

Lough Carra Catchment Catch-Up Catchment Assessment Team Update October 2021

Introduction

The Local Authorities Waters Programme (LAWPRO) have been carrying out fieldwork on the main tributaries of Lough Carra since June 2019. Two seasons of fieldwork were undertaken in 2019 (June & September) as well as several days of fieldwork during 2020 and 2021 with further assessments scheduled up to the end of 2021. The fieldwork involves biological and chemical sampling, together with catchment walks to determine the pathways for contaminants and water loss from land and to confirm the main pressures. The biological sampling determines the condition of the macroinvertebrate community and the vegetation of the tributaries (macrophytes and macroalgae). The water chemistry sampling determines the concentration of nutrients (e.g. ammonium, nitrate and phosphorus), BOD (biological oxygen demand), pH, conductivity, dissolved oxygen and temperature.

Findings

Common findings of the fieldwork throughout the catchment include:

Plant communities

Aquatic plants known as macrophytes are common in the tributaries of the Lough Carra. Macrophyte communities respond to hydromorphology (physical) changes and sediment input in lowland channels such as those in the Carra catchment. Some macrophytes also respond to nutrients. Changes to the hydromorphology of rivers is caused by activities such as channelisation which involves widening, deepening and/or straightening the river channel. The Carra catchment is part of an OPW arterial drainage scheme. The maintenance involved in arterial drainage schemes includes activities such as the removal of in-channel obstructions (e.g. large wood, fallen trees) and in-channel and bank vegetation. These types of maintenance works will also affect the hydromorphology of the channels leading to more homogenous instream habitats and a lower diversity of aquatic flora and fauna. Excessive macrophytes can result in the de-oxygenation of the river which will impact on the macroinvertebrate and fish life.



Figure 1: Plant community at Annies Bridge (June 2019)

Nutrients

Grab sampling undertaken by LAWPRO for nutrient analysis did not show a widespread or high nutrient issue in the streams and rivers feeding Lough Carra. Nutrients were elevated at four of the 33 sites sampled during 2019. Two sites were located at springs and two sites were located close to agricultural activities. However, it must be noted that the low nutrient concentrations detected by LAWPRO sampling is not indicative of an absence of nutrient pressure in the catchment. A number of lines of evidence have been recorded which indicate nutrient issues e.g. higher abundances of macroalgal growth in some rivers during the summer low flow periods, coupled with analysis of EPA nutrient data for Lough Carra which displays scattered higher nutrient concentrations in the lake reflective of episodic nutrient loading associated with individual wet-weather or storm events. It is a recommendation of the work of LAWPRO, that higher frequency, continuous monitoring is undertaken to establish the nature and extent of the episodic events. This recommendation has been carried through to the LIFE Lough Carra project.



Figure 2: Excessive macroalgal growth upstream of Carra Bridge (June 2019)

Agricultural Sustainability Support and Advisory Programme (ASSAP)

The Agricultural Sustainability Support and Advisory Programme (ASSAP) advisors are working closely with the farming community in the Lough Carra catchment to provide free and confidential advice on how they can help to improve and protect water quality. ASSAP have visited 64 farmers to date including both dry-stock and dairy enterprises. They have provided advice around slurry storage; run-off from yards and roadways; buffer zones around lakes, rivers and drains; cattle access; use of supplementary feeders (e.g. ring feeders and troughs); and field drainage. ASSAP have also advised on activities in Critical Source Areas. These are areas where the risk of run-off of contaminants such as nitrogen, phosphorus and sediment to rivers and lakes is highest.

Farm Visit findings:

- **Inadequate Slurry Storage** was usually a problem on dairy farms. In general, the non-dairy farmers have adequate slurry storage.
- **Dirty Yard Run-Off** was mainly an issue with dairy farms where not all dirty water run-off is collected at all times of the year. This was also an issue on some non-dairy farms where cattle/sheep might be fed in an open yard and the run-off was not collected (usually in spring after the closed period had ended). Farm Yard Manure heaps were also noted in a number of yards with effluent not being collected; also noted in relation to round bale storage. One dairy farmer had a major silage effluent leak which was a source of organic pollution.

- **Farm Roadways** are generally an issue on all dairy farms. The farm roadway either runs alongside a drain or crosses a drain(s) or both. Dirty farm roadways were not generally a problem on non-dairy farms.
- **Buffer Zones** - every farm visited in the catchment had drains and many had drains and a stream. 12 of the total farmers visited had lakeshore lands (9 on Carra and 3 on Carnacon Lough). Around 70% use a contractor for slurry spreading.
- **Critical Source Areas (CSAs)** were common to every farm visited in the catchment and generally existed in low-lying wet ground adjacent to a drain, stream or lakeshore. The main concern with CSAs is the run-off of nutrients to the waterbody. The risk is highest with dairy farmers as they try to maximise the productivity of these CSAs. Non-dairy farmers tend to farm the CSAs extensively (very little nutrients) and so the risk of nutrient run-off is lower (rainfall factor).
- **Access to Watercourses** - Cattle access to the lake for drinking was found at a number of farms in the Carra catchment.
- **Supplementary Feeding** - Of the total number of farms visited this was noted as an issue on approximately a quarter of them, but not a serious issue. It usually involved a ring feeder or meal trough out on land in the Feb – Apr period. Poaching around the feeders was the main issue but none were located close to drains.
- **Unsuitable Drainage System** - There were a handful of examples where field drains were filled to the surface with stone.
- **Pesticides** - No major issue with pesticide application or sheep dip misuse were observed.

Conclusions

Phosphorus loss (diffuse) would be the most significant risk noted from ASSAP assessments. Nitrogen loss (diffuse) is more likely to be a problem on the dairy farms (given the higher rates of N applied) and where there was very dry land with shallow soils as well as some marginal land.

Sediment mobilisation is likely from cattle access to streams but could also come from direct access to lakes and also from land drain maintenance and improvement works (land clearance and vegetation removal) which have taken place in the catchment. Land drainage works on peaty soils was recorded during assessments which could give rise to ammonium and sediment losses, as little to no mitigation was put in place. Point source losses are also likely to contribute to the overall problem.



Figure 3: Animal access on the Ballintubber Stream (Aghinish_010) (June 2019)



Figure 4: Drain maintenance and land improvement (March 2020)

Ongoing Activities

The EPA have recently updated the Pollution Impact Potential (PIP) maps for phosphorus and nitrogen with more recent data and information. In the catchment areas of rivers and lakes with unsatisfactory water quality, PIP maps help to focus on the areas and sources that might be causing the impacts. Where agriculture is considered to be a pressure on water quality, the PIP maps act as a signpost to where there are high-risk areas (referred to as critical source areas) for phosphorus and nitrogen loss. Further fieldwork will make best use of these next generation of PIP maps and local catchment work will be focused initially in these high-risk areas to validate previous findings and referrals to ASSAP. It is important to note however, that the location of farmland in critical source areas does not necessarily mean that they are a significant pressure as best management practices may be in place.

The updated PIP map will also identify breakthrough points and delivery points where surface runoff pathways are predicted to cross field boundaries and be delivered directly into waterbodies. LAWPRO will 'ground truth' the maps during fieldwork (in particular during winter fieldwork towards the autumn of 2021) and liaise with ASSAP who in turn will liaise with farmers to further refine the locations of where actions can be taken to prevent or reduce diffuse losses of nutrients and sediment. For further information see: <https://www.catchments.ie/water-quality-agriculture-pollution-impact-potential-maps-tool-guide-resources-areas-investigation/>. An example of PIP mapping is shown below. The higher the rank (darker colour), the greater the potential risk of losses to waters. Delivery pathways to watercourses are illustrated in red.

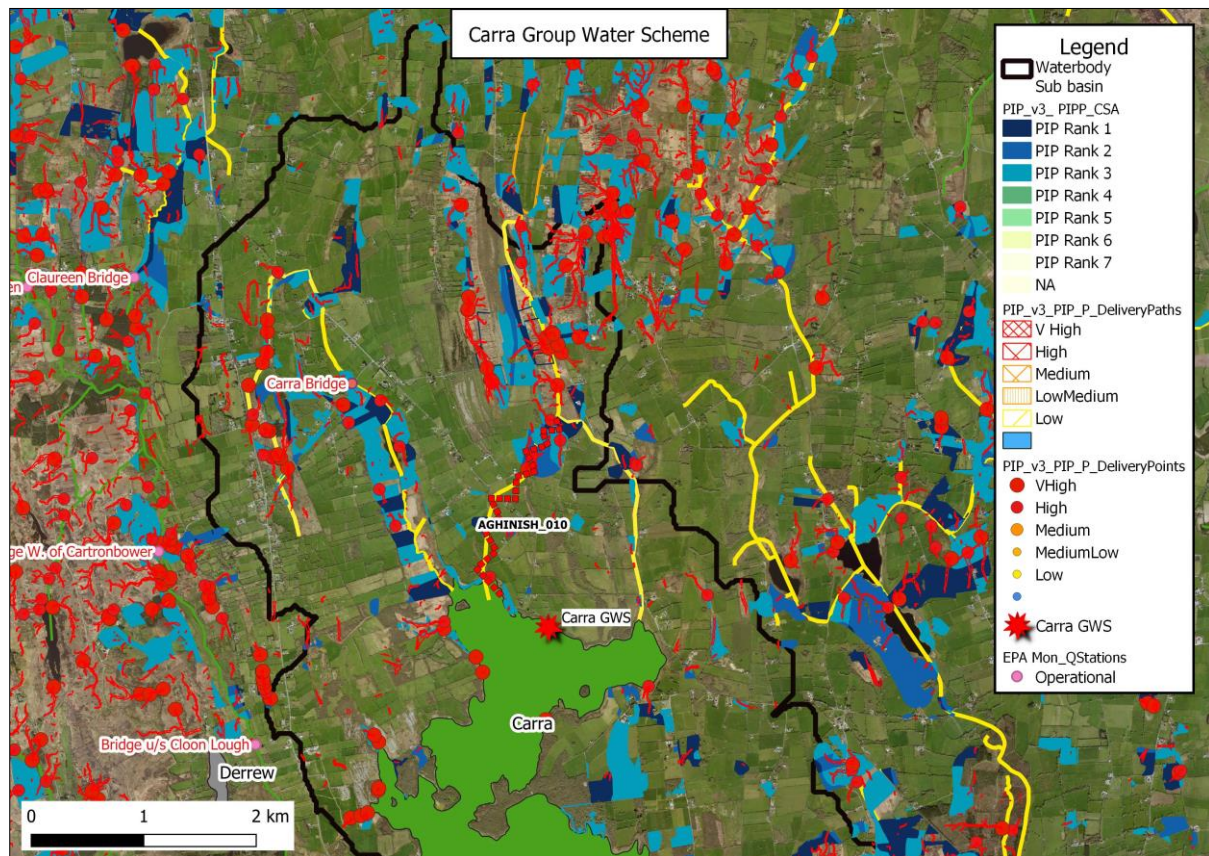


Figure 5: Example of the PIP mapping for the Ballintubber Stream (Aghinish_010)

Collaboration

Lough Carra Group Water Scheme (GWS) is one of several Integrated Source Protection Projects underway led by the National Federation of Group Water Schemes (NFGWS). NFGWS have contracted CDM Smith consultants to undertake a study which includes preparation of a desk study for the GWS catchment. An important element of CDM Smith's work was to undertake catchment walks within the surface water catchment delineated zone. LAWPRO assisted consultants during the walks which were undertaken on the 18th and 19th of August 2021. A representative from NFGWS also attended as well as an ASSAP advisor.

The main focus of the walks was to locate karst features such as springs and enclosed depressions and sample where accessible. LAWPRO collected chemistry samples for analysis at Roscommon County Council laboratory. Both LAWPRO and CDM Smith recorded *in-situ* measurements of dissolved oxygen, temperature, conductivity, oxidation reduction potential and pH of the features sampled as well as general observations.

The findings from the catchment walks will be summarised in a report which will be prepared by CDM Smith for the NFGWS.



Figure 6: Spring behind Ballintubber Abbey (March 2020)



Figure 7: Turloughs at Attavally (August 2021)

Next Steps

LAWPRO are planning further fieldwork in the Carra catchment up to the end of 2021. This fieldwork will involve focused catchment walks which will be informed by the updated PIP mapping and feedback from ASSAP based on their farm assessments. The aim of this additional work is to further refine referrals made to ASSAP, which in turn will help identify the right actions required in the right location. LAWPRO will continue to refer significant pressures/ issues encountered during fieldwork to the relevant bodies (e.g. ASSAP, Mayo County Council etc.).

LAWPRO have scheduled a joint field trip within the catchment with OPW regional staff including their environmental officer and members of the arterial drainage maintenance team. The joint field trip will involve visits to several sites throughout the catchment where recent arterial drainage maintenance work was carried out. We aim to communicate our local catchment assessment findings at these sites and hold a discussion on where improvements can be made to the necessary maintenance works which may benefit water quality overall.



Figure 8: Maintenance of bank vegetation (June 2019)