Summary: Lough Gur Priority Area for Action Desk Assessment

This is a non-technical summary of the desk study for the Lough Gur Priority Area for Action (PAA).

A desk study is the first step in our work. We gather available information about the river into a single document. 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 local community meeting. The community meeting for Lough Gur PAA was held online (via Zoom) on the 8th September 2021.

The desk assessment helps us to understand:

- The quality of the water in each of the waterbodies in the area for action
    - Has it changed in the last few years?
- The importance of each waterbody
    - Are there any rare plants, animals or habitats that must be protected?
    - Is it used to supply our drinking water?
- The human-made impacts
    - Is there a wastewater treatment plant?
    - Is land used for agriculture or forestry?
    - Has the river been changed physically?

Background and location

Lough Gur Priority Area for Action (PAA) is located in Co. Limerick. The PAA is divided into sections or waterbodies as shown in **Figure 1** below. These waterbodies are differentiated by a unique name and number. The boundary of each waterbody is shown by the black lines on the map. The lake, rivers and streams are shown in blue. The two waterbodies in the PAA are:

- Lough Gur itself, which is situated in the sub basin of the Ballycullane (Limerick)_010 river waterbody.
- The Ballycullane (Limerick)_010, which rises in the south near Tullabracky, flowing north and west to discharge to the Camoge river (part of the Camoge PAA) upstream of Meanus.

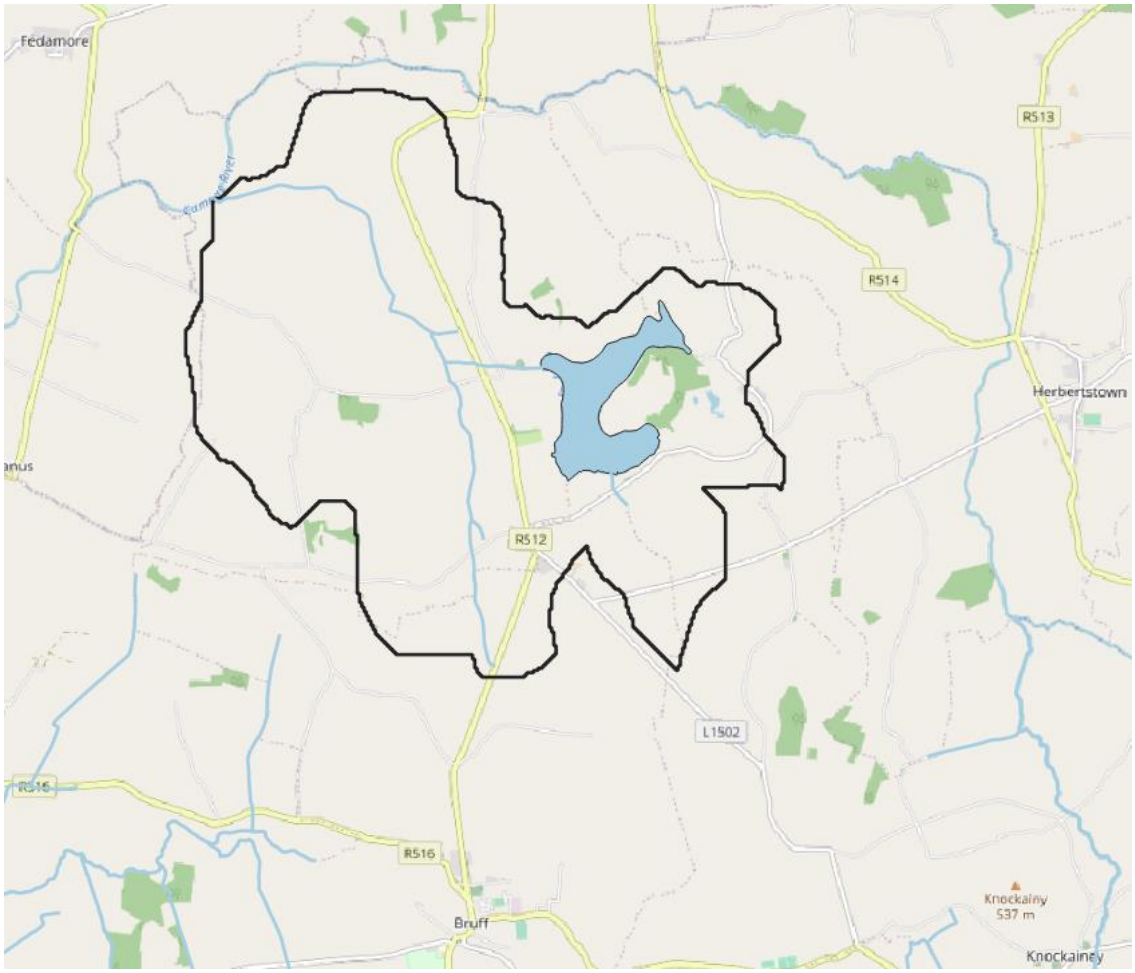

Figure 1: Lough Gur PAA.

Catchment Description

Lough Gur priority area for action (PAA) is approximately 20km south of Limerick city. The lake is the largest lake in County Limerick and the area around the lake is of ecological and archaeological importance.

The lake is fed mainly by groundwater springs and surface runoff from adjacent lands. There are no rivers flowing into it. Lands in the catchment are mainly under agriculture and residential use. Lough Gur Group Water Scheme supply is to the east of the lake but not within the lake's contributing catchment.

The lake sits in the sub basin of the Ballycullane (Limerick)_010 river waterbody, which is part of the PAA.

Water Quality in Lough Gur PAA

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

High	Good	Moderate	Poor	Bad

The Environmental Protection Agency (EPA) assigns status at (approximately) 3-yearly intervals based on the standards set out in European legislation, the Water Framework Directive. Status is based on many different elements that altogether indicate the overall health of the waterbody. For example in a river waterbody, 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 river bed and bank all help to determine the overall status. In a lake waterbody, lake plants, fish, physico- chemical condition and physical condition can be examined to determine the overall lake status.

We need to make sure that Lough Gur PAA achieves good status. We have reviewed water quality data available for each of the waterbodies and we have found that:

- The Ballycullane (Limerick)_010 is not monitored under the Water Framework Directive and its status was unassigned up to March of this year. The EPA have now assigned an extrapolated status of Moderate to this waterbody. This means that they have looked at all the information that's available on the river from different sources. They have also looked at the type of catchment that the river flows through and the results for other similar rivers. They have concluded from all of this information that the river is at moderate status.
- Lough Gur is monitored under the Water Framework Directive and it is currently at moderate status because of lake plants, fish status and elevated levels of the nutrient total phosphorus.

The map in **figure 2** shows the status of the two PAA waterbodies.

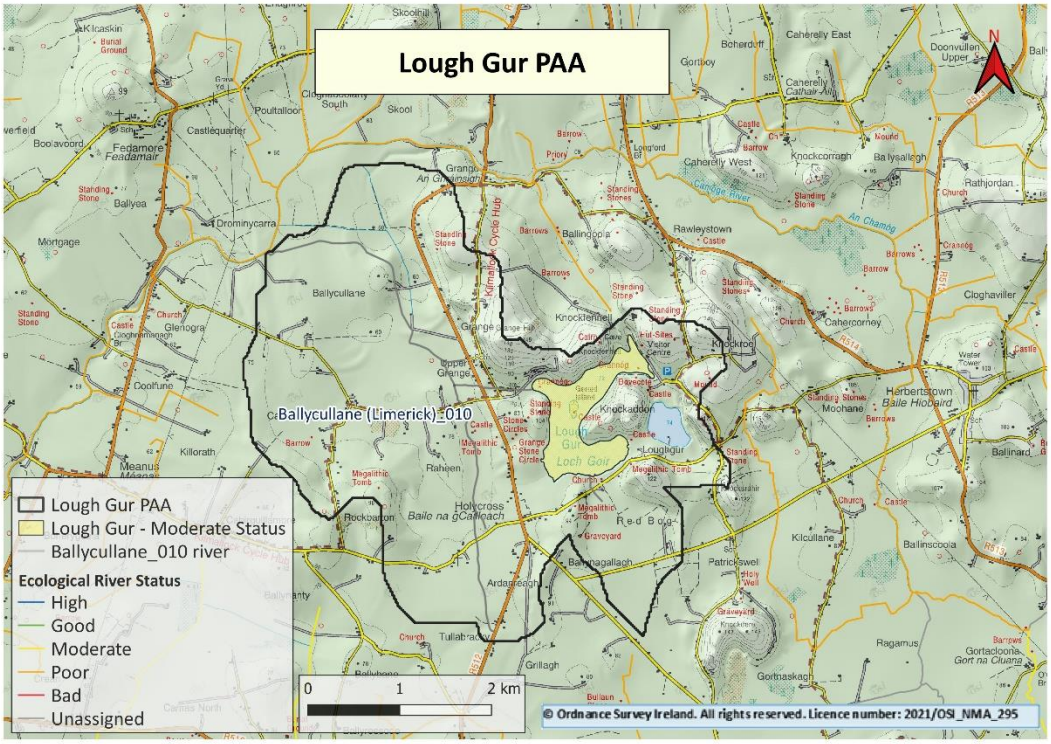

Figure 2: Lough Gur PAA. Note that the river status here is show as unassigned on the map but status is now moderate (extrapolated status, based on expert judgement).

Sources of Pollution

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

- They can be piped directly 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 or lake when nutrients which are applied to the land as fertiliser are washed off by rainfall before the crop and soil has time to absorb them. This is usually a problem where soils are wetter and poorly draining, particularly during wet weather.
- Groundwater losses can occur when pollutants move down through the soil and rock into groundwater and on to the river or lake. This usually occurs when too much fertiliser is applied to land, or when the soil is not ready to absorb the nutrient (for example where temperatures too cold, soil pH is incorrect etc) and is more common in free-draining/ light soils.
- For lakes, atmospheric deposition can also be a source of nutrients. Dust in air can contain nutrients which can then be deposited directly to the lake.

From our desk study, we have identified four potential pollution sources in Lough Gur PAA which we will examine further. These are agriculture, domestic wastewater treatment systems, hydromorphology and atmospheric deposition.

Lough Gur

- **Agriculture** is a likely source of the elevated nutrient phosphorus in Lough Gur. Pathways may be overland where soils are heavy and via groundwater where soils are well drained but very thin. The nature of the heavy soils in the catchment around the lake is that they do not hold on to phosphorus well. This means it can be easily washed off the land into the lake. This happens when fields are waterlogged, particularly following heavy rainfall. Groundwater in the catchment around the lake flows into Lough Gur. Where soils are very thin particularly where rock is near to the surface, phosphorus can be lost directly to groundwater from the land and on to the lake via these groundwater pathways.
- **Domestic wastewater treatment systems** or septic tanks are another likely source of phosphate to the lake.
- The EPA estimated that **atmospheric deposition** is another likely source of the lake phosphate. This could possibly come from pasture within the lake catchment but also from further afield. We would need to carry out specialist monitoring to confirm this.

Ballycullane (Limerick)_010

- The Ballycullane (Limerick)_010 river waterbody is not monitored under the Water Framework Directive so we do not know very much about it yet. Form our desk study we believe that sediment is likely to be an issue here and nutrients may also be a problem.
- Sediment problems are linked to **Hydromorphology** as a pressure. **Hydromorphology** is where the river and lands beside the river are physically changed from their natural conditions. Straightening and deepening of the channel and land drainage are some examples. These practices can cause sediment to be released to the river and to settle out in

places on the river bed where the gradient is low and flows are slow. This sediment affects the habitat for fish and other life in the river.

- If our fieldwork shows that the nutrients phosphate or ammonium are a problem in the river waterbody, then **Agriculture** is a possible pressure that will need to be investigated, particularly where soils are heavy and poorly draining. In these areas, phosphate can be lost to the river over land. We will also need to measure the nutrient load getting to the river from Lough Gur itself.

These as well as other potential pollution sources that may arise will be examined further during field visits.

Community Engagement Meetings and Next Steps

We held a community information meeting via Zoom on the 8th September 2021 to tell the public about our work and to hear about water quality concerns from people living in the area. We normally hold these meetings face to face but had to move to an online format because of Covid concerns.

Questions and comments raised at the meeting included the following:

- A comment was made that Lough Gur has been nominated as a UNESCO World Heritage site and concerns were expressed about buffer zones and animals accessing the lake.
- Questions on water quality, why has the lake improved from poor to moderate status?
- Query whether the ASSAP advisors are working with farmers in the catchment at the moment.
- Query on the larger Camoge PAA and how the work in Lough Gur will tie into this.
- Several questions around communications, whether further meetings are proposed and when attendees can expect to see the results of LAWPROs work. Also queried how LAWPRO proposes to keep attendees informed if domestic wastewater treatment systems are an issue here.
- Catchments.ie maps were praised but attendees would like more information on how to use them.

The Agricultural Sustainability Support and Advice Programme advisors from Teagasc, Kerry Agribusiness and Dairygold held an information meeting for farmers within the PAA on the 3rd December 2021. During this meeting, the advisors gave details of the support and advice they can provide for farmers.

Local Catchment Assessment

The desk assessment indicates that sediment is an issue in the Ballycullane (Limerick)_010 river waterbody. Nutrients may also be an issue here.

LAWPRO's catchment scientists will carry out fieldwork to identify areas of impact in the river. We will assess the biology and sediment levels in the river. We will walk stretches of the river to identify where sediment may be lost to the river.

We will also collect water samples to measure nutrient levels. This will help us to determine whether nutrients are a problem and if so, where the nutrients may be coming from.

For Lough Gur itself, we will look at the total phosphorus and ammonium levels going to the lake from Lake Bog to the east. This is the only planned fieldwork for the lake at present because we are confident from the studies already carried out on Lough Gur that total phosphorus is a problem in the lake and that much of this phosphorus is coming from agriculture and domestic wastewater treatment systems in the lake catchment.

A report on the outcome of our local catchment assessment work will be published here when available.

The table below gives some summary information on waterbody status, possible water quality issues and sources of pollution for the waterbodies in Lough Gur PAA.

Table 1 Ecological status, pressures and significance in Lough Gur PAA

WB Code	WB Name	WB Type	Risk	Ecological Status				EPA Characterisation Significant Pressure Category (Sub-category) (2013-2015)	EPA Characterisation Significant Issue	Desk Study Review Potential Additional Pressures (2019)	Desk Study Review Potential Significant Issue (2019)
				2007 – 2009	2010 – 2012	2013 – 2015	2016 -- 2018				
IE_SH_24_99	Lough Gur	Lake	*At Risk*	**Bad**	**Poor**	**Poor**	**Mod**	Agriculture Domestic wastewater	Nutrient pollution	Atmospheric deposition (from EPA Source Load Apportionment Model output, Feb 2022).	Nutrients (total phosphorus).
IE_SH_24B900440	Ballycullane (Limerick)_010	River	*Review*	Unassigned up to March 2022. Extrapolated status now **Moderate**				Anthropogenic pressures (Anthropogenic unknown)	No data	Hydromorphology. If nutrients are found to be an issue, agriculture will need to be investigated as a possible pressure. Lake contribution to river nutrient levels will also need to be assessed.	Sediment. Nutrient issue needs to be investigated in the local catchment assessment.

View looking northwest across Red Bog towards Lough Gur, September 2021