Castlebar Lannagh Priority Area for Action – Deskstudy Summary

This is a summary of the desk study for the Castlebar Lannagh Priority Area for Action (PAA), which is located in Co. Mayo. Desk studies are reports that are prepared by the catchment scientists using available information and data. To write these reports, we use information available for all waters that we plan to assess in the PAA. We get our information from:

- The Environmental Protection Agency
- Local Authorities
- Inland Fisheries Ireland
- Irish Water
- The Department of Agriculture, Food, and the Marine
- Other public agencies.

The desk study also includes information learned from the public at a community information meeting specific to the Castlebar Lannagh PAA which was held on the 5th of October 2021.

In our desk studies, we examine a number of things:

- **quality** – how the water quality has changed since 2007
- **importance** – for example, if its water is used for drinking water, and if there are any rare plants or animals in it that we need to protect
- **impacts from human activity** – here we focus on impacts that damage water quality such as from wastewater discharges, agricultural practices, forestry practices, physical changes to the water body etc.

We complete desk studies first before starting our field-based assessments or local catchment assessments (LCAs).

1. Background and Location

LAWPRO catchment scientists work in specific catchment areas called Priority Areas for Action (PAAs). A catchment is an area of land around a river, lake, or other body of water. Rainwater that falls in the catchment eventually flows into rivers, lakes or directly into estuaries or coastal waters bringing with it any contaminants that may be in the landscape. The map below (Figure 1) shows the catchment area for the Castlebar Lannagh PAA, along with the current ecological status of the rivers and the lakes.

The Castlebar Lannagh PAA in located in the vicinity of Castlebar, County Mayo. The PAA covers an area of approximately 178km². It extends from the townland of Kilbree Lower in the west of the PAA to Ballyclogher in the east and from Raheen Barr in the north to Cloonagh in the south (Figure 1). It includes the larger urban areas of Castlebar and Balla along with the villages of Manulla, Belcarra, Mayo Abbey, Breaffy, Turlough and Islandeady.

The land cover is primarily agricultural pasture with significant areas of natural vegetation. There are also areas of peat and forestry. Amenities include Raheens Wood Trail near Castlebar; the Castlebar to Turlough Greenway which runs north-east from Castlebar; the Knockaunakil Loop located to the south of the PAA, and the Croagh Patrick Heritage Trail located centrally in the PAA.

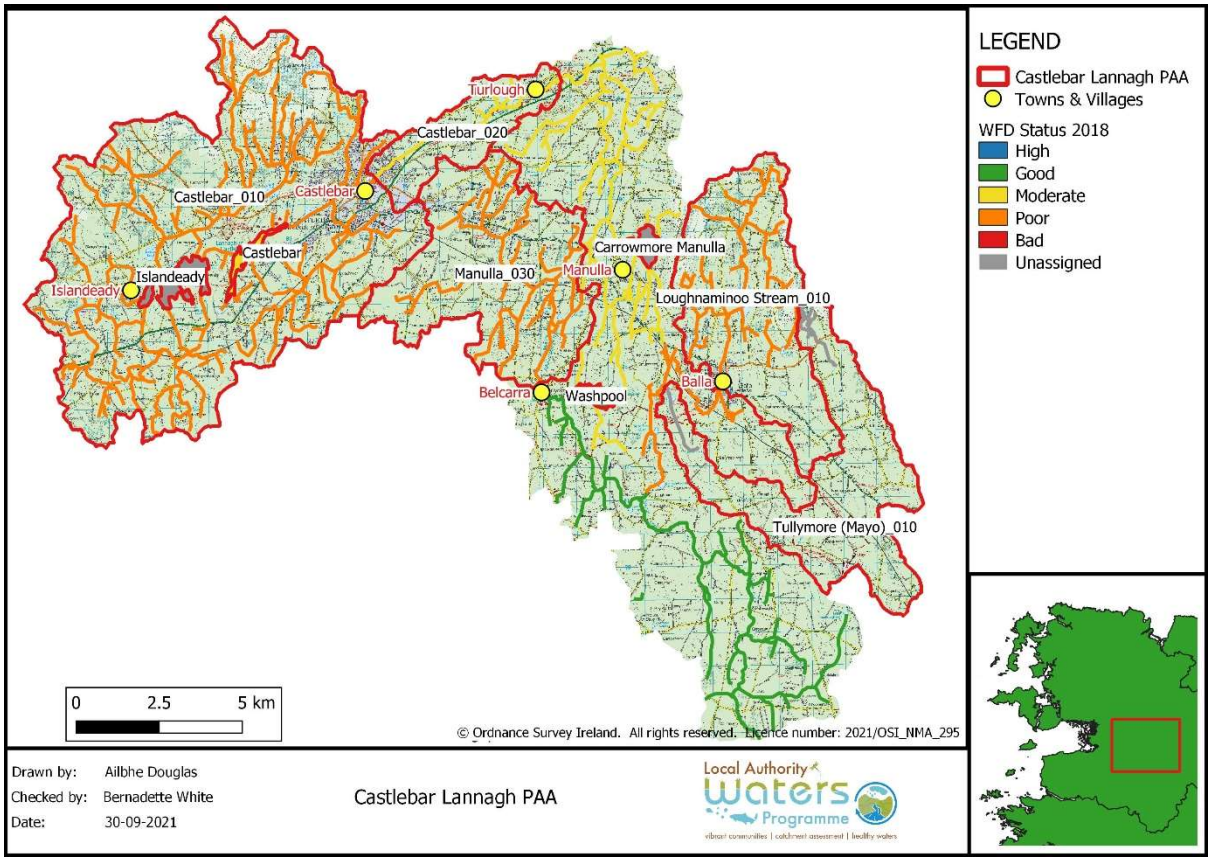


Figure 1: The Castlebar Lannagh PAA

2. Catchment Description

The PAA lies within the Moy & Killala Bay Catchment. It includes the upper sections of the Castlebar River (as far as Turlough), the lower sections of the Manulla river (from Belcarra and Breaghwy, as far as downstream of Lakeland Lough), Lough Naminoo Stream (which flows through Lough Naminoo and as far as Balla) and the upper tributary of the Little (Straide) in the townlands of Carrownahaun and Ballyclogher (north east of Balla). While there are several lakes within this geographical area, the ones included within LAWPROs work programme are Islandeady, Castlebar/Lannagh, Carrowmore (near Manulla) and Walshpool (near Belcarra).

There is a strong linkage between this PAA and the Lough Conn and Lough Cullin PAA given both have rivers which input to Lough Cullin. Lough Cullin and the downstream River Moy's water quality are influenced by the water quality within Castlebar Lannagh PAA.

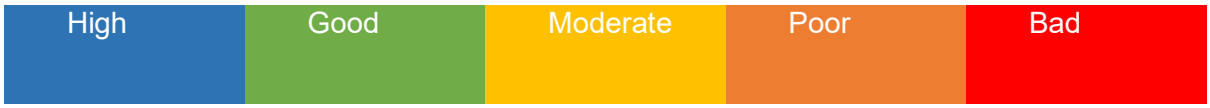
3. Blue Dot Catchments Programme

Walshpool lake is part of the Blue Dot Catchments Programme which is a collaborative programme being delivered by a range of agencies as a means of focusing attention and resources towards the protection and restoration of our high status objective waters. The EPA have identified the waters in

Ireland that should have a high status objective, and these are more commonly known as Blue Dot waters or Blue Dots. Ireland has seen a long-term declining trend in our high status waters. Blue Dot waters are our best quality waters. They have the highest ecological quality of all our waters and often a greater diversity of species that are sensitive to pollution. Blue Dot waters have a natural physical form that has not been changed much by human activities. Further information on this Programme can be found here - Blue Dot Programme - Local Authority Water Programme (lawaters.ie).

4. Water Quality History in the Castlebar Lannagh PAA

Rivers and lakes are classified into five quality classes (status), with high status being unpolluted and bad status the most polluted.

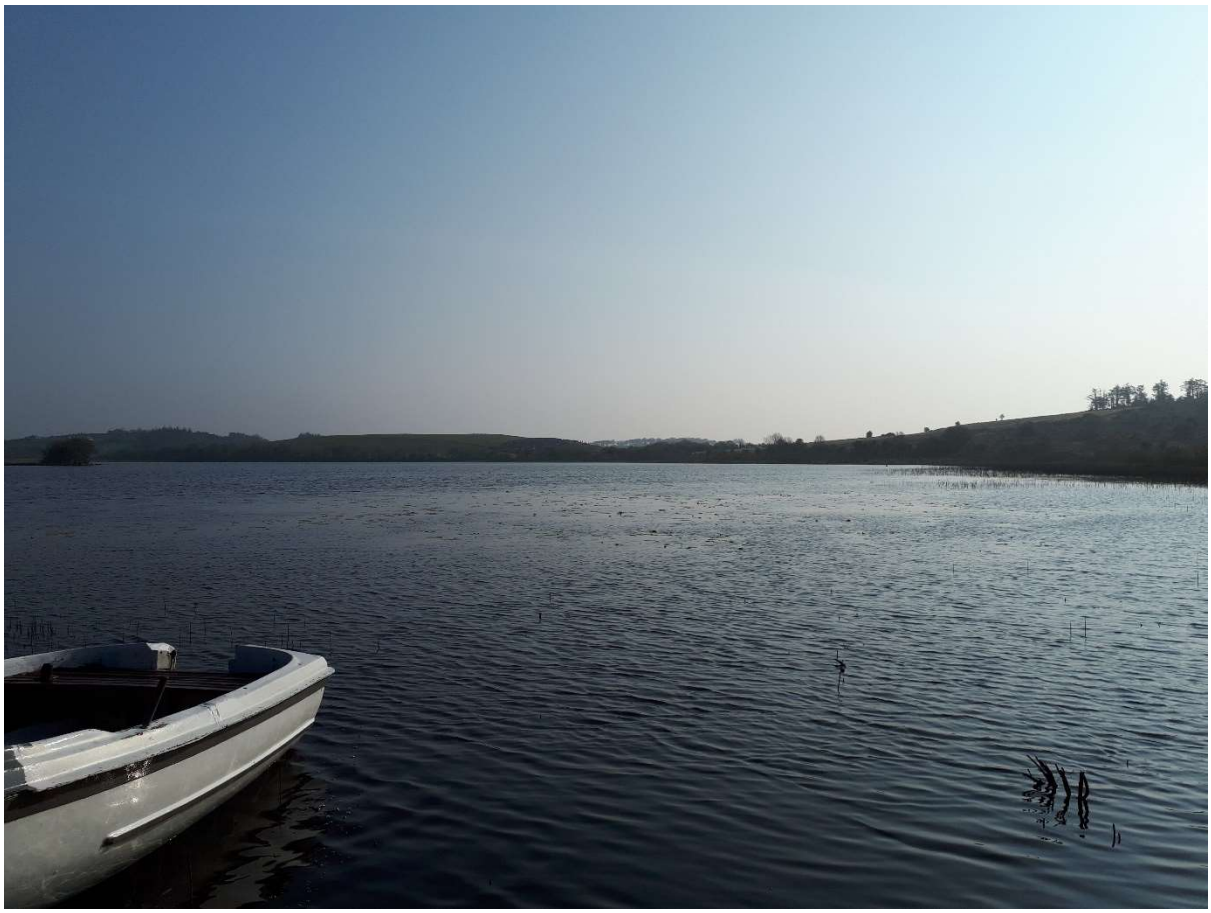


The EPA assign status at (approximately) 3-yearly intervals based on the standards set out in the Water Framework Directive (WFD). Status is based on many different elements that altogether indicate the overall health of the river, for example the ecology recorded in river habitats, the physico-chemical condition of the river (oxygen levels, nutrient concentrations, indicators of organic and chemical pollution etc) and also the physical condition of the riverbed and bank or lake shore.

We need to make sure that the Castlebar Lannagh PAA achieves at least Good Status and that Walshpool is restored back to High Ecological status. We have reviewed water quality data available between 2013 and 2018 for Ecological Status for each of the waterbodies in the PAA (Table 1), or newer data from 2019 or 2020 (results from macroinvertebrates assessments, but not a full ecological status assessment) and we have found that:

- **Castlebar_010** is currently at Poor Ecological Status and has suffered from deteriorated water quality for over 30 years.
- **Castlebar_020** is currently at Moderate Ecological Status. This section of the Castlebar River had suffered from significant pollution since EPA monitoring was first recorded in 1971, through to 2013, but more recent monitoring of the macroinvertebrate communities (Q value) from both 2016 and 2019 has shown a welcome finding of Good Status in terms this biological community. At present, it is Fish Status which is preventing the overall achievement of Good Ecological Status for this section of the Castlebar River.
- **Loughnaminoo Stream_010** is currently at Poor Ecological Status and has been significantly polluted since first monitored in 1984, bar some improvements to Moderate, more recently in 2005, 2007 and 2011. The most recent Q value assessment has found an improvement again to Moderate using macroinvertebrates as the indicator.
- **Manulla_030** is currently at Poor Ecological Status (2013 to 2018), but a recent Q value assessment in 2019 shows an improvement in the macroinvertebrate community to Moderate.
- **Tullymore (Mayo)_010** This water body is not monitored by the EPA and therefore is unassigned. Its status is therefore unknown.
- **Carrowmore Manulla Lake** This water body is not monitored by the EPA and therefore is unassigned. Its status is therefore unknown.

- I**slandeady Lake** This water body is not monitored by the EPA and therefore is unassigned. Its status is therefore unknown.
- **Walshpool Lake** is currently at Good Ecological Status, however as it has a High Status Objective, it needs to be restored back to high status.
- **Castlebar Lake** is currently at Moderate Ecological Status and has been since first assessed for the WFD in 2011. This is a charophyte lake (charophyte lakes are high alkalinity lakes with a lake bed of marl and a plant community of mostly Chara species) and there should be a higher abundance of these species than currently is in the lake. While nutrients, specifically phosphorus levels in the lake are not excessively high, they may have been in the past or may still be too high for this macrophyte community to recover sufficiently. The presence of zebra mussels in the lake are also likely to be affecting both chlorophyll and phosphorus levels in this lake.



Islandeady Lake

Table 1: Ecological Status, pressures, and significance in the Castlebar Lannagh PAA

WB_Name	Risk [1]	Ecological Status				EPA Characterisation Significant Pressure Category (Sub – Category) 2013 – 2015)	EPA Characterisation Significant Issues (2013 – 2015)	Desk Study Potential additional pressures (2019)	Desk Study potential Significant issues
		2007 – 2009	2010 - 2012	2010 - 2015	2013 - 2018				
Carrowmore Manulla (Lake)	*RE*	Unassigned					None identified	Extractive Industry (Peat Cutting)	Sediment and Nutrient (ammonium) pollution
								Hydromorphology (Land Drainage)	Sediment
								Abstractions (Water Supply)	Nutrient Pollution
Islandeady (Lake)	*RE*	Unassigned				Agriculture (Pasture)	Nutrient Pollution	No additional potential pressures to add from the desk study stage	-
Walshpool (Lake)	*AR*	Good	High	Good	Good	Hydromorphology (Land Drainage)	Altered habitat due to hydrological changes	No additional potential pressures to add from the desk study stage	Nutrient Pollution (Total phosphorus)
Castlebar (Lake)	*AR*	Moderate	Poor	Moderate	Moderate	Agriculture (Agriculture)	Nutrient Pollution	No additional potential pressure to add from the desk study stage	-
						Domestic Wastewater (Single House Discharges)	Nutrient Pollution		
						Invasive Species (Invasive Species)	Altered habitat due to morphological changes		
							Other Significant Impacts		
Castlebar_010 (River)	*AR*	Poor	Poor	Moderate	Poor	Domestic Wastewater (Single House Discharges)	Organic Pollution	No additional potential pressure to add from the desk study stage	-
						Urban Run – off (Diffuse sources run – off)	Organic Pollution		
Castlebar_020 (River)	*AR*	Poor	Poor	Poor	Moderate	Hydromorphology (Channelisation)	Altered habitat due to morphological changes	No additional potential pressure to	-
							Other Significant Impacts		

[1] Risk Status
RE = Review
AR = At Risk
NAR = Not At Risk

WB_Name	Risk [1]	Ecological Status				EPA Characterisation Significant Pressure Category (Sub – Category) 2013 – 2015)	EPA Characterisation Significant Issues (2013 – 2015)	Desk Study Potential additional pressures (2019)	Desk Study potential Significant issues
		2007 – 2009	2010 - 2012	2010 - 2015	2013 - 2018				
						Urban Run – off (Diffuse sources run – off)	Organic Pollution	add from the desk study stage	
							Nutrient Pollution		
Loughnaminoo Stream_010 (River)	*RE*	Unassigned				Urban Wastewater (Agglomeration PE of 1,001 – 2,000 – Balla)	Organic Pollution	No additional potential pressure to add from the desk study stage	-
							Nutrient Pollution		
						Domestic Wastewater (Single House Discharges)	Organic Pollution		
							Nutrient Pollution		
						Hydromorphology (Channelisation)	Altered habitat for morphological changes		
Manulla_030 (River)	*AR*	Moderate	Moderate	Moderate	Poor	Hydromorphology (Channelisation)	Altered habitat for morphological changes	No additional potential pressure to add from the desk study stage	-
Manulla_040 (included as Walshpool & Carrowmore lakes are linked to this water body)	*AR*	Moderate	Moderate	Good	Moderate	Agriculture (Pasture)	Nutrient Pollution	No additional potential pressure to add from the desk study stage	-
Tullymore (Mayo)_010 (River)	*RE*	Unassigned				Agriculture (Agriculture)	Organic Pollution	No additional potential pressure to add from the desk study stage	-
							Nutrient Pollution		

5. Sources of Pollution

Pollutants find their way to rivers by a number of paths:

- They can be piped directly to the river from large sources such as wastewater treatment plants, or small sources such as faulty septic tanks, farmyards, roadside drains etc.
- They can flow across the ground to the river when nutrients which are applied to the land as fertiliser are washed off by rainfall before the crop and soil has absorbed them. This is usually a problem where soils are wetter and poorly draining, particularly during wet weather.
- Groundwater losses occur when pollutants move down through the soil and rock into groundwater and eventually into rivers, lakes, and coastal waters. This usually occurs when too much fertiliser is applied to land, or when the soil is not ready to absorb the nutrient (e.g., temperatures too cold, incorrect soil pH etc) and is common in free draining/ light soils.

There are a number of sources of pollution in the Castlebar Lannagh PAA. Hydromorphology, Agriculture, Domestic wastewater treatment systems, Urban Waste Water and Urban run – off are the pressures identified from the deskstudy as being present. Additional pressures may be identified during the local catchment assessment.

- **Hydromorphology (Land Drainage):** Hydromorphology refers to physical changes made to the habitat within water bodies or it's banks, which in turn can affect the e.g. rivers sediment regime and flow, and in turn the macroinvertebrates and other life living in the water. Hydromorphology pressures in the form of land drainage is affecting the Manulla_040 which is a tributary of Walshpool lake.
- **Hydromorphology (Channelisation):** Hydromorphology is noted as a significant pressure in the form of channelisation in the Castlebar_020, Loughnaminoo Stream_010 and Manulla_030, where it is altering the habitat of the waterbody due to the physical changes made to the river by over deepening and over widening. All three rivers are included in the Moy Arterial Drainage Scheme. Arterial drainage schemes were undertaken between 1945 and 1995 under the Arterial Drainage Act (1945), and the scheme areas undergo a programme of maintenace which is managed by the OPW.
- **Agriculture (Pasture and Agriculture):** Agriculture is impacting on Islandeady and Castlebar/Lannagh lakes, and the Manulla_040 and Tullymore (Mayo) rivers. Agriculture is identified as contributing to the nutrient pollution observed in these river waterbodies and lakes. The majority of the river catchments feeding these water bodies have permanent pasture as the dominant landuse.
- **Domestic Wastewater Treatment Systems (DWWTS) (Single House Discharges):** Is impacting on Castlebar lake, Castlebar_010 and Loughnaminoo Stream_010 rivers. DWWTS are of most concern when located in areas with poorly drained soils or where well drained soils are present with rock at or close to ground surface. The main risk from domestic wastewater arises from existing systems where the site was not suitability assessed or the system was not designed correctly or from treatment systems that are not adequately maintained e.g. regularly de-sludged.

- **Urban Run – off:** Urban run-off (diffuse sources run-off) was identified as a significant pressure on two river water bodies, Castlebar_010 and 020. The main concern is around the Castlebar urban area and potential misconnections into the drainage network. Significant work has been undertaken in the Castlebar agglomeration to improve it's overall performance in the last decade or more.

6. Next Steps

Community Engagement Meeting
LAWPRO held an online community information meeting on the 5th of October 2021. The meeting was held to inform the public about our proposed work and to hear about water quality concerns from people living in the area. The meeting involved two presentations from LAWPRO followed by a Q&A session with the attendees. There were various questions and comments on the night which ranged from questions about the wastewater treatment plant in Belcarra; how the public would be informed of LAWPROs work progress in the PAA and comments in relation to the drinking water supply from Carrowmore Manulla lake.

Farmers Meeting
The Agricultural Sustainability Support and Advisory Programme (ASSAP) aim to hold a farmers meeting for Castlebar-Lannagh PAA at some time in 2022. In the interim, letters advising farmers in the PAA of the programme issued to all farmers in March 2022. As part of the ASSAP programme, Teagasc is providing a free and confidential advisory service to farmers in the PAA. LAWPRO will provide guidance on where the streams are impacted by agriculture and the local ASSAP advisor will then visit these farms to provide advice on how to mitigate any agricultural impacts on water quality.

7. Local Catchment Assessment

To confirm the sources of pollution affecting the water quality of the Castlebar_010, Castlebar_020, Manulla_030 and Loughnaminoo Stream_010, and to identify any additional pollution sources, we will be carrying out local catchment assessments in this PAA throughout 2022, starting in April/May 2022. The LCAs will involve the sampling of biology (macroinvertebrates and vegetation) and chemistry (orthophosphate, ammonia and nitrogen) at sites along the rivers as well as catchment walks. The dissolved oxygen, pH, temperature and conductivity will be measured at each site also.

Where agricultural activities e.g. maintaining existing drains or creating new drains, clearing riparian vegetation from river banks and bank tops etc., are confirmed as impacting water quality through the introduction of sediment, nutrients and/ or pesticide, we will communicate our LCA findings to the ASSAP advisor for the area. Where point sources such as urban waste water are confirmed as pressures, we will liaise with both the EPA and Irish Water to communicate our findings which can facilitate decision making regarding potential investment programmes or maintenance programmes. Urban run-off pressures will be documented and discussed with Mayo County Council. Opportunities for Nature Based Solutions for the management of rainwater and surface water runoff in urban areas will be promoted by LAWPRO.

Where a home has been identified by LAWPRO as posing a risk of water pollution from its septic tank/domestic waste water treatment system, the homeowner will receive a letter from LAWPRO outlining the availability of a grant specifically for homeowners within PAAs which they may choose to avail of (a letter is required; homeowners cannot self declare). Finally for pressures associated with channelisation of rivers, in this case the Moy Arterial Drainage Scheme, we will liaise with the

EPA and OPW to identify the channels which may warrant restoration, or where restoration is not possible, to reduce the impact of regular maintenance if it is leading to water quality impacts.

The unmonitored water bodies in this PAA i.e. Islandeady lake, Carrowmore Manulla lake, and Tullymore River will be assessed to gain some understanding about their water quality and to attempt to determine if they show signs of impact or not. A number of rounds of seasonal sampling will be undertaken.