the Killala Bay coastal water body, and individual observations at the MY120 station ranging from 0.56 PSU to 31.5 PSU (Ryan Hanley Ltd, 2023). The range indicates strong variability driven by tidal exchange

and freshwater inputs, primarily from the Moy Estuary, with conditions ranging from low-salinity events to fully marine waters, typical of an estuarine influenced embayment (Ryan Hanley Ltd, 2023).

2.4.1.6 CURRENT PATTERNS

TELEMAC modelling indicates that tidal circulation in Killala Bay is dominated by alternating flood and ebb flows concentrated within intertidal and channelled areas of inner BMPA and at the Moy Estuary mouth (Figure 2-9), with weaker flows in deeper open waters as depth increases (Aquafact Ltd, 2013). Circulation pathways follow the main tidal channels around Bartragh Island. The ebb flows convey the Moy Estuary outflow seaward primarily to the east of the island. The flood flows enter inner BMPA via the tidal channel to the west of the island defining the main tidal exchange route within the BMPA (Ryan Hanley Ltd, 2023).



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Delineation of the inner and outer BMPA
for geographical description purposes



Legend

Bivalve Mollusc Production Area (BMPA)

Geographical Areas

Inner BMPA

Outer BMPA

Map Scale: 1:45,000

Coordinate System: IREN95 / Irish Transverse Mercator

0 750 1,500 m



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Figure 2-7 – Delineation of the inner and outer BMPA for geographical description purposes only



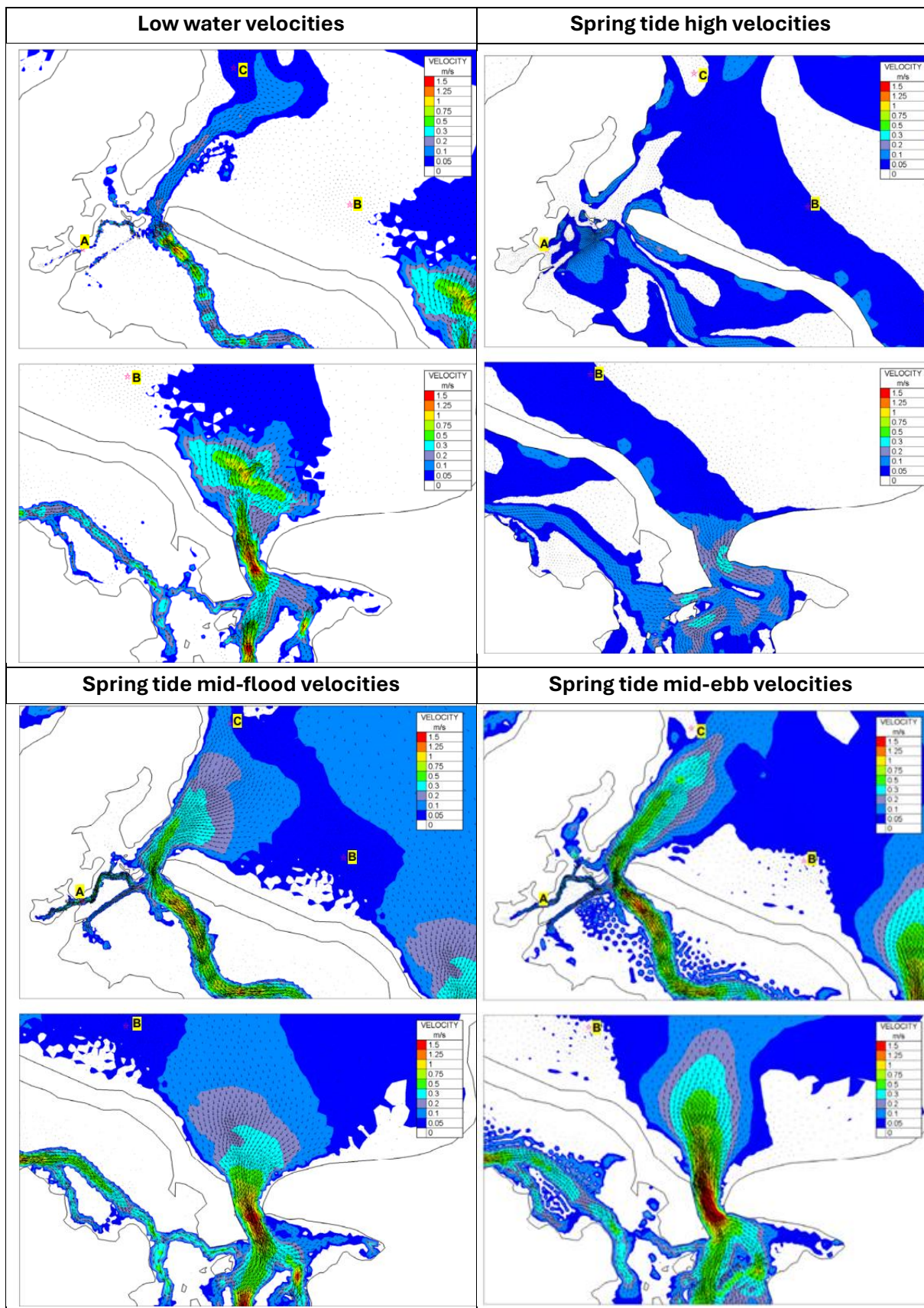


Figure 2-9 – Water velocities from hydrodynamic simulations conducted by Aquafact Ltd (2013)

2.4.2 WEATHER

Weather patterns significantly influence the transport of organic pollutants. The nearest synoptic weather station to the BMPA is Knock Airport, located c. 36.19 km south-southeast (SSE). Data from this station from January 2015 to December 2025 inclusive (Met Éireann, 2026a, 2026b) have been used to infer weather patterns and seasonality influencing pollutant circulation within the BMPA.

2.4.2.1 WIND AND WAVES

Wind

The prevailing wind direction is westerly (W) ($\sim 13.6 \text{ ms}^{-1}$), accounting for 28.1% of all winds (Figure 2-10). The next strongest sector is southerly (S) (accounting for 17.3%) with a maximum mean of $\sim 11.2 \text{ ms}^{-1}$. There is a seasonal prevalence for winter having the strongest and most persistent winds dominated by westerly and southerly winds and higher overall mean speed ($\sim 5.37 \text{ ms}^{-1}$).

Spring and autumn retain the westerly and southerly bias but with slightly lower wind speeds (~ 4.63 and 4.60 ms^{-1}) respectively, with westerly blasts more common during the summer. Although the summer period is predominantly westerly, it is the gentlest wind speed ($\sim 4.27 \text{ ms}^{-1}$) and displays a broader directional spread overall, including occasional south and north westerlies. For further details refer to Appendix 2 – Summary Statistics for Weather.

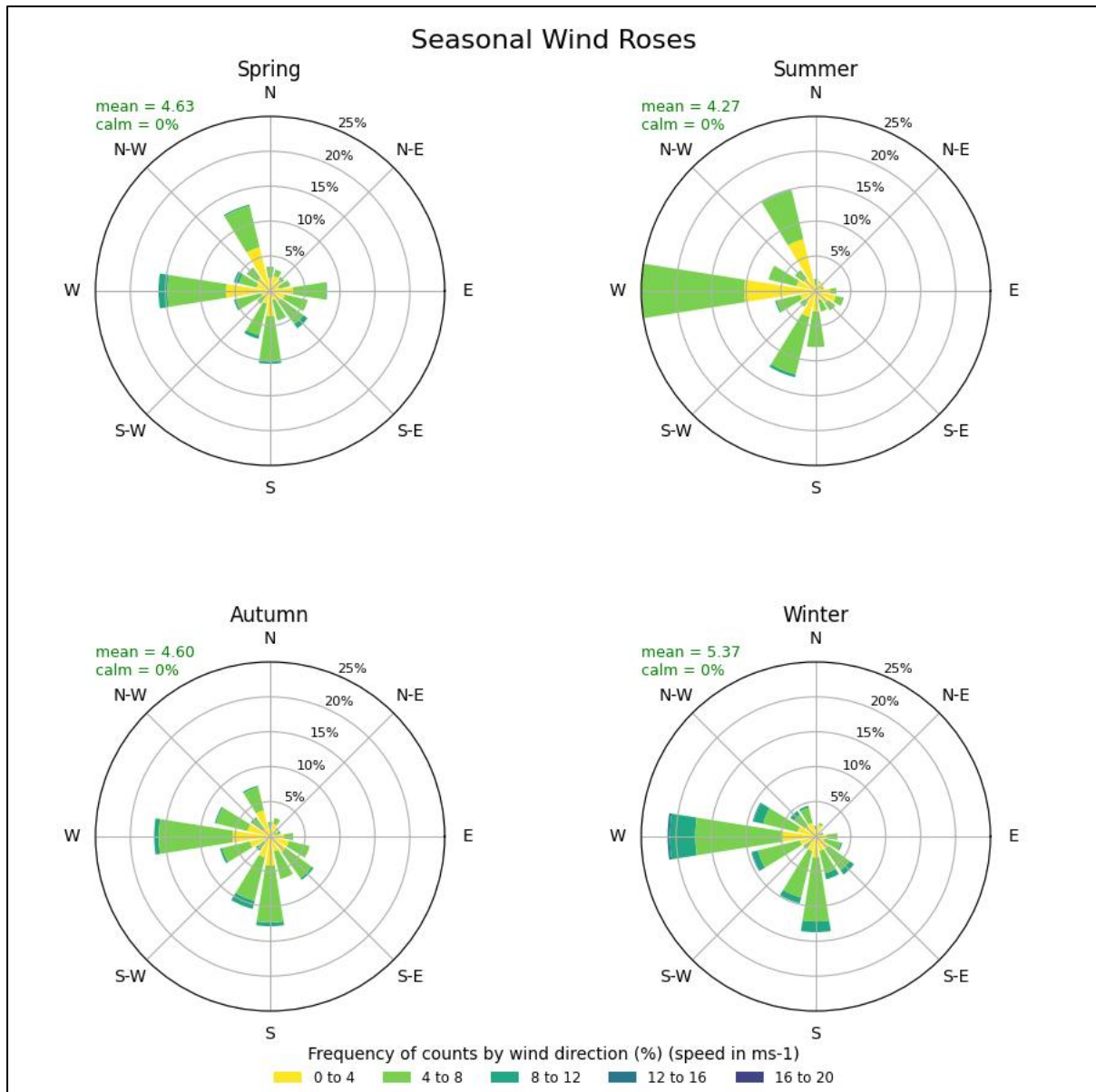


Figure 2-10 – Seasonal wind roses for Knock Airport (January 2015 to December 2025 inclusive)

Waves

Waves and currents play a crucial role in hydrographic conditions. Of relevance to sanitary surveys, wind-driven waves facilitate sediment resuspension and transport (Green & Coco, 2014; Young, 1999). These waves are primarily generated by local prevailing winds and travel in the direction of those winds. Their characteristics are influenced by factors such as wind speed, duration, and fetch (Young, 1999).

Bartragh Island, in conjunction with the bay's overall bathymetry and geometry, reduces the influence of open-ocean fetch on the inner BMPA. This aids in creating sheltered conditions over intertidal flats and nearshore waters limiting the growth of locally generated wind waves compared with exposed west coast sites.

Hydrodynamic modelling undertaken in Killala Bay to date has largely focused on tidal circulation and dispersion processes, rather than detailed site-specific nearshore wave climate characterisation (Aquafact Ltd, 2013). Within Killala Bay, wave conditions relevant to sediment resuspension are governed primarily by local wind forcing, bay orientation and fetch. Westerly to south-westerly winds (Met Éireann, 2026a, 2026b) can generate local wind waves across the bay, increasing near-bed shear stress and the potential for sediment resuspension across the shallow intertidal and subtidal flats, particularly during higher water levels (Mariotti & Fagherazzi, 2013).

2.4.2.2 PRECIPITATION

Heavy rainfall can lead to surface runoff, transporting organic pollutants from land-based sources, such as farms and wastewater overflows, into surface water bodies and potentially to the BMPA. The mean monthly rainfall is at its lowest levels during the spring period followed by summer, with rain fall peaking in autumn and winter (Figure 2-11). The driest period occurs from April to June, with precipitation reaching its peak in December.

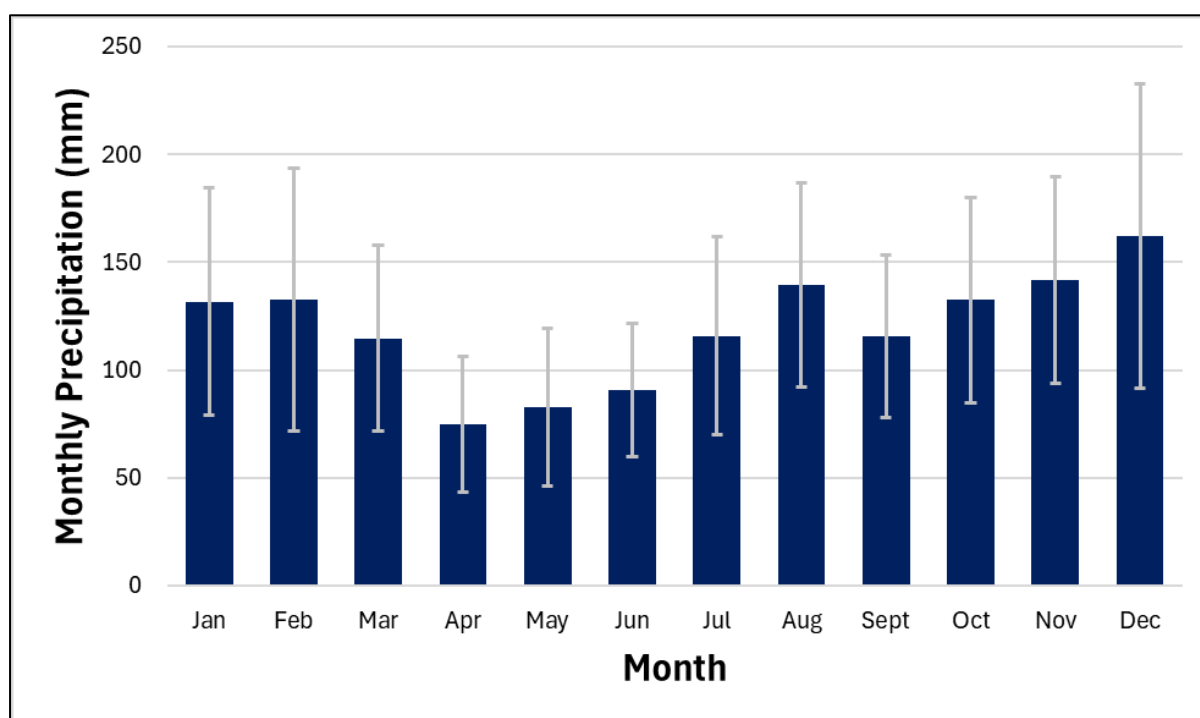


Figure 2-11 – Mean monthly precipitation (± 1 standard deviation) at Knock Airport (January 2015 to December 2025 inclusive)

Mean monthly rainfall levels are highest in February (277.40 mm), although heavy rainfall events occur throughout the year, with the exception of the months of April to June where precipitation levels drop to less than 129 mm per month on average.

Although the heaviest rainfall typically occurs in autumn and winter, intense rainfall during the spring and summer can result in disproportionality high faecal loadings. This coincides with higher livestock stocking densities and the accumulation of faecal matter over the summer months. Therefore, the influence of precipitation on circulation of pollutants will be further discussed in Section 2.5 as relevant for each source of contamination.

2.4.3 SUMMARY OF THE CHARACTERISTICS OF CIRCULATION OF POLLUTANTS

For clarity at this stage of the sanitary survey, a brief overview of the findings of this section of the report is provided below. Key characteristics identified include:

- **Freshwater Inflows:** Inflow 5 at the Moy Estuary drains the largest catchment area. A number of smaller inflows also converge at the Moy Estuary, in the south-central portion of the BMPA. The Moy Estuary is considered to be the primary inflow of freshwater to the BMPA. Other smaller inflow points are distributed on the east and west of the BMPA.
- **Groundwater:** Groundwater vulnerability mapping shows areas of elevated groundwater vulnerability along coastal zones bordering the BMPA, notably in southern areas of the BMPA (in proximity of Inflows 6 and 7 and Inflows 2 and 3) as well as along the Moy Estuary to the south of the BMPA. These are the areas at greatest risk in terms of groundwater infiltration.
- **Hydrodynamics:** Tidal circulation within the BMPA is driven by semi-diurnal tides with spring-neap variability. Strong alternating flood and ebb currents occur within intertidal and channelised areas of the inner BMPA and at the Moy Estuary mouth, while currents weaken in the deeper, more open waters of the outer BMPA. Circulation pathways are structured around Bartragh Island, with ebb flows routing the Moy Estuary outflow seaward to the east of Bartragh Island and flood flows entering the inner BMPA via the western tidal channel. Reduced current strength and flushing during neap tides increase residence times within the inner BMPA and estuarine areas, whereas stronger spring-tide currents enhance mixing and dispersion. This would indicate that pollutant persistence is most likely under low-energy (neap tide) tidal conditions.
- **Weather:** Sediment resuspension and movement of contaminants (within surface waters) may occur through seasonal changes in wind, waves, sediment resuspension and rainfall. This is likely to occur particularly during the stronger westerly to southerly winds and higher rainfall in autumn and winter. Heavy rainfall may influence the seasonality of the surface water run-off particularly during the autumn and winter seasons.

These factors collectively affect the entry, movement, and dispersion of pollutants in the BMPA, with further details on individual pollution sources to be discussed in subsequent sections.

2.5 INVENTORY OF POLLUTION SOURCES AND SEASONAL VARIATIONS OF POLLUTANTS

An inventory was compiled detailing potential pollution sources of human and animal origin, focusing solely on those containing faecal matter. All identified sources within the contributing catchment (Figure 2-3) were assessed, considering seasonal variations where relevant. This assessment complies with Part 1a and 1b of Article 56 of Commission Implementing Regulation (EU) 2019/627 (see Section 1 for details).

2.5.1 SEWAGE DISCHARGES

This section examines sewage discharges from human sources, primarily Urban Waste Water Treatment Plants (UWWTPs) and septic tanks. Contamination risk is influenced by factors such

as location, size, treatment level, and discharge frequency. The following sections provide a detailed analysis of all identified discharges within the contributing catchment.

2.5.1.1 URBAN WASTE WATER TREATMENT PLANTS

Urban Waste Water Treatment Plants (UWWTPs) are linked to various discharges, primarily the continuous release of treated and untreated sewage. They also produce intermittent discharges, including rainfall-dependent releases via combined sewer overflows (CSOs) and stormwater overflows, as well as emergency discharges under exceptional circumstances.

Following examination of EPA data (EPA, 2020a), seven UWWTPs serving a Population Equivalent (PE) <500 were identified within the contributing catchment. Additionally, 14 UWWTPs serving a PE of ≥ 500 are present within the contributing catchment, and these are further elaborated on in Table 2-3.

Primary emission point data were derived from EPA (2026), with additional information obtained from the respective Annual Environmental Reports (AERs). Detailed AERs are not available for UWWTPs <500 PE, therefore only plants ≥ 500 PE are included in Table 2-3.

Table 2-3 – Active Waste Water Discharge Authorisations for UWWTPs serving a Population Equivalent ≥500 within the contributing catchment

Name	Population Capacity	AER Compliance	Notes	Primary Emission Point and BMPA Connectivity*
Name (Code) Ballina (D0016-01) Discharge Point Reference TPEFF2200D0016SW001 Treatment Type Tertiary P Removal	Total Capacity 25,000 Remaining Capacity 14,840 Predicted to Exceed Capacity No	Status Non-Compliant (2024). Failing Parameters Total Nitrogen mg/l	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP. A total of 17 were incidents reported in 2024, including five uncontrolled releases. (D0016-01_2024_AER)	The primary emission point (54.12569723, -9.14528540) to the Moy Estuary has connectivity with Inflow 5.
Name (Code) Castlebar (D0047-01) Discharge Point Reference TPEFF2200D0047SW001 Treatment Type Tertiary N&P Removal	Total Capacity 28,000 Remaining Capacity 20,371 Predicted to Exceed Capacity No	Status Non-Compliant (2024). Failing Parameters ortho-Phosphate (as P) - unspecified mg/l	The discharge from the wastewater treatment plant does not have an observable impact on the water quality. One incident was reported in 2024 relating to a breach of Emission Limit Values (ELV). (D0047-01_2024_AER)	The primary emission point (53.89213710, -9.18671386) to the Castlebar_030 watercourse has connectivity with Inflow 5.
Name (Code) Balla (D0216-01) Discharge Point Reference TPEFF2200D0216SW001	Total Capacity 12,000 Remaining Capacity 955	Status Non-Compliant (2024). Failing Parameters	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP. A total of four incidents were reported in 2024, including two breaches of ELV.	The primary emission point (53.80379290, -9.13434126) to the Loughnamino Stream_010 watercourse has connectivity with Inflow 5.

Name	Population Capacity	AER Compliance	Notes	Primary Emission Point and BMPA Connectivity*
Treatment Tertiary P Removal	Predicted to Exceed Capacity Yes	Ammonia-Total (as N) mg/l ortho-Phosphate (as P) - unspecified mg/l Suspended Solids mg/l	(D0216-01_2024_AER)	
Name (Code) Charlestown (D0214-01) Discharge Point Reference TPEFF2200D0214SW001 Treatment Tertiary P Removal	Total Capacity 3,250 Remaining Capacity 1,488 Predicted to Exceed Capacity No	Status Non-Compliant (2024). Failing Parameters Ortho-Phosphate (as P) -unspecified (mg/l)	The discharge from the wastewater treatment plant does not have an observable impact on the water quality. One incident was reported in 2024, a breach of ELV. (D0214-01_2024_AER)	The primary emission point is not presented in EPA mapping but is assumed to enter to the Charlestown Stream_010 sub-basin, which has connectivity with Inflow 5.
Name (Code) Foxford (D0213-01) Discharge Point Reference TPEFF2200D0213SW001 Treatment Secondary Treatment	Total Capacity 3,250 Remaining Capacity 2,488 Predicted to Exceed Capacity No	Status Compliant (2024).	The discharge from the wastewater treatment plant does not have an observable impact on the water quality. No incidents were reported in 2024. (D0213-01_2024_AER)	The primary emission point (53.98585391, -9.11275562) to the Moy 34_100 watercourse has connectivity with Inflow 5.

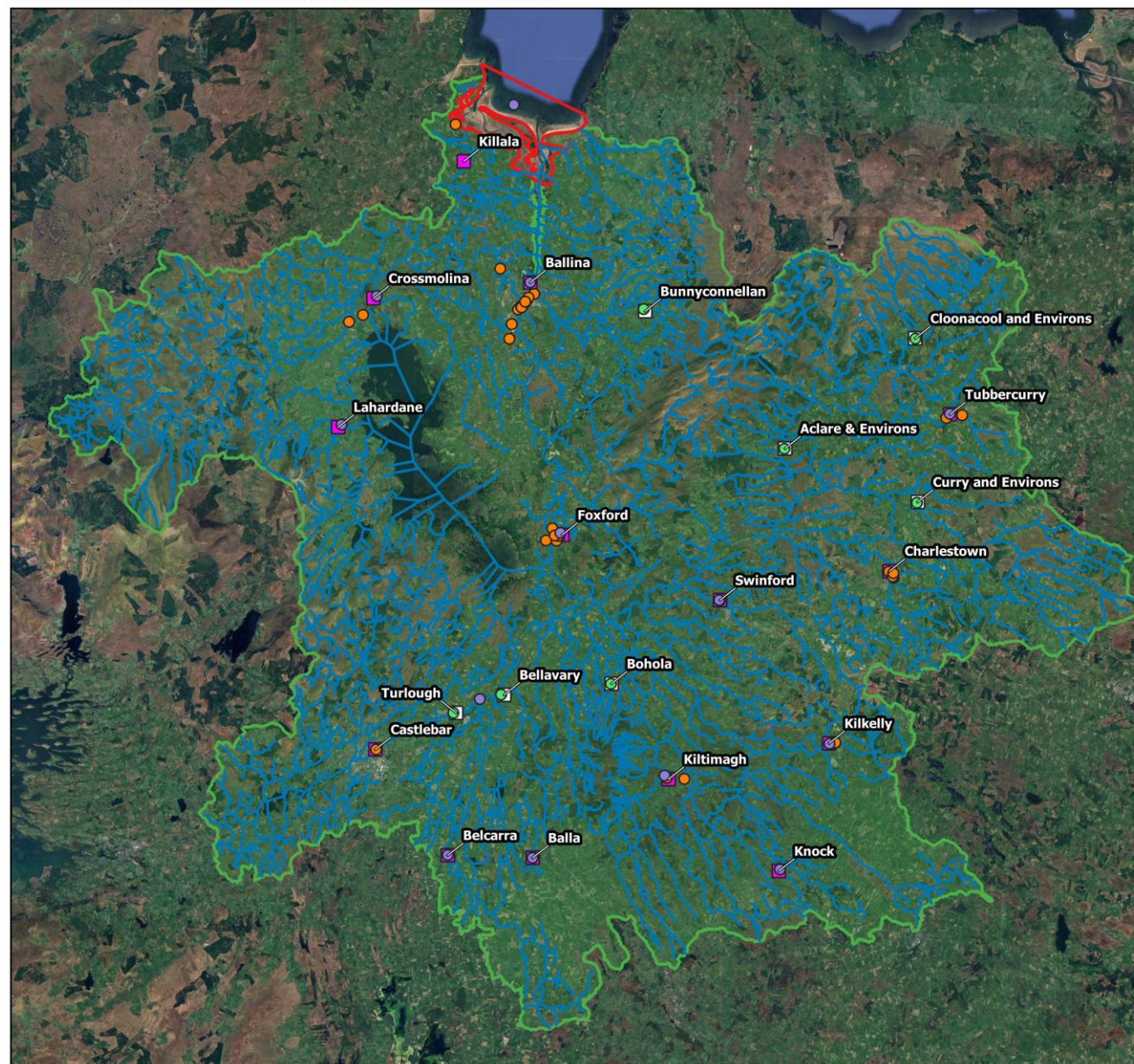
Name	Population Capacity	AER Compliance	Notes	Primary Emission Point and BMPA Connectivity*
Name (Code) Kiltimagh (D0217-01)	Total Capacity 3,333	Status Compliant (2024).	The discharge from the wastewater treatment plant does not have an observable impact on the water quality.	The primary emission point (53.85091079, -9.01046394) to the Pollagh_030 watercourse has connectivity with Inflow 5.
Discharge Point Reference TPEFF2200D0217SW001	Remaining Capacity 1,781		A total of two incidents were reported in 2024, one related to an uncontrolled release, the other related to a shock load to the UWWTP.	
Treatment Tertiary P Removal	Predicted to Exceed Capacity No		(D0217-01_2024_AER)	
Name (Code) Crossmolina (D0073-01)	Total Capacity 3,150	Status Compliant (2024).	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP.	The primary emission point (54.11654523, -9.29146186) to the Deel (Crossmolina)_050 watercourse has connectivity with Inflow 5.
Discharge Point Reference TPEFF2200D0073SW001	Remaining Capacity 1,716		Two incidents were reported in 2024 due to abatement equipment being offline.	
	Predicted to Exceed Capacity No		(D0073-01_2024_AER)	
Name (Code) Killala (D0067-01)	Total Capacity 2,300	Status Compliant (2024).	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP.	The primary emission point (54.22487755, -9.16377486) to the BMPA to the north of Bartragh Island.
Discharge Point Reference TPEFF2200D0067SW001	Remaining Capacity 1,243		A total of four incidents were reported in 2024, of which three related to	

Name	Population Capacity	AER Compliance	Notes	Primary Emission Point and BMPA Connectivity*
Treatment Secondary Treatment	Predicted to Exceed Capacity No		plant/equipment breakdown and one related to an uncontrolled release. (D0067-01_2024_AER)	
Name (Code) Knock (D0065-01) Discharge Point Reference TPEFF2200D0065SW001 Treatment Tertiary P Removal	Total Capacity 6,200 Remaining Capacity 1,553 Predicted to Exceed Capacity No	Status Non-Compliant (2024). Failing Parameters Ammonia-Total (as N) mg/l ortho-Phosphate (as P) - unspecified mg/l	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP. A total of six incidents were reported in 2024, of which three related to breach of ELV, two to abatement equipment being offline and one related to an uncontrolled release. (D0065-01_2024_AER)	The primary emission point (53.79930088, -8.90011773) to the Yellow (Knock)_010 watercourse has connectivity with Inflow 5.
Name (Code) Swinford (D0068-01) Discharge Point Reference TPEFF2200D0068SW001 Treatment Tertiary P Removal	Total Capacity 6,500 Remaining Capacity 1,859 Predicted to Exceed Capacity No	Status Compliant (2024).	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP. A total of two incidents were reported in 2024, of which one related to abatement equipment being offline and one related to an uncontrolled release. (D0068-01_2024_AER)	The primary emission point (53.89213710, -9.18671386) to the Castlebar_030 watercourse has connectivity with Inflow 5.

Name	Population Capacity	AER Compliance	Notes	Primary Emission Point and BMPA Connectivity*
Name (Code) Tubbercurry (D0092-01) Discharge Point Reference TPEFF2700D0092SW004 Treatment Tertiary P Removal	Total Capacity 3,500 Remaining Capacity 2,848 Predicted to Exceed Capacity Yes	Status Non-Compliant (2024). Failing Parameters ortho-Phosphate (as P) - unspecified mg/l	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP. A total of two incidents were reported in 2024, of which one related to abatement equipment being offline and one related to breach of ELV. (D0092-01_2024_AER)	The primary emission point (54.05526609, -8.74387251) to the Tubbercurry_010 watercourse has connectivity with Inflow 5.
Name (Code) Belcarra (D0366-01) Discharge Point Reference TPEFF2200D0366SW001 Treatment Secondary Treatment	Total Capacity 500 Remaining Capacity 327 Predicted to Exceed Capacity No	Status Non-Compliant (2024). Failing Parameters ortho-Phosphate (as P) - unspecified mg/l	The discharge from the wastewater treatment plant does not have an observable impact on the water quality. A total of two incidents were reported in 2024, of which one related to abatement equipment being offline and one related to breach of ELV. (D0366-01_2024_AER)	The primary emission point (53.80459749, -9.21459898) to the Manulla_020 watercourse has connectivity with Inflow 5.
Name (Code) Kilkelly (D0357-01) Discharge Point Reference TPEFF2200D0357SW001	Total Capacity 900 Remaining Capacity 466	Status Compliant (2024).	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP. No reportable incidents in 2024.	The primary emission point (53.86994643, -8.85465849) to the Trimoge_010 watercourse has connectivity with Inflow 5.

Name	Population Capacity	AER Compliance	Notes	Primary Emission Point and BMPA Connectivity*
Treatment Secondary Treatment	Predicted to Exceed Capacity No		(D0357-01_2024_AER)	
Name (Code) Lahardane (D0380-01)	Total Capacity 500	Status Compliant (2024).	A deterioration in water quality has been identified; however, it is not known if it or is not caused by the UWWTP.	The primary emission point (54.04430260, -9.32265489) to the Castlehill_010 watercourse has connectivity with Inflow 5.
Discharge Point Reference TPEFF2200D0380SW001	Remaining Capacity 281		A total of two incidents were reported in 2024, relating to monitoring and abatement equipment being offline.	
Treatment Tertiary P Removal	Predicted to Exceed Capacity No		(D0380-01_2024_AER)	

* Coordinates presented in the WGS84 reference system



Sanitary Survey and Sampling Plan for Killaloe Bay, Co. Mayo & Co. Sligo

Urban emissions in the contributing
catchment



Legend

 Bivalve Mollusc Production Area (BMBA)

 Contributing Catchment

Primary Emission Points

● >500 PE

● <500 PE

● Storm Water Overflows

EPA UWWTP Locations

 Population Equivalent < 500

 Population Equivalent >500

— River Network

Map Scale: 1:330,000

Coordinate System: IREN95 / Irish Transverse Mercator

0 2 4 km



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Project Manager: Maeve Guilfoyle, Senior Ecologist



Figure 2-12 – Urban emissions in the contributing catchment

Of the UWWTPs serving a PE of ≥ 500 , half ($n = 7$) did not meet the licensing standards outlined in their 2024 annual environmental compliance reports (AER; Table 2-3). Each of these failing UWWTPs lie within sub-basins that ultimately drain to Inflow 5 (Moy Estuary). The only UWWTP serving a PE of ≥ 500 that does not drain to Inflow 5 is the Killala UWWTP, with the primary emission point for this UWWTP entering the BMPA to the north of Bartragh Island. The Killala UWWTP was compliant with the licensing standards outlined in the 2024 AER.

The discharge points of the storm water overflows (SWOs) for all UWWTPs serving a PE of ≥ 500 (as reported in the 2024 AERs) are provided in Table 2-4 below, with locations illustrated in Figure 2-12. The SWO for the Killala UWWTP drains directly to the west of the BMPA at Killala Quay.

Table 2-4 – Location of Storm Water Overflows (SWOs) for UWWTPs serving a Population Equivalent ≥ 500 within the contributing catchment*

Name (Code)	Inflow Point	Latitude (WGS84)	Longitude (WGS84)
Balla (D0216-01)	5	53.804054	-9.134257
Balla (D0216-01)	5	54.110442	-9.156516
Ballina (D0016-01)	5	54.114280	-9.149757
Ballina (D0016-01)	5	54.112033	-9.153655
Ballina (D0016-01)	5	54.133065	-9.174128
Ballina (D0016-01)	5	54.115951	-9.147968
Ballina (D0016-01)	5	54.119230	-9.141299
Ballina (D0016-01)	5	54.117140	-9.146671
Ballina (D0016-01)	5	54.114828	-9.149818
Ballina (D0016-01)	5	54.112521	-9.153394
Ballina (D0016-01)	5	54.112412	-9.152488
Ballina (D0016-01)	5	54.111615	-9.153170
Ballina (D0016-01)	5	54.093917	-9.164295
Ballina (D0016-01)	5	54.114828	-9.149818
Ballina (D0016-01)	5	54.102139	-9.162309
Belcarra (D0366-01)	No SWOs		
Castlebar (D0047-01)	5	53.862931	-9.284157
Charlestown (D0214-01)	5	53.966644	-8.800154
Charlestown (D0214-01)	5	53.963259	-8.795853
Charlestown (D0214-01)	5	53.963350	-8.795626
Charlestown (D0214-01)	5	53.963910	-8.796566
Charlestown (D0214-01)	5	53.965800	-8.795993
Crossmolina (D0073-01)	5	54.101834	-9.317358
Crossmolina (D0073-01)	5	54.105842	-9.304151
Foxford (D0213-01)	5	53.981462	-9.126314
Foxford (D0213-01)	5	53.988255	-9.120550
Foxford (D0213-01)	5	53.983005	-9.114052

Name (Code)	Inflow Point	Latitude (WGS84)	Longitude (WGS84)
Foxford (D0213-01)	5	53.981411	-9.116311
Foxford (D0213-01)	5	53.984115	-9.114508
Foxford (D0213-01)	5	53.984307	-9.118066
Kilkelly (D0357-01)	5	53.870429	-8.850847
Kilkelly (D0357-01)	5	53.870657	-8.849149
Killala (D0067-01)	Direct to BMPA	54.213365	-9.219063
Kiltimagh (D0217-01)	5	53.849220	-8.991762
Kiltimagh (D0217-01)	5	53.849693	-9.008277
Kiltimagh (D0217-01)	5	53.849693	-9.008277
Kiltimagh (D0217-01)	5	53.849693	-9.008277
Knock (D0065-01)	5	53.799301	-8.900118
Lahardane (D0380-01)	No SWOs		
Swinford (D0068-01)	5	53.949171	-8.960533
Swinford (D0068-01)	5	53.540680	-9.288359
Tubbercurry (D0092-01)	5	54.054584	-8.732103
Tubbercurry (D0092-01)	5	54.052928	-8.747159
Tubbercurry (D0092-01)	5	54.054593	-8.732103

*Sourced from the AERs for each relevant UWWTPs (Uisce Éireann, 2025) and specific AERs linked in Table 2-3

Under both the Urban Waste Water Treatment Regulations (2001) and the Water Framework Directive, discharges from works of <500 PE are classed as “small agglomerations” and are not required to meet the same monitoring or reporting frequency as larger plants; they are therefore of lower regulatory priority but likely to still have a contamination impact to the BMPA if not functioning as recommended.

A discussion of each of these UWWTPs (<500 PE) is provided below, considering EPA (2026) mapping and data compliance records available on the LEAP portal (EPA, 2025c), in addition to the inflows to which they ultimately enter the BMPA (EPA, 2020c):

- **A0350-01 Cloonacool and Environs:** No compliance records available. This UWWTP lies within the Moy_040 sub-basin, which ultimately enters the BMPA via Inflow 5 (Moy Estuary).
- **A0314-01 Aclare & Environs:** No compliance records available. This UWWTP lies within the Eighnagh sub-basin, which ultimately enters the BMPA via Inflow 5 (Moy Estuary).
- **A0316-01 Curry and Environs:** A number of compliance records relate to this UWWTP, including an Open Compliance Investigation relating to drinking water, with poor effluent quality to the Owengarve River. This river ultimately enters the BMPA via Inflow 5 (Moy Estuary).
- **A0012-01 Bellavary:** An uncontrolled release of sewage was reported in January 2025 due to adverse weather. This UWWTP lies within the Castlebar_040 sub-basin, which ultimately enters the BMPA via Inflow 5 (Moy Estuary).

- **A0015-01 Bunnyconnellan:** No compliance records available relating to uncontrolled sewage releases. This UWWTP lies within the Behy (North Mayo) 010 sub-basin, which ultimately enters the BMPA via Inflow 5 (Moy Estuary).
- **A0054-01 Turlough:** An uncontrolled release of sewage was reported in January 2025 due to adverse weather. This UWWTP lies within the Castlebar_020 sub-basin, which ultimately enters the BMPA via Inflow 5 (Moy Estuary).
- **A0557-01 Bohola:** An uncontrolled release of sewage was reported in January 2025 due to adverse weather. This UWWTP lies within the Carrowward_010 sub-basin, which ultimately enters the BMPA via Inflow 5 (Moy Estuary).

Each of the UWWTPs (<500 PE) are located within the catchment area of Inflow 5, the southernmost portion of the Moy Estuary as it enters the BMPA. A number of uncontrolled sewage releases have been reported for these UWWTPs.

As the majority of UWWTPs (<500 PE and ≥500 PE), including all non-compliant UWWTPs, lie within the catchment area of Inflow 5 at the Moy Estuary in the south of the BMPA (Figure 2-12). Therefore, this inflow is considered the primary location of discharge of faecal contamination associated with UWWTPs. An additional but lesser area of risk is present due to the direct release from the SWO at the Killala UWWTP at Killala Quay.

2.5.1.2 SEPTIC TANKS AND OTHER SEWERAGE TYPES

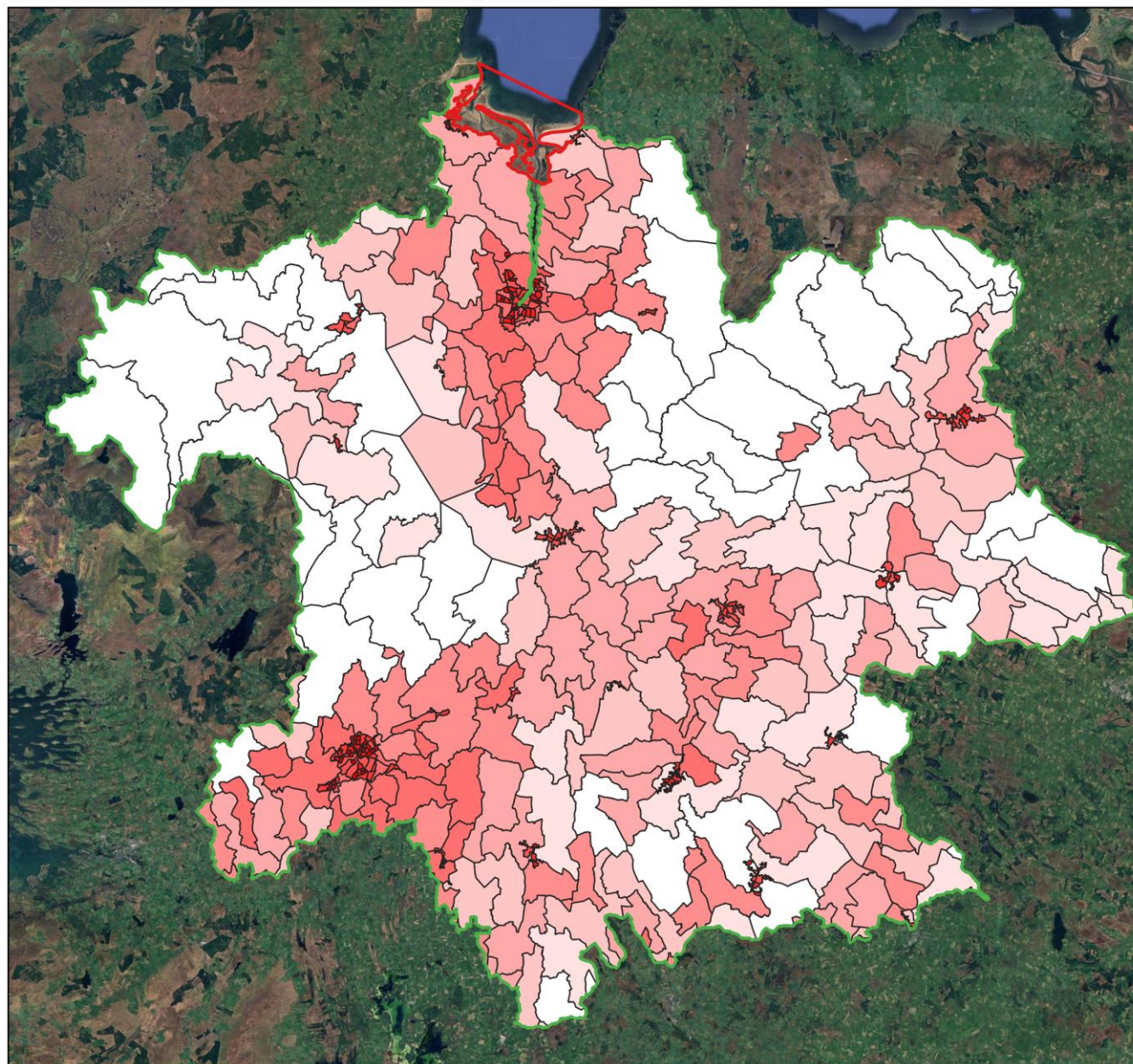
Ireland has nearly half a million Domestic Waste Water Treatment Systems (DWWTSs), primarily septic tanks (EPA, 2021). In 2023, 45% of these systems failed inspection, posing risks to household drinking water and the wider environment, including surface and groundwater. The EPA categorises DWWTS risk zones as follows:

- Zone 1: Higher risk to surface waters.
- Zone 2: Higher risk to household wells.
- Zone 3: Lower risk areas.

Currently, no comprehensive database exists for DWWTS locations. Therefore, this section relies on Census 2022 Small Area statistics (CSO, 2023b). Appendix 3 – Small Area Statistics and Figure 2-13 presents the percentage of each Small Area overlapping the contributing catchment and its population density.

Sewerage type estimates were also obtained from Census 2022 data (CSO, 2023c). These figures are presented as percentages for entire Small Areas, as individual data for overlapping catchments would not be representative (Small Areas do not directly align with the contributing catchment, see Appendix 3 – Small Area Statistics).

Figure 2-14 highlights that 47.65% of the population rely on individual septic tanks. A further 46.88% of the total catchment population are served by public sewerage schemes. This highlights the mixture of both urban and rural populations within the contributing catchment. Those within urban areas are likely to rely on public sewerage schemes, with those in rural and dispersed areas relying on septic tanks.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Small Areas overlapping the contributing
catchment



Legend

- Bivalve Mollusc Production Area (BMPA)
- Contributing Catchment

Population Density (People per sq km)

- 0.5 - 13
- 13 - 17
- 17 - 21
- 21 - 28
- 28 - 41
- 41 - 500
- 500 - 950
- 950 - 1767
- 1767 - 2852
- 2852 - 8405

Map Scale: 1:330,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Figure 2-13 – Small Areas overlapping the contributing catchment

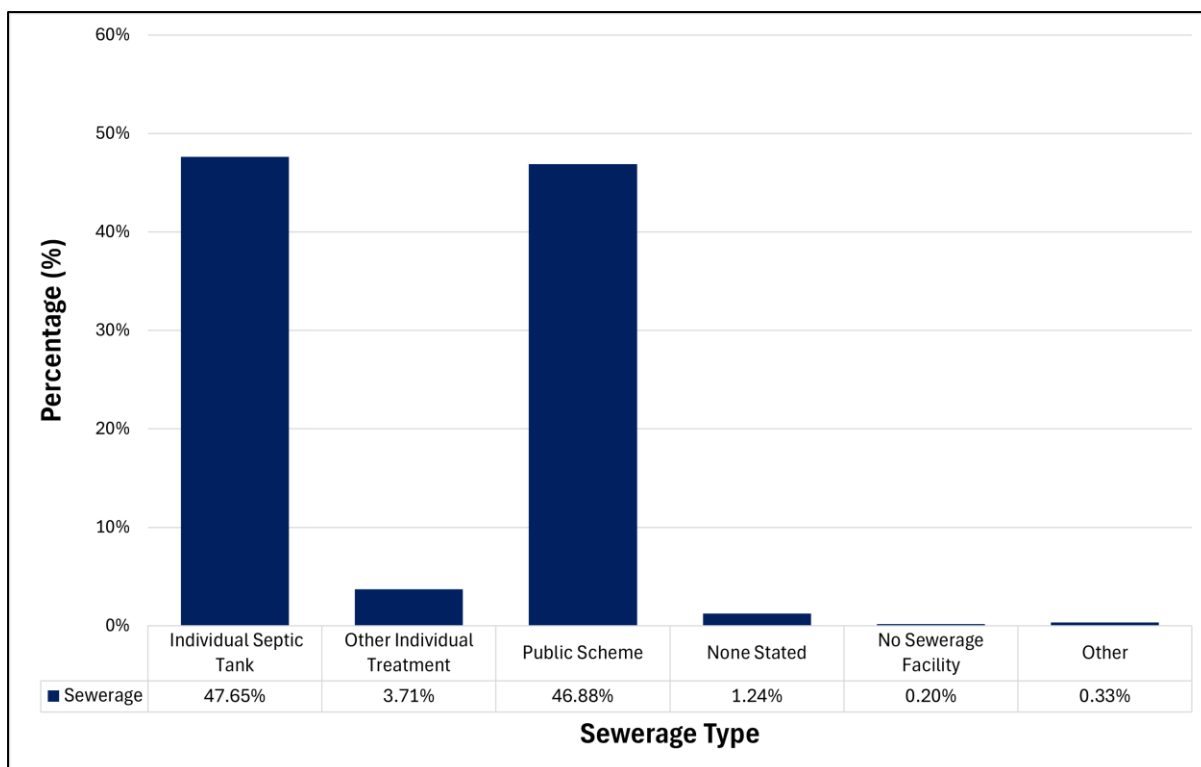


Figure 2-14 – Percentage estimates of sewerage types for permanent private households according to the 2022 census

The majority of the contributing catchment falls within “Zone 3 Low” (EPA, 2021). There are dispersed, localised areas of “Zone 1 Environment”, which pose a higher relative risk to surface waters.

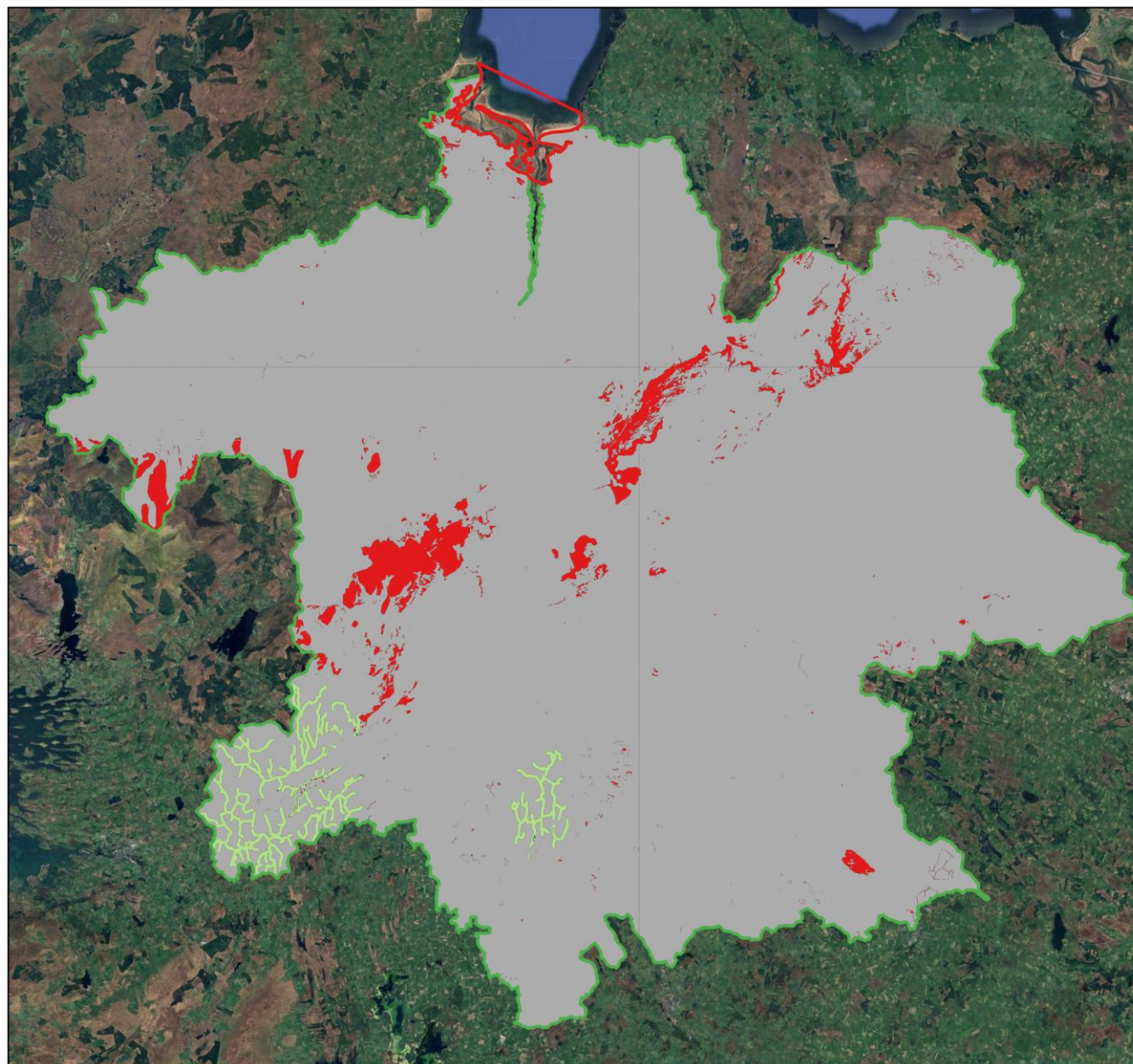
These “Zone 1 Environment” areas are in the southeast of the contributing catchment and along the margins of the Moy Estuary (Figure 2-15). In proximity of the BMPA, these higher risk areas are present along the margins of the southern shores to the east and west of the Moy Estuary inflow (Inflow 5). While these risk zones indicate potential contamination, other factors must be considered when assessing susceptibility to DWWTS failure or non-compliance. Population densities are relatively high in the urban areas of Killala, Enniscrone and Ballina, with maximum population densities in these areas of 5,313 persons per km², 2,031 persons per km² and 4,707 persons per km² respectively. Given the widespread reliance on septic tanks (almost half of the population; Figure 2-14), and the greater population densities along the Moy Estuary and shores of the BMPA (Figure 2-13), elevated risk of faecal pollution from DWWTSs exists at the south of the BMPA, in proximity of the Moy Estuary.

Along the boundaries of the BMPA and the Moy Estuary to the south, groundwater vulnerability is elevated (i.e. “Rock at or near Surface or Karst” and “Extreme”). The vulnerable areas overlap with “Zone 1 Environment” along the Moy Estuary, particularly south of the BMPA and around its confluence with the BMPA. Elevated groundwater vulnerability also overlaps “Zone 1 Environment” near Inflows 2 and 3, south of the Enniscrone beach and dune system. In areas of elevated groundwater vulnerability, thin subsoils and bedrock outcrops increase permeability and create a more direct pathway for surface water (and associated pollutants) to enter the

groundwater body. Therefore, areas of elevated groundwater vulnerability close to the Moy Estuary pose the greatest risk of faecal contamination from DWWTSs via direct groundwater entry.

Surface water hydrology also plays a crucial role in contamination risk. Surface waterbodies may also pose a linkage between groundwater the along the shores of the BMPA, e.g. where groundwater-fed streams and drainage ditches enter the BMPA and may act as conduits from adjacent areas of elevated groundwater vulnerability. Conversely, where surface waterbodies have a longer path and traverse areas of low groundwater vulnerability, dilution of pollutants is likely to be greater. Notably, “Zone 1 Environment” is located predominantly in areas close to waterbodies that ultimately enter the BMPA via Inflow 5 (Moy Estuary).

Therefore, considering groundwater vulnerability, surface water flows, and population density, Inflow 5 (Moy Estuary) is the most likely location for sewage-contaminated discharges from DWWTSs.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Domestic Waste Water Treatment System
Risk Zones within the contributing
catchment



Legend

Bivalve Mollusc Production Area (BMPA)

Contributing Catchment

Domestic Waste Water Treatment
System Risk Zones

Zones 1&2 Environment & Human Health

Zone 3 Low

Zone 2 Human Health

Zone 1 Environment

Map Scale: 1:330,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Figure 2-15 – Domestic Waste Water Treatment System Risk Zones (EPA, 2021)

2.5.2 INDUSTRIAL EMISSIONS

2.5.2.1 IE AND IPC LICENCES

The EPA regulates specific industrial and agricultural activities in Ireland through Industrial Emissions (IE) licences and Integrated Pollution Control (IPC) licences. While these cover a broad range of activities, only those relevant to potential faecal contamination from human or animal sources are considered in this desk-based study. The key categories assessed include:

- Food and Drink
- Waste
- Intensive Agriculture (Poultry and Pigs)
- Other Activities (including wastewater treatment)

A total of 10 licences (IE = 7, IPC = 3, Waste = 0) have been granted within the contributing catchment (EPA, 2026). Of those relevant to the sanitary survey (listed above), only three were present. The three relevant licences relate to a landfill, poultry production and a slaughterhouse (Table 2-5; Figure 2-16).

Table 2-5 provides the relevant information including pathways for potential connectivity with the BMPA and where there may be areas of concern for contamination from the licenced facilities. This excludes any licences previously discussed in Section 2.5.1.

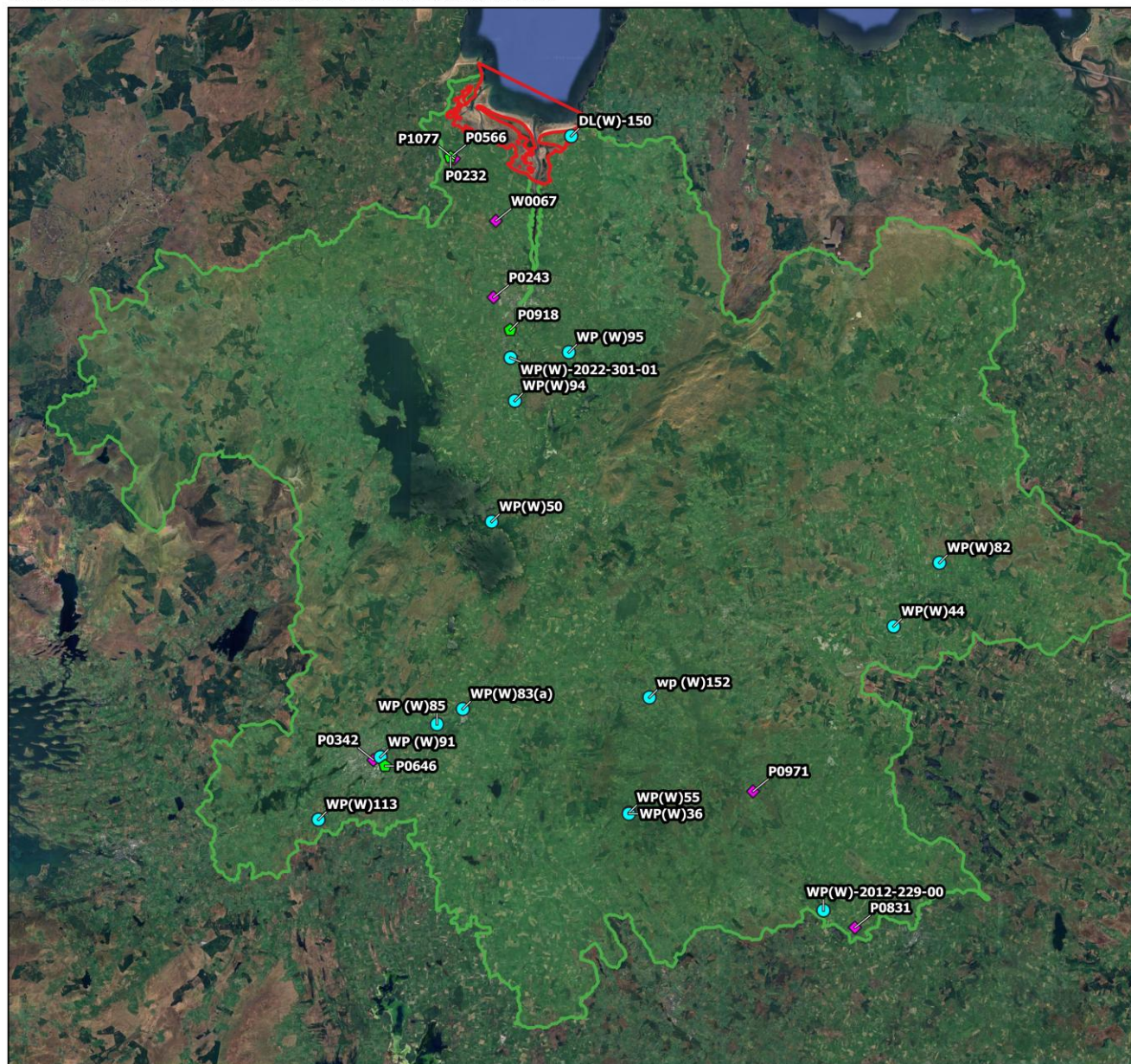
The primary inflow point for all three relevant IE licences is via the Moy Estuary at Inflow 5 (Figure 2-16). This represents the dominant entry location of faecal contamination related to IE and IPC licences within the BMPA.

Table 2-5 – Characterisation of the relevant IE, IPC and waste licences granted within the contributing catchment

Licence Type	Licence Number	Name	Pathways	Latitude (WGS84)	Longitude (WGS84)	Main Class of Activity
IE	W0067-02	Rathroeen Landfill	Storm water from this landfill flows to River Moy. Leachate is pumped to Ballina UWWTP. These pathways have ultimately connectivity with Inflow 5 (Moy Estuary) (W0067-02_2024_AER)	54.15917055	-9.17642077	Class 11.5: Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.
IE	P0566-02	SSE Generation Ireland Limited (Killala)	N/A as activity class not of relevance for sanitary survey (Refer to Section 2.5.2.1 for relevant licence types).	54.19362264	-9.21728716	Class 2.1: Combustion of fuels in installations with a total rated thermal input of 50 MW or more.
IE	P0243-01	Henniges Elastomers Ireland GmbH	N/A as activity class not of relevance for sanitary survey (Refer to Section 2.5.2.1 for relevant licence types).	54.11638521	-9.17738800	Class 5.7 The manufacture of elastomers where the production capacity exceeds 1,000 litres per week
IE	P0971-01	Martin and Mhairi Dempsey	Broiler rearing farm, no details in AER on discharge locations therefore pathway was assessed in accordance with EPA mapping. Located in the Yellow (Knock)_020 sub-basin which drains to Inflow 5. Located in a separate	53.84191580	-8.92377086	Class 6: Intensive Agriculture

Licence Type	Licence Number	Name	Pathways	Latitude (WGS84)	Longitude (WGS84)	Main Class of Activity
			groundwater body to those bounding the BMPA. (P0971-01_2024_AER)			
IE	P0342-01	Heiton Buckley Limited t/a Heiton Buckley Builders Merchants	N/A as activity class not of relevance for sanitary survey (Refer to Section 2.5.2.1 for relevant licence types).	53.85618559	-9.28395003	Class 8.3 The treatment or protection of wood, involving the use of preservatives, with a capacity exceeding 10 tonnes per day.
IE	P0831-02	Western Brand Group Unlimited Company	Storm water goes to ground at Greenwood Turlough and a bog area east of the facility. Treated wastewater enters the Dalgan River. While the facility overlies a separate groundwater body to those bounding the BMPA, the Dalgan River has connectivity with the BMPA via Inflow 5. (P0831-02_2024_AER)	53.76638753	-8.82576070	Class 7.4.1: The operation of slaughterhouses with a carcass production capacity greater than 50 tonnes per day.
IE	P1077-01	Mayo Renewable Limited	N/A as activity class not of relevance for sanitary survey (Refer to Section 2.5.2.1 for relevant licence types).	54.19442720	-9.22078356	Class 2.1. Combustion of fuels in installations with a total rated thermal input of 50 MW or more.
IPC	P0646-01	Fort Wayne Metals	N/A as activity class not of relevance for sanitary survey	53.85296496	-9.27271870	3.2.2 The processing of iron and steel in forges, drawing plants and rolling mills where the production area

Licence Type	Licence Number	Name	Pathways	Latitude (WGS84)	Longitude (WGS84)	Main Class of Activity
		Ireland Limited	(Refer to Section 2.5.2.1 for relevant licence types).			exceeds 500 square meters, not included in paragraph 3.2.1
IPC	P0232-01	Asahi Synthetic Fibres (Ireland) Limited	N/A as activity class not of relevance for sanitary survey (Refer to Section 2.5.2.1 for relevant licence types).	54.19442720	-9.22078356	Class 8.4 The manufacture of synthetic fibres.
IPC	P0918-01	Hollister ULC	N/A as activity class not of relevance for sanitary survey (Refer to Section 2.5.2.1 for relevant licence types).	54.09817731	-9.16098520	Class 12.2.2 The use of coating materials in processes with a capacity to use at least 10 tonnes per year of organic solvent



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Industrial emissions in the contributing
catchment and BMPA



Legend

- Bivalve Mollusc Production Area (BMPA)
- Contributing Catchment
- ◆ IE Licences
- ◆ IPC Licences
- Section 4 Discharges

Map Scale: 1:330,000

Coordinate System: IREN95 / Irish Transverse Mercator



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Figure 2-16 – Industrial emissions in the contributing catchment

2.5.2.2 SECTION 4 DISCHARGES

Section 4 discharge licences, issued under Section 4 of the Local Government (Water Pollution) Act 1977 (as amended in 1990), regulate the discharge of trade and sewage effluent into surface water and groundwater. These licences set conditions to ensure effluent is treated and controlled to protect the receiving environment.

A total of 15 Section 4 discharges are present within the contributing catchment (EPA, 2024), which will be characterised and discussed in further detail below (Table 2-6; Figure 2-16).

Publicly available data from the relevant Local Authorities (Mayo County Council and Sligo County Council) do not allow Section 4 discharges to be classified according to whether they discharge to ground or surface water. In the absence of this information, discharges have been characterised based on both surface and groundwater pathways.

In terms of surface water, Inflow 5 (Moy Estuary) represents the location that ultimately discharges the majority ($n = 15$) Section 4 Discharges. One further Section 4 discharge is located at Enniscrone Golf Club (DL(W)-150), with potential direct surface water run off to the east of the BMPA (Figure 2-16).

Of the Section 4 discharges presented in Table 2-6, two overlap the Foxford groundwater body, which borders the BMPA along its eastern side. However, this groundwater body covers an area of 583 km² and is unlikely to represent a significant risk to the BMPA due to dilution within the groundwater body.

Therefore, Section 4 discharges deliver faecal contamination primarily to the Moy Estuary, which enters the south of the BMPA at Inflow 5. Additionally, direct contamination the BMPA is possible via surface water run-off in the vicinity of Enniscrone Golf Club in the east of the BMPA.

Table 2-6 – Characterisation of the Section 4 Discharges granted within the contributing catchment

Reference	Licence Holder	Facility Address	Latitude (WGS 84)	Latitude (WGS 84)	Potential Surface Water Pathway to BMPA	Potential Groundwater Pathway
WP(W)55	Western Care Association	Ballinamore, Kiltimagh, County Mayo	53.82904	-9.040936	Surface water via the Pollagh_020 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Kilkelly Charlestown groundwater body, which does not border the BMPA.
WP(W)44	St. Attracta's Nursing Home, Hagfield, Charlestown	Haghfield, Charlestown	53.93529	-8.792272	Surface water via the Charlestown Stream_010 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.
WP(W)50	Pontoon Bridge - Geary's	Pontoon, Co. Mayo	53.99075	-9.17561	Surface water via the Moy_100 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Foxford groundwater body, which directly border the BMPA.
WP(W)36	Western Care Association, Ballinamore (St. Johns Center)	Kiltimagh, Co. Mayo	53.82843	-9.041103	Surface water via the Pollagh_020 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Kilkelly Charlestown groundwater body, which does not border the BMPA.
WP(W)82	T. J. Grady Ltd.	Brackloonagh, Charlestown, Co. Mayo	53.97117	-8.749415	Surface water via the Black (Sligo)_010 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Kilkelly Charlestown groundwater body, which does not border the BMPA.
WP(W)83(a)	Horkans Garden Centre,	Turlough, Castlebar, Co. Mayo	53.88562	-9.200049	Surface water via Castlebar_030 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.
WP (W)85	Abbey Breaffy Nursing Home	Clogher, Turlough, Castlebar	53.87687	-9.224279	Surface water via Castlebar_020 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.

Reference	Licence Holder	Facility Address	Latitude (WGS 84)	Latitude (WGS 84)	Potential Surface Water Pathway to BMPA	Potential Groundwater Pathway
WP(W)94	Mr. Alan Maloney, Mount Falcon Castle Hotel	Drumrevagh, Ballina, Co. Mayo.	54.05863	-9.155382	Surface water via the Moy_120 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Ballina groundwater body, which does not border the BMPA.
WP (W)91	Roadstone Provinces Ltd.	Moneen, Castlebar, County Mayo	53.8579	-9.277254	Surface water via Castlebar_020 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.
WP (W)95	Breaffy N.S.	Ballina, Co. Mayo	54.08633	-9.104729	Surface water via the Moy_120 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Ballina groundwater body, which does not border the BMPA.
WP(W)113	Derrywash NS, Derrydorragh	Derrywash, Castlebar, Co. Mayo	53.82224	-9.334953	Surface water via the Castlebar_010 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.
WP(W)-2012-229-00	Connacht GAA Centre of Excellence	Cloonacurry, Ballyhaunis, Co. Mayo.	53.7758	-8.855688	Surface water via the Yellow (Knock)_010 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.
WP (W)152	Cheshire Foundation	O'Dwyer Cheshire Home, Lismiraun, Bohola, Co. Mayo	53.89373	-9.023163	Surface water via the Yellow (Knock)_010 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Swinford Gravels groundwater body, which does not border the BMPA.
DL(W)-150	Enniscrone Golf Club Ltd.	Enniscrone Golf Club, Batragh Td, Enniscrone, Co. Sligo	54.20734	-9.105686	Surface water via the Scurmore_010 sub-basin, likely direct to the BMPA.	Overlies the Foxford groundwater body, which directly border the BMPA.

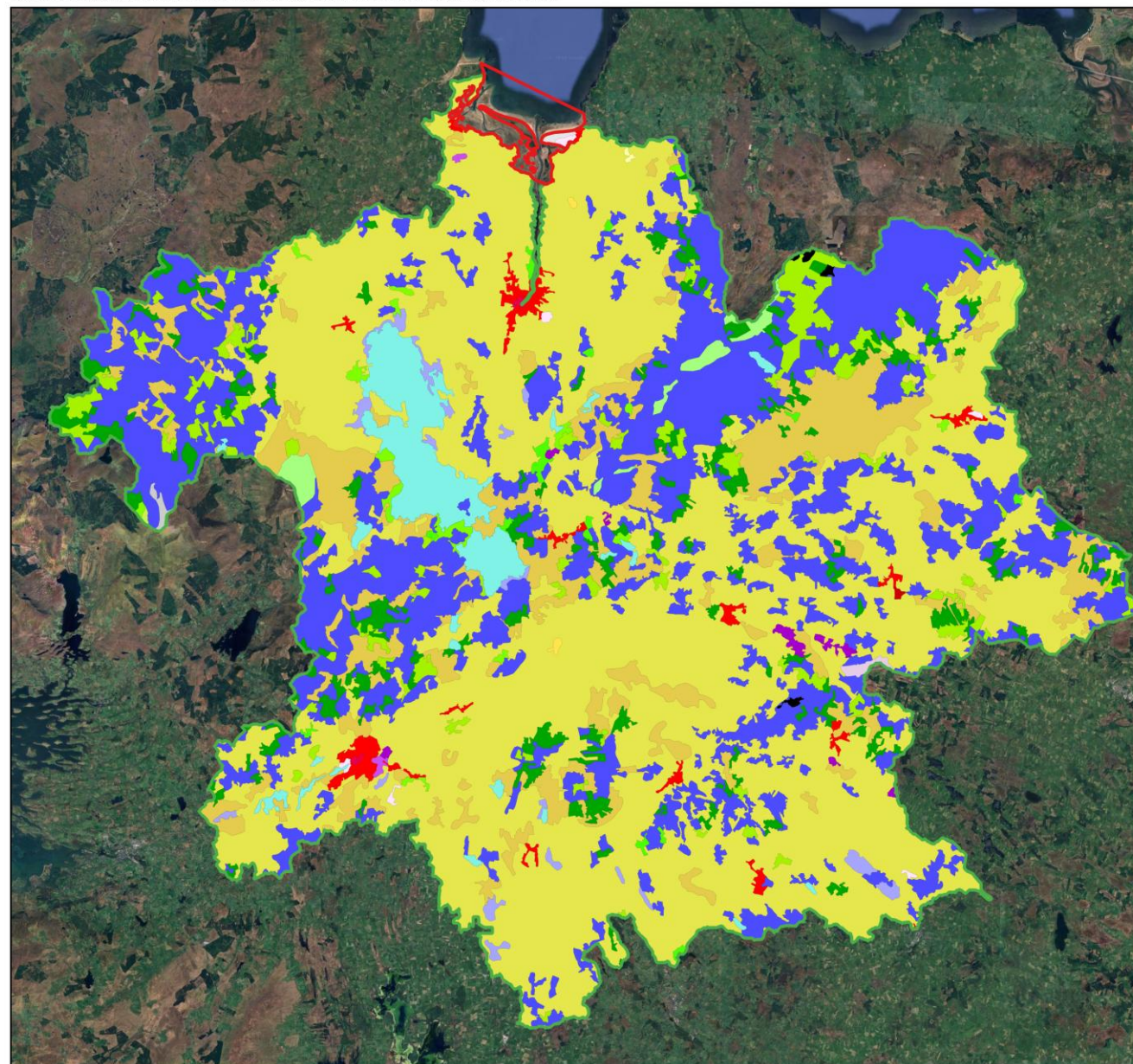
Reference	Licence Holder	Facility Address	Latitude (WGS 84)	Latitude (WGS 84)	Potential Surface Water Pathway to BMPA	Potential Groundwater Pathway
WP(W)-2022-301-01	Charles River Laboratories Ireland Limited	Carrentreila, Ballina, Co. Mayo	54.08267	-9.160176	Surface water via the Corroy_010 sub-basin, entering the BMPA at Inflow 5 (Moy Estuary).	Overlies the Ballina groundwater body, which does not border the BMPA.

2.5.3 LAND USE

According to Corine (2018), land cover within the contributing catchment is dominated by Pastures (2184.8 km², 66.7%). Peat bogs is the next most dominant land cover type (524.5 km², 16.0%). Other land use types within the contributing catchment are: Coniferous forests (93.3 km², 2.9%); Discontinuous urban fabric (41.8 km², 1.3%); Land principally occupied by agriculture with significant areas of natural vegetation (228.2 km², 7.0%); Transitional woodland scrub (64.3 km², 2.0%) and Water bodies (66.7 km², 2.0%).

A number of land cover types cover areas of less than 1%, namely: Airports; Bare rocks; Beaches, dunes, sand; Broad-leaved forests; Burnt areas; Complex cultivation patterns; Continuous urban fabric; Estuaries; Industrial and commercial units; Inland marshes; Intertidal flats; Mineral extraction sites; Mixed forests; Moors and heathlands; Natural grassland; Non-irrigated arable land; Road and rail network; Sea and ocean and Sport and leisure facilities.

In terms of land cover, agricultural land (including Pastures, Land principally occupied by agriculture with significant areas of natural vegetation, Complex cultivation patterns, Non-irrigated arable land) is the most likely to give rise to faecal contamination in the contributing catchment. Land use within the contributing catchment is depicted in Figure 2-17.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Land use within the contributing
catchment



Legend

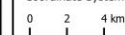
- Bivalve Mollusc Production Area (BMPP)
- Contributing Catchment

Corine (2018) Land Use

- | | |
|---|---|
| Continuous urban fabric | Broad-leaved forest |
| Discontinuous urban fabric | Coniferous forest |
| Industrial or commercial units | Mixed forest |
| Road and rail networks and associated land | Natural grasslands |
| Port areas | Moors and heathland |
| Airports | Transitional woodland-shrub |
| Mineral extraction sites | Beaches, dunes, sands |
| Dump sites | Bare rocks |
| Construction sites | Sparsely vegetated areas |
| Green urban areas | Burnt areas |
| Sport and leisure facilities | Inland marshes |
| Non-irrigated arable land | Peat bogs |
| Fruit trees and berry plantations | Salt marshes |
| Pastures | Intertidal flats |
| Complex cultivation patterns | Water courses |
| Land principally occupied by agriculture, with significant areas of natural vegetation | Water bodies |
| | Coastal lagoons |
| | Estuaries |
| | Sea and ocean |

Map Scale: 1:330,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Figure 2-17 – Land use within the contributing catchment

2.5.3.1 AGRICULTURE

Animals

Faecal production and *E. coli* loads from domestic animals are often comparable to or greater than those from humans (Table 2-7). Sheep have the highest daily *E. coli* load, followed by pigs, cows, humans, and chickens. Contamination can occur through direct deposition into watercourses or run-off following rainfall, with seasonal patterns influencing agricultural contamination (see Section 2.4.2.2). Stocking densities also play a role, with higher faecal contamination typically observed during summer months (Hunter et al., 1999).

Table 2-7 – Estimated faecal production and *E. coli* loadings of selected domestic animals in comparison with humans (Jones and White, 1982 as read in Taylor (2003))

Source	Faecal Production (g/day)	Average Number (<i>E. coli</i> /g)	Daily Load (<i>E. coli</i>)
Man	150	13×10^6	1.9×10^9
Cow	23,600	0.23×10^6	5.4×10^9
Sheep	1,130	16×10^6	18.1×10^9
Chicken	182	1.3×10^6	0.24×10^9
Pig	2,700	3.3×10^6	8.9×10^9

The most comprehensive agricultural data available is derived from 2020 Census of Agriculture (CSO, 2020) with the smallest reporting unit being the Electoral Division (ED). While data are not provided on chickens or pigs, intensive poultry farms (>40,000 places³) and pig farms requiring licences (>750 sows or >3,000 production pigs) that fall under EPA licensing control are discussed in Section 2.5.2.1, of which one was identified.

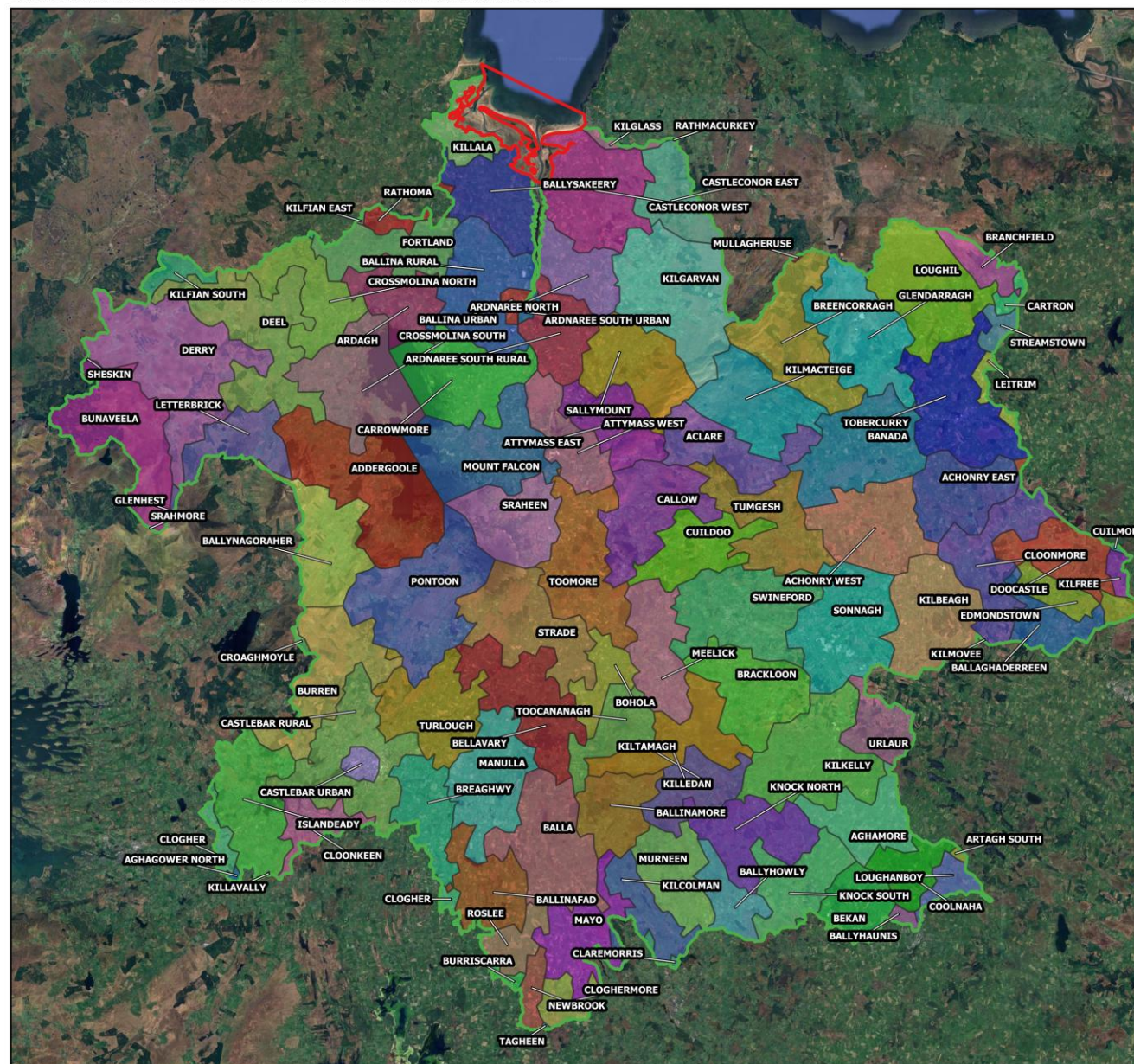
A total of 107 Electoral Divisions (EDs) overlap with the contributing catchment (Figure 2-18). However, these ED boundaries do not directly align with the contributing catchment boundary. To address this, the proportion of each ED that overlaps the contributing catchment was calculated as a percentage. Appendix 4 – Statistics from the Census of Agriculture 2020 for grazing farm animals within the Electoral Divisions overlapping the contributing catchment reports both the total grazing animal census data per ED and corrected totals (calculated according to the percentage overlap of each ED). This provides an estimate of the number of animals within the contributing catchment, based on the assumption that animals are evenly distributed across each ED.

In the context of the Census of Agriculture in Appendix 4 – Statistics from the Census of Agriculture 2020 for grazing farm animals within the Electoral Divisions overlapping the contributing catchment, the term “livestock” refers to Livestock Units⁴. This includes the following domesticated animals raised for agricultural purposes: cattle, sheep, goats, pigs,

³Refers to places for birds e.g. broilers, layers, etc.

⁴ For interpretation of livestock units please refer to [LSU Statistics Explained](#)

horses, poultry and female breeding rabbits. Cattle and sheep are reported separately to provide more detailed information in Appendix 4 – Statistics from the Census of Agriculture 2020 for grazing farm animals within the Electoral Divisions overlapping the contributing catchment.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Electoral Divisions overlapping the
contributing catchment



Legend

- Bivalve Mollusc Production Area (BMBA)
- Contributing Catchment

Map Scale: 1:330,000

Coordinate System: IREN95 / Irish Transverse Mercator

0 2 4 km



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Figure 2-18 – Electoral Divisions overlapping the contributing catchment

Under Ireland's Water Framework Directive (WFD) monitoring programme, waterbodies classified as "At Risk" of failing to meet their water quality objectives undergo assessment for significant pressures that must be addressed. Of particular relevance to this section are pressures from agriculture⁵. A number of river waterbodies and ground waterbodies are considered as under "Review" in terms of their risk status⁶. In the absence of review data, there remains a potential risk to surface waters and groundwaters, and ultimately, the BMPA due to agricultural pressures on these waterbodies. Therefore, for the purposes of the sanitary survey these under "Review" waterbodies are considered to have agricultural pressures on a precautionary basis in the discussion below.

As part of the third WFD cycle, 22 groundwater bodies underlie the contributing catchment (Section 2.4.1.1). All are classified as "Not at Risk" and therefore have been assessed for agricultural pressures.

In terms of impacts to the BMPA, the primary risk from groundwater is via surface water connectivity (discussed below), or via direct proximity of the groundwater body with the BMPA. Three groundwater bodies border the BMPA: Killala South to the west and south, Bellacorick-Killala in the south near the Moy Estuary, and Foxford to the east.

Areas within these groundwater bodies bordering the BMPA have pockets of elevated groundwater vulnerability ("Rock at or near Surface or Karst" and "Extreme"; GSI, 2021). Such areas overlap with agricultural land use (Figure 2-17) to the south of Bartragh Island and the Enniscrone beach and dunes system. Therefore, these areas pose a groundwater risk from grazing animals through diffuse pollution to the BMPA in these locations in the south of the BMPA.

Surface waters in the contributing catchment are classified as "At Risk", "Not At Risk" or "Review" under the third WFD cycle (Appendix 4 – Statistics from the Census of Agriculture 2020 for grazing farm animals within the Electoral Divisions overlapping the contributing catchment). Of those considered "At Risk", 13 are experiencing agricultural pressures (EPA, 2020b). These waterbodies all ultimately reach the BMPA via Inflow 5 (Moy Estuary). A total of 17 of these waterbodies are classified as under "Review" and such are considered here on a precautionary basis. The majority (n = 15) of under "Review" waterbodies drain to Inflow 5; however, inflows are distributed around the BMPA.

Analysis of the 107 EDs overlapping the contributing catchment (Figure 2-18) shows a strong agricultural presence. Only three EDs have no grazing livestock, Ardnaree South Urban, Ballina Urban and Castlebar Urban. These EDs are located in close proximity to each other near Ballina

⁵ Not all parameters from WFD apply, please refer to Section 2.4.1.

⁶ Waterbodies fall into the "Review" category for one of two reasons:

1. Additional information is required to determine their status before allocating resources and implementing targeted measures.
2. Measures have already been undertaken, but their effectiveness has yet to be assessed.

c. 6. 8 km south of the BMPA. Four EDs directly border the BMPA, each of these with cattle and sheep present in considerable numbers.

The remaining EDs support livestock farming, with spatial variations in stocking density. Six EDs have a high corrected cattle population exceeding 3,000 animals: Castleconor West, Ballina Rural, Balla, Kilkelly, Fortland and Tobercurry. Castleconor West (>99% of this ED overlaps with the contributing catchment) recorded the highest corrected cattle numbers (n = 4,706). This ED borders the eastern boundary of the BMPA, extending from the Moy Estuary to the east side of Enniscrone Beach. Pollution from this ED may occur directly via run-off, or via watercourses (Inflows 1, 2, 3, 4 and 5). The other EDs are distributed across the contributing catchment, but each has hydrological connectivity to the BMPA through Inflow 5.

Sheep dominated EDs also contribute significantly to *E. coli* loading due to the higher output per animal (Table 2-7). Four EDs hold corrected populations of more than 5,000 sheep: Loughil, Addergoole, Derry and Ballynagoraher. These EDs are distributed around the contributing catchment and also have hydrological connectivity to the BMPA via Inflow 5.

In summation for grazing animals, pressures are evident across both groundwater and surface water systems. Under the WFD monitoring for the contributing catchment, a number of surface waterbodies are subject to agricultural pressures, creating pathways for pollution transfer to the BMPA. Given the presence of agriculture in the adjacent to the BMPA, there is potential for direct runoff, as well as inputs via riverine inflows surrounding the BMPA. This risk is particularly relevant along the eastern boundary of the BMPA where elevated cattle densities occur in Castleconor West ED.

The most significant pathway for faecal contamination from agricultural animals is associated with Inflow 5 (Moy Estuary). This reflects its extensive and predominantly agricultural upstream catchment. Seasonality further influences contamination risk with summer months characterised by higher livestock densities on pasture.

Land

In addition to the direct source of organic pollution from animals, agricultural land use contributes to organic pollution through the spreading of slurry and soiled water. To provide a clearer understanding of agricultural land use, the 2020 Census of Agriculture (CSO, 2020) can again be consulted, with a correction to account for the percentage overlap of each ED in the contributing catchment (Appendix 6 – Statistics from Census of Agriculture 2020 relating to land utilisation within the Electoral Divisions overlapping the contributing catchment). The largest assumed area of farmed land is in the Balla ED, followed by Castleconor West. No cereals are produced within the contributing catchment, with the majority of farmed land represented by grassland.

In accordance with the 5th Nitrates Action Programme (Government of Ireland, 2022), the contributing catchment lies in Zone B, where a closed period for slurry spreading runs from 1st October to 15th January. The spreading of soiled water is also prohibited in December. Therefore, the greatest risk to the BMPA primarily exists outside this period, assuming the regulations are adhered to.

In areas designated as "Extreme Vulnerability Areas on Karst Limestone Aquifers" under S.I. No. 113/2022, there are further restrictions on the spreading of soiled water. As the contributing catchment overlies a number of karst limestone aquifers (GSI, 2023), the spreading of soiled water is restricted if the total volume exceeds 25,000 litres per hectare over a 42-day period, or if the application rate exceeds three mm per hour on land with a thickness of less than one metre. However, the majority of the contributing catchment does not overlie such aquifers and is not subject to this SI.

Considering the 2020 Agriculture Census, c. 56.79% of the contributing catchment is farmed. As there are no refined spatial data available for the Agriculture Census, Corine mapping has been used to calculate areas of elevated groundwater vulnerability overlapping agricultural land. Approximately 10.52% (c. 254 km) of Corine mapped agricultural land overlaps areas classified as having "Extreme" or "Rock-at-Surface" groundwater vulnerability (GSI, 2021). Such areas overlap with agricultural land use (Figure 2-17) in the inner BMPA, to the south of Bartragh Island and the Enniscrone beach and dunes system. Therefore, these areas pose a groundwater risk from grazing animals through diffuse pollution to the BMPA in these locations in the south of the BMPA. Additionally, agricultural land is present within all river sub-basins within the contributing catchment.

Therefore, considering the agricultural land use, groundwater vulnerability, surface water runoff and riverine inputs, Inflow 5 (Moy Estuary) is considered as the most likely location for pollution from spreading of slurry and soiled water. However, all riverine inflows to the BMPA may also receive pollution from slurry and soiled water. Considering the regulatory restrictions in place, this risk is likely to be greatest from mid-January to September inclusive.

2.5.3.2 URBAN AREAS AND HUMAN POPULATIONS

Human populations contribute to contamination from sewage, as previously discussed in Section 2.5.1. However, examining urban areas and population dynamics can provide further insight into pollution sources and the seasonality of contamination.

A total of 20 urban areas are present within the contributing catchment⁷. The urban areas of Killala and Enniscrone directly border the BMPA, to the west and east respectively. The urban area of Ballina is located c. 5.3 km south of the BMPA along the Moy Estuary.

The highest population density (Appendix 3 – Small Area Statistics; Figure 2-13) is recorded in Castlebar Urban Small Area (A157049009), which is located in the urban area of Castlebar in the southwest of the contributing catchment (c. 40 km south of the BMPA). This density (8,404 persons/km²) is above the national average of 73 persons/km² (CSO, 2023b).

During the most recent census (3rd April 2022), 6.56% of houses within the contributing catchment were identified as unoccupied holiday homes (CSO, 2023a). This is lower than the national average of 11%, however considering the size of the contributing catchment, may still pose a risk of seasonal increases in organic pollution during the summer months due to holiday homes. For further information refer to Section 2.5.1.2 relating to septic tanks.

In addition to domestic and urban wastewater treatment, facilities such as nursing homes, schools, hospitals, and other large developments can be sources of pollution. A search of the Environmental Impact Assessment (EIA) database identified applications for 10 developments requiring EIA in the contributing catchment since 2017 (Department of Housing, Local Government and Heritage, 2026). Of these, two relate to poultry farming developments, which may increase volume of faecal contamination in the contributing catchment (Appendix 6 – Statistics from Census of Agriculture 2020 relating to land utilisation within the Electoral Divisions overlapping the contributing catchment). Both of these developments are in the south of the contributing catchment, c. 5 km west of Ballyhaunis. The sub-basin here drains to the BMPA via Inflow 5 (Moy Estuary; Figure 2-5).

A search of Google Maps for relevant facilities (e.g. schools, universities, nursing homes, hospitals, barracks, and prisons) was also conducted on 6th February 2026 within a 250 m boundary of the BMPA. This search yielded the following results, which are unlikely to add significant levels of faecal contamination:

- Jesus & Mary Secondary School: 150 m east of the BMPA in Enniscrone,
- St. Joseph's National School: c. 230 m south of the BMPA in Killala.

⁷ The CSO classifies urban areas based on the following “Buildings in Urban Areas are within a group of at least 100 buildings and buildings need to be within 65 meters of another building. Building groups of 100 buildings or more must be within 500 meters of each other.” (Táilte Éireann, 2023).

Tourist facilities can contribute to organic pollution, particularly in peak seasons. The contributing catchment lies within a low-density area of accommodation providers, including hotels, B&Bs, and campsites (Fáilte Ireland, 2018).

While hotels and B&Bs typically use domestic or urban wastewater treatment, campsites and caravan parks may pose additional pollution risks. A Google Maps search on 6th February 2026 found six caravan parks/campsites within the contributing catchment (Figure 2-19). Two of these sites are in close proximity to the BMPA near Enniscrone and may contribute to faecal contamination in the east of the BMPA. The remainder of camping sites are distributed throughout the BMPA and may further increase faecal contamination at Inflow 5 (Moy Estuary).



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Campsites within the contributing
catchment

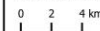


Legend

- ▭ Bivalve Mollusc Production Area (BMPA)
- ▭ Contributing Catchment
- Campsites

Map Scale: 1:400,000

Coordinate System: IRENET95 / Irish Transverse Mercator



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Figure 2-19 – Campsites within the contributing catchment

2.5.4 OTHER POLLUTION SOURCES

2.5.4.1 MARINE VESSELS

Marine vessels, including ferries, cargo ships, fishing boats, and recreational craft can contribute to faecal contamination depending on passenger volume, onboard waste management practices, treatment systems, and compliance with discharge regulations.

Under S.I. No. 492/2012 (which transposes MARPOL Annex IV into Irish law), treated sewage can be discharged at a minimum of 3 nautical miles from shore, while untreated sewage must be released no closer than 12 nautical miles. Since sewage is typically discharged at sea or stored onboard for disposal, vessels are unlikely to be a major source of organic contamination. However, localised risk may arise in areas of vessel convergence, particularly from small craft.

A manual review of GIS shapefiles under the “Marine Vessels” theme (Marine Institute, 2025) confirmed the absence of commercial ports, ferry terminals or designated fishing ports within the BMPA. The only mapped marine infrastructure in/adjacent to the BMPA (Marine Institute, 2025) are Killala Pier in the west of the BMPA, and Enniscrone Pier and Slip to the east (Figure 2-20). Recognised anchorages are present at Bartragh Pool in the east of the BMPA (UK Hydrographic Office, 2026).

To supplement Marine Institute mapping, a review of Google satellite imagery was conducted on 6th February 2026 to identify additional slips, piers, or jetties around the BMPA. Vessel facilities are concentrated around the towns of Killala and Enniscrone to the west and east of the BMPA respectively (Figure 2-20).

Considering the scale and nature of vessel activity, any vessel-related discharges are most likely to occur locally and intermittently near Killala and Enniscrone. However, given the scale of operations and expected compliance with S.I. No. 492/2012, the risk of contamination from vessels is relatively low. Instead, discharges from land are more likely to pose a more significant source of contamination.

2.5.4.2 SWIMMING, BATHING AND RECREATION

The recreational use of beaches and shorelines acts as a source of faecal contamination. Bathers are a non-point source of faecal bacteria, including *E. coli*, due to the shedding of microbes from skin (An et al., 2020; Elmir et al., 2007). Dog walking is also a contamination source in recreational waters and may contribute up to 20% of faecal indicator bacteria in urban Irish areas (Martin et al., 2024). Such contamination is expected to peak during the summer months in association with warmer weather.

The beaches.ie website (EPA, 2025a) was consulted on 6th February 2026 to identify blue flag and monitored beaches within the BMPA (Figure 2-20). These data were supplemented with a search of Google satellite imagery (6th February 2026) to further identify beaches and coastal walks within the BMPA. Two blue-flag beaches/regulated bathing waters are present: Enniscrone Beach and Ross Beach, Killala (in the east and northwest respectively). For these Blue Flag beaches, a condition of maintaining their Blue Flag status is that dogs are prohibited from 11:00 – 19:00 during the bathing season (June 1st to September 25th).

Due to the estuarine and intertidal nature of the much of the BMPA, there are expanses of sandy shores. While evidence of human use is not clearly visible on satellite imagery, these areas may also be intermittently used for bathing purposes and walking. Such sandy shores have not been included in Figure 2-20, but were ground truthed for evidence of human use during shoreline surveys. Evidence of walkways is present particularly along the dunes to the east of Enniscrone, in close proximity to the BMPA.

Swimming numbers may increase during the summertime due to higher water temperatures, giving rise to potential contamination sources in proximity of the beaches, in the east and northwest of the BMPA. Dog walking is likely to be a consistent but negligible contamination source, particularly near Enniscrone dunes and beach system.

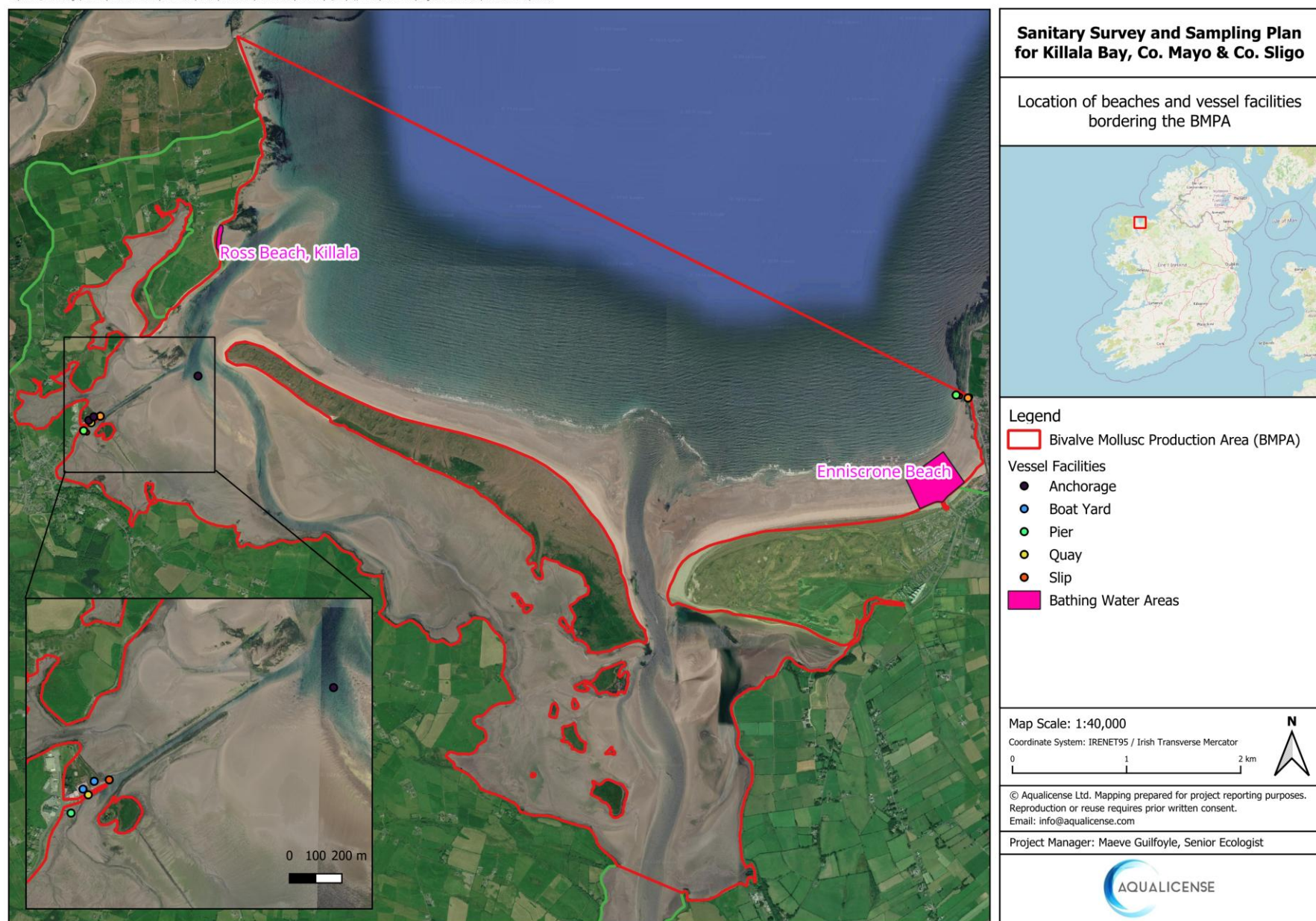


Figure 2-20 – Location of beaches and vessel facilities bordering the BMPA

2.5.4.3 WILDLIFE

Wildlife, including birds and aquatic animals, has been shown to act as a source of faecal contamination in the marine environment (Alderisio & DeLuca, 1999; Godino Sanchez et al., 2024). In coastal and estuarine settings, high densities of mobile fauna, repeated site use, and hydrodynamic connectivity can result in localised but potentially significant inputs of faecal indicator organisms to adjacent waters.

To identify key areas of wildlife-related faecal contamination, a search was conducted for locations with potentially high densities of animals in proximity to the BMPA (Figure 2-21, Table 2-8). This search included Special Protection Areas (SPAs), Special Areas of Conservation (SACs), and Irish Wetland Bird Survey (I-WeBS) sites (Birdwatch Ireland, 2025; NPWS, 2025).

Only SACs where mobile fauna are listed as a Qualifying Interest (QI) were examined further, with the exception of those listed for mudflats and sandflats not covered by seawater at low tide [1140]⁸. Intertidal mudflats and sandflats they may act as a temporary storage medium for *E. coli*, potentially influencing microbial water quality in adjacent marine areas during tidal resuspension or runoff events (Wyness et al., 2019). Therefore, the Killala Bay/Moy Estuary SAC (000458) has been considered below in relation to this intertidal QI habitat.

Bird species for which SPAs are designated are inherently mobile, with foraging and roosting ranges that may extend beyond both the SPA and BMPA boundaries. Consequently, a proportionate and spatially defensible approach is required when considering the SPA related pressures, such that relevant sources of potential *E. coli* input are captured without extending the assessment beyond areas with a credible sanitary risk pathway.

For the purposes of this desk-based review, consideration has therefore been limited to functionally relevant areas of SPAs, defined using the following criteria:

- Areas of SPAs that overlap with the BMPA and/or its contributing catchment, where direct or indirect transfer of faecal matter to the BMPA may occur via direct input, tidal exchange, freshwater inflows or surface runoff.
- I-WeBS or Ramsar sites that overlap with the SPAs, which may represent locations of consistently high bird abundance, particularly for roosting. These areas are considered more likely to contribute to elevated localised faecal loading due to sustained high-bird densities and repeated use over time.

By focussing on SPAs with demonstrated high bird densities and hydrological connectivity to the BMPA, the assessment captures those SPA related pressures most likely to be of relevant to the sanitary survey.

⁸ [1140] denotes the habitat type number under the EU Habitats Directive Annex I

While it is acknowledged that QI species may occur more widely within the broader SPA network, the inclusion of SPA areas outside of the criteria defined above would not materially improve the identification or characterisation of microbiological risk to the BMPA. The exclusion therefore represents a proportionate and risk-based spatial cut-off, consistent with the objectives of the sanitary survey.

Bird aggregations (and associated faecal contamination) within the BMPA are particularly concentrated within the estuarine environments of the inner BMPA, where mats of eelgrass, beaked tassel weed and green algae provide important feeding material (NPWS, 2014). These areas also provide high hide roosts. In addition to bird aggregations within the BMPA, those upstream of the BMPA within the contributing catchment (Table 2-8), may also increase faecal deposits entering the BMPA via Inflow 5 (Moy Estuary). The SPAs, Ramsar and I-WeBS sites within the contributing catchment are important for wintering waterfowl, which may result in seasonal increases in contamination associated with wildfowl.

In addition to the avian sources, marine mammals in particular represent a further wildlife-related faecal input within the wider BMPA. Killala Bay/Moy Estuary SAC (000458) supports harbour seal (*Phoca vitulina*), with known haul-out sites in the inner BMPA, south of Bartragh Island and Enniscrone beach and dune system (NPWS, 2026).

Seal haul-out areas are associated with repeated and concentrated faecal deposition, which may contribute to elevated localised microbial loading in adjacent coastal waters, particularly under conditions of limited dispersion. The remaining SACs with fauna listed as QI species occur within sub-basins with connectivity to Inflow 5 (Moy Estuary), and while of a lesser risk than avian and marine mammal sources, they may cumulatively contribute to faecal contamination at this location.

In summary, mobile species (primarily birds and seals), with extensive foraging ranges or territories, occur within the BMPA. Therefore, there is potential for direct contamination of the BMPA, particularly in southern intertidal/estuarine waters. Additionally, faecal contamination from fauna located upstream in the contributing catchment may increase faecal contamination inputs at Inflow 5 (Moy Estuary) and presents a potential source of faecal contamination at the BMPA. Wildlife associated faecal contamination may fluctuate seasonally, particularly during the winter due to waterfowl usage of the BMPA and contributing catchment. The impacts of which are assessed further within Section 2.5.5, Table 2-9.

Table 2-8 – Wildlife areas within or bordering the BMPA

Type	Name (Code)*	Qualifying Interests	Location
SAC	Ballinafad SAC (002081)	<i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat)	c. 45 km south of the BMPA. Within a sub-basin that drains to Inflow 5 (Moy Estuary)
SAC	Lough Hoe Bog SAC (000633)	<i>Vertigo geyeri</i> (Geyer's Whorl Snail) <i>Austropotamobius pallipes</i> (White-clawed Crayfish)	c. 13.5 km southeast of the BMPA. Overlapping sub-basins, which drain to Inflow 5.
SAC	Killala Bay/Moy Estuary SAC (000458)	Mudflats and sandflats not covered by seawater at low tide <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) <i>Petromyzon marinus</i> (Sea Lamprey) <i>Phoca vitulina</i> (Harbour Seal)	Overlapping the BMPA. Also located within the Moy Estuary to the south of the BMPA, which drains to Inflow 5.
SAC	Ox Mountains Bogs SAC (002006)	<i>Vertigo geyeri</i> (Geyer's Whorl Snail)	c. 9 km southeast of the BMPA. Overlapping sub-basins, which drain to Inflow 5.
SAC	Bellacorick Bog Complex SAC (001922)	<i>Vertigo geyeri</i> (Geyer's Whorl Snail)	c. 11 km west of the BMPA. Overlapping sub-basins that drain to Inflow 5.
SAC	Owenduff/Nephin Complex SAC (000534)	<i>Salmo salar</i> (Salmon) <i>Lutra lutra</i> (Otter)	c. 30 km southwest of the BMPA. Overlapping sub-basins that drain to Inflow 5.
SAC	River Moy SAC (002298)	<i>Austropotamobius pallipes</i> (White-clawed Crayfish) <i>Petromyzon marinus</i> (Sea Lamprey) <i>Lampetra planeri</i> (Brook Lamprey) <i>Salmo salar</i> (Salmon) <i>Lutra lutra</i> (Otter)	c. 7 km south of the BMPA. Overlapping sub-basins that drain to Inflow 5.
SPA	Killala Bay/Moy Estuary SPA (004036)	<i>Charadrius hiaticula</i> (Ringed Plover)	Overlapping the BMPA. Also located within the Moy Estuary to the south of the BMPA, which

Type	Name (Code)*	Qualifying Interests	Location
		<i>Pluvialis apricaria</i> (Golden Plover) <i>Pluvialis squatarola</i> (Grey Plover) <i>Calidris alba</i> (Sanderling) <i>Calidris alpina</i> (Dunlin) <i>Limosa lapponica</i> (Bar-tailed Godwit) () <i>Numenius arquata</i> (Curlew) <i>Tringa totanus</i> (Redshank) Wetland and Waterbirds	drains to Inflow 5. Portions of this SPA also occur within Cloonaghmore Estuary and Lackan Strand, which drain to coastal waters to the northeast of the BMPA.
SPA	Lough Conn and Lough Cullin SPA (004228)	<i>Aythya fuligula</i> (Tufted Duck) <i>Melanitta nigra</i> (Common Scoter) <i>Larus canus</i> (Common Gull) <i>Anser albifrons flavirostris</i> (Greenland White-fronted Goose) Wetland and Waterbirds	c. 12 km south of the BMPA. Overlapping sub-basins that drain to Inflow 5.
I-WeBS	Killala Bay (0D407)	Relevant species listed above under Killala Bay/Moy Estuary SPA (004036)	Overlapping the BMPA. Also located within the Moy Estuary to the south of the BMPA, which drains to Inflow 5. Portions of this SPA also occur within Cloonaghmore Estuary, which drains to coastal waters to the northeast of the BMPA.
I-WeBS	Lough Conn (0D002)	Relevant species listed above under Lough Conn and Lough Cullin SPA (004228)	c. 12 km south of the BMPA. Overlapping sub-basins that drain to Inflow 5.
I-WeBS	Lough Cullin (0D001)	Relevant species listed above under Lough Conn and Lough Cullin SPA (004228)	c. 22 km south of the BMPA. Overlapping sub-basins that drain to Inflow 5.

Type	Name (Code)*	Qualifying Interests	Location
Ramsar	Killala Bay/Moy Estuary (843)	Relevant species listed above under Killala Bay/Moy Estuary SPA (004036)	Overlapping the BMPA. Also located within the Moy Estuary to the south of the BMPA, which drains to Inflow 5.

*Sites and relevant QIs are only listed above if they meet the criteria specified in Section 2.5.4.3.

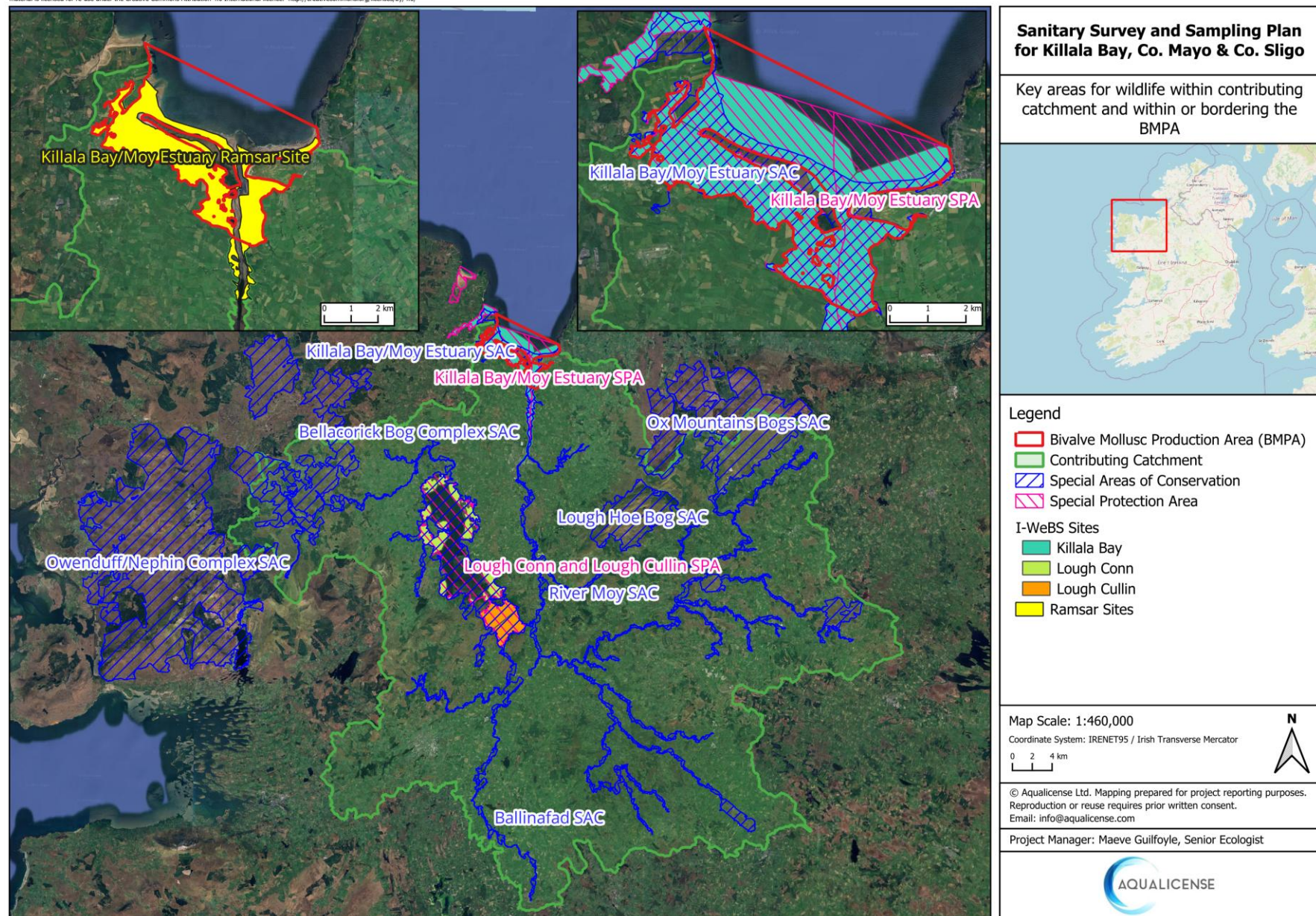


Figure 2-21 – Key areas for wildlife within contributing catchment and within or bordering the BMPA

2.5.5 SOURCE-PATHWAY-RECEPTOR MODEL OF POLLUTION SOURCES AND SEASONAL VARIATIONS OF POLLUTANTS

Considering the details in the above section, the SPR model was used to assess the relative risk of faecal contamination in the BMPA by identifying potential contamination sources and transport pathways to the receiving environment and determining the likely impact on licensed shellfish sites (Table 2-9). Each source was assessed qualitatively based on the potential loading of *E. coli*, the existence and strength of transport pathways (surface water, groundwater, or direct discharge), and known seasonal variability associated with agricultural pressure, human activity and wildlife presence.

The SPR model integrates the desk-based assessment and contributing catchment characterisation. Seasonal factors were included to reflect the higher agricultural runoff and waste water treatment loading during wetter winter months, and increased human and wildlife inputs during summer and migratory periods.

The resulting impacts identified represent the likelihood of each source contributing contamination to the BMPA and the licenced sites under typical conditions.

Table 2-9 – Source-Pathway-Receptor Model to the Bivalve Mollusc Production Area and licensed sites

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
UWWTPs	A total of seven UWWTPs serving a PE <500 and 14 serving PE ≥500 are present in the contributing catchment. Of the those serving a PE ≥500, seven were non-compliant in the most recent AERs (Table 2-3).	The pathway is primarily via surface water flows to Inflow 5 (Moy Estuary). All UWWTPs (with the exception of Killala) drain to Inflow 5 (Moy Estuary). Killala UWWTP discharges directly to the BMPA north of Bartragh Island, with a SWO at Killala Quay.	Transport from Inflow 5 occurs along tidal channels south of Bartragh Island, with ebb flows primarily directing estuarine waters seawards and away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. Localised transport is possible from Killala Quay in the easternmost portion of the inner BMPA, particularly to the western portion of the inactive cockle fishery. Minimal pathways exist to licensed sites from the discharge north of Bartragh Island due to the open-water nature of the outer BMPA. The primary pathway to licensed sites is during neap tides, which reduce flushing and increase residence times for	- The main pathway is via Inflow 5 (Moy Estuary), with the majority of UWWTPs (and all non-compliant UWWTPs ≥500 PE) located upstream of this inflow. - Tidal circulation is structured around Bartragh Island, with ebb flows routed seaward to the east of the island and flood entering via the western channel, away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. - Localised transport from Killala Quay is possible, particularly on a flood tide transporting contaminants eastwards. - Within the inner BMPA (and location of licensed sites), neap tides reduce flushing and increase residence times, while spring tides enhance mixing and dispersion. - High rainfall increases freshwater inflow and has the potential to increase the likelihood and effect of storm-related discharges.	Yes; UWWTPs are a primary faecal contamination risk. Most UWWTP discharges ultimately enter the BMPA at the Moy Estuary (Inflow 5). Persistence risk is higher during neap tide conditions, and faecal loadings could increase following high rainfall events.

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
			contaminants from the Moy Estuary within the Inner BMPA.		
Septic Tanks and Other Sewerage Types	Approximately half (47.65%) the population relies on septic tanks. While the contributing catchment is mostly in a lower risk zone (Zone 3), Zone 1 areas with higher risk to surface waters are present along the Moy Estuary margins and in the southeast of the contributing catchment. Elevated groundwater vulnerability borders the BMPA along the Moy Estuary and near Inflows 2 and 3.	Both surface water and groundwater pathways exist, with greatest risk in proximity to Inflow 5 (Moy Estuary). Potential groundwater pathways exist where elevated groundwater vulnerability overlaps higher risk DWWTS zones along the Moy Estuary margins and near Inflows 2 and 3.	Transport from Inflow 5 occurs along tidal channels south of Bartragh Island, with ebb flows primarily directing estuarine waters seawards and away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. Localised contamination from higher risk Zone 1 areas can be dispersed to the licensed sites via tidal exchange. The primary pathway to licensed sites is during neap tides, which reduce flushing and increase residence times for contaminants from the Moy Estuary within the inner BMPA.	- The main pathway is via Inflow 5 (Moy Estuary), driven by large populations utilising septic tank systems in its upstream catchment. - Elevated groundwater vulnerability bordering the inner BMPA increases potential for subsurface delivery near the Moy Estuary and near Inflows 2 and 3. - Reduced flushing during neap tides increases residence time in the inner BMPA.	Yes; a medium risk exists, with contaminant inflow concentrated near the Moy Estuary due to combined surface water and groundwater susceptibility. There is the potential for higher persistence in the inner BMPA during neap tide conditions.
IE and IPC Licenses	Ten industrial licences are present in the contributing catchment, with three identified as	All relevant licences have hydrological connectivity	Transport from Inflow 5 occurs along tidal channels south of Bartragh Island, with ebb	Contamination from IE licenses is most likely delivered via Inflow 5 due to the hydrological	Yes; though low, relevant licensed sites all drain to Inflow 5. Contamination risk is therefore highest at the Moy Estuary.

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
	relevant to faecal contamination (landfill, broiler farm, slaughterhouse).	through Inflow 5 (Moy Estuary).	flows primarily directing estuarine waters seawards and away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. The primary pathway to licensed sites is during neap tides, which reduce flushing and increase residence times for contaminants from the Moy Estuary within the inner BMPA.	connectivity with the relevant industrial licenses. Dispersion and persistence are controlled by spring-neap tidal energy, with neap tides increasing residence times within the inner BMPA.	Contamination is more likely to persist during neap tides, with greatest risk at the western side of the inactive cockle fishery and westernmost oyster site (T10-326) due to proximity to the Moy Estuary.
Section 4 Discharges	A total of 15 Section 4 discharge licences are present within the contributing catchment.	Contaminants from Section 4 discharges primarily enter the BMPA via Inflow 5 (Moy Estuary). Potential for direct runoff from one Section 4 discharge at Enniscrone Golf Club.	Transport from Inflow 5 occurs along tidal channels south of Bartragh Island, with ebb flows primarily directing estuarine waters seawards and away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. The primary pathway to licensed sites is during neap tides, which reduce flushing and increase residence times for	- The main inflow point is Inflow 5 due to the presence of upstream Section 4 discharges. - Additional localised entry is possible in the east of the BMPA from Enniscrone Golf Club via runoff. - Reduced flushing during neap tides increases residence time in the inner BMPA.	Yes; though low, the primary risk is via Inflow 5. Contamination risk is therefore highest at the Moy Estuary. Contamination is more likely to persist during neap tides, with greatest risk at the western side of the inactive cockle fishery and westernmost oyster site (T10-326) due to proximity to the Moy Estuary.

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
			contaminants from the Moy Estuary within the inner BMPA. Minimal pathways exist to licensed sites from the discharge at Enniscrone Golf Club due to the open-water nature of the outer BMPA.		
Agriculture	Land cover is dominated by pasture, and agriculture is widespread across the contributing catchment. WFD assessment identified multiple river waterbodies with agricultural pressures that ultimately reach the BMPA via Inflow 5. Elevated groundwater vulnerability overlaps agricultural land near the inner BMPA. Seasonal risk is influenced by higher livestock density in summer and rainfall driven runoff.	Primarily surface water via Inflow 5 (Moy Estuary). Additional faecal contamination may occur via all other riverine inflows. Contamination is also possible via groundwater where elevated vulnerability overlaps agricultural land adjacent to the inner BMPA.	Transport from Inflow 5 occurs along tidal channels south of Bartragh Island, with ebb flows primarily directing estuarine waters seawards and away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. The primary pathway to licensed sites is during neap tides, which reduce flushing and increase residence times for contaminants from the Moy Estuary within the Inner BMPA.	- The dominant pathway is via Inflow 5, due to the extensive agricultural catchment of the Moy Estuary. - Elevated groundwater vulnerability adjacent to the inner BMPA increases potential for diffuse delivery near southern shore areas and near Enniscrone dunes - Risk is seasonally influenced by summer stocking densities and rainfall driven runoff with stronger winds potentially increasing resuspension in the intertidal shallow flats. - Neap tides increase residence times and persistence potential.	Yes; agriculture represents a significant (high) faecal contamination risk, primarily via the Moy Estuary inflow, with additional local risk in the inner BMPA where zones of elevated groundwater vulnerability overlap agricultural land. The risk of persistence in the inner BMPA is higher during neap tides. Risk is also greater following episodic increases during rainfall and during summer under increase stocking pressure.
Urban Areas and Human Populations	A total of 20 urban areas occur in the contributing catchment. Killala and	Primarily via surface water through the	Transport from Inflow 5 occurs along tidal channels south of	Urban areas largely overlap with sewerage pathways to Inflow 5.	Yes; though low, urban population pressure is primarily expressed through UWWTPs and DWWTSs.

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
	Enniscrone directly border the BMPA. Ballina lies upstream along the Moy Estuary. Holiday homes account for 6.56% of houses within the contributing catchment. Campsites and caravan parks are also present including two near Enniscrone close to the BMPA.	sewerage pathways already described (UWWTPs and DWWTSs), dominated by Inflow 5. Additional localised runoff risk exists near Enniscrone to the east of the BMPA where there is a campsite in close proximity to the BMPA.	Bartragh Island, with ebb flows primarily directing estuarine waters seawards and away from licensed oyster sites, but along the eastern boundary of the inactive cockle fishery. The primary pathway to licensed sites is during neap tides, which reduce flushing and increase residence times for contaminants from the Moy Estuary within the inner BMPA. Localised runoff near Enniscrone may affect the eastern section of the outer BMPA, although no licensed sites are located in this area.	- Seasonal occupancy (holiday homes and tourism) can increase loading pressure on wastewater systems, with additional localised risk from campsites. - Reduced flushing during neap tides increases persistence potential in the inner BMPA and estuarine areas.	pathways to Inflow 5. This has been accounted for under the discussion of UWWTP and Septic Tank and Individual Treatment.
Marine Vessels	No commercial ports or major vessel facilities are present within the BMPA. Vessel facilities includes Killala Pier and Enniscrone Pier and Slip, with a recognised anchorage at Bartragh Pool. Activity is expected	Direct, localised input within BMPA near Killala and Enniscrone facilities and anchorage areas.	Any vessel related discharges would disperse via tidal circulation within the BMPA, but they are expected to be local and intermittent.	- Potential inputs are localised near small craft activity areas. - Regulatory controls and absence of major facilities reduce likelihood of significant loading. - Additionally, MARPOL dictates that no blackwater or greywater	No; there is a negligible potential impact from this source, refer to Section 2.5.4.1 for further details. Given the small scale of operations in the BMPA and regulatory controls in place, the risk of contamination posed by marine vessels is considered minimal.

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
	to be small scale and intermittent with regulatory controls under S.I. No. 492/2012.			discharges be allowed within 3 nm of the shore.	
Swimming, Bathing and Recreation	Two Blue Flag beaches are present within the BMPA: Enniscrone Beach and Ross Beach. Recreational use is expected to peak during the summer months. Dog walking occurs and may contribute locally particularly near Enniscrone dunes and beach system, though is considered small in scale.	Potential for direct non-point inputs along beaches and shoreline areas within or in close proximity (e.g. Enniscrone dunes) to the BMPA.	Potential movement within nearshore BMPA waters via tidal currents, particularly affecting adjacent nearshore areas.	- Inputs are seasonal with higher summer use. - Contamination is localised near bathing areas and shore access points.	No ; the impact from swimming, bathing and recreation is likely to be negligible in comparison with the other sources of contamination.
Wildlife	The following wildlife areas (designated for mobile fauna and birds) overlap the BMPA or occur within the contributing catchment: - Ballinafad SAC - Lough Hoe Bog SAC - Killala Bay/Moy Estuary SAC - Ox Mountains Bogs SAC Bellacorick Bog Complex SAC	Direct input from wildlife into BMPA waters. Potential surface water pathway via Inflow 5 (Moy Estuary) for upstream wildlife areas.	Potential movement within nearshore BMPA waters via tidal currents, particularly affecting adjacent nearshore areas.	- Potential inputs are distributed around the BMPA but primarily focussed on intertidal areas in the inner BMPA. - Seasonal fluctuations in wildlife contamination may occur, particularly during winter, as large flocks of overwintering birds utilise the estuaries and intertidal areas. - Reduced flushing during neap tides increases persistence potential in the inner BMPA and estuarine areas.	Yes , a comparably low level of risk exists due to wildlife (birds in particular), which may fluctuate seasonally depending on seasonal migration. Resuspension of <i>E. coli</i> from intertidal mudflats and sandflats may also be an additional source of contamination during resuspension and contamination events. The main areas at risk are the eastern portions of the licensed sites, in closest proximity to the Moy Estuary.

Source	Source Description	Pathway to BMPA	Pathway to Licensed Sites*	Details	Impact
	• Owenduff/Nephrin Complex SAC • River Moy SAC • Killala Bay/Moy Estuary SPA • Lough Conn and Lough Cullin SPA • Killala Bay I-WeBS site • Lough Conn I-WeBS site • Lough Cullin I-WeBS site • Killala Bay/Moy Estuary Ramsar site				

2.6 CONCLUSIONS OF THE DESK-BASED SURVEY

This desk-based component of the sanitary survey employed the SPR model to assess the principal potential impacts from the possible sources of faecal contamination identified during the desktop study (Sections: 2.4.1.1 – 2.5.4.3), the mechanisms by which these contaminants are transported, and their circulation dynamics within the BMPA.

The analysis identified the Moy Estuary (Inflow 5) as the largest inflow of freshwater to the BMPA, draining 101 sub-basins. Inflow 5 (the Moy Estuary) enters the BMPA at its southernmost point. Inflows 2, 3, 4 and 6 also drain into the Moy Estuary channel upstream of Inflow 5, further increasing freshwater (and contaminant) input in the southern portion of the BMPA. There are additional smaller contributions from smaller streams and areas of run off distributed throughout the BMPA (Figure 2-5).

SPR Model

The SPR model was applied to identify potential faecal contamination sources, assess the viability of transport pathways to the Killala Bay BMPA and evaluate the likelihood of impact on licensed shellfish sites. Each source was assessed qualitatively based on potential faecal loading, the existence and strength of surface water, groundwater, or marine pathways and seasonal variations in both contamination pressure and transport conditions.

The SPR assessment indicates that Urban Waste Water Treatment Plant (UWWTP) discharges, agricultural activity, and Domestic Waste Water Treatment Systems (DWWTSs) represent the principal potential sources of faecal contamination to the Killala Bay BMPA. This is supported by the concentration of UWWTPs (including seven non-compliant UWWTPs serving a population equivalent (PE) ≥ 500) draining to the Moy Estuary. In addition, there is extensive agricultural land use across the large contributing catchment and widespread reliance on septic tanks in rural areas. These sources are primarily linked to the BMPA via Inflow 5 (Moy Estuary), which receives the majority of surface water, stormwater and diffuse inputs.

More localised risks arising from groundwater pathways exist in areas of elevated vulnerability bordering the inner BMPA and from direct coastal discharges near Killala and Enniscrone. Wildlife represents a minimal ongoing background source with potential for season variability.

Other assessed sources, including marine vessels operating under regulatory controls, and recreational use, present negligible to no meaningful risk to the BMPA due to the absence of viable transport routes or minimal contamination loading.

Circulation and Seasonal Influence

Circulation within the BMPA is dominated by semi-diurnal, spring-neap tidal exchange, with strong flood and ebb flows through the Moy Estuary and inner BMPA channels. These are directed around Bartragh Island, with weaker circulation noted in outer BMPA waters. In the inner BMPA, reduced flushing and increased residence times occur during neap tides that favour contaminant persistence.

As discussed, the dominant sources of faecal pollution were attributed to the widespread use of UWWTPs, DWWTSs, and the extensive agricultural activity in the contributing catchment, particularly livestock farming. Seasonal variations are anticipated to play a significant role, particularly during the summer months when increased stocking densities may lead to higher faecal loads. Furthermore, extended dry periods followed by rainfall events may exacerbate pollutant runoff through the "first flush" effect. Conversely, winter rainfall increases hydraulic loading on septic tanks and promotes localised pollutant mobilisation potential.

Summary

The findings of the sanitary survey desktop assessment can be summarised as follows:

- UWWTPs, DWWTSs and agriculture are the primary sources of contaminants within the contributing catchment;
- Inflow 5 (Moy Estuary) is the dominant pathway for contaminants to the BMPA;
- While transport from Inflow 5 (Moy Estuary) is primarily directed seaward to the east of Bartragh Island on a flood tide, increased residence times in the inner BMPA during neap tides increases residence times and contamination risk for licensed sites here. The eastern portion of the inactive cockle fishery also lies in close proximity of Inflow 5 (c. 500 m).
- Contamination is likely to be seasonally influenced, with increased rainfall promoting the mobilisation of pollutants.

The shoreline survey and bacteriological sampling subsequently provided field-based validation and refinement of these findings. They identified additional local drainage features, agricultural pressures and active shoreline pathways relevant to the overall risk assessment.

3 SHORELINE SURVEY

This section of the sanitary survey relates to the shoreline survey, which has been undertaken by the SFPA following receipt of the desk-based study conducted by Aqualicense. The purpose of this shoreline survey is to confirm the findings of the desk-based study and identify any sources of contamination previously unidentified.

3.1 SHORELINE SURVEY METHODOLOGY

The SFPA Code of Practice for the Classification and Microbiological Monitoring of Bivalve Mollusc Production Areas in Ireland identifies the methodology for carrying out shoreline surveys (SFPA, 2025). Any identified pollution risks were clearly documented, including GPS coordinates, photographs, and detailed descriptions. Photographs were also obtained for all identified risk locations.

Evidence of faecal contamination, such as odours, discolouration, or algae growth, were documented. Surveyors recorded observations even in situations where there was uncertainty regarding potential contamination. Where faecal contamination of an inflow, waterbody, or discharge location was suspected, bacteriological samples were obtained in accordance with the code of practice (COP).

3.2 SURVEYOR RESULTS

A comprehensive shoreline survey was conducted around the full extent of the Killala BMPA, over multiple survey days between 20 April 2026 to 22 April 2026. The purpose of the shoreline survey was to verify the desk-based assessment and identify visible contamination sources or pathways. All accessible sections of the BMPA shoreline were surveyed on foot; no vessel was utilised.

Rainfall was not recorded in the 24 hours prior to any of the survey days, which may have reduced the visibility of runoff-related and intermittent features. Additionally, conditions were not representative of major storm events, and some intermittent or rainfall-dependent discharges may therefore have been inactive or less evident than under more extreme conditions.

Full details of weather conditions are provided in Table 3-1 below. Table 3-2 and Figure 3-1 – Shoreline survey observation points made for Killala BMPA April 2026 present all observations recorded during the shoreline survey and photographs for each observation have been provided in Appendix 8.

Table 3-1 – Summary of survey period, weather conditions, specific sections covered and general notes for the Killala BMPA

Date	Weather conditions*	Area covered
20/04/2026	No rain in the previous 24hrs or during the survey	From Enniscrone Pier to the eastern section of the River Moy Estuary
21/04/2026	No rain in the previous 24hrs or during the survey	Western side of the River Moy Estuary to Killala town
22/04/2026	No rain in the previous 24hrs or during the survey	Killala town to the western most section of the BMPA

Table 3-2 – Locations and details of observations made during the shoreline survey of the Killala BMPA in April 2026

Date	Low Tide		High Tide		SFPA ID	Mapped ID	Latitude	Longitude	Feature
	Time	Height (m)	Time	Height (m)			(WGS84)*	(WGS84)*	
20/04/2026	14:22	0.5	08:29, 20:55	3.7, 3.6	1	1	54°13'11.96"N	9°5'44.81"W	Pier/slip. No boats.
					2	2	54°13'9.55"N	9°5'45.24"W	Algae on shore.
					3	3	54°13'8.83"N	9°5'44.92"W	Steady flow.
					4	4	54°13'5.99"N	9°5'44.34"W	Algae evident.
					5	5	54°13'5.23"N	9°5'43.26"W	Strong flow/green algae.
					6	6	54°12'57.71"N	9°5'41.89"W	Walkway concrete.
					7	7	54°12'41.39"N	9°5'57.11"W	Good flow/algae enrichment.
					8	8	54°12'40.77"N	9°5'55.76"W	Large number of mobile homes.
					19	9	54°12'10.80"N	9°6'16.52"W	Good flow/plant growth/some algae.
					18	10	54°11'54.82"N	9°6'53.57"W	Good flow/algae evident.
					17	11	54°11'54.56"N	9°7'3.14"W	Good flow/algae evident.
					16	12	54°11'49.09"N	9°7'26.98"W	Flowing. Algae evident on shoreline.
					15	13	54°11'18.71"N	9°7'31.98"W	Good flow/some algae.
					9	14	54°10'58.19"N	9°7'31.19"W	Good flow.
					10	15	54°10'48.97"N	9°7'48.68"W	Good flow/algae enrichment.
					Additio nal station	16	54°10'53.37"N	9°08'11.26"W	Waded out to take sample
					12	17	54°10'24.42"N	9°8'1.18"W	Dung evident on shoreline.
					13	18	54°10'18.26"N	9°7'54.59"W	Good flow/algae present on adjacent shoreline.
					14	19	54°10'18.23"N	9°8'1.10"W	Main channel flow at this point.

Date	Low Tide		High Tide		SFPA ID	Mapped ID	Latitude	Longitude	Feature
	Time	Height (m)	Time	Height (m)			(WGS84)*	(WGS84)*	
20/04/2026	14:22	0.5	08:29, 20:55	3.7, 3.6	11	20	54°10'18.80"N	9°8'17.02"W	View of 16 seals on haulout on channel edge.
21/04/2026	15:13	0.7	9:23, 21:48	3.6, 3.6	1	21	54°10'23.70"N	9°8'36.89"W	Signs of cattle egress onto shore
					2	22	54°10'25.72"N	9°8'43.87"W	Flowing
					3	23	54°10'30.32"N	9°8'45.17"W	Steady flow
					4	24	54°10'38.57"N	9°8'45.78"W	Horse manure visible, worn access trail.
					5	25	54°10'39.00"N	9°8'45.92"W	Concrete pipe, flowing. Algae on shoreline.
					6	26	54°10'47.39"N	9°8'40.78"W	Algae visible on shoreline adjacent.
					7	27	54°11'13.74"N	9°9'21.67"W	Strong flow. Algae evident on shoreline downstream.
					8	28	54°11'19.57"N	9°9'40.43"W	Seepage. Algae evident.
					9	29	54°11'27.46"N	9°9'55.91"W	Lagoon drainage
					10	30	54°11'51.72"N	9°9'31.86"W	Flowing. Algae on adjacent shoreline.
					12	31	54°12'9.00"N	9°10'28.96"W	WWTP infrastructure.
					11	32	54°12'10.84"N	9°10'30.58"W	Good flow, algae evident.
					13	33	54°12'36.14"N	9°11'2.18"W	33 seals hauled out on sandbed.
					14	34	54°12'27.25"N	9°11'37.72"W	Good flow.
					15	35	54°12'35.93"N	9°12'27.11"W	Cows on land upstream.
					16	36	54°12'33.41"N	9°12'31.61"W	Good flow.
					17	37	54°12'43.78"N	9°12'59.26"W	Trickle flow from mudflats above.
					NA	38	54°13'8.31"N	9°12'57.66"W	No Comments

Date	Low Tide		High Tide		SFPA ID	Mapped ID	Latitude	Longitude	Feature
	Time	Height (m)	Time	Height (m)			(WGS84)*	(WGS84)*	
21/04/2026	15:13	0.7	9:23, 21:48	3.6, 3.6	18	39	54°12'44.60"N	9°13'7.32"W	4 x pipes. No flow. Aglae evident on shoreline.
22/04/2026	16:11	0.9	10:22, 22:46	3.3, 3.5	17	40	54°12'47.88"N	9°13'7.86"W	Possibly storm water overflow. Dry.
					19	41	54°12'55.94"N	9°13'1.27"W	Black pipe, no flow.
					18	42	54°12'58.50"N	9°13'1.27"W	10 to 15 commercial boats. Mostly day boats.
					20	43	54°12'58.50"N	9°12'58.43"W	Onto shoreline, green algae evident.
					16	44	54°13'0.41"N	9°13'28.06"W	Good flow, green algae on shoreline adjacent
					13	45	54°13'2.21"N	9°13'30.40"W	WWTP - pumping station
					14	46	54°13'8.22"N	9°13'25.97"W	Low flow through marshland
					15	47	54°13'8.29"N	9°13'26.44"W	Low flow through marshland
					9	48	54°13'22.44"N	9°13'2.21"W	30 + on adjacent field
					8	49	54°13'39.68"N	9°12'58.25"W	Low flow
					7	50	54°13'39.68"N	9°12'54.54"W	Good flow through mudflats
					6	51	54°13'47.21"N	9°12'37.91"W	Some algae on shoreline at exit onto shore
					5	52	54°13'50.27"N	9°12'35.96"W	Shore access
					10	53	54°13'53.33"N	9°12'37.87"W	Concrete pipe. Algae on shore at entrance point.
					11	54	54°13'55.74"N	9°12'25.34"W	Cow sheds and cows adjacent
					12	55	54°14'0.56"N	9°12'20.70"W	Flowing
					4	56	54°13'26.51"N	9°12'23.15"W	Mixed flock of ringed plover etc
					1	57	54°14'13.78"N	9°11'31.49"W	Mixed flock of oystercatchers etc.

Date	Low Tide		High Tide		SFPA ID	Mapped ID	Latitude	Longitude	Feature
	Time	Height (m)	Time	Height (m)			(WGS84)*	(WGS84)*	
22/04/2026	16:11	0.9	10:22, 22:46	3.3, 3.5	3	58	54°14'15.65"N	9°11'34.80"W	Sheep on agricultural land upstream
					2	59	54°14'21.01"N	9°11'32.71"W	Agricultural run off

**Further comparative table for latitude and longitude is provided in Appendix 9*



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Shoreline survey observation points made
fo Killala BMPA April 2026



Legend

- Bivalve Mollusc Production Area (BMPA)
- Shoreline Survey Observation Points

Map Scale: 1:45,000

Coordinate System: IRENET95 / Irish Transverse Mercator

0 750 1,500 m



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Project Manager: Maeve Guilfoyle, Senior Ecologist



Figure 3-1 – Shoreline survey observation points made for Killala BMPA April 2026

In total, 59 observations were recorded during the shoreline survey (Figure 3-1). These encompassed a range of potential contamination sources, including freshwater or drainage inputs entering the BMPA, including steady or strong flows, field drains, large drains, streams, pipes, runoff points, soakage areas and lagoon drainage. These features represent potential pathways by which faecal contamination from the contributing catchment could enter the BMPA, particularly during or following rainfall. Algal growth or enrichment was noted at several locations, including areas associated with flowing water, drains, pipes and shoreline discharge points. While algal growth does not confirm faecal contamination, it may indicate nutrient enrichment and highlights locations where land-based inputs may be influencing shoreline conditions.

The survey also identified a number of previously undocumented features that were not fully characterised in the desk-based assessment. These included field drains, larger drainage channels, pipes, a wastewater pumping station (part of the wastewater network- not a treatment point), livestock adjacent to the shore and wildlife activity including seal haul-out and bird congregations.

Where visual evidence of pollution was recorded, this is also discussed below. This occurred where appearance, odour, visible foam, discolouration, or surrounding conditions were considered sufficiently suspect to merit further attention. Targeted bacteriological samples were collected at selected locations identified by the SFPA as appropriate for sampling under the conditions encountered. The results of the bacteriological analysis are presented in Section 4.

Agricultural sources and associated runoff pathways were also identified during the shoreline survey. Direct observations included dung evident on the shoreline at mapped ID 17 on 20/04/2026 (east of Moy estuary), cattle in an adjacent field at mapped ID 48 (west of Killala), cow sheds and cattle adjacent to the shoreline at ID 54, sheep on agricultural land upstream at mapped ID 58 and agricultural runoff at mapped ID 59 (westerly most section of the BMPA), all recorded on 22/04/2026.

The survey also recorded wildlife activity within the BMPA, including seal haul-out activity and congregations of waterbirds. Sixteen seals were recorded hauled out on a channel edge (inside Bartragh island) during the 20/04/2026 survey, with an observation of a further 33 seals recorded on 21/04/2026. Mixed flocks of waders and other shorebirds were also recorded, including ringed plover and oystercatchers. These observations are consistent with the ecological importance of Killala Bay/Moy Estuary, which is designated as an SAC for, among other interests, harbour seal, and as an SPA for wetland and waterbirds. Vessel-related activity and infrastructure were also recorded, including piers, slips, shore access points and commercial/day boats. These features are relevant in the context of potential localised contamination risk, although no direct evidence of vessel-related pollution was recorded in the survey notes.

Overall, the shoreline survey confirmed the presence of multiple potential contamination sources and pathways within and adjacent to the Killala BMPA. The most relevant pathways identified were freshwater inflows, drainage features, agricultural runoff, wastewater or stormwater infrastructure, wildlife activity and localised shoreline access or vessel-related infrastructure. These findings support the desk-based assessment and identify areas where contamination may enter the BMPA, particularly under rainfall-driven conditions.

4 BACTERIOLOGICAL SURVEY

Where possible, the COP (SFPA, 2025) recommends that water samples for *E. coli* should be taken from inflows or watercourses discharging near the shellfish harvesting areas. Shellfish sampling may also be conducted if uncertainty regarding RMPs remains following the desk-based survey and shoreline survey.

For the purposes of this sanitary survey, bacteriological surveys and analysis are the responsibility of the SFPA, with Aqualicense relaying the relevant results within the report.

4.1 BACTERIOLOGICAL SURVEY METHODOLOGY

To complement shoreline observations and better understand contamination risks under current conditions, a bacteriological survey was carried out by SFPA at 17 targeted locations where faecal contamination was suspected. Locations were selected based on field indicators including (but not limited to): odour, discolouration, algal matting, foam etc., along with proximity to potential contamination sources such as water courses, drainage outfalls, livestock access and proximity, and waterfowl activity. The sampling was undertaken at low tide using protocols outlined in the SFPA Code of Practice (SFPA, 2025b).

Where practicable, samples should be collected under worst-case conditions, such as after heavy rainfall, to provide a more representative assessment of contamination levels. Each sample is assigned a clear identification code, with location codes following the format SS1, SS2, etc., to designate them as sanitary survey shellfish samples.

Samples are collected in sterile plastic bottles. All samples are transferred to the testing laboratory within 48 hours of collection and are maintained at a temperature below 15°C during transport to ensure sample integrity.

4.2 BACTERIOLOGICAL SURVEY RESULTS

A total of seventeen water samples were obtained at areas where faecal contamination was suspected, based on the findings of the shoreline survey and desk-based assessment. Samples were collected on two separate sampling days, 06/05/2026 and 13/05/2026, for logistical reasons. No rain was recorded on the 06/05/2026 or during the previous 24hrs. Rain was recorded on the 13/05/2026 and during the preceding 24hrs. Sampling results are presented in Table 4-1 and Figure 4-1.

Table 4-1 – Results of water sampling for *E. coli* in Killala BMPA

SFPA Water Sample	Feature (Mapped ID)	cfu/ 100 mL*	Date	Latitude (WGS84)	Longitude (WGS84)
1	Steady flow (ID 3)	200	06/05/2026	54°13'8.83"N	9°5'44.92"W
2	Strong flow/green algae (ID 5)	555	06/05/2026	54°13'5.23"N	9°5'43.26"W
3	Good flow/algae enrichment (ID 7)	150	06/05/2026	54°12'41.39"N	9°5'57.11"W

SFPA Water Sample	Feature (Mapped ID)	cfu/100 mL*	Date	Latitude (WGS84)	Longitude (WGS84)
4	Good flow/plant growth/some algae (ID 9)	20	06/05/2026	54°12'10.80"N	9°6'16.52"W
5	Good flow/algae evident (ID 10)	690	06/05/2026	54°11'54.82"N	9°6'53.57"W
6	Good flow (ID 14)	15	06/05/2026	54°10'58.19"N	9°7'31.19"W
7	Waded out to take sample (ID 16)	30	06/05/2026	54°10'53.37"N	9°08'11.26"W
8	Strong flow. Algae evident on shoreline downstream. (ID 27)	720	06/05/2026	54°11'13.74"N	9°9'21.67"W
9	Lagoon drainage (ID 29)	10	06/05/2026	54°11'27.46"N	9°9'55.91"W
17	Good flow, algae evident. (ID 32)	375	13/05/2026	54°12'10.84"N	9°10'30.58"W
18	Good flow. (ID 34)	50	13/05/2026	54°12'27.25"N	9°11'37.72"W
21	Good flow. (ID 36)	175	13/05/2026	54°12'33.41"N	9°12'31.61"W
22	Trickle flow from mudflats above. (ID 37)	25	13/05/2026	54°12'43.78"N	9°12'59.26"W
27	No Comments (ID 38)	75	13/05/2026	54°13'8.31"N	9°12'57.66"W
43	Some algae on shoreline at exit onto shore (ID 51)	320	13/05/2026	54°13'47.21"N	9°12'37.91"W
45	Concrete pipe. Algae on shore at entrance point. (ID 53)	25	13/05/2026	54°13'53.33"N	9°12'37.87"W
46	Flowing (ID 55)	440	13/05/2026	54°14'0.56"N	9°12'20.70"W

*cfu/100 mL stands for colony-forming units per 100 millilitres. It is used to estimate the number of live viable bacteria in a liquid volume

E. coli was detected at all locations sampled on 06/05/2026 and 13/05/2026. Results ranged from 10 to 720 cfu/100 mL, indicating that faecal contamination was present at the sampled locations, with concentrations varying considerably between locations (Figure 4-1).

The most elevated *E. coli* results were recorded on 06/05/2026, water sample 8, associated with a stream with strong flow and algae evident on the shoreline downstream at mapped ID 27, returned 720 cfu/100 mL (to the west of the Moy Estuary). Other elevated results recorded on 06/05/2026 included water sample 5, associated with a drain/stream with good flow (algae also present) at mapped ID 10 (south of Enniscrone), which returned 690 cfu/100 mL, and water sample 2, associated with strong flow and green algae at mapped ID 5, which returned 555 cfu/100 mL (near Enniscrone pier).

Elevated *E. coli* concentrations were also recorded during the 13/05/2026 sampling event. Water sample 46, taken from flowing lagoon/marsh at mapped ID 55, returned 440 cfu/100 mL. Other notable results on 13/05/2026 included water sample 17, associated with a stream with good

flow and algae evident at mapped ID 32, which returned 375 cfu/100 mL, and water sample 43, associated with some algae on the shoreline at the exit onto the shore at mapped ID 51, which returned 320 cfu/100 mL.

Lower results were generally recorded at lagoon, marsh, downstream channel or lower-flow features, including the lagoon drainage at mapped ID 29 (to the east of Killala town), which returned 10 cfu/100 mL, the stream at mapped ID 14 (west of the Moy Estuary), which returned 15 cfu/100 mL, and the stream with evidence of some algal growth at mapped ID 9, returned 20 cfu/100 mL. However, as *E. coli* was detected at all sampled locations, these lower values still indicate the presence of faecal contamination at the time of sampling.

The detection of *E. coli* at all sampled locations indicates that faecal contamination pathways are present within the survey area. The bacteriological results support the shoreline survey findings by confirming that a range of mapped freshwater inputs, drainage features, pipes and flowing watercourses were associated with detectable *E. coli* concentrations. The highest results were recorded at features with active flow and, in several cases, visible algal growth or enrichment.

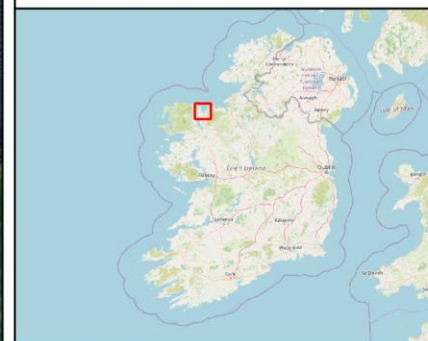
Rainfall was recorded on only the 13/05/2026 (including the previous 24 hrs), which may have influenced the bacteriological results through increased runoff, river flow and mobilisation of faecal material from surrounding land uses. However, it is noted that seasonal factors, including variations in rainfall, river flow and agricultural activity may influence contamination patterns over time. Such seasonal variations in such sources should be considered when devising a suitable sampling plan.

Considering the bacteriological results alongside the shoreline survey and desktop assessment, the primary pathway of contamination to the BMPA are likely to be associated with freshwater inflows, surface water drainage and diffuse land-based runoff entering or discharging near the shellfish harvesting area. The results support the need for these pathways to be considered when assessing representative monitoring points and identifying areas of higher potential contamination risk.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Water sampling results for *E. coli* within
Killala Bay BMPA



Legend

Bivalve Mollusc Production Area (BMPA)

Water Sampling Results (cfu/ml)

○ 10 - 75

● 75 - 200

● 200 - 375

● 375 - 555

● 555 - 720

Map Scale: 1:45,000

Coordinate System: IRENET95 / Irish Transverse Mercator

0 750 1,500 m



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Project Manager: Maeve Guilfoyle, Senior Ecologist



Figure 4-1 – Water sampling results for *E. coli* within Killala Bay BMPA

5 SANITARY SURVEY CONCLUSION

The sanitary survey findings were synthesised through the integration of three primary data sources: a desk-based study using the Source–Pathway–Receptor (SPR) model, on-site shoreline inspections, and targeted bacteriological analysis. The defined BMPA boundary reflects the main hydrodynamic area influencing the licensed sites, with the seaward limit aligned to the principal tidal exchange zone and the landward extent encompassing areas influenced by the Moy Estuary, Inflow 5. Overall, the findings indicate that the main faecal contamination pressure to the BMPA is primarily derived from the contributing catchment, with additional localised inputs entering through shoreline drains, streams, pipes and runoff pathways.

The desk-based assessment identified the Moy Estuary as the dominant freshwater and contaminant pathway to the BMPA. It drains 101 of the 104 sub-basins within the contributing catchment, receives upstream inputs from Inflows 2, 3, 4 and 6, and discharges to the BMPA at its southern extent. The principal potential sources within this contributing catchment are UWWTP discharges, DWWTSs and agriculture, particularly livestock farming. The presence of UWWTPs draining to the Moy Estuary, including non-compliant plants serving population equivalents greater than 500, together with widespread rural septic tank use and extensive agricultural land use, indicate that the main contamination pressure is associated with the wider contributing catchment. Local shoreline pathways, including smaller streams, field drains, pipes, soakage areas and runoff points, provide additional routes of entry close to shellfish production areas.

The shoreline survey supported the desk-based risk profile and identified additional local pathways around the BMPA. A total of 59 observations were recorded over the three-day survey period, including freshwater flows, field drains, larger drainage channels, streams, pipes, runoff points, soakage areas, lagoon drainage and wastewater or stormwater infrastructure. Algal growth or enrichment was recorded at several locations associated with flowing water, drains, pipes and shoreline discharge points. While algal growth does not confirm faecal contamination, it may indicate nutrient enrichment and highlights locations where land-based inputs may be influencing shoreline conditions.

Agricultural pressures were recorded at several locations during the shoreline survey, including dung on the shoreline, cattle in adjacent fields, cow sheds and cattle near the shore, sheep on upstream agricultural land and agricultural runoff. These observations indicate that diffuse agricultural inputs are a relevant pressure within the BMPA, particularly during or following rainfall. Wildlife activity, including seal haul-out sites and mixed flocks of waders and other shorebirds, was also recorded and is considered a localised or background potential source of faecal loading. Vessel-related infrastructure and activity were noted, including piers, slips, shore access points and commercial or day boats, although no direct evidence of vessel-related pollution was recorded.

Of the 59 shoreline observations, 17 water samples were collected for bacteriological analysis at locations where faecal contamination was suspected. *E. coli* was detected in all sampled locations, with concentrations ranging from 10 to 720 cfu/100 mL. The highest result was recorded at mapped ID 27, a stream with strong flow and algae evident on the downstream

shoreline, which returned 720 cfu/100 mL. Other elevated results were recorded at mapped ID 10, a drain/stream with good flow, at 690 cfu/100 mL, and mapped ID 5, a large pipe with strong flow and green algae, at 555 cfu/100 mL.

Further elevated results were recorded at mapped ID 32, a stream with good flow and algae evident, at 375 cfu/100 mL, and mapped ID 55, flowing lagoon/marsh, at 440 cfu/100 mL. Lower results were generally associated with lagoon, marsh, downstream channel or lower-flow features. The range of results indicates that contamination levels varied between shoreline pathways and were likely influenced by flow conditions, local source pressure, rainfall and tidal state. The bacteriological results identify active freshwater inputs, drains, pipes and flowing watercourses as potentially relevant local routes for faecal contamination entering the BMPA.

Contaminant movement within the Killala Bay BMPA is primarily controlled by semi-diurnal spring-neap tidal exchange. Strong flood and ebb flows occur through the Moy Estuary and inner BMPA channels and are directed around Bartragh Island, while weaker circulation occurs in the outer BMPA. Although flood tide transport from the Moy Estuary is primarily directed seaward to the east of Bartragh Island, reduced flushing and increased residence times in the inner BMPA during neap tides may increase the potential for contaminant persistence. This is most relevant to licensed shellfish sites in the inner BMPA and to the eastern portion of the inactive cockle fishery, which lies close to Inflow 5.

Rainfall and seasonality are important controls on contamination risk. The shoreline survey was undertaken following dry conditions, so intermittent or storm-driven discharges may have been inactive or less visible during the inspection. Under wetter conditions, increased river flow, surface runoff, stormwater discharge and hydraulic loading on DWWTSs may increase the mobilisation and transport of faecal material to the BMPA. Agricultural activity may also vary seasonally, with stocking density, land management, rainfall and ground conditions affecting both faecal loading and runoff potential.

Overall, contamination risk within the Killala Bay BMPA is primarily driven by contributing catchment inputs delivered through the Moy Estuary, with additional local contributions from shoreline drains, streams, pipes, agricultural runoff and other discharge pathways. The greatest risk is associated with active freshwater inputs and drainage features where flow, visible enrichment, agricultural influence or proximity to shellfish production areas increases the likelihood of contamination reaching the BMPA. Risk is expected to be spatially variable and episodic, increasing after rainfall and where tidal conditions or reduced flushing favour retention in the inner BMPA. Future monitoring and risk assessment should therefore focus on the Moy Estuary influence, active shoreline discharge points, rainfall-related mobilisation and areas of reduced flushing near licensed sites.

6 RECOMMENDATIONS FOR BIVALVE MOLLUSC PRODUCTION AREA BOUNDARY

To meet requirements of defining a Bivalve Mollusc Production Area (BMPA) with precise geographical limits relative to the coastline and, where necessary, the open sea, a BMPA will ideally constitute a coherent entity based on the following:

- Access
- Production activity
- Demarcation of boundaries
- Hydrological Features
- Characteristics of the circulation of microbiological pollutants.

BMPAs must constitute an enforceable entity, clearly defined as per the above parameters. The sanitary survey report for Killala Bay confirms the existing 25.6 km² BMPA boundary satisfies all criteria as set out above, revealing no operational or compliance issues.

Therefore, no modifications are recommended, and the current boundary will be maintained.

7 RECOMMENDATIONS FOR RMPs FOR CURRENTLY LICENSED SPECIES

The selection of the Representative Monitoring Points (RMPs) is a critical component of this report, as they provide the basis for protecting public health by ensuring that shellfish harvested for human consumption are effectively monitored for contamination risks, including *E. coli*.

The RMP represents the location within the BMPA most likely to reflect the highest contamination risk to shellfish production, thereby providing a conservative and protective basis for classification. In determining the RMP and BMPA boundaries, multiple factors were considered in line with established regulatory guidance.

These included hydrographic conditions; pre-existing classified area boundaries and their ongoing suitability; contaminant sources and pathways; historical and current bacteriological data; historic aquaculture activity and existing aquaculture licences; and practical accessibility for sampling. The selection of the RMPs within the BMPA and each classified area was informed by the best available evidence, including existing environmental datasets, hydrodynamic modelling outputs and localised hydrodynamic features such as restricted circulation. In consideration of the absence of site-specific hydrodynamic survey data, a precautionary approach was adopted to ensure that the RMPs appropriately capture areas of potential variability in water quality and environmental conditions across the BMPA.

A spatial tolerance is applied around the RMP to ensure that the monitoring point remains representative of the wider production area while maintaining sufficient proximity to potential shellfish production sites. These determinations are therefore central to ensuring that the classification accurately reflects the sanitary quality of shellfish production waters and supports the safe commercial harvesting of bivalve molluscs, in accordance with Regulation (EU) 2019/627 sanitary survey protocols.

In the case of the inactive cockle fishery, it should be again noted that there is no harvesting activity currently operating as this area is not classified. When previously harvested, this fishery was only exploited intermittently targeting naturally occurring wild stocks rather than managed or cultivated beds. The spatial distribution and intensity of fishing effort for any future classified fishery may therefore vary between seasons and a fixed RMP cannot be established for it. Instead, the RMP for any potential future cockle classification is treated as a floating reference, reflecting the variable spatial extent of fishing activity in any given season. This adaptive approach allows monitoring to remain responsive to the actual location of harvesting operations while continuing to uphold public health protection standards and regulatory compliance. Should this species' fishery undergo all required steps under the DAFM *Protocol for Opening a New Fishery for Bivalve Molluscs*⁹ and subsequently be assigned classification by

⁹ <http://www.fishingnet.ie/media/fishingnet/content/inshorefisheriesmanagement/Protocol%20for%20Opening%20a%20New%20Fishery%20for%20Bivalve%20Molluscs%202022%20081122.pdf>

the SFPA under short-term classification rules, sampling will be undertaken in accordance with that specific year's sampling plan as issued by the SFPA.

In accordance with Article 61 of Regulation (EU) 2019/627, the following recommendations are made for incorporation into future sampling plans. It should be noted that these recommendations, based on the completed sanitary survey (desktop review and shoreline visit), relate specifically to the positioning of RMPs and should not be misconstrued as a full sampling plan.

7.1 REPRESENTATIVE MONITORING POINT (PACIFIC OYSTER)

Considering the extent of the proposed BMPA, prevailing circulation patterns, and the distribution of licensed sites, it is considered that the existing classified areas and boundaries are maintained, and one RMP is appropriate. Based on the findings of this sanitary survey (summarised in Section 5) it is recommended that the RMPs represent the area's most at risk of contamination under worst-case scenarios.

It is recommended that RMP 1 be located at 54.2092466, -9.1916402 (54°12'33.29"N, 9°11'29.90"W) within site T10-309A. This is located in a section of the site that is closest to surveyed areas of runoff and is likely to be influenced by local runoff and flow-through pathways as identified during the survey. Oyster harvesting is contingent upon the availability of stock.

While a specific RMP has been identified for Pacific oysters, it is recognised that, oysters may not always be available within 100 metres of the RMP. In such circumstances, the SFPA sample coordinator and local industry representatives should be informed, and an alternative sampling location agreed. This alternative location should be selected with reference to the findings of the sanitary survey and should continue to represent a worst-case scenario for contamination risk.



Sanitary Survey and Sampling Plan for Killala Bay, Co. Mayo & Co. Sligo

Representative Monitoring Point for
Pacific Oyster within Killala Bay



Legend

- Bivalve Mollusc Production Area (BMPA)
- ◆ Representative Monitoring Point for Pacific Oyster
- Pacific Oyster Aquaculture Sites

Map Scale: 1:45,000

Coordinate System: IRENET95 / Irish Transverse Mercator

0 750 1,500 m



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Project Manager: Maeve Guilfoyle, Senior Ecologist



Figure 7-1 – Recommended Monitoring Point for Pacific oyster within Killala Bay

7.2 SAMPLING PLAN FOR PACIFIC OYSTER

Species-specific sampling plans have been developed in line with EU Regulation 2019/627 and the SFPA Code of Practice (2025). Key features of the plans are detailed in Table 7-1.

Table 7-1 – Sampling Plan for Pacific oysters Killala Bay classification

SPECIES	<i>Magallana gigas</i>
SITE NAME	Killala Bay
SAMPLE POINT IDENTIFIER	MO-KB-KB-PO
GEOGRAPHICAL LOCATION OF SAMPLING POINT (RMP)	54.20924 N, -9.19164 W
SAMPLING FREQUENCY	Samples shall be taken monthly from Killala Bay. Sampling will occur throughout the year.
SAMPLING DEPTH	Samples should be taken as close to the surface as possible, from trestle or bag.
MAXIMUM ALLOWED DISTANCE FROM SAMPLING POINT	Samples are to be collected within 100 m of the RMP. Where this is not possible, the SFPA sample coordinator and local industry shall be informed to agree an alternative sampling location.
SAMPLING METHOD	Sampling will be conducted in accordance with the SFPA Code of Practice for the Classification and Microbiological Monitoring of Bivalve Mollusc Production Areas (SFPA, 2025), specifically in accordance with Appendix 9.2.
SAMPLE SIZE	A minimum of 10 oysters of market size (8 cm)
AUTHORISED SAMPLERS	It is the responsibility of the SFPA Killybegs Port Office to arrange sampling, with designated sampling officers assigned to collect samples.

8 SAMPLING PLAN FOR CURRENTLY UNCLASSIFIED WILD FISHERIES

8.1 REPRESENTATIVE MONITORING POINT (COCKLES)

Please note that any future classification of the inactive cockle fishery is contingent on fully satisfying the provisions of the Department of Agriculture, Food and the Marine's *Protocol for Opening a New Fishery for Bivalve Molluscs*¹⁰. No classification of this species is implied by the inclusion of this species' sampling plan in the current sanitary survey report as the SFPA cannot classify an area for a wild bivalve species prior to meeting all requirements of the protocol.

If, following classification of the area for this species, commercial harvesting of the common cockles (*Cerastoderma edule*) is proposed under the microbiological CoP's short-term classification rules, it is recognised that fishing activity is intermittent and targets naturally occurring wild stocks rather than fixed or cultivated beds. Consequently, a single permanent RMP would not be appropriate. A season-specific, fishery-representative RMP will therefore be identified in advance of each proposed fishing period, based on the anticipated location of harvesting activity. The intended fishing period (duration in months) and proposed RMP will be notified to the SFPA prior to sampling, in accordance with the requirements as set out in the [short-term classification note 4](#).

The season-specific RMP will be selected with reference to the sanitary survey, including identified freshwater inflows, shoreline contamination pressures, hydrodynamic influences, and historic microbiological data. Following SFPA approval, two initial samples will be collected from the agreed RMP not closer than two weeks apart prior to the commencement of harvesting. Subsequent samples are to be taken during the authorised fishing period in accordance with the sampling plan issued by SFPA for that year. The selected RMP will be located within, or immediately representative of, the active fishing area and will reflect a conservative (worst-case) representation of contamination risk in the area.

Where harvesting activity shifts materially during the authorised period such that sampling at the agreed RMP is no longer representative, this will be notified to the SFPA sample coordinator. Any alternative sampling location will be agreed in advance and selected with reference to the sanitary survey findings and the approved sampling plan, ensuring that monitoring remains representative of the active fishery and that public health protection and regulatory compliance are maintained throughout the fishing period.

¹⁰

<http://www.fishingnet.ie/media/fishingnet/content/inshorefisheriesmanagement/Protocol%20for%20Opening%20a%20New%20Fishery%20for%20Bivalve%20Molluscs%202022%20081122.pdf>

8.2 SAMPLING PLAN FOR WILD COMMON COCKLE

Species-specific sampling plans have been developed in line with EU Regulation 2019/627 and the SFPA Code of Practice (2025). As noted elsewhere in this sanitary survey report, cockles, as an inactive and currently unclassified wild fishery in the Killala Bay BMPA, will need to go through all steps of the Department of Agriculture, Food and the Marine's (DAFM's) *Protocol for Opening a New Fishery for Bivalve Molluscs* prior to classification and commercial exploitation. Details of the sampling plan below may only be implemented once the requirements of the DAFM protocol have been met in full, allowing the SFPA to classify the area for this species. Key features of the plan are detailed in Table 8-1:

Table 8-1 – Sampling Plan for wild common cockle within the Killala Bay BMPA

SPECIES	<i>Cerastoderma edule</i>
SITE NAME	Killala Bay BMPA
SAMPLE POINT IDENTIFIER	MO-KB-KB-CO
GEOGRAPHICAL LOCATION OF SAMPLING POINT (RMP)	This is treated as a floating RMP. If classified, following completion of all steps of DAFM's <i>Protocol for Opening a New Fishery for Bivalve Molluscs</i> , there will be a defined and supervised sampling regime for an authorised period in accordance with the requirements of the short-term classification process as per the microbiological code of practice.
SAMPLING FREQUENCY	As noted above, as there is no current classification for this species in this classified production area, it will be subject to going through all the required steps of the DAFM protocol for opening new bivalve fisheries before it can be classified. As the proposed fishery is a wild bivalve fishery and expected to be exploited under short-term classification rules, if classified, fishers must submit a request to carry out initial collection of two samples not closer than two weeks apart before risk assessment is carried out by the SFPA and prior to approval or refusal of permission to fish in a given year. Regular monitoring will be required during any allowed fishing period(s), subject to a tailored sampling plan and sufficient availability of local SFPA personnel for adequate supervision of this sampling plan. If classified, the sampling frequency is to be decided specific to this fishery, with a sampling plan issued following risk assessment if fishing is approved. Please refer to the CoP ¹¹ for further details on required sampling under short-term classification rules.
SAMPLING DEPTH	If classified, samples should be taken as close to the surface of the sediment as possible.
MAXIMUM ALLOWED DISTANCE FROM SAMPLING POINT	If classified, samples are to be collected within 100 m of the pre-approved RMP. Where this is not possible, the SFPA sample coordinator and local industry shall be informed and may agree an alternative sampling location.

¹¹ <http://www.fishingnet.ie/media/fishingnet/content/inshorefisheriesmanagement/Protocol%20for%20Opening%20a%20New%20Fishery%20for%20Bivalve%20Molluscs%202022%20081122.pdf>

SAMPLING METHOD	If classified, sampling will be conducted in accordance with the SFPA Code of Practice for the Classification and Microbiological Monitoring of Bivalve Mollusc Production Areas (SFPA, 2025), specifically in accordance with Appendix 9.2.
SAMPLE SIZE	A minimum of 30 cockles of market size (3 cm).
AUTHORISED SAMPLERS	If classified it is the responsibility of the SFPA Killybegs Port Office to arrange sampling, with designated sampling officers assigned to collect samples.

9 CONCLUSIONS

A sanitary survey has been conducted in accordance with Article 56 of Regulation (EU) 2019/627 (European Commission, 2024). The survey integrated a contributing catchment-scale desk assessment, field-based shoreline verification, and bacteriological sampling to evaluate faecal contamination risks in Killala Bay.

These findings informed the delineation of the Bivalve Mollusc Production Area (BMPA), identification of Representative Monitoring Points (RMPs), and the development of recommendations for microbiological sampling plans.

The outputs of the survey are as follows:

- A geographically defined BMPA boundary of approximately 25.6 km².
- The common cockle fishery does not currently operate and when active only intermittently operated, targeting naturally occurring wild stocks rather than managed or cultivated beds. As a result, a fixed RMP cannot be established for any future classification. Accordingly, it is not possible to develop a predetermined sampling plan for this site. The RMP is instead treated as a floating reference, reflecting the variable spatial extent of fishing activity in any given year.
- To capture the dominant contamination pressures 2 RMPs (1 active, 1 inactive) have been created located at the following:
 - Pacific oyster (Single active RMP)
 - RMP 1 (active) at site T10-309A (54.20924 N, -9.19164 W).
 - Wild common cockle (Floating- unclassified and inactive)
 - This is treated as a floating RMP. There will be a defined and supervised sampling regime for an authorised period in accordance with the requirements of the short-term classification process.
- Recommendations for a species-specific sampling plans for Pacific oyster (*Magallana gigas*), and common cockle (*Cerastoderma edule*) in line with SFPA COP (2025) and EU (2019/627) regulatory requirements.

These components provide the scientific basis for the classification and ongoing monitoring of Killala Bay BMPA as a shellfish production area and the potential future classification of this area for common cockle.

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APPENDIX 1 – WFD RIVER SUB-BASINS COMPRISING THE CONTRIBUTING CATCHMENT

Sub-basin ID	River Sub-basin (EPA Code)	Area (km ²)
1	BAR DEELA_010 (IE_WE_34B020200)	17.33
2	DEEL (CROSSMOLINA)_010 (IE_WE_34D010006)	8.64
3	DEEL (CROSSMOLINA)_020 (IE_WE_34D010010)	36.06
4	DEEL (CROSSMOLINA)_030 (IE_WE_34D010025)	33.80
5	DEEL (CROSSMOLINA)_040 (IE_WE_34D010120)	29.40
6	CASTLEBAR_010 (IE_WE_34C010180)	86.80
7	ADDERGOOLE_010 (IE_WE_34A010600)	40.32
8	ATTIAPPLETON_010 (IE_WE_34A120980)	12.92
9	ABBEYTOWN_010 (IE_WE_34A350930)	14.53
10	BELLANAMEAN_010 (IE_WE_34B040500)	12.93
11	BELLAWADDY_010 (IE_WE_34B050150)	8.88
12	BELLAWADDY_020 (IE_WE_34B050300)	9.73
13	BRUSNA (NORTH MAYO)_010 (IE_WE_34B070200)	12.32
14	BRUSNA (NORTH MAYO)_020 (IE_WE_34B070600)	19.61
15	BEHY (NORTH MAYO)_010 (IE_WE_34B080400)	35.35
16	BLACK (SLIGO)_010 (IE_WE_34B120180)	13.33
17	BALLAGHAMUCK_010 (IE_WE_34B180860)	13.08
18	BALLYMANAGH_010 (IE_WE_34B400840)	9.92
19	CASTLEBAR_020 (IE_WE_34C010300)	9.34
20	CASTLEBAR_030 (IE_WE_34C010400)	8.64
21	CASTLEBAR_040 (IE_WE_34C010500)	27.52
22	CASTLEHILL_010 (IE_WE_34C020460)	14.69
23	CLYDAGH (CASTLEBAR)_010 (IE_WE_34C050100)	34.75
24	CLYDAGH (CASTLEBAR)_020 (IE_WE_34C050200)	19.46
25	CORROY_010 (IE_WE_34C060200)	24.68
26	CARROWKERIBLY LOUGH STREAM_010 (IE_WE_34C070600)	34.98
27	CALLOW LOUGHS STREAM_010 (IE_WE_34C080300)	8.85
28	CARROWARD_010 (IE_WE_34C090700)	11.49
29	CLOONLAVIS_010 (IE_WE_34C100300)	18.16
30	CRUMLIN (LOUGH CULLIN)_010 (IE_WE_34C110300)	20.12
31	CORSALLAGH STREAM_010 (IE_WE_34C120400)	17.60
32	CHARLESTOWN STREAM_010 (IE_WE_34C280100)	24.96
33	CREEVY_010 (IE_WE_34C700920)	11.93
34	DEEL (CROSSMOLINA)_050 (IE_WE_34D010300)	23.38
35	DEEL (CROSSMOLINA)_060 (IE_WE_34D010400)	6.59

Sub-basin ID	River Sub-basin (EPA Code)	Area (km ²)
36	DOOYEAGHNY_or_CLOONLOUGHAN_010 (IE_WE_34D310990)	23.61
37	DRUMBAUN_010 (IE_WE_34D360920)	17.59
38	EIGNAGH_010 (IE_WE_34E010100)	12.65
39	EIGNAGH_020 (IE_WE_34E010200)	21.48
40	EIGNAGH_030 (IE_WE_34E010300)	11.82
41	GLENREE_010 (IE_WE_34G010020)	8.55
42	GLENREE_020 (IE_WE_34G010060)	10.40
43	GLENREE_030 (IE_WE_34G010200)	9.22
44	GLORE (MAYO)_010 (IE_WE_34G020010)	12.39
45	GLORE (MAYO)_020 (IE_WE_34G020200)	39.40
46	GWEESTION_010 (IE_WE_34G030100)	12.20
47	GWEESTION_020 (IE_WE_34G030200)	9.49
48	LITTLE (STRADE)_010 (IE_WE_34L020500)	12.40
49	LOUGHNAMINOO STREAM_010 (IE_WE_34L040200)	25.93
50	LOUGH MUCK STREAM_010 (IE_WE_34L050600)	9.74
51	LENYVEE_010 (IE_WE_34L060300)	6.33
52	LOUGHANABOLL_010 (IE_WE_34L070100)	6.71
53	MANULLA_010 (IE_WE_34M010100)	13.86
54	MANULLA_020 (IE_WE_34M010225)	17.08
55	MANULLA_030 (IE_WE_34M010300)	28.91
56	MANULLA_040 (IE_WE_34M010500)	29.05
57	MOY_010 (IE_WE_34M020010)	8.08
58	MOY_020 (IE_WE_34M020050)	7.85
59	MOY_030 (IE_WE_34M020100)	28.00
60	MOY_040 (IE_WE_34M020300)	22.99
61	MOY_050 (IE_WE_34M020400)	20.87
62	MOY_060 (IE_WE_34M020470)	33.23
63	MOY_070 (IE_WE_34M020500)	11.30
64	MOY_080 (IE_WE_34M020650)	68.49
65	MOY_090 (IE_WE_34M020750)	12.18
66	MOY_100 (IE_WE_34M020800)	133.27
67	MOY_110 (IE_WE_34M020850)	26.76
68	MOY_120 (IE_WE_34M021100)	33.25
69	MULLAGHANOE_010 (IE_WE_34M030300)	13.69
70	MAD_010 (IE_WE_34M040100)	7.83
71	MEANDER_010 (IE_WE_34M050400)	27.29
72	MOYNE_010 (IE_WE_34M190890)	15.23
73	NORTH COOLNAHA_010 (IE_WE_34N190740)	11.19

Sub-basin ID	River Sub-basin (EPA Code)	Area (km ²)
74	OWENAHHER_010 (IE_WE_34O010050)	16.04
75	OWENAHHER_020 (IE_WE_34O010100)	10.70
76	OWENGARVE (SLIGO)_010 (IE_WE_34O030050)	35.24
77	OWENGARVE (SLIGO)_020 (IE_WE_34O030100)	37.23
78	OWENGARVE (SLIGO)_030 (IE_WE_34O030200)	17.82
79	OWENLOBNAGLAUR_010 (IE_WE_34O040200)	9.44
80	OUGH TAGH_010 (IE_WE_34O050400)	8.35
81	POLLAGH_010 (IE_WE_34P010100)	9.35
82	POLLAGH_020 (IE_WE_34P010200)	36.85
83	POLLAGH_030 (IE_WE_34P010260)	6.10
84	POLLAGH_040 (IE_WE_34P010300)	11.07
85	RATHROEEN STREAM_010 (IE_WE_34R010200)	22.58
86	SHANVOLAHAN_010 (IE_WE_34S010400)	27.54
87	SONNAGH (MOY)_010 (IE_WE_34S020100)	35.69
88	SPADDAGH_010 (IE_WE_34S030200)	15.30
89	STRADE_010 (IE_WE_34S040800)	10.77
90	SWINFORD_010 (IE_WE_34S050300)	19.24
91	SLIEVECLAUR_010 (IE_WE_34S060400)	22.29
92	Scurmore_010 (IE_WE_34S610980)	13.23
93	TRIMOGE_010 (IE_WE_34T010200)	25.99
94	TRIMOGE_020 (IE_WE_34T010300)	27.99
95	TRIMOGE_030 (IE_WE_34T010500)	15.04
96	TUBBERCURRY_010 (IE_WE_34T020050)	7.18
97	TUBBERCURRY_020 (IE_WE_34T020200)	6.94
98	TUBBERCURRY STREAM_010 (IE_WE_34T030400)	10.61
99	TULLYMORE (Mayo)_010 (IE_WE_34T560640)	24.88
100	TULLYEGAN_010 (IE_WE_34T830920)	12.23
101	YELLOW (FOXFORD)_010 (IE_WE_34Y010100)	19.78
102	YELLOW (FOXFORD)_020 (IE_WE_34Y010400)	18.31
103	YELLOW (KNOCK)_010 (IE_WE_34Y020155)	21.55
104	YELLOW (KNOCK)_020 (IE_WE_34Y020400)	41.77

APPENDIX 2 – SUMMARY STATISTICS FOR WEATHER

Appendix 2A – Summary statistics for wind derived from Knock Airport weather station (January 2015 to December inclusive 2025)]

Direction	Frequency (%)	Max. Mean Wind Speed (m/s)	Mean Wind Speed (m/s)
W	28.1	13.8	5.0
S	17.3	11.2	5.1
NW	11.9	13.5	4.6
SW	11.9	11.6	4.9
SE	10.7	10.3	4.7
N	9.0	9.0	3.9
E	7.9	10.3	4.3
NE	3.2	8.7	3.4

Appendix 2B – Summary statistics for daily rainfall derived from Knock Airport weather station (January 2015 to December inclusive 2025)]

Month	Max. Daily Rain (mm)	Mean Daily Rain (mm)	Median Daily Rain (mm)
January	201.0	122.33	124.30
February	277.4	136.33	128.50
March	182.4	112.64	118.25
April	112.9	73.64	87.25
May	124.7	75.87	68.60
June	128.8	94.60	104.70
July	203.7	111.27	96.15
August	215.4	135.32	128.95
September	173.5	118.22	110.45
October	217.5	137.72	128.25
November	172.8	130.80	132.35
December	214.3	143.46	137.70

APPENDIX 3 – SMALL AREA STATISTICS

Statistics for Small Areas overlapping the contributing catchment and corresponding population density (CSO, 2023b)

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157002001	>99.9%	7
A157002002	>99.9%	14
A157002003	>99.9%	965
A157002004	>99.9%	19
A157002005	>99.9%	16
A157003002	8.4%	37
A157005001	>99.9%	21
A157005002	44.5%	20
A157005003	94.7%	35
A157009001	>99.9%	19
A157010001	93.4%	26
A157010002	>99.9%	53
A157010003	99.7%	36
A157010004	>99.9%	893
A157011002	>99.9%	1840
A157011003/A157011001/A157011005	>99.9%	483
A157011004/01	>99.9%	36
A157011004/02	>99.9%	80
A157011004/03	>99.9%	38
A157011006	>99.9%	2499
A157011007	77.6%	433
A157011008	>99.9%	3871
A157011009	>99.9%	3258
A157011010	>99.9%	375
A157011011	>99.9%	2282
A157012001	>99.9%	34
A157012002	>99.9%	11
A157013001	>99.9%	14
A157014001	>99.9%	30
A157014002	>99.9%	30
A157014003	>99.9%	24
A157014004	>99.9%	919
A157014005	>99.9%	2180
A157014006	>99.9%	16
A157014007	>99.9%	1991

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157014008	>99.9%	1006
A157015001	>99.9%	21
A157015002	>99.9%	38
A157015003	>99.9%	97
A157015004	>99.9%	58
A157015005	>99.9%	611
A157015006	>99.9%	3000
A157015008/01/A157015007	>99.9%	122
A157015008/02	>99.9%	1803
A157015009	>99.9%	689
A157015010	>99.9%	3195
A157015011	92.5%	59
A157015012	>99.9%	2312
A157016001	>99.9%	2075
A157016002	>99.9%	3485
A157016003	>99.9%	2561
A157016004	>99.9%	2442
A157016005	>99.9%	2157
A157016006	>99.9%	2388
A157016007	>99.9%	225
A157016008	>99.9%	2784
A157016009	>99.9%	5134
A157016010	>99.9%	4377
A157016011	>99.9%	2258
A157016012	>99.9%	2656
A157016013/A157016014	98.6%	1031
A157016015	84.4%	1264
A157016016	>99.9%	965
A157016017	>99.9%	1380
A157016018	>99.9%	1793
A157016019	>99.9%	471
A157016020	>99.9%	3783
A157016021	>99.9%	1997
A157016022	>99.9%	2994
A157017001	>99.9%	91
A157017002	94.0%	19
A157017003	>99.9%	18
A157018001	>99.9%	23

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157018002	>99.9%	13
A157025002	16.1%	32
A157025003	18.1%	737
A157025004	11.4%	854
A157025006	7.5%	18
A157025009	1.2%	3333
A157025014	62.6%	816
A157027001	29.9%	15
A157027002	>99.9%	32
A157028001	32.9%	7
A157028002	>99.9%	9
A157030001	83.4%	22
A157030002	95.9%	23
A157033001	4.6%	18
A157033002	94.2%	26
A157033003	94.5%	24
A157033004	13.2%	22
A157035001	>99.9%	40
A157035002	>99.9%	14
A157035003	>99.9%	22
A157035004	>99.9%	51
A157035005	>99.9%	1017
A157037001	>99.9%	27
A157038001	>99.9%	16
A157038002	>99.9%	18
A157038003	>99.9%	31
A157038004	>99.9%	26
A157039001/01	81.6%	56
A157039001/02	>99.9%	780
A157039002	57.3%	34
A157039003	99.8%	79
A157039004	>99.9%	1444
A157039005	>99.9%	127
A157040001	70.6%	1
A157042001	67.9%	20
A157042002	98.2%	6
A157043002	16.0%	24
A157044001	>99.9%	17

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157044002	>99.9%	12
A157047001	>99.9%	13
A157047002	>99.9%	37
A157047003	>99.9%	30
A157047004	>99.9%	48
A157048001	52.2%	43
A157048002	>99.9%	356
A157048003	>99.9%	91
A157048004	>99.9%	373
A157048005	>99.9%	40
A157048006	>99.9%	43
A157048007	>99.9%	1064
A157048008	>99.9%	3374
A157048009/01	>99.9%	487
A157048009/02	>99.9%	1214
A157048010	>99.9%	3071
A157048011	>99.9%	3516
A157048012	>99.9%	2422
A157048013	>99.9%	2573
A157048014	>99.9%	1423
A157048015	>99.9%	38
A157048016	>99.9%	973
A157048017	>99.9%	4222
A157048018	>99.9%	3145
A157048019	>99.9%	4327
A157048020	>99.9%	3091
A157048021	>99.9%	2727
A157048022	>99.9%	4991
A157048023	>99.9%	890
A157048024	>99.9%	2926
A157048025	>99.9%	1712
A157048026	>99.9%	3192
A157048027	>99.9%	4667
A157048028	>99.9%	4501
A157048029	>99.9%	91
A157048030	>99.9%	1756
A157049001	>99.9%	814
A157049002	>99.9%	600

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157049003	>99.9%	2859
A157049004	>99.9%	3555
A157049005	>99.9%	1475
A157049006	>99.9%	3116
A157049007	>99.9%	651
A157049008	>99.9%	3609
A157049009	>99.9%	8404
A157049010	>99.9%	2726
A157049011	>99.9%	3266
A157049012	>99.9%	1012
A157049013	>99.9%	746
A157049014	>99.9%	867
A157049015	>99.9%	1590
A157049016	>99.9%	1429
A157049017	>99.9%	2482
A157049018	>99.9%	3371
A157049019	>99.9%	3394
A157049020	>99.9%	2527
A157049021	>99.9%	3054
A157049022	>99.9%	5579
A157049023	>99.9%	1862
A157049024	>99.9%	2978
A157049025	>99.9%	2100
A157049026	>99.9%	1910
A157049027	>99.9%	3928
A157049028	>99.9%	6034
A157051001	8.2%	54
A157051005	7.1%	39
A157052002	23.3%	39
A157053002	33.5%	29
A157054001	51.4%	12
A157055001	98.9%	36
A157055002	34.1%	46
A157055003	27.7%	19
A157056001	80.6%	11
A157056002	>99.9%	15
A157056003	97.7%	19
A157058001	63.2%	20

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157058002	>99.9%	30
A157058003	7.7%	18
A157062001	2.4%	6
A157065001	81.1%	12
A157065002	>99.9%	1662
A157065003	>99.9%	868
A157065005/A157065004	>99.9%	501
A157066002	>99.9%	27
A157066003/A157066001	>99.9%	9
A157066004	>99.9%	490
A157066005	>99.9%	607
A157067001	>99.9%	13
A157067002	>99.9%	20
A157070001	>99.9%	15
A157070002	99.0%	9
A157071001	86.5%	3
A157073001	3.6%	14
A157073002	95.5%	8
A157078001	96.8%	28
A157078002	86.6%	18
A157082001/A157136001	<0.1%	1
A157083001	<0.1%	6
A157087001	44.5%	11
A157087002	>99.9%	51
A157087003	91.4%	26
A157087004	>99.9%	59
A157087005	>99.9%	27
A157088001	54.1%	18
A157088002	>99.9%	15
A157088003	>99.9%	741
A157088004	>99.9%	2252
A157088005	>99.9%	27
A157088006	88.1%	12
A157089001	90.6%	20
A157089002	61.6%	25
A157091001	0.9%	10
A157092001	7.4%	3
A157094001	>99.9%	1009

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157094002	>99.9%	35
A157094003	82.3%	5
A157096001	>99.9%	17
A157096002/A157096004	>99.9%	1114
A157096003	>99.9%	18
A157096005/A157096002	>99.9%	13
A157097002/A157097009	30.2%	21
A157097004	77.2%	22
A157097006	>99.9%	1806
A157097007/A157097005	95.5%	837
A157097008	>99.9%	5313
A157098001	0.4%	19
A157099001	>99.9%	24
A157099002	>99.9%	36
A157099003	>99.9%	22
A157099004	>99.9%	33
A157103001	0.8%	17
A157105001/01	>99.9%	1769
A157105001/02	>99.9%	1428
A157105002	>99.9%	1095
A157105003/A157105008/A157105004	>99.9%	16
A157105005	>99.9%	1098
A157105006	>99.9%	962
A157105007	>99.9%	42
A157105009	>99.9%	2874
A157108001/A157108005	>99.9%	13
A157108002	>99.9%	24
A157108003	>99.9%	2013
A157108004	>99.9%	878
A157108006	>99.9%	2051
A157109001	>99.9%	14
A157109002	>99.9%	607
A157109003	64.6%	13
A157109004/A157109005	>99.9%	956
A157114001	53.0%	3
A157115001	58.4%	15
A157115002	0.2%	12
A157117001	>99.9%	46

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157117002	>99.9%	25
A157117003	>99.9%	28
A157118001	76.4%	15
A157118002	92.8%	17
A157119001	>99.9%	25
A157119002	>99.9%	17
A157119003	>99.9%	27
A157120001	>99.9%	17
A157120002	>99.9%	77
A157120003	>99.9%	87
A157120004	>99.9%	29
A157120005	>99.9%	62
A157120006	>99.9%	50
A157123001	>99.9%	10
A157123002	76.9%	28
A157125003	54.6%	18
A157130001	>99.9%	11
A157130002	>99.9%	9
A157133001	26.9%	14
A157134001	12.9%	28
A157134002	99.8%	26
A157135001	>99.9%	11
A157135002	>99.9%	32
A157140001	86.3%	23
A157140002	>99.9%	21
A157140003	>99.9%	15
A157140004	>99.9%	14
A157140005	>99.9%	971
A157140006	>99.9%	1479
A157141001	>99.9%	13
A157141002	>99.9%	36
A157141003	>99.9%	1054
A157141004	>99.9%	919
A157141005	>99.9%	1313
A157141006	>99.9%	78
A157142001	<0.1%	2
A157143001	>99.9%	12
A157143002	>99.9%	25

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157143003	>99.9%	19
A157144001	>99.9%	41
A157144002	>99.9%	22
A157144003	>99.9%	27
A157144004	>99.9%	41
A157144005	>99.9%	30
A157144006	>99.9%	1089
A157144007	>99.9%	895
A157144008	>99.9%	499
A157144009	>99.9%	1321
A157144010	>99.9%	702
A157144011	>99.9%	721
A157144012/A157144014	>99.9%	1510
A157144013	>99.9%	836
A157145001	1.4%	16
A157147001	>99.9%	20
A157147002	>99.9%	1149
A157148001	>99.9%	23
A157148002	>99.9%	21
A157148003	>99.9%	934
A157148004	>99.9%	25
A157148005	>99.9%	864
A157148006	>99.9%	1183
A157148007	>99.9%	900
A157148008	>99.9%	871
A157149001	>99.9%	14
A157149002	>99.9%	10
A157150001/A157150006	>99.9%	77
A157150002/A157150004	>99.9%	33
A157150003	>99.9%	37
A157150005	>99.9%	1556
A157151001	>99.9%	929
A157151002	58.2%	10
A157154001	>99.9%	647
A157154002	>99.9%	3679
A157154003	87.0%	626
A157154004	86.0%	798
A157154005	>99.9%	3341

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A157154006	>99.9%	2567
A157154007	>99.9%	2307
A157154008	>99.9%	3663
A157154009	>99.9%	1425
A157154010	>99.9%	577
A157154011	>99.9%	4707
A157154012	>99.9%	1841
A197005001	2.3%	13
A197011001	>99.9%	17
A197011002	14.4%	25
A197011015	43.8%	15
A197057001	>99.9%	14
A197057002	14.8%	13
A197057003	13.0%	14
A207001001	>99.9%	20
A207001002	>99.9%	17
A207002001	>99.9%	680
A207002002	>99.9%	35
A207002003	>99.9%	17
A207002004	>99.9%	14
A207003001	>99.9%	6
A207003002	>99.9%	29
A207014001	>99.9%	9
A207014002	>99.9%	19
A207014003	>99.9%	20
A207014004	>99.9%	26
A207015001/A207022001	23.1%	4
A207016001	92.1%	3
A207023001	14.4%	9
A207024001	65.9%	8
A207025001	>99.9%	18
A207025002	>99.9%	624
A207025003	99.6%	21
A207025004	>99.9%	25
A207025005	>99.9%	37
A207025006	>99.9%	38
A207028001	78.6%	10
A207033001	1.8%	15

Small Area Code	Contributing Catchment Overlap	Population Density (People per km ²)
A207045001	97.7%	6
A207046002	18.6%	16
A207047005/A207047010	32.3%	882
A207047008	18.4%	22
A207047009	2.4%	1986
A207047011	18.4%	2031
A207051001	>99.9%	7
A207057001	0.4%	13
A207057002	32.5%	18
A207062001	77.7%	4
A207063001/A207075001	0.2%	3
A207065001	0.5%	26
A207072001	21.6%	13
A207077001	>99.9%	21
A207077002	97.2%	24
A207077003	99.3%	22
A207077004	>99.9%	2740
A207077005	>99.9%	2459
A207077006	>99.9%	1507
A207077007	>99.9%	1708
A207077008	>99.9%	710
A207077009	>99.9%	2128
A207077010	>99.9%	889
A207077011	>99.9%	1865
A207077012	>99.9%	1089

APPENDIX 4 – STATISTICS FROM THE CENSUS OF AGRICULTURE 2020 FOR GRAZING FARM ANIMALS WITHIN THE ELECTORAL DIVISIONS OVERLAPPING THE CONTRIBUTING CATCHMENT

Electoral Division	Percentage Overlap Contributing Catchment of	Total (Corrected) Dairy Cows	Total (Corrected) Livestock	Total (Corrected) Other Cows	Total (Corrected) Cattle	Total (Corrected) Sheep
Achonry East	>99.9%	0 (0)	1131 (1131)	563 (563)	1676 (1676)	374 (374)
Achonry West	>99.9%	0 (0)	1354 (1354)	664 (664)	1877 (1877)	1285 (1285)
Aclare	>99.9%	0 (0)	566 (566)	250 (250)	729 (729)	788 (788)
Addergoole	>99.9%	0 (0)	1868 (1868)	570 (570)	1728 (1728)	7190 (7190)
Aghagower North	2.6%	0 (0)	1338 (35)	386 (10)	1370 (36)	4117 (108)
Aghamore	79.1%	304 (240)	2717 (2149)	978 (773)	3911 (3093)	0 (0)
Ardagh	>99.9%	0 (0)	1492 (1492)	461 (461)	1845 (1845)	2594 (2594)
Ardnaree North	96.6%	0 (0)	1606 (1551)	460 (444)	2119 (2046)	1216 (1174)
Ardnaree South Rural	99.4%	0 (0)	1233 (1226)	540 (537)	1771 (1761)	702 (698)
Ardnaree South Urban	95.6%	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Artagh South	1.5%	0 (0)	1090 (16)	509 (8)	1590 (24)	0 (0)
Attymass East	>99.9%	0 (0)	668 (668)	350 (350)	892 (892)	836 (836)
Attymass West	>99.9%	0 (0)	631 (631)	209 (209)	908 (908)	0 (0)
Balla	>99.9%	0 (0)	3625 (3625)	801 (801)	3807 (3807)	4845 (4845)
Ballaghaderreen	30.7%	0 (0)	2057 (632)	1089 (334)	3030 (930)	498 (153)
Ballina Rural	99.3%	490 (487)	3097 (3076)	1000 (993)	4254 (4224)	1703 (1691)
Ballina Urban	>99.9%	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ballinafad	97.5%	0 (0)	2020 (1970)	609 (594)	2592 (2527)	2300 (2242)
Ballinamore	>99.9%	0 (0)	972 (972)	398 (398)	1398 (1398)	567 (567)

Electoral Division	Percentage Overlap Contributing Catchment of	Total (Corrected) Dairy Cows	Total (Corrected) Livestock	Total (Corrected) Other Cows	Total (Corrected) Cattle	Total (Corrected) Sheep
Ballyhaunis	5.8%	0 (0)	2084 (120)	642 (37)	3011 (174)	1419 (82)
Ballyhowly	58.4%	0 (0)	2473 (1445)	571 (334)	2758 (1611)	852 (498)
Ballynagoraher	60.2%	0 (0)	1751 (1055)	568 (342)	1400 (843)	8355 (5033)
Ballysakeery	88.9%	478 (425)	2249 (2000)	566 (503)	3024 (2688)	1191 (1059)
Banada	>99.9%	0 (0)	1631 (1631)	717 (717)	2109 (2109)	2567 (2567)
Bekan	43.4%	0 (0)	2296 (996)	884 (383)	3290 (1427)	963 (418)
Bellavary	>99.9%	0 (0)	1901 (1901)	827 (827)	2590 (2590)	1845 (1845)
Bohola	>99.9%	0 (0)	827 (827)	388 (388)	1184 (1184)	351 (351)
Brackloon	>99.9%	0 (0)	1709 (1709)	946 (946)	2465 (2465)	1002 (1002)
Branchfield	23.2%	0 (0)	971 (225)	311 (72)	806 (187)	4551 (1055)
Breaghwy	79.2%	521 (413)	2141 (1696)	562 (445)	2812 (2228)	1723 (1365)
Breencorragh	92.0%	0 (0)	802 (738)	160 (147)	650 (598)	3498 (3217)
Bunaveela	70.4%	0 (0)	643 (453)	58 (41)	117 (82)	5643 (3974)
Burren	89.4%	0 (0)	902 (806)	369 (330)	915 (818)	3140 (2806)
Burriscarra	5.6%	0 (0)	2015 (113)	524 (29)	2684 (151)	2420 (136)
Callow	>99.9%	0 (0)	1070 (1070)	529 (529)	1429 (1429)	1010 (1010)
Carrowmore	>99.9%	0 (0)	1912 (1912)	627 (627)	2598 (2598)	1722 (1722)
Cartron	15.1%	0 (0)	1612 (244)	465 (70)	1633 (247)	5031 (760)
Castlebar Rural	92.8%	0 (0)	1267 (1176)	604 (561)	1723 (1599)	1322 (1227)
Castlebar Urban	>99.9%	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Castleconor East	66.0%	0 (0)	1289 (850)	529 (349)	1788 (1179)	1046 (690)
Castleconor West	99.3%	573 (569)	3647 (3623)	998 (991)	4737 (4706)	3410 (3388)

Electoral Division	Percentage Overlap Contributing Catchment	of	Total (Corrected) Dairy Cows	Total (Corrected) Livestock	Total (Corrected) Other Cows	Total (Corrected) Cattle	Total (Corrected) Sheep
Claremorris	3.8%		0 (0)	1200 (45)	232 (9)	1566 (59)	1090 (41)
Clogher	8.6%		0 (0)	1586 (136)	553 (47)	2017 (173)	2224 (190)
Clogher	19.5%		270 (53)	1692 (330)	534 (104)	2076 (405)	2659 (519)
Cloghermore	51.2%		0 (0)	1564 (800)	426 (218)	1991 (1018)	2008 (1027)
Cloonkeen	42.9%		0 (0)	1492 (639)	497 (213)	1701 (729)	3757 (1610)
Cloonmore	90.7%		0 (0)	808 (732)	426 (386)	1238 (1122)	0 (0)
Coolnaha	55.8%		0 (0)	1688 (941)	553 (309)	2221 (1239)	1630 (909)
Croaghmoyle	2.5%		0 (0)	557 (14)	157 (4)	428 (11)	2821 (70)
Crossmolina North	82.0%		0 (0)	1665 (1364)	632 (518)	2229 (1827)	1609 (1319)
Crossmolina South	>99.9%		0 (0)	2044 (2044)	664 (664)	2406 (2406)	3853 (3853)
Cuildoo	>99.9%		0 (0)	925 (925)	554 (554)	1350 (1350)	430 (430)
Cuilmore	1.0%		0 (0)	1570 (16)	673 (7)	2340 (23)	470 (5)
Deel	99.5%		0 (0)	2261 (2249)	896 (891)	2824 (2809)	4088 (4067)
Derry	86.7%		0 (0)	1316 (1141)	328 (284)	857 (743)	7364 (6383)
Doocastle	58.0%		0 (0)	1040 (603)	490 (284)	1567 (909)	145 (84)
Edmondstown	36.7%		0 (0)	1229 (451)	590 (217)	1751 (643)	748 (275)
Fortland	91.7%		0 (0)	2766 (2536)	956 (877)	3681 (3376)	2669 (2448)
Glendarragh	97.8%		0 (0)	753 (736)	210 (205)	637 (623)	3200 (3130)
Glenhest	<0.1%		0 (0)	1196 (1)	274 (0)	584 (0)	8117 (4)
Islandeady	74.7%		0 (0)	2094 (1564)	818 (611)	2292 (1712)	5585 (4172)
Kilbeagh	84.2%		0 (0)	1485 (1251)	755 (636)	2230 (1878)	311 (262)
Kilcolman	77.3%		419 (324)	2057 (1589)	446 (345)	2692 (2080)	1408 (1088)

Electoral Division	Percentage Overlap Contributing Catchment of	Total (Corrected) Dairy Cows	Total (Corrected) Livestock	Total (Corrected) Other Cows	Total (Corrected) Cattle	Total (Corrected) Sheep
Kilfian East	1.1%	0 (0)	2500 (27)	774 (8)	3451 (37)	811 (9)
Kilfian South	7.5%	0 (0)	1450 (108)	682 (51)	1995 (149)	1198 (90)
Kilfree	18.0%	0 (0)	625 (113)	283 (51)	969 (175)	0 (0)
Kilgarvan	86.2%	0 (0)	2266 (1954)	824 (710)	2844 (2452)	3719 (3207)
Kilglass	9.0%	0 (0)	2780 (251)	471 (43)	3568 (322)	2728 (246)
Kilkelly	>99.9%	0 (0)	2322 (2322)	1176 (1176)	3387 (3387)	762 (762)
Killala	25.0%	537 (134)	3631 (909)	1374 (344)	4989 (1249)	1812 (454)
Killavally	0.2%	0 (0)	2150 (4)	560 (1)	2318 (5)	5124 (10)
Killedan	>99.9%	0 (0)	1429 (1429)	747 (747)	2158 (2158)	495 (495)
Kilmacteige	>99.9%	0 (0)	926 (926)	362 (362)	930 (930)	3295 (3295)
Kilmovee	0.2%	0 (0)	1366 (3)	601 (1)	2003 (5)	389 (1)
Kiltamagh	>99.9%	0 (0)	981 (981)	143 (143)	883 (883)	0 (0)
Knock North	>99.9%	0 (0)	2008 (2008)	661 (661)	2302 (2302)	1073 (1073)
Knock South	80.8%	0 (0)	1517 (1226)	465 (376)	2099 (1697)	811 (656)
Leitrim	13.0%	0 (0)	1810 (236)	666 (87)	2351 (306)	2540 (331)
Letterbrick	52.9%	0 (0)	858 (454)	208 (110)	479 (253)	5338 (2823)
Loughanboy	27.9%	0 (0)	1905 (532)	603 (169)	2668 (746)	1061 (296)
Loughil	78.3%	0 (0)	1530 (1197)	209 (164)	737 (577)	10066 (7877)
Manulla	>99.9%	0 (0)	2187 (2187)	820 (820)	3035 (3035)	1325 (1325)
Mayo	84.9%	234 (199)	2334 (1981)	612 (520)	3124 (2652)	1574 (1336)
Meelick	>99.9%	0 (0)	1895 (1895)	753 (753)	2596 (2596)	1201 (1201)
Mount Falcon	>99.9%	409 (409)	2117 (2117)	611 (611)	2900 (2900)	954 (954)

Electoral Division	Percentage Overlap Contributing Catchment of	Total (Corrected) Dairy Cows	Total (Corrected) Livestock	Total (Corrected) Other Cows	Total (Corrected) Cattle	Total (Corrected) Sheep
Mullagheruse	0.2%	0 (0)	1683 (4)	280 (1)	1211 (3)	8563 (21)
Murneen	93.5%	0 (0)	1711 (1600)	632 (591)	2301 (2151)	1623 (1518)
Newbrook	16.0%	425 (68)	3907 (623)	951 (152)	4700 (750)	6704 (1070)
Pontoon	>99.9%	0 (0)	993 (993)	343 (343)	1033 (1033)	3121 (3121)
Rathmacurkey	0.2%	0 (0)	1784 (3)	646 (1)	2457 (4)	1403 (3)
Rathoma	26.4%	371 (98)	1628 (430)	455 (120)	2123 (560)	1674 (442)
Roslee	62.2%	0 (0)	2342 (1456)	523 (325)	2762 (1717)	3607 (2243)
Sallymount	>99.9%	0 (0)	1679 (1679)	608 (608)	2135 (2135)	2444 (2444)
Sheskin	<0.1%	0 (0)	1274 (0)	157 (0)	646 (0)	8044 (3)
Sonnagh	96.5%	0 (0)	1636 (1579)	696 (672)	2395 (2312)	242 (234)
Sraheen	>99.9%	0 (0)	369 (369)	208 (208)	534 (534)	0 (0)
Srahmore	<0.1%	0 (0)	1391 (0)	192 (0)	409 (0)	11240 (0)
Strade	>99.9%	0 (0)	2200 (2200)	939 (939)	2915 (2915)	2415 (2415)
Streamstown	21.3%	0 (0)	1609 (343)	654 (139)	2083 (443)	2111 (449)
Swineford	>99.9%	0 (0)	1941 (1941)	927 (927)	2838 (2838)	617 (617)
Tagheen	1.3%	0 (0)	1370 (17)	338 (4)	1735 (22)	1722 (22)
Tobercurry	98.9%	328 (324)	2588 (2559)	802 (793)	3140 (3105)	3891 (3848)
Toocananagh	>99.9%	0 (0)	798 (798)	264 (264)	915 (915)	0 (0)
Toomore	>99.9%	0 (0)	1897 (1897)	703 (703)	2549 (2549)	856 (856)
Tumgesh	>99.9%	0 (0)	1044 (1044)	480 (480)	1514 (1514)	295 (295)
Turlough	>99.9%	0 (0)	1671 (1671)	642 (642)	2108 (2108)	2487 (2487)
Urlaur	33.7%	0 (0)	1285 (433)	571 (192)	1865 (629)	684 (231)

APPENDIX 5 – WFD RISK STATUS AND AGRICULTURE PRESSURES OF RIVER WATERBODIES WITHIN THE CONTRIBUTING CATCHMENT

Sub-basin ID	River Sub-basin (EPA Code)	WFD Risk (3rd Cycle)	Agriculture (Yes/No)	Pressure	Inflow Point
1	BAR DEELA_010 (IE_WE_34B020200)	Not at risk	N/A		N/A
2	DEEL (CROSSMOLINA)_010 (IE_WE_34D010006)	Not at risk	N/A		N/A
3	DEEL (CROSSMOLINA)_020 (IE_WE_34D010010)	Not at risk	N/A		N/A
4	DEEL (CROSSMOLINA)_030 (IE_WE_34D010025)	Not at risk	N/A		N/A
5	DEEL (CROSSMOLINA)_040 (IE_WE_34D010120)	Not at risk	N/A		N/A
6	CASTLEBAR_010 (IE_WE_34C010180)	At risk	No		N/A
7	ADDERGOOLE_010 (IE_WE_34A010600)	Not at risk	N/A		N/A
8	ATTIAPPLETON_010 (IE_WE_34A120980)	At risk	No		N/A
9	ABBEYTOWN_010 (IE_WE_34A350930)	Review	N/A		5
10	BELLANAMEAN_010 (IE_WE_34B040500)	At risk	No		N/A
11	BELLAWADDY_010 (IE_WE_34B050150)	Not at risk	N/A		N/A
12	BELLAWADDY_020 (IE_WE_34B050300)	Not at risk	N/A		N/A
13	BRUSNA (NORTH MAYO)_010 (IE_WE_34B070200)	Not at risk	N/A		N/A
14	BRUSNA (NORTH MAYO)_020 (IE_WE_34B070600)	Not at risk	N/A		N/A
15	BEHY (NORTH MAYO)_010 (IE_WE_34B080400)	Review	N/A		5
16	BLACK (SLIGO)_010 (IE_WE_34B120180)	Not at risk	N/A		N/A
17	BALLAGHAMUCK_010 (IE_WE_34B180860)	Review	N/A		5
18	BALLYMANAGH_010 (IE_WE_34B400840)	Review	N/A		5
19	CASTLEBAR_020 (IE_WE_34C010300)	At risk	No		N/A
20	CASTLEBAR_030 (IE_WE_34C010400)	At risk	No		N/A
21	CASTLEBAR_040 (IE_WE_34C010500)	Not at risk	N/A		N/A

Sub-basin ID	River Sub-basin (EPA Code)	WFD Risk (3rd Cycle)	Agriculture (Yes/No)	Pressure	Inflow Point
22	CASTLEHILL_010 (IE_WE_34C020460)	Review	N/A		5
23	CLYDAGH (CASTLEBAR)_010 (IE_WE_34C050100)	Not at risk	N/A		N/A
24	CLYDAGH (CASTLEBAR)_020 (IE_WE_34C050200)	At risk	No		N/A
25	CORROY_010 (IE_WE_34C060200)	At risk	Yes		5
26	CARROWKERIBLY LOUGH STREAM_010 (IE_WE_34C070600)	At risk	Yes		5
27	CALLOW LOUGHS STREAM_010 (IE_WE_34C080300)	Not at risk	N/A		N/A
28	CARROWARD_010 (IE_WE_34C090700)	At risk	Yes		5
29	CLOONLAVIS_010 (IE_WE_34C100300)	At risk	No		N/A
30	CRUMLIN (LOUGH CULLIN)_010 (IE_WE_34C110300)	Not at risk	N/A		N/A
31	CORSALLAGH STREAM_010 (IE_WE_34C120400)	Not at risk	N/A		N/A
32	CHARLESTOWN STREAM_010 (IE_WE_34C280100)	At risk	Yes		5
33	CREEVY_010 (IE_WE_34C700920)	Review	N/A		5
34	DEEL (CROSSMOLINA)_050 (IE_WE_34D010300)	At risk	No		N/A
35	DEEL (CROSSMOLINA)_060 (IE_WE_34D010400)	Not at risk	N/A		N/A
36	DOOYEAGHNY_or_CLOONLOUGHAN_010 (IE_WE_34D310990)	Review	N/A		4, 5
37	DRUMBAUN_010 (IE_WE_34D360920)	Not at risk	N/A		N/A
38	EIGNAGH_010 (IE_WE_34E010100)	Not at risk	N/A		N/A
39	EIGNAGH_020 (IE_WE_34E010200)	At risk	No		N/A
40	EIGNAGH_030 (IE_WE_34E010300)	At risk	No		N/A
41	GLENREE_010 (IE_WE_34G010020)	Not at risk	N/A		N/A
42	GLENREE_020 (IE_WE_34G010060)	At risk	No		N/A
43	GLENREE_030 (IE_WE_34G010200)	Not at risk	N/A		N/A
44	GLORE (MAYO)_010 (IE_WE_34G020010)	At risk	Yes		5

Sub-basin ID	River Sub-basin (EPA Code)	WFD Risk (3rd Cycle)	Agriculture (Yes/No)	Pressure	Inflow Point
45	GLORE (MAYO)_020 (IE_WE_34G020200)	At risk	Yes		5
46	GWEESTION_010 (IE_WE_34G030100)	Not at risk	N/A		N/A
47	GWEESTION_020 (IE_WE_34G030200)	Not at risk	N/A		N/A
48	LITTLE (STRADE)_010 (IE_WE_34L020500)	Not at risk	N/A		N/A
49	LOUGHNAMINOO STREAM_010 (IE_WE_34L040200)	At risk	No		N/A
50	LOUGH MUCK STREAM_010 (IE_WE_34L050600)	Review	N/A		5
51	LENYVEE_010 (IE_WE_34L060300)	Not at risk	N/A		N/A
52	LOUGHANABOLL_010 (IE_WE_34L070100)	Not at risk	N/A		N/A
53	MANULLA_010 (IE_WE_34M010100)	At risk	Yes		5
54	MANULLA_020 (IE_WE_34M010225)	Review	N/A		5
55	MANULLA_030 (IE_WE_34M010300)	At risk	No		N/A
56	MANULLA_040 (IE_WE_34M010500)	Not at risk	N/A		N/A
57	MOY_010 (IE_WE_34M020010)	At risk	Yes		5
58	MOY_020 (IE_WE_34M020050)	Not at risk	N/A		N/A
59	MOY_030 (IE_WE_34M020100)	Not at risk	N/A		N/A
60	MOY_040 (IE_WE_34M020300)	At risk	No		N/A
61	MOY_050 (IE_WE_34M020400)	Not at risk	N/A		N/A
62	MOY_060 (IE_WE_34M020470)	Not at risk	N/A		N/A
63	MOY_070 (IE_WE_34M020500)	Not at risk	N/A		N/A
64	MOY_080 (IE_WE_34M020650)	Not at risk	N/A		N/A
65	MOY_090 (IE_WE_34M020750)	Not at risk	N/A		N/A
66	MOY_100 (IE_WE_34M020800)	At risk	Yes		5
67	MOY_110 (IE_WE_34M020850)	Not at risk	N/A		N/A

Sub-basin ID	River Sub-basin (EPA Code)	WFD Risk (3rd Cycle)	Agriculture (Yes/No)	Pressure	Inflow Point
68	MOY_120 (IE_WE_34M021100)	At risk	No		N/A
69	MULLAGHANOE_010 (IE_WE_34M030300)	Not at risk	N/A		N/A
70	MAD_010 (IE_WE_34M040100)	At risk	Yes		5
71	MEANDER_010 (IE_WE_34M050400)	Not at risk	N/A		N/A
72	MOYNE_010 (IE_WE_34M190890)	Review	N/A		7, 8, 9, 10, 11
73	NORTH COOLNAHA_010 (IE_WE_34N190740)	Review	N/A		5
74	OWENAHAR_010 (IE_WE_34O010050)	Not at risk	N/A		N/A
75	OWENAHAR_020 (IE_WE_34O010100)	Not at risk	N/A		N/A
76	OWENGARVE (SLIGO)_010 (IE_WE_34O030050)	At risk	No		N/A
77	OWENGARVE (SLIGO)_020 (IE_WE_34O030100)	At risk	No		N/A
78	OWENGARVE (SLIGO)_030 (IE_WE_34O030200)	Not at risk	N/A		N/A
79	OWENLOBNAGLAUR_010 (IE_WE_34O040200)	Not at risk	N/A		N/A
80	OUGHTAGH_010 (IE_WE_34O050400)	Not at risk	N/A		N/A
81	POLLAGH_010 (IE_WE_34P010100)	At risk	No		N/A
82	POLLAGH_020 (IE_WE_34P010200)	At risk	No		N/A
83	POLLAGH_030 (IE_WE_34P010260)	Not at risk	N/A		N/A
84	POLLAGH_040 (IE_WE_34P010300)	Review	N/A		5
85	RATHROEEN STREAM_010 (IE_WE_34R010200)	Review	N/A		5, 6
86	SHANVOLAHAN_010 (IE_WE_34S010400)	At risk	Yes		5
87	SONNAGH (MOY)_010 (IE_WE_34S020100)	At risk	Yes		5
88	SPADDAGH_010 (IE_WE_34S030200)	Not at risk	N/A		N/A
89	STRADE_010 (IE_WE_34S040800)	Not at risk	N/A		N/A
90	SWINFORD_010 (IE_WE_34S050300)	At risk	No		N/A

Sub-basin ID	River Sub-basin (EPA Code)	WFD Risk (3rd Cycle)	Agriculture (Yes/No)	Pressure	Inflow Point
91	SLIEVECLAUR_010 (IE_WE_34S060400)	Review	N/A		5
92	Scurmore_010 (IE_WE_34S610980)	Review	N/A		2, 3
93	TRIMOGGE_010 (IE_WE_34T010200)	At risk	No		N/A
94	TRIMOGGE_020 (IE_WE_34T010300)	Not at risk	N/A		N/A
95	TRIMOGGE_030 (IE_WE_34T010500)	At risk	No		N/A
96	TUBBERCURRY_010 (IE_WE_34T020050)	At risk	No		N/A
97	TUBBERCURRY_020 (IE_WE_34T020200)	At risk	Yes		5
98	TUBBERCURRY STREAM_010 (IE_WE_34T030400)	At risk	No		N/A
99	TULLYMORE (Mayo)_010 (IE_WE_34T560640)	Review	N/A		5
100	TULLYEGAN_010 (IE_WE_34T830920)	Review	N/A		5
101	YELLOW (FOXFORD)_010 (IE_WE_34Y010100)	Not at risk	N/A		N/A
102	YELLOW (FOXFORD)_020 (IE_WE_34Y010400)	Not at risk	N/A		N/A
103	YELLOW (KNOCK)_010 (IE_WE_34Y020155)	At risk	No		N/A
104	YELLOW (KNOCK)_020 (IE_WE_34Y020400)	Not at risk	N/A		N/A

APPENDIX 6 – STATISTICS FROM CENSUS OF AGRICULTURE 2020 RELATING TO LAND UTILISATION WITHIN THE ELECTORAL DIVISIONS OVERLAPPING THE CONTRIBUTING CATCHMENT

Electoral Division	Percentage Overlap of Contributing Catchment	Total (Corrected) Number of Holdings	Average Size of Holdings	Total (Corrected) Area Farmed (Hectares)	Total (Corrected) Cereals	Total (Corrected) Grassland
Achonry East	>99.9%	69 (69)	20.7	1425.5 (1425.5)	0.0 (0.0)	1417.2 (1417.2)
Achonry West	>99.9%	92 (92)	18.9	1740.4 (1740.4)	0.0 (0.0)	1736.3 (1736.3)
Aclare	>99.9%	39 (39)	24.3	946.1 (946.1)	0.0 (0.0)	946.1 (946.1)
Addergoole	>99.9%	107 (107)	20.3	2166.8 (2166.8)	0.0 (0.0)	2155.1 (2155.1)
Aghagower North	2.6%	80 (2)	16.9	1354.0 (35.4)	0.0 (0.0)	1348.6 (35.3)
Aghamore	79.1%	97 (77)	23.0	2231.9 (1765.2)	0.0 (0.0)	2191.3 (1733.1)
Ardagh	>99.9%	56 (56)	24.3	1360.8 (1360.8)	0.0 (0.0)	1356.2 (1356.2)
Ardnaree North	96.6%	59 (57)	20.7	1224.1 (1182.1)	0.0 (0.0)	1221.2 (1179.3)
Ardnaree South Rural	99.4%	70 (70)	16.6	1158.8 (1152.4)	0.0 (0.0)	1155.1 (1148.7)
Ardnaree South Urban	95.6%	0 (0)	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Artagh South	1.5%	65 (1)	18.8	1225.1 (18.2)	0.0 (0.0)	1199.9 (17.9)
Attymass East	>99.9%	50 (50)	15.3	766.0 (766.0)	0.0 (0.0)	766.0 (766.0)
Attymass West	>99.9%	44 (44)	17.3	760.8 (760.8)	0.0 (0.0)	753.1 (753.1)
Balla	>99.9%	130 (130)	23.5	3057.5 (3057.5)	0.0 (0.0)	2974.5 (2974.5)
Ballaghaderreen	30.7%	128 (39)	20.5	2618.5 (803.8)	0.0 (0.0)	2603.8 (799.2)
Ballina Rural	99.3%	117 (116)	22.8	2668.0 (2649.2)	0.0 (0.0)	2645.9 (2627.2)
Ballina Urban	>99.9%	0 (0)	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Ballinafad	97.5%	84 (82)	21.5	1805.9 (1760.7)	0.0 (0.0)	1769.4 (1725.1)
Ballinamore	>99.9%	55 (55)	20.0	1099.0 (1099.0)	0.0 (0.0)	1089.8 (1089.8)

Electoral Division	Percentage Overlap Contributing Catchment	of Total (Corrected) Number Holdings	of Average Size of Holdings	Total (Corrected) Area Farmed (Hectares)	Total (Corrected) Cereals	Total (Corrected) Grassland
Ballyhaunis	5.8%	90 (5)	19.0	1706.1 (98.4)	0.0 (0.0)	1695.3 (97.8)
Ballyhowly	58.4%	68 (40)	24.5	1668.0 (974.6)	0.0 (0.0)	1652.1 (965.3)
Ballynagoraher	60.2%	82 (49)	32.3	2647.1 (1594.7)	0.0 (0.0)	2635.5 (1587.7)
Ballysakeery	88.9%	76 (68)	25.3	1925.4 (1711.7)	0.0 (0.0)	1900.7 (1689.7)
Banada	>99.9%	97 (97)	21.3	2068.6 (2068.6)	0.0 (0.0)	2063.9 (2063.9)
Bekan	43.4%	105 (46)	20.5	2154.0 (934.1)	0.0 (0.0)	2113.8 (916.7)
Bellavary	>99.9%	126 (126)	16.9	2133.3 (2133.3)	0.0 (0.0)	2121.0 (2121.0)
Bohola	>99.9%	50 (50)	19.1	952.8 (952.8)	0.0 (0.0)	951.5 (951.5)
Brackloon	>99.9%	95 (95)	21.0	1997.7 (1997.7)	0.0 (0.0)	1991.0 (1991.0)
Branchfield	23.2%	47 (11)	33.4	1568.1 (363.6)	0.0 (0.0)	1568.1 (363.6)
Breaghwy	79.2%	94 (74)	19.4	1819.0 (1441.2)	0.0 (0.0)	1815.7 (1438.6)
Breencorragh	92.0%	45 (41)	37.8	1699.2 (1562.7)	0.0 (0.0)	1690.2 (1554.4)
Bunaveela	70.4%	32 (23)	55.9	1788.2 (1259.3)	0.0 (0.0)	1784.6 (1256.8)
Burren	89.4%	62 (55)	23.7	1467.2 (1311.3)	0.0 (0.0)	1467.2 (1311.3)
Burriscarra	5.6%	69 (4)	20.8	1438.2 (80.9)	0.0 (0.0)	1430.5 (80.5)
Callow	>99.9%	71 (71)	23.5	1670.4 (1670.4)	0.0 (0.0)	1670.4 (1670.4)
Carrowmore	>99.9%	84 (84)	20.4	1716.4 (1716.4)	0.0 (0.0)	1700.7 (1700.7)
Cartron	15.1%	49 (7)	36.1	1767.0 (267.0)	0.0 (0.0)	1759.5 (265.9)
Castlebar Rural	92.8%	112 (104)	15.9	1786.0 (1657.4)	0.0 (0.0)	1782.5 (1654.1)
Castlebar Urban	>99.9%	0 (0)	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Castleconor East	66.0%	61 (40)	26.2	1598.7 (1054.4)	0.0 (0.0)	1585.1 (1045.4)
Castleconor West	99.3%	103 (102)	27.6	2845.2 (2826.5)	0.0 (0.0)	2809.6 (2791.1)

Electoral Division	Percentage Overlap Contributing Catchment	of Total (Corrected) Number Holdings	of Average Size of Holdings	Total (Corrected) Area Farmed (Hectares)	Total (Corrected) Cereals	Total (Corrected) Grassland
Claremorris	3.8%	50 (2)	20.7	1032.5 (39.1)	0.0 (0.0)	1000.5 (37.9)
Clogher	8.6%	68 (6)	21.2	1442.1 (123.4)	0.0 (0.0)	1436.6 (123.0)
Clogher	19.5%	80 (16)	20.3	1622.9 (316.7)	0.0 (0.0)	1616.4 (315.4)
Cloghermore	51.2%	39 (20)	27.6	1076.5 (550.7)	0.0 (0.0)	1069.9 (547.3)
Cloonkeen	42.9%	83 (36)	19.8	1646.2 (705.5)	0.0 (0.0)	1645.0 (705.0)
Cloonmore	90.7%	63 (57)	19.3	1218.4 (1104.5)	0.0 (0.0)	1215.0 (1101.4)
Coolnaha	55.8%	76 (42)	20.3	1535.4 (856.6)	0.0 (0.0)	1524.4 (850.5)
Croaghmoyle	2.5%	41 (1)	30.2	1238.0 (30.6)	0.0 (0.0)	1238.0 (30.6)
Crossmolina North	82.0%	70 (57)	23.0	1610.1 (1319.7)	0.0 (0.0)	1595.4 (1307.7)
Crossmolina South	>99.9%	88 (88)	23.3	2049.9 (2049.9)	0.0 (0.0)	2020.6 (2020.6)
Cuildoo	>99.9%	64 (64)	21.3	1365.4 (1365.4)	0.0 (0.0)	1359.2 (1359.2)
Cuilmore	1.0%	71 (1)	23.3	1657.0 (16.5)	0.0 (0.0)	1651.5 (16.5)
Deel	99.5%	103 (102)	26.7	2746.8 (2732.4)	0.0 (0.0)	2723.3 (2709.0)
Derry	86.7%	63 (55)	48.9	3080.8 (2670.2)	0.0 (0.0)	3080.7 (2670.2)
Doocastle	58.0%	72 (42)	20.4	1467.0 (850.6)	0.0 (0.0)	1459.5 (846.2)
Edmondstown	36.7%	61 (22)	27.0	1645.8 (604.3)	0.0 (0.0)	1618.1 (594.1)
Fortland	91.7%	77 (71)	27.9	2144.6 (1967.0)	0.0 (0.0)	2137.8 (1960.7)
Glendarragh	97.8%	40 (39)	37.3	1490.7 (1457.9)	0.0 (0.0)	1490.7 (1457.9)
Glenhest	<0.1%	60 (0)	33.4	2007.0 (1.0)	0.0 (0.0)	2003.8 (1.0)
Islandeady	74.7%	119 (89)	24.1	2872.3 (2145.7)	0.0 (0.0)	2862.8 (2138.6)
Kilbeagh	84.2%	106 (89)	20.6	2185.6 (1840.6)	0.0 (0.0)	2183.2 (1838.6)
Kilcolman	77.3%	66 (51)	23.5	1553.2 (1200.0)	0.0 (0.0)	1540.5 (1190.2)

Electoral Division	Percentage Overlap Contributing Catchment	of Total (Corrected) Number Holdings	of Average Size of Holdings	Total (Corrected) Area Farmed (Hectares)	Total (Corrected) Cereals	Total (Corrected) Grassland
Kilfian East	1.1%	61 (1)	33.1	2016.3 (21.7)	0.0 (0.0)	1994.3 (21.5)
Kilfian South	7.5%	61 (5)	37.8	2306.3 (172.4)	0.0 (0.0)	2292.5 (171.3)
Kilfree	18.0%	46 (8)	24.9	1145.2 (206.6)	0.0 (0.0)	1139.8 (205.6)
Kilgarvan	86.2%	131 (113)	19.4	2538.2 (2188.5)	0.0 (0.0)	2534.6 (2185.4)
Kilglass	9.0%	73 (7)	27.3	1992.7 (180.0)	0.0 (0.0)	1921.0 (173.5)
Kilkelly	>99.9%	135 (135)	20.2	2726.1 (2726.1)	0.0 (0.0)	2712.6 (2712.6)
Killala	25.0%	129 (32)	25.4	3276.7 (820.5)	0.0 (0.0)	3253.2 (814.6)
Killavally	0.2%	59 (0)	30.3	1787.8 (3.6)	0.0 (0.0)	1786.1 (3.6)
Killedan	>99.9%	82 (82)	19.8	1620.9 (1620.9)	0.0 (0.0)	1619.9 (1619.9)
Kilmacteige	>99.9%	53 (53)	23.1	1223.7 (1223.7)	0.0 (0.0)	1223.7 (1223.7)
Kilmovee	0.2%	92 (0)	22.3	2055.6 (4.7)	0.0 (0.0)	2043.9 (4.7)
Kiltamagh	>99.9%	38 (38)	14.4	545.6 (545.6)	0.0 (0.0)	525.3 (525.3)
Knock North	>99.9%	78 (78)	22.0	1716.9 (1716.9)	0.0 (0.0)	1704.6 (1704.6)
Knock South	80.8%	79 (64)	21.7	1712.7 (1384.4)	0.0 (0.0)	1707.3 (1380.1)
Leitrim	13.0%	80 (10)	25.6	2048.5 (267.0)	0.0 (0.0)	2036.1 (265.4)
Letterbrick	52.9%	43 (23)	39.7	1705.2 (901.7)	0.0 (0.0)	1703.9 (901.0)
Loughanboy	27.9%	78 (22)	21.1	1648.0 (460.5)	0.0 (0.0)	1639.0 (458.0)
Loughil	78.3%	62 (49)	53.7	3327.9 (2604.1)	0.0 (0.0)	3307.2 (2587.9)
Manulla	>99.9%	103 (103)	20.4	2105.5 (2105.5)	0.0 (0.0)	2093.0 (2093.0)
Mayo	84.9%	70 (59)	26.6	1858.6 (1577.9)	0.0 (0.0)	1828.9 (1552.7)
Meelick	>99.9%	95 (95)	20.0	1903.2 (1903.2)	0.0 (0.0)	1903.2 (1903.2)
Mount Falcon	>99.9%	120 (120)	13.8	1654.4 (1654.4)	0.0 (0.0)	1642.5 (1642.5)

Electoral Division	Percentage Overlap Contributing Catchment	of Total (Corrected) Number Holdings	of Average Size of Holdings	Total (Corrected) Area Farmed (Hectares)	Total (Corrected) Cereals	Total (Corrected) Grassland
Mullagheruse	0.2%	54 (0)	70.6	3812.4 (9.3)	0.0 (0.0)	3810.5 (9.3)
Murneen	93.5%	74 (69)	22.6	1676.0 (1567.1)	0.0 (0.0)	1655.5 (1547.9)
Newbrook	16.0%	88 (14)	28.7	2526.6 (403.1)	0.0 (0.0)	2486.7 (396.7)
Pontoon	>99.9%	71 (71)	21.0	1491.8 (1491.8)	0.0 (0.0)	1491.8 (1491.8)
Rathmacurkey	0.2%	109 (0)	17.7	1933.1 (3.5)	0.0 (0.0)	1924.5 (3.4)
Rathoma	26.4%	53 (14)	24.7	1308.3 (345.4)	0.0 (0.0)	1291.7 (341.0)
Roslee	62.2%	53 (33)	30.6	1624.2 (1009.9)	0.0 (0.0)	1613.8 (1003.4)
Sallymount	>99.9%	80 (80)	19.0	1522.1 (1522.1)	0.0 (0.0)	1522.1 (1522.1)
Sheskin	<0.1%	54 (0)	68.6	3704.0 (1.4)	0.0 (0.0)	3702.6 (1.4)
Sonnagh	96.5%	117 (113)	19.1	2235.4 (2157.9)	0.0 (0.0)	2227.8 (2150.6)
Sraheen	>99.9%	50 (50)	10.9	546.9 (546.9)	0.0 (0.0)	546.8 (546.8)
Srahmore	<0.1%	54 (0)	43.6	2356.3 (0.1)	0.0 (0.0)	2355.0 (0.1)
Strade	>99.9%	95 (95)	22.7	2156.1 (2156.1)	0.0 (0.0)	2143.7 (2143.7)
Streamstown	21.3%	52 (11)	32.1	1667.0 (354.9)	0.0 (0.0)	1663.5 (354.2)
Swineford	>99.9%	144 (144)	15.7	2254.6 (2254.6)	0.0 (0.0)	2247.3 (2247.3)
Tagheen	1.3%	34 (0)	26.0	882.5 (11.2)	0.0 (0.0)	866.2 (11.0)
Tobercurry	98.9%	101 (100)	23.6	2383.6 (2357.0)	0.0 (0.0)	2372.2 (2345.7)
Toocananagh	>99.9%	41 (41)	21.3	874.6 (874.6)	0.0 (0.0)	874.6 (874.6)
Toomore	>99.9%	101 (101)	19.6	1982.8 (1982.8)	0.0 (0.0)	1955.0 (1955.0)
Tumgesh	>99.9%	76 (76)	20.6	1569.3 (1569.3)	0.0 (0.0)	1565.6 (1565.6)
Turlough	>99.9%	114 (114)	18.8	2142.8 (2142.8)	0.0 (0.0)	2135.7 (2135.7)
Urlaur	33.7%	91 (31)	19.6	1786.7 (602.2)	0.0 (0.0)	1775.1 (598.3)

APPENDIX 7 – EIA APPLICATIONS SINCE 2017

Portal Ref	Competent Authority	Competent Authority Ref	Applicant	Location	Description	Type
2021092	Minister for Public Expenditure and Reform	DPE063-014-2018	Commissioners of Public Works	Crossmolina Co Mayo	The proposed flood scheme for the River Deel is a diversion channel upstream of Crossmolina with a capacity of 110 m ³ /s, which will redirect flood waters away from the town, directly to the flood plains of Lough Conn.	Infrastructure
2025186	An Bord Pleanála	ACP-323778-25	Constant Energy Ltd	Near Killala Co. Mayo, in the townlands of Aghaleague, Ballymurphy, Ballynaleck, Barnhill Lower, Barnhill Upper, Barroe, Billoos, Carn, Carrickanass, Carrowmore, Castlelackan Demesne, Castletown, Cloonanass, and others	16 wind turbines; a rotor diameter of 117 m, a hub height of 76.5 m and a tip height of 135 m. Battery arrays. Meteorological mast. 110 kV Electrical Substation. Underground Cabling. All associated works.	Energy
2023119 /202306 1	Mayo County Council	2360266/2360 117	Constant Energy Ltd.	Tawnaghmore Lower and Meelick, Killala Business Park, Killala, County Mayo.	The Proposed Development will consist of a Hydrogen Plant and an Energy Centre.	Energy
2017057	An Bord Pleanála	PL16.246323	Eugene Lannon	Greenwood, Bekan, Co. Mayo.	Construct new poultry house for 38,000 places, new silo and site works.	Agriculture
2025242	Minister for Agriculture,	N/A	Flip and Matian Scram	Lismiraun, Carrowmore Co. Mayo	Planting of a 62.04 ha Native woodland	Conservation

Portal Ref	Competent Authority	Competent Authority Ref	Applicant	Location	Description	Type
	Food and the Marine					
2025060	An Bord Pleanála	ABP-322329-25	Mayo County Council	In the vicinity of the River Moy and the following tributaries: Quignamanger Stream, Bunree (Behy Road) Stream, Brusna River and the Tullyegan Stream in Ballina, County Mayo.	Flood relief works generally comprising flood walls, embankments, regrading of banks, culverts, underground surface water pumping stations and all associated works.	Infrastructure
2024191	Mayo County Council	2460708	Mayo Data Hub Limited	Mullafarry and Tawnaghmore Upper, Killala, Co. Mayo	Construction of a data centre including ancillary office space, backup / dispatchable generators, access, parking, sprinkler tank and pump house, entrance hut and security and all associated works	Commercial/ Manufacturing
2023113	An Bord Pleanála	ABP-307264	Mercury Renewables (Carrowleagh) Limited	The proposed wind farm site is located 4 km north-east of Bunnyconnellan, Co. Mayo in the townland of Carrowleagh and the proposed hydrogen plant is located 2.9 km south-west of Corballa, Co. Sligo in the townland of Carraun.	Construction of a 13-turbine wind farm and 80 MW hydrogen plant along with the associated related works including a 110 kV grid connection, interconnector and upgrade works on the local roads.	Energy
2024069	Mayo County Council	No record	Paul Hanley	Ballyholan Td., Ballina, Co. Mayo.	Planning Permission for the following: (1) filling of land with inert soil & stones	Land Infilling

Portal Ref	Competent Authority	Competent Authority Ref	Applicant	Location	Description	Type
					on an approximate area of 12,000 m ² , with an average depth of 1.2 m, (2) level and reseed the site on completion of the fill and, (3) carry out all ancillary site works.	
2020016	Mayo County Council	19174	Western Brand Group	Greenwood, Ballyhaunis, County Mayo	"Demolition of 2no. existing broiler chicken houses with a population of 24,000 birds and the construction of 1no. replacement broiler chicken house with a population of 40,000 birds, together with all ancillary site works and services including silos"	Agriculture
2021092	Minister for Public Expenditure and Reform	DPE063-014-2018	Commissioners of Public Works	Crossmolina Co Mayo	The proposed flood scheme for the River Deel is a diversion channel upstream of Crossmolina with a capacity of 110 m ³ /s, which will redirect flood waters away from the town, directly to the flood plains of Lough Conn.	Infrastructure

APPENDIX 8 – SHORELINE SURVEY PHOTOGRAPHS

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No Photograph Taken

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No Photograph Taken

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50a



50b



51a



51b



52a



52b



53a



53b



54a



54b



55a



55b



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APPENDIX 9 – COMPARATIVE COORDINATES FOR SURVEY LOCATIONS

MAPPED_ ID*	LATITUDE (WGS 84) (DECIMAL)	LONGITUDE (WGS 84) (DECIMAL)	LATITUDE (WGS 84) (DMS)	LONGITUDE (WGS 84) (DMS)
1	54.21999	-9.09578	54°13'11.96"N	9°05'44.81"W
2	54.21932	-9.09590	54°13'09.55"N	9°05'45.24"W
3_B	54.21912	-9.09581	54°13'08.83"N	9°05'44.92"W
4	54.21833	-9.09565	54°13'05.99"N	9°05'44.34"W
5_B	54.21812	-9.09535	54°13'05.23"N	9°05'43.26"W
6	54.21603	-9.09497	54°12'57.71"N	9°05'41.89"W
7_B	54.21150	-9.09920	54°12'41.39"N	9°05'57.11"W
8	54.21132	-9.09882	54°12'40.77"N	9°05'55.76"W
9_B	54.20300	-9.10459	54°12'10.80"N	9°06'16.52"W
10_B	54.19856	-9.11488	54°11'54.82"N	9°06'53.57"W
11	54.19849	-9.11754	54°11'54.56"N	9°07'03.14"W
12	54.19697	-9.12416	54°11'49.09"N	9°07'26.98"W
13	54.18853	-9.12555	54°11'18.71"N	9°07'31.98"W
14_B	54.18283	-9.12533	54°10'58.19"N	9°07'31.19"W
15	54.18027	-9.13019	54°10'48.97"N	9°07'48.68"W
16_B	54.18149	-9.13646	54°10'53.37"N	9°08'11.26"W
17	54.17345	-9.13366	54°10'24.42"N	9°08'01.18"W
18	54.17174	-9.13183	54°10'18.26"N	9°07'54.59"W
19	54.17173	-9.13364	54°10'18.23"N	9°08'01.10"W
20	54.17189	-9.13806	54°10'18.80"N	9°08'17.02"W
21	54.17325	-9.14358	54°10'23.70"N	9°08'36.89"W
22	54.17381	-9.14552	54°10'25.72"N	9°08'43.87"W
23	54.17509	-9.14588	54°10'30.32"N	9°08'45.17"W
24	54.17738	-9.14605	54°10'38.57"N	9°08'45.78"W
25	54.17750	-9.14609	54°10'39.00"N	9°08'45.92"W
26	54.17983	-9.14466	54°10'47.39"N	9°08'40.78"W
27_B	54.18715	-9.15602	54°11'13.74"N	9°09'21.67"W
28	54.18877	-9.16123	54°11'19.57"N	9°09'40.43"W
29_B	54.19096	-9.16553	54°11'27.46"N	9°09'55.91"W
30	54.19770	-9.15885	54°11'51.72"N	9°09'31.86"W
31	54.20250	-9.17471	54°12'09.00"N	9°10'28.96"W
32_B	54.20301	-9.17516	54°12'10.84"N	9°10'30.58"W
33	54.21004	-9.18394	54°12'36.14"N	9°11'02.18"W
34_B	54.20757	-9.19381	54°12'27.25"N	9°11'37.72"W
35	54.20998	-9.20753	54°12'35.93"N	9°12'27.11"W
36_B	54.20928	-9.20878	54°12'33.41"N	9°12'31.61"W

MAPPED_ID*	LATITUDE (WGS 84) (DECIMAL)	LONGITUDE (WGS 84) (DECIMAL)	LATITUDE (WGS 84) (DMS)	LONGITUDE (WGS 84) (DMS)
37_B	54.21216	-9.21646	54°12'43.78"N	9°12'59.26"W
38_B	54.21220	-9.21710	54°13'08.31"N	9°12'57.66"W
39	54.21239	-9.21870	54°12'44.60"N	9°13'07.32"W
40	54.21330	-9.21885	54°12'47.88"N	9°13'07.86"W
41	54.21554	-9.21702	54°12'55.94"N	9°13'01.27"W
42	54.21625	-9.21702	54°12'58.50"N	9°13'01.27"W
43	54.21625	-9.21623	54°12'58.50"N	9°12'58.43"W
44	54.21678	-9.22446	54°13'00.41"N	9°13'28.06"W
45	54.21728	-9.22511	54°13'02.21"N	9°13'30.40"W
46	54.21895	-9.22388	54°13'08.22"N	9°13'25.97"W
47	54.21897	-9.22401	54°13'08.29"N	9°13'26.44"W
48	54.22290	-9.21728	54°13'22.44"N	9°13'02.21"W
49	54.22769	-9.21618	54°13'39.68"N	9°12'58.25"W
50	54.22769	-9.21515	54°13'39.68"N	9°12'54.54"W
51_B	54.22978	-9.21053	54°13'47.21"N	9°12'37.91"W
52	54.23063	-9.20999	54°13'50.27"N	9°12'35.96"W
53_B	54.23148	-9.21052	54°13'53.33"N	9°12'37.87"W
54	54.23215	-9.20704	54°13'55.74"N	9°12'25.34"W
55_B	54.23349	-9.20575	54°14'00.56"N	9°12'20.70"W
56	54.22403	-9.20643	54°13'26.51"N	9°12'23.15"W
57	54.23716	-9.19208	54°14'13.78"N	9°11'31.49"W
58	54.23768	-9.19300	54°14'15.65"N	9°11'34.80"W
59	54.23917	-9.19242	54°14'21.01"N	9°11'32.71"W

*_B indicates the coordinates where bacteriological samples were taken

APPENDIX 10 – INDUSTRY ENGAGEMENT SUMMARY (PREPARED BY SFPA)

Date of circulation of draft report: 10-July-2026

Stakeholders contacted: BIM, IFA Aquaculture, Producers

Method of engagement: email circulation

Period for responses: 10-July-2026–20-July-2026

Summary of feedback received:

- Confirmation from BIM that no issue is taken with the proposed boundary and RMP location.
- Request from BIM asking that the final report is circulated to a provided list of recipients.

Outcome:

Given the feedback, this report is recommended for publication and finalisation.