CATCHMENT MANAGEMENT PLAN 2022 – 2025

TULLAGHOBEGLEY AND RAY FISHERY

Cloughaneely Angling Association
in collaboration with
Inland Fisheries Ireland

Clúdach:
Radharc ar dhobharcheantar uachtarach Thulacha Beigile ó Mhac Uchta don Eachla Mhór agus an Eachla Bheag, le Loch na Beithí chun tosaigh agus Loch Alltáin laistiar

Cover:
View of upper Tullaghobegley catchment from Mackoght to Aghla More and Achla Beg, with Lochnabehy in the foreground and Altan Loch behind

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1 Acknowledgements

Cloughaneely Angling Association (CAA) has prepared this Catchment Management Plan (CMP) for the 2022 – 2025 management cycle substantially through its own resources and by drawing on the expertise and knowledge of its members, in particular past and present members of the CAA Committee, especially Dr Tony McNally, McNally Environmental Ltd. Catchment Management Plans are prepared and reviewed to cover a three-year management cycle. The previous CMP was for the period 2018-2021 and is available on the CAA website.

CAA gratefully acknowledge the support and assistance of the IFI, Donegal County Council, the Local Authority Water and Communities Office, and MOWI who provided information and data, and financial support for projects carried out during the previous management cycle.

The views expressed in this document are those of the CAA. The officers, services or agents of CAA accept no liability whatsoever for any loss or damage arising from the interpretation or use of the information, or reliance on views contained herein. This document does not purport to represent policy of any government.

CLoughaneely Angling Association Committee

2 Foreword

The parish of Cloughaneely encompasses the catchments of the Ray and Tullaghobegley rivers. The area is renowned for its magnificent mountain and coastal landscapes. The unique natural richness of the area is attested to by the fact that 16 designated sites of European Importance occur within 15km of the mouth of the Tullaghobegley River.

We cannot take these natural assets for granted. Nationally, many of our highest quality habitats have been lost or degraded. Development, intensification of land use and increasing demands on natural resources have all combined in this decline of environmental quality and gradual loss of biodiversity. Climate change brings further pressures which only resilient ecosystems will resist. Our own catchments are not exempt from impact and we have seen inappropriate development proposals such as large scale aquaculture in Ballyness Bay, and quarrying activities that flout legislation.

Protecting our environment requires community wide engagement. The community of Cloughaneely has not been found wanting in this regard. It also requires the support and backing of agencies with a remit in environmental management and protection. CAA has a formal role in managing the Ray and Tullaghobegley catchments and this CMP is part of that process. We cannot protect our waters without protecting the catchment area that feeds them.

This plan sets out the principal environmental issues identified in the Ray and Tullaghobegley catchments and suggests actions to achieve specific objectives. The actions and achievements of the previous 3-year management cycle are also reviewed.

Colm Gallagher

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Chairman, Cloughaneely Angling Association.
Cathaoirleach, Cumann Iascaigh Chloich Chionnaola

3 Executive Summary

This Catchment Management Plan 2022-2025 for the Ray and Tullaghobegley rivers has been prepared by Cloughaneely Angling Association in compliance with its agreed role in catchment management in partnership with Inland Fisheries Ireland.

This present plan is based on a review of the 2018-2021 Plan and considers recent developments in the catchment. A summary overview of catchment characteristics is provided.

The main pressures operating in the catchment are set out along with their impact on receiving waters, the measures proposed to mitigate them, the objectives for the current planning cycle and the group responsible for achieving them.

The actions taken during the previous management cycle in relation to each pressure identified are summarised, and proposed actions for the current plan set out. These include reference to a number of projects completed by CAA, or projects to which CAA has made significant contributions including:

- *Upland Lakes - Citizen Science Monitoring Project* – (CAA 2019)
- *Upland Lakes Survey 2* – (CAA 2020)
- *Tullaghobegley Bank Protection and Habitat Enhancement Project* – (CAA 2021)
- *Ray River Silt Sources – A Catchment Investigation into Sediment Export* – (CAA 2021)
- *Ballyness Bay - Community Proposal for Marine Protected Area* – (Save Ballyness Bay 2021)
- *Ballyness Way – Bealach Bhaile an Easa* – (Coiste Glan agus Glas agus Cósta Glan agus Glas An Fhál Carraigh 2019)

Excessive point source nutrient loadings are a source of impact at one location, but siltation is identified as a prevalent pollutant. CAA has completed a project entailing high frequency measurements of turbidity over 5 months in a study sub-catchment of the Ray, in order to identify and study sources of silt.

One of the primary concerns identified for the coming cycle is the continued operation of an illegal quarry in the upper Ray catchment and the extreme sediment pollution arising. Monitoring evidence for the impact of this activity on the river is presented. It is seen as an existential threat to

the Ray River which is currently at high status. The inability of cumbersome legal instruments to achieve timely interventions in such cases is outlined and the additional use of administrative sanctions by regulators is recommended.

With the support and permission of a local landowner, CAA have undertaken a significant project on the Tullaghobegley aimed at protecting banks through the establishment of fenced riparian buffer strips and the installation of settlement ponds on drains to reduce silt loads. Tree planting and species rich seed mixes used in this project also enhance biodiversity.

CAA continue to liaise with IFI to assess fish stocks and identify habitat improvement needs. Conservation of stocks has been promoted through the establishment of a sanctuary area and the encouragement of voluntary catch-and-release and no-fish reaches.

CAA have also established and provide support to a Catchment Management Plan Group with broad representation of stakeholders. This group is key to resourcing and delivering projects and effectively coordinating resource application and information flow. CAA also provides relevant information through its website.

In recent years the prolific growth of macrophytes in the Tullaghobegley has become a significant issue with implications for silt deposition and loss of freshwater pearl mussel habitat and angling amenity. The likely origin of the problem is the high phosphorus emissions in trade effluent discharges from an aquaculture venture. CAA will explore sustainable solutions and interim interventions to address the problem.

Invasive alien species occur in the riparian zones of both the Ray and the Tullaghobegley rivers. Biosecurity measures are in place to prevent spread and further introductions of terrestrial or aquatic invasive species.

CAA will prioritise actions to take forward in the current planning cycle in line with available resources. An emphasis will be placed on maximizing participation by voluntary workers and providing appropriate roles for all who wish to participate.

4 Introduction

CAA entered into an agreement with IFI to formalise its role in management of the Ray and Tullaghobegley catchments. As part of that agreement CAA prepared a Strategic Plan setting aims and objectives in relation to catchment management. Subsequently a multi-annual Catchment Management Plan (CMP 2018-2021) was prepared defining the context within which the strategic plan will be pursued. A 3/4 year planning cycle is appropriate to objective setting and actions to further those objectives. This allows for regular review and revision of the CMP. This revised CMP is a scheduled review of the previous CMP 2018-2021, and will cover the period 2022-2025.

The review process considers the targets and objectives previously set and progress in achieving them. It also assesses new information gathered during implementation of actions, projects undertaken in line with the CMP 2018-2021, and recent catchment developments and emerging issues. This information and findings inform the review process, and revisions of objectives for the coming catchment management cycle.

In some instances, factors have emerged that hampered progress in achieving stated objectives. These include restrictions imposed due to the Covid pandemic, and diversion of resources to other unforeseen pressures, including proposals to establish a major aquaculture industry in the catchment, and the opening of an illegal quarry in catchment headwaters.

5 Catchment Overview

A detailed characterisation of the Cloughaneely Angling Association's catchment areas is provided in the *Tullaghobegly and Ray River Catchments Management Plan 2018 – 2021* (CAA, 2018). A brief summary is provided here for context, and some catchment descriptors are listed in Table 1.

The Ray and Tullaghobegley catchments are bounded to the south by the Derryveagh Mountains where the main river channels rise on the northern flanks of the Seven Sisters, a series of quartzite peaks from Errigal (751m) in the southwest to Muckish (666m) in the northeast. Both rivers flow northwards for a distance of about 15km in parallel courses, and their main channels drop 300m from source to point of discharge.

The main settlement within the catchments is Falcarragh with a population less than 1,000 (764 in the 2016 census). Outside Falcarragh the dispersed rural population is of low density (generally less than 100/km^2).

Both the Ray and Tullaghobegly are characterised as 'flashy' rivers based on flow duration curves presented in the *Catchment Management Plan 2018-2021* (CAA, 2018), and flows respond rapidly to rainfall events.

Table 1 Catchment descriptors for the Ray and Tullaghobegly Catchments (EPA Hydrotool)

	Ray Overall	Tullaghobegly
Area (km^2)	53	30.3
Rainfall (mm)	1675	1788
Q5 (m^3/s)	8.00	5.01
Q95 (m^3/s)	0.218	0.139
FARL	0.96	0.81
Area Peat (%)	62.7	57.5
Area Poorly Drained (%)	30.0	31.7

The peaks bounding the catchments are mainly of quartzite and much of the upland geology is overlain by dolomitic marble and schist. The lowland catchment is mostly composed of pelitic schists. Large areas of outcropping rock occur in the upper catchments and soils are poorly drained acidic till (approximately 30% of the area) with extensive areas of blanket bog (approximately 60% of the area).

Mountain slopes support some natural acid grassland and areas of heather and moor. Blanket bog is the dominant vegetation feature with extensive peat harvesting and associated drainage.

Agriculture is predominantly rough grazing and largely confined to the lower catchment. Some areas of conifer plantations occur, but remnants of ancient woodland with sessile oak, holly and honeysuckle remain in some steep, inaccessible river valley sections.

6 Pressures - Targets and Objectives

Significant pressures in the Tullaghobegley and Ray catchments and actions required to help mitigate them, were identified in the CMP 2018-2021. These pressures remain relevant in the current 2022-2025 catchment management planning cycle along with measures proposed and objectives.

The main pollutants of concern in the Tullaghobegley and Ray catchments arising from the pressures identified are nutrients and sediments. These may derive from point sources (usually end-of-pipe discharges) or diffuse sources (landscape scale leaching or losses of pollutant). Nationally, nutrients are the most prevalent pollution issue giving rise to enrichment (eutrophication) of surface waters. However, in general, sediment pollution of waterways is more prevalent in our local catchments. Exceptions relate to point source discharges of sewage and an industrial discharge. Less intensive agriculture in the catchments results in reduced nutrient losses and export to streams and rivers.

There is a growing understanding of the significance of the effects of sediment pollution on rivers. At a national level it is now believed to be the second most important factor impacting on water quality after nutrient enrichment. Erosion of soils also represents a significant loss of resource to farmers.

Fine sediment, both mineral sediment and eroding peat, can seriously affect the river system in a number of ways. When sediment enters the river it settles on the river bed and can clog clean gravels and reduce water and oxygen flow through them. This makes them unsuitable for spawning fish, and for the invertebrates that live in them. Oxygen conditions in the river bed gravels of the Tullaghobegley River have been measured (*Tullaghobegley River Catchment Characterisation* (RPS, 2014)). The percentage reduction in redox potential is used as an indicator of oxygen status. For gravels to be suitable for the survival of young pearl mussels there should be no more than a 20% reduction in redox potential at a depth of 5cm in the gravels. Over 40% of the Tullaghobegly samples failed this standard, and at sites just downstream of the salmon smolt facility, the average reduction in redox potential was 34% (maximum value recorded was 40.9%).

When sediment settles on the river bed it also provides a medium in which plants can root. Fine sediment can also contain nutrients, in particular phosphorus, and this exacerbates the problem. The combination of nutrients and sediment means aquatic plants can increase, promoting further

sediment deposition and reducing water flows and choking channels. Heavy weed growth is now a feature of the upper Tullaghobegly.

Table 2 Register of significant pressures identified in CMP 2018-2021, mitigation measures and agencies with primary responsibility to achieve management objectives

PRESSURE	POLLUTANT/ IMPACT	MEASURES	OBJECTIVES	RESPONSIBILITY
Urban Wastewater Discharges	– Nutrients – Sediment – Microbial pathogens	Consultations and representation to Irish Water	IW to upgrade Falcarragh sewerage system	Irish Water Donegal CC
Industrial Discharges	– Sediment – Nutrients – Oxygen demanding substances	– Review of Section 4 discharge licenses – Review of Muckish landfill monitoring – Annual Environmental Reporting by licensees	– Reduce discharge impacts on receiving waters – Transparent reporting and compliance assessment	DCC
Bank Protection	– Sediment – Microbial pathogens – Trampling impact on FPM – Elevated temperatures – Over widening	– Identification of vulnerable banks in critical locations – Liaison with landowners and advice provision – Secure resources where necessary	Appropriate measures to prevent damaging erosion of targeted banks	Landowners IFI CAA
Land Drainage	– Sediment – Nutrients – Hydrology impacts	– Collate information on drainage best practice – Liaison with landowners to mitigate and remediate drainage impacts	Works to mitigate land drainage impacts in sensitive areas	Landowners IFI CAA
Fisheries Impacts	– Poaching – Habitat loss – Barriers to migration	– Fisheries assessment of Owenwee – Assessment of lakes fisheries potential – Liaise with IFI to prevent fishery impacts due to in-stream works and poaching	Improve fish stocks and habitat	IFI CAA
Illegal and Polluting Discharges	– Sediment – Nutrients – Hydrology changes – Priority Substances (pesticides)	– Catchment surveillance and reporting – Awareness raising	Eliminate illegal discharges	DCC IFI CAA
Environmental and Habitat Degradation	– In-stream modifications	– Riparian habitat creation – Biodiversity promotion – Educational and information material	– Increased biodiversity and buffering of surface waters – Sustainable fish stocks. – Protection of freshwater pearl mussel population – Raise wider stakeholder awareness and appreciation of the local environment	CAA Community Groups
Invasive Alien Species (IAS)	– Habitat Loss – Biodiversity Loss – Erosion of soils	– Recording of IAS locations – Submission of IAS records to NBDC	Identify IAS problem areas for future control programmes and prevention of spreading	CAA DCC

Therefore there is *prima facie* evidence of sediment impact in the catchments. Several important sources of sediment have been identified, including industrial discharges, bank erosion and land drainage features, and peat harvesting.

Road drainage and urban runoff may also deliver sediments and pollutants to streams. While this is not believed to be a major problem in our catchment areas, instances of diversion of road drains into sensitive streams without mitigation or proper consideration of receiving waters have occurred.

The relevant pressures, pollutants of concern, measures, objectives and agencies with primary responsibility/remit are summarised in the register in Table 2. The following sections review the measures proposed, actions taken and set out objectives for the current 2022-2025 planning cycle.

6.1 Urban Wastewater Discharges

Wastewater treatment is essential to protect our rivers, lakes and coastal waters. Aquatic ecosystems and human health can come under threat when waste water is not adequately collected and treated. Waste water continues to be one of the principal pressures on water quality in Ireland.

Falcarragh sewage treatment works discharges into Ballyness Bay at the mouth of the Tullaghobegly River. The works was constructed in 1959 to serve a population of 1,225. There is no sewage treatment provided in the Falcarragh works. The flow discharge is now continuous at all tidal stages. This means that raw sewage can move into the mouth of the Tullaghobegly at the Bawaan pool on rising tides. The Bawaan Pool is a sanctuary area, regularly holding numbers of salmon awaiting suitable flows to pass the falls and move up the river. The discharge has also had an impact on shellfish harvested within Ballyness Bay in the past.

There are four pumping stations within the Falcarragh sewerage system. The pumping station at Carrowcannon is connected to a storm overflow that discharges to the Ray River. All four pumping stations also have emergency overflow pipelines that discharge to local streams flowing into the Ray and Tullaghobegly rivers. Pump failures on the Bellina Housing Estate tank and chronic overflows to the Tullaghobegly have been reported by CAA. The Falcarragh treatment plant is manned only part time and there are no composite samplers or continuous flow monitoring devices in place on the existing system. Response times are therefore inadequate which results in protracted discharges of raw sewage to the Tullaghobegly River.

The primary responsibility for urban wastewater discharges rests with Irish Water (IW), although Donegal County Council (DCC) act as agents for IW through service level agreements.

6.1.1 Measures

IW, in conjunction with DCC plan to invest in a new combined sewer overflow (CSO), pumping station and wastewater treatment plant (WwTP) to end the discharge of untreated sewage into Ballyness Bay. Unfortunately such plans have been in existence for some decades and have not been implemented. Works to mitigate water quality impacts, and ensure compliance with UWWT Directive, are required immediately.

6.1.2 Actions Taken

CAA attended public information meetings organised by IW in Falcarragh in October 2018 in relation to sewerage system upgrades. This indicated that upgrade works would commence in 2021. CAA identified that the proposed works did not include the Bellina pumping station. Polluting discharges from this station had been highlighted to DCC on numerous occasions, as far back as 1986. This serious omission was highlighted to both DCC and IW in submissions on several occasions in 2018, 2020 and 2021 in an effort to have it included in the scope of works. IW's position, as presently understood, is to continue to exclude the pumping station from proposed works and for DCC to carry on operating this facility.

The most recent report on *Urban Wastewater Treatment in 2019* (EPA, 2020) identifies 113 priority areas where improvements are needed to prevent water pollution, eliminate discharges of raw sewage, meet EU treatment standards and protect bathing waters and freshwater pearl mussels. These include smaller towns and villages where waste water is significantly impacting on the local environment or creating a health risk. Falcarragh is included in this priority list. In the EPA's list of urban wastewater plants for priority action (EPA 2021), the Falcarrragh plant (Authorisation Number D0343-01) is listed amongst 34 WwTPs nationally that are still discharging raw sewage, and cites Q4 2025 as the proposed date for completion of the action plan to remediate this situation. IW indicated that works on the wastewater system would commence in 2021. This has not happened.

Delays and uncertainty in Irish Water's delivery of critical improvements to infrastructure are prolonging risks to the environment and public health. Irish Water has extended the timeframe to provide treatment for many of the 34 towns and villages that continue to discharge raw sewage every day. In 2018, Irish Water advised it would provide treatment for 30 of these areas by 2021. It

will fall far short of this and now plans to connect just two of these areas to treatment by the end of 2021.

6.1.3 Actions for CMP 2022-2025

Targets and objectives set in the previous CMP remain current. The resolution of the serious issue of significant pollution of freshwater, transitional and coastal waters by discharges from IW's non-compliant wastewater treatment system at Falcarragh will be retained as a priority objective in the CMP 2022-2025. CAA will continue to monitor discharges from malfunctioning pumping stations and polluting raw sewage effluents, and will report incidents to the responsible agency and regulatory authorities to secure early interventions and mitigate impact. CAA will advocate for an urgent and effective resolution to the current unacceptable WwTP situation at Falcarragh.

6.2 Industrial Discharges

There are two commercial ventures in the Ray and Tullaghobegly catchment areas that discharge trade effluent to rivers under licence issued by Donegal County Council under Section 4 of the Local Government (Water Pollution) Act, 1977 as amended. These are the quarry operated by Cassidy Brothers, and the MOWI (formerly Marine Harvest) Smolt Facility. The latter also operates under an aquaculture licence issued by the Department of Agriculture, Food and the Marine (DAFM). This licence has conditions attached and site inspections would be normal procedure for conditions compliance.

Cassidy Brothers Concrete Products (Falcarragh) Ltd is a substantial quarrying and concrete products manufacturing venture set up in 1974. It operates at Fawnmore and the current revision of the discharge licence (Lwat6 issued in 2012) permits discharge of up to 25 m^3 per day of quarry water to the Ray River via the Owenwee tributary. The Owenwee has traditionally been known as an important nursery stream for sea trout and its present status should be assessed.

MOWI operate the Altan Smolt and Hatchery Unit at Procklis in the upper Tullaghobegly catchment. The latest revision of their discharge licence (Lwat26 issued in November 2017) permits the discharge of up to 400 l/s of effluent on average. Abstraction and discharge of large volumes of effluent containing nutrients and solids have been identified as issues of concern in the previous CMP. In particular, quality standards set for the MOWI discharge need to consider the lack of dilution and assimilative capacity available in receiving waters since most of the Tullaghobegly flow is abstracted before discharge back to the river. A review of compensation flows and their

measurement in the case of the MOWI operation was also recommended considering the above hydrological implications.

An EPA waste licence has also been issued for the management of the Landfill Site at Muckish. The EPA Waste Licence WO126-01 granted to Donegal County Council in 2001 and amended in 2013, provides for the orderly closure, capping and restoration of the landfill site at Muckish Gap. The site is in the headwater catchment of the Ray. Capping and restoration are complete and the site is now in a phase of monitoring. Frequency of monitoring may not be compliant with licence conditions and should be reviewed.

Conditions are set in licences in relation to quality and volumes of emissions, and the monitoring regime required to assess compliance. However in the case of both Cassidy Brothers and MOWI, monitoring is based on grab samples, or sometimes composite sampling taken at extremely low frequencies (monthly, quarterly or even annually). Such sampling is not capable of assessing compliance in a meaningful environmental way that offers real protection to receiving waters. Episodic pollution events will not be detected and may be of extreme and long lasting environmental consequence. For example damaging deposition of sediments on stream beds from episodic release events cannot be detected by annual sampling of suspended solids in the receiving water column. This is particularly critical in the context of sensitive habitats and species in receiving waters, such as spawning beds in nursery streams and the Freshwater Pearl Mussel river habitat.

It is not sufficient to state in discharge licences that no deterioration in the quality of receiving waters shall occur. Effluent emission limit values set by Donegal County Council are required to support achievement of good status water quality, and must not result in a deterioration in status or impair the achievement of Water Framework Directive objectives. Sampling regimes should be proportionate and adequate in light of the risks posed. Realistic, robust and transparent monitoring regimes that offer adequate protection to receiving waters must be implemented.

6.2.1 Measures

The primary responsibility for industrial discharges rests with DCC. The CMP 2018-2021 identified that the Section 4 discharge licences relating to the above facilities should be reviewed by the licensing authority (DCC) with regard to monitoring and reporting conditions.

The range of parameters specified for monitoring, emission limit values for some parameters and, in particular, the frequency of monitoring have been identified as deficient and incapable of affording adequate protection to receiving waters. The lack of reporting and interpretation of monitoring results was also highlighted. In the interests of transparency and to ensure a timely environmental assessment of monitoring results, it was proposed that production of an Annual Environmental Report by the licensee, assessing compliance with licence conditions, should be a specified requirement of industrial discharge licences.

6.2.2 Actions Taken

In line with the CMP 2018-2021, a project to investigate sources of silt in rivers was completed in 2021. High frequency data (measurements made at 15 minute intervals), including turbidity records which indicate the amount of silt in water, were collected over a period of 5 months at a station on the Ray River. Findings of the project are comprehensively reported in *Ray River Silt Sources – A Catchment Investigation into Sediment Export* (CAA 2021). This dataset was used to examine the implications of the frequency at which samples are taken and the likelihood of detecting silt pollution events. It clearly indicates the need for high frequency sampling, and recommends the use of turbidity meters as part of the monitoring regime for licenced facilities with potential to release sediments to receiving waters.

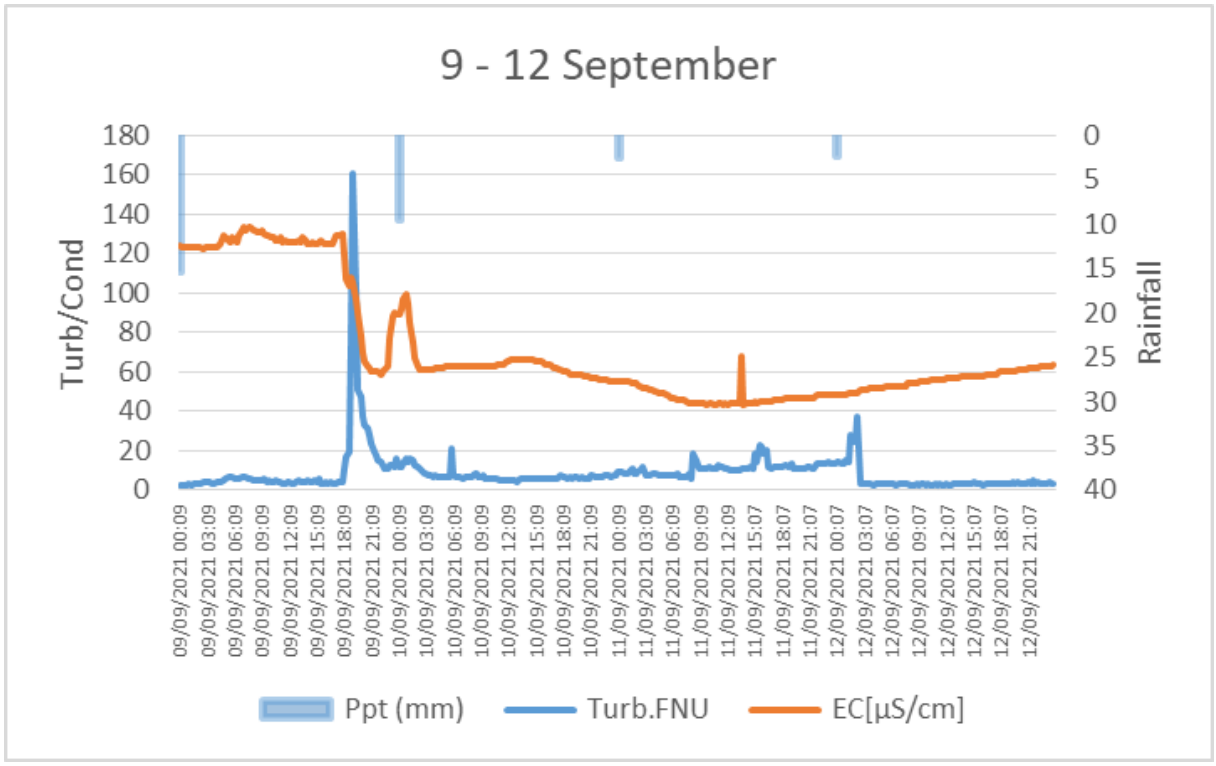

Figure 1 Example of high frequency monitoring showing turbidity and conductivity response to rainfall in the Ray River

Given the scale of operations and the resources of the licensed entities, BATNEEC principles suggest that appropriate monitoring should at a minimum be based on real time continuous turbidity and flow monitoring at points upstream and downstream of discharges.

Consideration should also be given to a requirement for licensees to prepare an annual environmental report (AER) detailing activities carried out at the facilities, summary report on quantities and composition of all discharges, summary of results and interpretation of environmental monitoring, incidents and complaints summaries and any other items or material of relevance to the receiving environment or to compliance with licence conditions.

Ongoing liaison with regulators and agencies with statutory catchment management roles is facilitated through the established Catchment Management Group (CMG). CMG membership includes representatives of DCC, IFI and NPWS. CAA members continue to observe and record environmental conditions and impacts throughout the catchment area and to liaise with other CMG members to effect improvements or resolutions. Some examples of actions taken are provided here.

In February 2020 CAA pinpointed and recorded high silt loads in drainage ditches and in the Owenwee River downstream of a licensed facility and extensive earthworks (Figure 2). The Owenwee has been identified as a potentially important fishery nursery stream and IFI have undertaken to do some work on it. Liaison with DCC confirmed they were aware of the silt pollution issues and that authorised officers were investigating. On the basis of their investigations an enforcement notice was issued under Section 14 of the Waste Management Act in January 2020 to halt polluting activities.

Figure 2 Drainage ditch and Owenwee River with high sediment loads

As a result of illegal quarrying at Muckish Gap, CAA undertook sampling of discharges and drainage waters in the upper Ray catchment. This is discussed in greater detail below. However, the scale of the illegal quarrying operations, and its situation adjacent to the Muckish landfill site, raised serious concerns about potential impact on the landfill, engineered containment structures and local geohydrology. These concerns were raised with DCC, who manage the landfill site, and an urgent assessment requested.

6.2.3 Actions for CMP 2022-2025

Targets and objectives set in the previous CMP remain current. The ongoing review of Section 4 licenced discharges will remain as a priority for the current 2022-2025 planning cycle. CAA will liaise with DCC in relation to licence conditions and compliance with emission limit standards.

DCC have visited the illegal quarry site on several occasions and are pursuing a legal resolution to the quarrying issue. However, there has been no formal assessment of the hydrological or environmental impacts of the illegal quarrying in relation to the Muckish landfill. CAA will continue to monitor the situation. Liaison with DCC, other relevant regulators and concerned groups and organisations will continue to highlight the need for rigorous and timely application of legislation.

6.3 Bank Protection

River courses are not static features, but change over time. Some amount of erosion and channel alteration is acceptable and even desirable. Sporadic flooding, bank erosion and resultant deposition of gravel and other materials are natural phenomena which play an integral part in the development and maintenance of fish spawning and nursery areas. Therefore it is not the intention of the CMP to prevent all erosion within the catchment. Where erosion is excessive due to anthropogenic pressures, or where critical infrastructure is threatened, it may be necessary to intervene by way of mitigation measures. Such measures will be appropriate to the local scenario, but will favour soft, green measures and removal of pressure sources. Hard engineering solutions or rock revetments will only be measures of last resort.

Recent significant erosion of banks at several locations on the Ray and Tullaghobegly rivers have been repaired. Damage occurs particularly in areas where trampling by animals occurs on steep banks, and where hard rock armour has been put in place and the changed dynamics of stream direction and velocity is creating new pressures and undercutting banks. At some locations boulders have been removed from in-stream positions and placed at eroding sites as bank armour. Some reaches have rock armour that was installed two or three decades ago and perhaps longer.

6.3.1 Measures

CAA will liaise with land owners and IFI to identify areas of eroding bank or banks at risk of erosion and agree a coordinated approach to bank protection. As a general measure to prevent damage to banks, CAA will actively promote good land and stock management practices in its regular meetings and dealings with farmers. This will include emphasis on the need for exclusion of stock from rivers to prevent trampling of banks, and the use of fencing to create adequate buffers.

Through consultation with land owners and river walks CAA will identify vulnerable sites, their proximity to sensitive river stretches, their potential to deliver fine sediment, and to form barriers to fish migration through over-widening. Any actions will be agreed fully with land owners in advance and will only take place with their full co-operation and support. Any measures identified on the Tullaghobegly River should be cognisant of the possible presence of Freshwater Pearl Mussel populations downstream of any proposed works.

The optimal sustainable solution to bank protection will entail protection through establishing vegetated riparian buffer strips and planting with native species mixes and trees such as willow and

alder. Other species may also be considered to maximise biodiversity benefits, and CAA may seek support under Coillte's Native Woodland Scheme for specific planting projects at key sites where land owner agreement is forthcoming and sufficient land is available.

If rock armour is used, it will be accompanied by energy dissipating mechanisms (e.g. deflectors, Christmas tree fenders) in the phased re-establishment of stable vegetated banks. Replacement of in-stream boulders will be considered in some circumstances. CAA will liaise with IFI and other agencies to secure resources for essential bank restoration/protection measures. Method statements will be prepared in advance of individual works. IFI is also responsible for preventing prohibited habitat manipulations, inappropriate bank alterations and in-stream works.

6.3.2 Actions Taken

CAA has liaised with landowners and IFI to have appropriate and essential bank protection measures implemented at locations on the Ray and Tullaghobegley rivers. These works have included willow planting, bank re-profiling and installation of set-back fencing to prevent trampling of banks. Where animal access to rivers has been removed, nose pumps were supplied to landowners for watering cattle.

In 2021 CAA secured funding from LAWPRO for a bank protection and habitat enhancement project addressing pressures along a 1km stretch of the Tullaghobegley River. This work is reported in the *Tullaghobegley Bank Protection and Habitat Enhancement Project Report* (CAA, 2021).

The reach which is the subject of this project is in the Tullaghobegly_020 River Waterbody. This is currently at WFD Good Status and is assigned to 'Not at risk' category in the WFD Risk 3rd Cycle. The accuracy of this latter categorisation has been questioned for reasons set out in the CAA Catchment Management Plan. CAA believe the waterbody to be at risk.

The surrounding land use is pasture, improved grassland and bog, with some coniferous forestry. At the upper extent of the project reach there is excessive macrophyte growth (*Callitriche*) in the channel which is associated with silt deposition. Areas of clean gravels with coarse cobble are present and provide spawning grounds for salmon and sea trout and habitat for a population of the Freshwater Pearl Mussel (FPM).

A riparian buffer zone has been established along this 1km reach and an additional 595m of fencing installed. Nose pumps were provided for watering cattle. Tree planting at appropriate locations to establish riparian woodland and copses has been carried out in conjunction with NPWS. Species planted include birch, alder, oak and holly. Where banks have been reprofiled, a species diverse mixture of native grasses and herbs suitable for acid soils have been used to re-seed bare soils (Table 3).

Figure 3 Fencing installed along Tullaghobegley main channel and tree planting on flood plain and along drainage ditch

Initial contacts in relation to participation in the Native Woodland Scheme have indicated that planting on peaty soils is not likely to be considered for funding. CAA will investigate this further, and believe that the large scale mapping of peaty soils overlooks the small scale mosaic of suitable sites that occur within such areas.

Table 3 Species mix typical of that used for re-seeding exposed acid soils and reprofiled banks

ACID SOILS

%	COMMON NAME	SPECIES	HEIGHT CM	COLOUR	PERIOD
20% WILD FLOWERS:					
1	BETONY	STACHYS OFFICIANLIS	30-80	Purple	June - Sept
1	BIRDSFOOT TREFOIL	LOTUS CORNICULATUS	5-40	Yellow	June - Aug
9	BLACK KNAPWEED	CENTAUREA NIGRA	30-80	Purple	June - Sept
2	COMMON CATS EAR	HYPOCHAERIS RADICATA	15-60	Yellow	June - Sept
2	COMMON STORKSBILL	ERODIUM CICUTARIUM	5-30	Pink	April - Sept
1	DEVILS BIT SCABIOUS	SUCCISA PRATENSIS	20-80	Lilac	July - Sept
2	FOXGLOVE	DIGITALIS PURPUREA	50-150	Purple	June - Sept
9	FRAGRANT AGRIMONY	AGRIMONIA PROCERA	40-150	Yellow	June - Aug
5	GREATER BIRDSFOOT TREFOIL	LOTUS ULIGINOSUS	50-60	Yellow	June - Aug
2	HEATH BEDSTRAW	GALIUM SAXATILE	5-30	White	June - Sept
11	LADY'S BEDSTRAW	GALIUM VERUM	50-80	Yellow	June - Sept
11	MEADOW BUTTERCUP	RANUNCULUS ACRIS	30-100	Yellow	May - Sept
6	OXEYE DAISY	LEUCANTHERMUM VULGARE	20-100	White	May - Oct
6	RAGGED ROBIN	LYCHNIS FLOS-CUCULI	30-80	Red	May - June
2	SHEEPS SORREL	RUMUX ACETOSELLA	30-100	Pink	May - June
4	SNEEZEWORT	ACHILLEA PTARMICA	20-150	White	July - Sept
6	SORREL	RUMEX ACETOSA	30-100	Pink	May - July
7	TUFTED VETCH	VICIA CRACCA	100-200	Purple	June - Aug
6	YARROW	ACHILLEA MILLEFOLIUM	20-45	White	June - Oct
7	YELLOW RATTLE	RHIANTHUS MINOR	15-40	Yellow	May - Aug
80% GRASSES:					
5	BROWNTOP BENT	AGROSTIS CAPILLARIS	10-70		
3	SWEET VERNAL GRASS	ANTHOXANTHUM ODORATUM	10-100		
38	CRESTED DOGSTAIL	CYNOSURUS CRISTATUS	5-75		
4	WAVY HAIRGRASS GRASS	DESCHAMPSIA FLEXUOSA	20-100		
10	SHEEPS FESCUE	FESTUCA OVINA	20-60		
40	CHEWINGS FESCUE	FESTUCA RUBRA COMMUTATA	20-100		

Other aspects of this project relating to mitigation of land drainage works are referred to below.

6.3.3 Actions for CMP 2022-2025

Targets and objectives set in the previous CMP remain current. CAA will continue to collaborate with NPWS to plant trees in appropriate catchment settings. These will be small stands of suitable tree species in areas not likely to attract funding under native woodland or riparian woodland schemes. Such stands will help to create a mosaic of habitats with positive benefits to biodiversity, and also with a role in providing bank protection and mitigation of sediment (and associated P) losses in surface flow events.

6.4 Land Drainage

The extent of land drainage for agriculture, forestry and peat cutting has increased significantly in recent decades facilitated to a large extent by ready access to diggers, and promoted through financial drivers of intensification. Drainage may be by open ditches (sheughs or dykes) or by tile drainage. Both systems result in rapid transport routes for drainage water and sediment to receiving streams/rivers and can therefore intensify the severity of flood events and increase sediment loads.

Appropriate ditch design and management can provide opportunities for sediment to settle before reaching sensitive rivers. Examples include simple measures such as terminating ditches before they reach the stream and leaving a buffer across which drainage water can diffuse, or creating in-ditch or end-of-ditch sumps for settlement. To improve sediment retention during ditch management works, only the bed of ditches should be cleaned and the banks left vegetated, and ditches should not be over-deepened.

6.4.1 Measures

CAA will liaise with local landowners and contractors involved in drainage works to advise on best practices for drainage design and management as outlined in various agency and sectoral guidelines, including the Transport Infrastructure Ireland (TII) series (2015); CIRIA (2010), O'Grady (2006), OPW (2019), Teagasc (2013; 2021).

While undertaking river walks, CAA will identify land drainage features with potential to impact surface waters by delivering significant sediment loads to streams. These will be considered for mitigation works and/or referred to the relevant agency for implementation of appropriate measures where feasible.

6.4.2 Actions Taken

CAA has had informal discussions with Cill Ulta (LAN Ctr), Centre for Sustainability in relation to their EIP-AGRI project, Cúlra Créafóige, to promote best practice drainage solutions. Cúlra Créafóige is working in conjunction with local landowners to return abandoned lands to cultivation based on principles of sustainability and biodiversity. At one site where subsoil drainage was installed, Cill Ulta adopted CAA proposals and installed a pond at the discharge point of land drains. This pond will provide settlement opportunities for sediment and also enhance local biodiversity.

Figure 4 Pond installed by Cúlra Créafóige at discharge point of subsurface land drains in the Ray Catchment during construction, and 6 weeks later with some macrophyte planting (Iris, Nymphaea, Stratiotes, Caltha, Menyanthes)

The Tullaghobegley bank protection and habitat enhancement project, managed by CAA and with funding from LAWPRO, has been mentioned above in relation to bank protection works. It also included drainage mitigation aspects.

Approximately 7 existing drains (sheughs) were identified in the project reach that required mitigation measures to reduce silt export to the river. These drains were culverted at their lower end using local angular quartzite stone with soil dressing to form the embankments, and corrugated plastic land drain pipes. The channel was deepened and sometimes widened upstream to create settlement sumps or ponds. Culverts are free flow under normal conditions and general ditch bed slope was retained at the invert of the culvert inflow pipe. Pipes were sized to match the flow experienced in drains, and generally 230mm or 300mm diameter. If necessary, large rocks were placed at outlets for energy dissipation and to prevent scour. Settlement sumps were also fenced to exclude animals.

Hay bales were used to block the ditch outfall prior to commencing works and works were only carried out in dry/low flow conditions. Consideration has been given to ditch and sump maintenance, and CAA will work with the landowner to ensure implementation of best practice during drain management to mitigate any environmental impacts and maintain biodiversity.

Figure 5 Drainage ditch with settlement/biodiversity pond construction (now fenced) showing culvert pipe and angular quartzite stone.

Such retention ponds/wetlands have an indicative suspended solids removal capability of 60% (DN-DNG-03022, TII 2015). The stretch of river involved was identified as an area in which silt impacts were occurring. It is also a reach of the river that supports a population of the Freshwater Pearl Mussel (FPM). The *Tulloghobegley River Catchment Characterisation* report (2014) estimated that a population of about 550 individual mussels was present in the river. It also stated that the Tullaghobegley has good stable substrate across a wide range of the river and has the potential to support a large *Margaritifera* (FPM) population if the condition of the habitat could be maintained in good status without periods of nutrient and sediment pollution. The landowner was well disposed to enhancement works and measures to help conserve FPM and increase biodiversity, and was closely involved in project execution.

6.4.3 Actions for CMP 2022-2025

Targets and objectives set in the previous CMP remain current. CAA will continue to collaborate with landowners to identify and mitigate drainage impacts, particularly silt export to streams. Tree planting as outlined above will also provide mitigation along drainage paths.

6.5 Fish Stocks

IFI is the statutory agency with responsibility for fisheries management. However, CAA have entered a formal partnership agreement with IFI to cooperate in the joint management of the Tullaghobegly and Ray Fishery. CAA, with its intimate knowledge of the area and its relationship with other catchment stakeholders, will facilitate, augment and help to inform measures required for management of fish stocks.

It is critical that a robust baseline is established to allow assessment of future stocks and the effectiveness of measures being implemented. CAA will support IFI in determining/implementing appropriate management targets based on conservation limits, stock diversity (e.g. genetics, age composition, run-timing, etc.). A number of measures are identified in relation to fish stock conservation.

6.5.1 Measures

Fish Stock/Habitat Assessment

Understandably much of the resource available is applied to main channels in the catchments. Many small streams (and some larger channels such as the Lough Agher River) provide important spawning and nursery habitat and their fishery status should be assessed. Given the size of many of these streams even small scale pressures and morphological changes can result in significant local impact. In such cases restoration works may be required and should be prioritized based on fisheries criteria including consideration of genetic diversity. CAA will liaise with IFI partners in informing the focus of resources for improving and restoring degraded salmon habitat in prioritised catchment areas by agreement.

While there is no substantial spring fishing tradition in the catchments, spring salmon have been taken in the past. An assessment of MSW (multi-sea-winter) stock would add to the data for assessment of conservation limits and help to inform a management programme.

As part of a major national and regional initiative to document, measure and examine all potential natural and man-made barriers (e.g. bridges, culverts and road crossings) to determine the extent of ‘available’ habitat to migratory fish species, IFI have completed a barriers assessment for the Tullaghobegley, Ray and Glenna rivers in the Tullaghobegly_SC_010 sub-catchment. All were assessed as having few or no man-made barriers of significance, although several structures were

identified which merit further investigation to see if modifications can be made to assist fish migration at low water.

Fish Stock Enhancement/Protection

In the face of ever declining fish stocks, it may be necessary to consider stock enhancement through measures such as increased protection, or novel approaches such as fry relocation to upstream sanctuary or high status areas. Increased protection may be afforded through designation of sanctuary areas or promotion of voluntary catch-and-release, or no-fishing areas.

Biosecurity measures and contingencies to prevent the introduction or spread of disease, non-native salmon, or invasive alien species should be promoted and implemented. This is particularly relevant to visiting anglers and the smolt rearing operation at the MOWI facility.

Unauthorised In-stream Works

Unauthorised or illegal habitat manipulations occur in the catchment (e.g. gravel extraction, channel alterations/deepening). Regulators must be proactive in addressing such issues and coordinate implementation of their statutory roles to maximise effect.

Poaching

CAA is rooted in the local community and hears much anecdotal evidence of poaching activity. Physical evidence in the form of nets is also often encountered and IFI have taken prosecutions for illegal possession and sale of wild salmon. The Ray and Tullaghobegly are small rivers without many large deep pools or lakes in the catchment accessible to fish. Fish stocks are therefore particularly vulnerable to illegal catching. Stock estimates used in setting conservation limits suggest the number of fish running in the catchment is roughly 250 in the Ray, and 140 in the Tullaghobegley (less than 400 fish in both catchments combined). In the context of such small stock numbers even low levels of poaching will have profound impacts. An evidence based assessment of the extent of poaching activity and unreported/illegal catch should be undertaken.

Coordination and Communication

Structures or systems are required to ensure good communication and co-operation between fisheries partners and stakeholders (Inland Fisheries Ireland, angling clubs / fishery owners) which can help identify issues that may impact the fishery and are vital for coordinating responses.

Public awareness material should be made available highlighting the precarious nature of salmon stocks in the catchments, and setting out activities that are beneficial or detrimental to the riverine environment.

6.5.2 Actions Taken

CAA have established a CMP Group that facilitates liaison between catchment stakeholders and groups. Membership of the group includes representation from the local Tidy Towns Committee, Irish Farmer's Association and Hill Sheep Farmers, Local Authorities Water Protection Office (LAWPRO), National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (IFI), Donegal County Council, Cloughaneely Anglers Association (CAA), and the salmon smolt production facility MOWI. CAA provides administrative support for the group; chairing and documenting meetings and actions; disseminating relevant information, reports and newsletters; and coordinating activities. The diversity of interests represented in the group, with access to a variety of resources, has enabled delivery of a number of projects, and allowed input to environmental activities of other groups active in the Ray/Tullaghobegley catchments and elsewhere. Through the CMP Group, CAA has participated in and contributed to the Local Authorities Waters Programme including annual seminars e.g. most recently a presentation by the CAA Chairperson on 'Planning for Success in River Projects - Rivers Ray and Tullaghobegley' at the Communities Caring for Water 2021 Conference.

CAA has also revised and updated its website (https://cloughaneelyanglingassociation.com/) and provides relevant catchment information and reports through that platform. Angling maps are also provided showing access routes and river pools. A map of Ballyness Bay and some angling guidance is also provided as part of CAA's aim to promote and develop sea trout angling in the estuarine waters of Ballyness Bay.

The CMP Group has been working closely with the Save Ballyness Bay committee to prepare submissions on behalf of the local community in relation to proposed aquaculture ventures in the Bay. This collaboration has further extended to the preparion of a comprehensive community submission proposing a Marine Protect Area centred on Ballyness Bay.

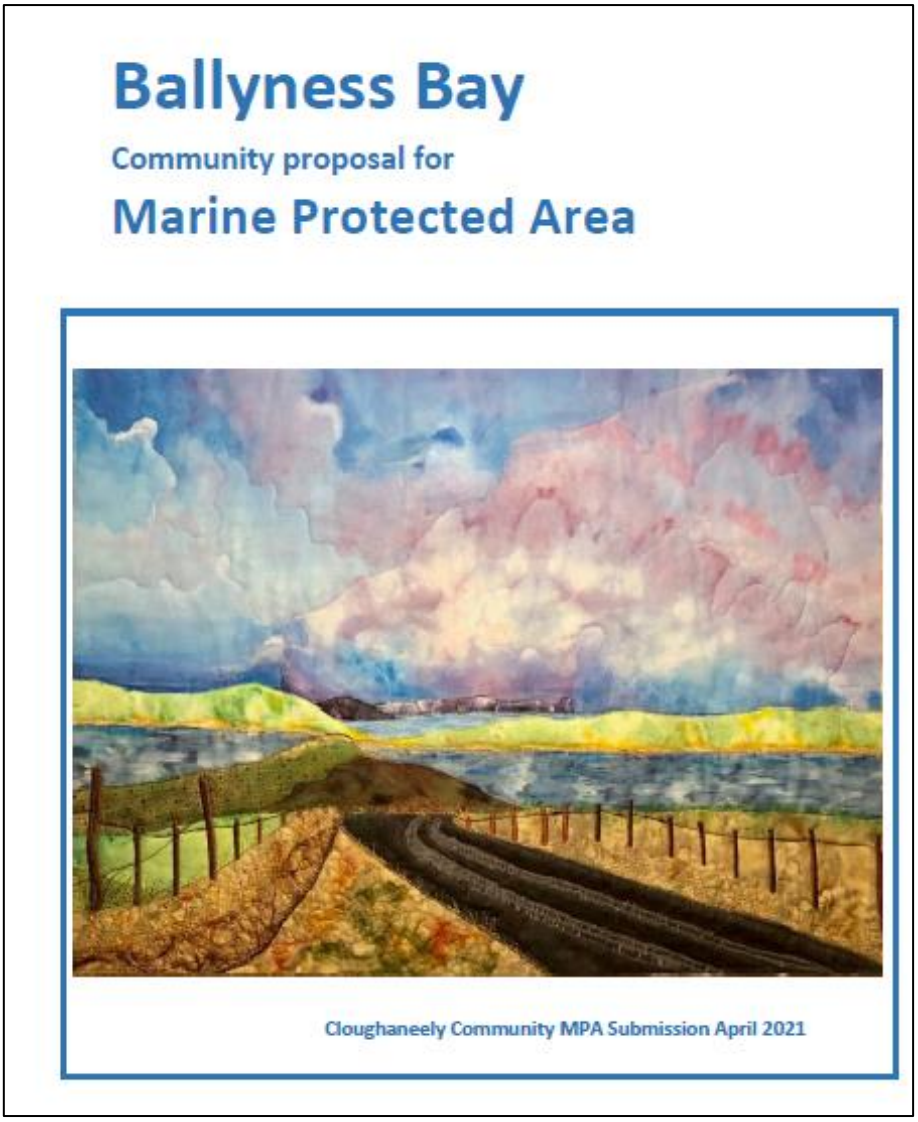

Figure 6 Proposal for establishment of a Marine Protected Area at Ballyness Bay

Through the CMP Group, CAA provided input to a walking guide at Ballyness Bay. The booklet was published in 2019 by Coiste Glan agus Glas agus Cósta Glan agus Glas An Fhál Carraigh (Falcarragh Tidy Towns Committee and Clean Coast Committee) and is available on line at http://falcarragh.ie/wp-content/uploads/2019/10/Ballyness_Way_Booklet_AW_update.pdf
The guide provides information on heritage, flora and fauna encountered along the walking route. It is divided into four short sections: Heritage; Ballyness Bay; The Dunes; Drumnatinny Beach. Links to other sites of interest are also included.

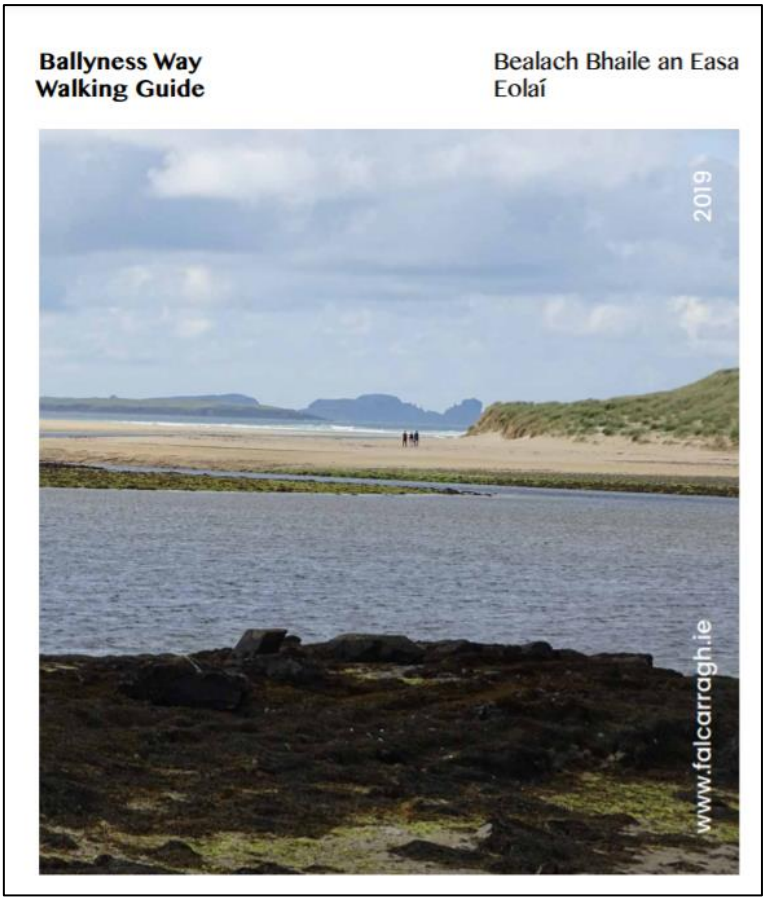

Figure 7 Ballyness Way Guide booklet produced with input through the CMP Group

CAA, as co-managers of the fishery, have liaised closely with IFI in relation to fishery issues during the previous catchment management cycle. IFI has supported CAA in several developments including the improvement of access to the fishery for anglers, essential bank protection measures, sponsorship of laboratory analysis of water samples during project work, and the establishment of a sanctuary area at the Bawaan pool on the Tullaghobegley.

IFI has also provided statutory regulatory responses to relevant catchment issues when requested. These have included surveillance and prosecution in relation to illegal fishing offenses, and actions pertaining to unauthorised habitat works or polluting activities.

As part of its catchment characterisation and fishery development works, CAA has undertaken a number of projects. Two of these relate to hill loughs and the upper catchment areas of the Ray and Tullaghobegley rivers. Loughs are key hydrological, physicochemical and ecological components of the catchment system, providing buffering of river flows and flood events, basins for silt deposition, habitats for unique flora and fauna, and refuges for fish populations. Situated as they are in the upper catchment areas, the protection and management of lake water quality is critical to water

status throughout the rest of the catchment. CAA also recognizes the inherent value of these lakes, their importance as centres of biodiversity and as sources of recruitment for fauna and flora to other catchment areas adversely impacted by pressures.

A study of upland loughs in the Ray catchment was carried out in 2019 with support funding from the LAWPRO Community Water Development Fund. A second study of loughs in the upper Tullaghobegley catchments was completed in 2020, again supported by LAWPRO and also with sponsorship of laboratory analyses of samples by IFI. Upland Lakes Project reports were published (CAA 2019, 2020) and are available on the CAA website.

6.5.3 Actions for CMP 2022-2025

CAA will continue to support the CMP Group and promote coordination of agency and other stakeholder work. CAA will collaborate with Group members in areas of mutual interest and benefit to the catchment environment and in the dissemination of information.

CAA will maintain collaboration with IFI in gathering information on salmon and trout stocks in the catchment and in establishing baseline data. This will include prioritising critical streams for habitat assessment and possible restoration/remediation works. CAA will liaise with IFI to identify other potential barriers to fish passage in the catchment area not included in the recent IFI barriers study. The assessment of MSW stock will be retained as an objective for this management cycle.

The CAA website will be updated as required, and information relating to fishery conservation measures will be uploaded. Additional material for educational and information purposes will be developed, and CAA will continue to participate in Rivers Trust networking events.

Further measures for conservation of salmon stocks will be considered. These may include designation of further sanctuary areas, and promotion of voluntary no-fish reaches.

CAA will continue to support IFI in the implementation of measures to prevent illegal fishing and to prevent prohibited habitat manipulations, and pollution events.

6.6 Illegal and Polluting Discharges

A number of events entailing pollution of catchment streams by sediments released from licensed and unlicensed works were detected and reported by CAA to regulatory authorities during the recent catchment management cycle 2018-2021.

The operation of an illegal quarry at Muckish first came to CAA's attention on 1st March 2021 through reports from its membership. Subsequently CAA became aware that Donegal County Council had been dealing with the matter for some time in advance of this date. The operation and expansion of illegal quarrying activity in the upper Ray catchment over the course of 2021 became an increasingly urgent focus of attention.

Quarrying at this site entails excavation and screening of rock and transport off site by lorry. Substantial amounts of water ponded in operational areas were found to be discharging through piped and excavated drains to the Ray River (Figure 8). The extensive stripping of surface vegetation and soils, along with excavations, including the construction of lagoons, has resulted in mass mobilisation of sediments and ongoing pollution of the river through discharge of heavily silt-laden waters.

Figure 8 Illegal quarrying in upper Ray catchment and discharges of polluting material to the Ray River

6.6.1 Measures

CAA will continue to monitor catchment waters for polluting discharges. Where such discharges are detected they will be reported to the appropriate regulatory authority for action.

Section 3 of the Local Government (Water Pollution) Acts (1977 – 1990) places a general prohibition on the entry of polluting matter to waters, and provides for daily fines in the case of a continuing contravention. A prosecution for an offence under this section may be taken by a local authority, a board of conservators, the Minister for Fisheries or any other person. In considering the licensing of trade and sewage effluents under Section 4 of the Act, a local authority shall not grant a licence under this section in respect of the discharge of an effluent which would not comply with, or would result in the waters to which the discharge is made not complying with, any relevant standard prescribed in the Act.

Where the remits of individual agencies in enforcement overlap, all agencies should deploy the available legal instruments relevant to them to maximise the effectiveness of enforcement responses. Legislative solutions can be extremely onerous and lengthy, particularly enforcement action such as a planning injunction requiring a development to cease or be removed. This may allow significant environmental damage to continue while a resolution is being pursued. When this occurs it can be extremely demoralising for those involved in catchment protection. CAA believes that in emergency cases of significant and ongoing pollution agencies should invoke the provisions of the Water Pollution Act as outlined above to effect an immediate cessation of discharges and if necessary to recover costs for primary, complementary or compensatory remediation as specified in the Environmental Liability Regulations. Administrative sanctions, that is non-criminal sanctions available to regulators by virtue of existing environmental legislation and which do not require intervention by a Court or Tribunal, should be considered in many circumstances. These include an enforcement notice or clean-up order, regulator step-in and recovery of costs order, fixed/variable/discretionary penalties, compensation order, enforcement undertakings, and name and shame/publicity orders.

6.6.2 Actions Taken

CAA undertook water quality monitoring in relation to discharges from the illegal quarrying activity at Muckish during 2021 and provided results to regulators including DCC, IFI and EPA. Results of this monitoring have been documented in *Ray River Silt Sources – A Catchment Investigation into Sediment Export* (CAA 2021). High turbidity events coinciding with quarrying activity were detected in the Ray River and affected reaches at least 5km downstream (Figure 9).

Figure 9 The left panel shows sediment pollution in the Ray River 5km downstream of the illegal quarry 3 May 2021. The right panel shows the same site in similar flow conditions in the absence of silt pollution

The principal issues of concern in relation to the illegal quarrying operation were notified to the regulator and are listed below.

- The quarrying operation has no planning permission, and no application for planning permission had been submitted to date
- Excavations associated with the quarry are taking place at the boundary of an engineered municipal dump site with a high risk of disruption of hydrology and groundwater flows, and possible damage to containment structures
- There has been no Environmental Impact Assessment, and no Habitats Directive Assessment
- In the absence of planning consents, there is no environmental plan to mitigate quarrying impacts or consideration of noise, vibration, dust, effects on the amount and quality of water, lowering of the water table, effects on the natural heritage, the cultural heritage, landscape, traffic and waste materials
- No monitoring regime and compliance conditions are in place
- There is no operational landscaping scheme, no after-life site restoration scheme, and no lodgement of bond or financial contribution by the operators to ensure satisfactory reinstatement of the site
- Wide heavy vehicles are operating on narrow and winding mountain roads, especially dangerous in the absence of a lead warning vehicle, with risk of damage to, or catastrophic failure of stone bridges of heritage value, used as roosting sites by bats and nesting sites by dippers, due to road transport of excessive loads of quarried material

- Soiling of local roads is occurring in the absence of wheel wash facilities, and sediment contamination of local road drainage which discharges to a salmonid river
- Un-vetted and unreviewed plans for settlement lagoons developed unilaterally by the operator have been allowed with potential for exacerbation of environmental damage

Other events entailing groundworks impacting the Owenwee River and Tullaghobegley were noted. Liaison with DCC and IFI resulted in inspections by regulators. In the case of the Owenwee works which were ongoing in January 2020, an enforcement notice was issued on the basis of inspection under Section 14 of the Waste Management Act.

6.6.3 Actions for CMP 2022-2025

CAA, through its managerial role in the fishery catchment, and through the established CMP Group, will continue to advocate for orderly development in compliance with statutory instruments and systematic prior assessment of proposals. It will seek access to all relevant statutory or ad hoc monitoring by regulators in the Tullaghobegley and Ray catchments. A synopsis of compliance levels with regulatory standards based on this data, and the required frequency of monitoring during the previous catchment management cycle will be incorporated in future CMPs.

6.7 Environmental and Fisheries Enhancement

The local catchment community has a strong and growing awareness of the environment in which they live and issues that may impact it. This has been heightened by recent developments and projects within the catchment area. These include proposals for an industrial scale aquaculture development in Ballyness Bay resulting in the mobilisation of community opposition and the formation of the 'Save Ballyness Bay' group. The local Tidy Towns committee is developing and promoting walking routes, which are supported by environmental information material in publications and on strategically placed signage. The work of CAA and its partner organisations in developing and maintaining catchment infrastructure has resulted in a modest resurgence in angling interest and the environmental awareness it brings.

6.7.1 Measures

CAA will continue to support local groups in developments and projects that promote environmental awareness raising and improvement. It will do so through material posted on its own website and through contributions to material being developed by other organisations and groups.

CAA will, in particular, seek to enhance the riverine environment for biodiversity benefits and fish stock improvements though its own resources and in collaboration with other groups.

In general, CAA will continue to liaise with IFI and NPWS in particular to assess riverine habitats and remediate if necessary, and to plant suitable tree species at appropriate locations. Where riparian buffers are being created, or land works offer opportunities, CAA will promote the use of native species-rich reseeding mixtures.

CAA will continue to raise awareness of the importance of proper drain management and promote installation of settlement sumps and ponds when possible.

6.7.2 Actions Taken

A number of initiatives aimed at habitat enhancement were undertaken during the previous management cycle. Some of these have been mentioned above in relation to bank protection and land drainage measures.

In partnership with the land owner and NPWS, CAA have planted a mix of alder, oak, birch and holly at strategic locations along the Tullaghobegley. All trees were of local provenance and provided by NPWS (Figure 10).

Figure 10 Trees ready for planting and planted area in background

CAA has contributed environmental material to public awareness publications produced by the local tidy towns committee.

6.7.3 Actions for CMP 2022-2025

CAA is currently liaising with Coiste Glan agus Glas an Fhál Carraig to prepare an information booklet relating to the newly developed railway walk which passes through the Ray and Tullaghobegley catchments. The booklet will include information on flora and fauna encountered, an interpretation of the local geology and geomorphology and information on the river and lake habitats along the route. Publication is anticipated in 2022.

In recent years heavy macrophyte growth in the upper Tullaghobegley River has been noted. The growth is primarily of *Callitriche*, but with abundant *Potamogeton* in some locations (Figure 11).

Figure 11 Macrophyte growth in the upper Tullaghobegley Rive – Callitriche top and bottom right, and Potamogeton with some Callitriche bottom left.

The profuse growth is problematical in a number of ways. Most importantly, it promotes settlement and accumulation of silt on the river bed. This is of particular concern as this reach of the river

supports a population of the freshwater pearl mussels. Juvenile mussels cannot survive under such conditions. Deposition of silt results in loss of salmonid spawning habitat and the profuse growth interferes with angling. Silt deposition (and the nutrients it contains) promotes further macrophyte growth and exacerbates the problems.

The fundamental cause of increased macrophyte growth in recent years is almost certainly the very substantial increase in phosphorus inputs upstream from the MOWI smolt production facility. CAA will seek to address the issue in this present management cycle through liaising with agencies and MOWI to confirm the source of the problem and seek a sustainable long term resolution. Short term interim interventions will also be considered given the urgency of the situation and the implications for the threatened and dwindling pearl mussel population in the river.

Herbicidal treatment is not an option, but some form of physical intervention may be appropriate. This could be in the form of manual removal of excessive plant biomass, although concerns regarding any pearl mussels present would need to be addressed, or instream manipulation. The latter method is currently being widely applied by IFI in rivers in a western catchment. It entails use of deflectors, V-dams and other instream structures to modify flow regimes. Used judiciously, this technique can help to scour weed and silt beds. Detailed discussions with IFI and NPWS will inform any actions selected.

That the rare and endangered FPM persists in the Tullaghobegley is a crowning jewel in catchment biodiversity. However, due to the ongoing loss of suitable FPM habitat in the Tullaghobegley, the dwindling population is now at crisis point. In the absence of immediate and effective actions the FPM will become extinct in the river over the coming years. The current population is estimated at no more than 560 individuals, comprised entirely of adult mussels, half of which are over 100 years old. Although still capable of reproduction, the population is overly dispersed and suitable juvenile habitat is lacking. The salmonid hosts necessary for glochidial development may not be sufficiently numerous or available to remaining mussels.

CAA will liaise with agencies to seek a re-assessment of the FPM population in the river in order to formulate conservation strategies. All potential conservation strategies will be considered, including habitat manipulations and captive breeding for eventual restocking, and enhancement of the remaining mussel population.

6.8 Invasive Alien Species

CAA is very aware of the fundamental importance of biodiversity in maintaining robust and sustainable ecosystems. In recent years the Association and its members have noted a growing threat from invasive alien species (IAS) in our catchments. In particular Himalayan balsam (*Impatiens glandulifera*), Japanese Knotweed (*Fallopia japonica*) and Himalayan Knotweed (*Persicaria wallichii*) occur widely and are spreading vigorously. While Giant Rhubarb (*Gunnera*) and Giant Hogweed (*Heracleum mantegazzianum*) occur in the county, they are not as yet problematical in the catchment. All these species are listed in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (Non-native species subject to restrictions under Regulations 49 and 50) which prohibits their introduction and dispersal.

The ways in which IAS negatively impact on native biodiversity are numerous. They may cause disease, act as predators or parasites, act as competitors, alter habitat, or hybridize with local species. Once introduced, control, management and possible eradication of IAS can be very difficult and costly. Therefore early detection and reactive measures are desirable.

Himalayan balsam and both Japanese and Himalayan Knotweed are now widely distributed in the Ray and Tullaghobegly catchments, particularly in the lower catchments. They can all spread rapidly; balsam through abundant seed production, and knotweed by dispersal of rhizomes and stems.

6.8.1 Measures

CAA will continue to promote awareness of invasive plants in the catchment, particularly amongst those involved in earthworks or land management. CAA will report new records of IAS to the National Biodiversity Data Centre using the https://invasives.ie/ platform.

Anglers are very familiar with normal local riverine fauna and flora. The committee will communicate any new threats and reports of invasive species to members e.g. the detection of Pacific Pink Salmon in nearby catchments or the presence of Pacific oysters in Ballyness Bay.

6.8.2 Actions Taken

CAA river work teams are alert to the potential of spreading propagules either as seed or stem/root fragments. Toolbox Workshops will be provided as required to update team members in relation to alien species, their identification and occurrence in reaches where works are planned, and measures required to prevent spread or introduction.

Transport Infrastructure Ireland (TII) introduced an eradication programme on selected national roads to treat knotweed infestations, including routes in Donegal. This programme will run in parallel with Donegal County Councils treatment programme on non-national roads. CAA will report roadside occurrences of IAS within the catchment to DCC.

CAA also operates biosecurity measures for anglers at Drumlish Lake. A disinfection station is maintained at the lake and instructions issued to anglers using the facility.

6.8.3 Actions for CMP 2022-2025

CAA members will be urged to report occurrences of IAS within the catchment to the CMP Group members. These reports will be collated and forwarded to DCC or Biodiversity Ireland as appropriate.

7 Concluding Remarks

As with all sectors of society, CAA has been heavily constrained by COVID related restrictions over the duration of the previous CMP. Notwithstanding this, significant progress and works have been delivered. CAA will now take the proposed actions in the present CMP 2022-2025 and prioritise them for implementation in line with available resources.

Through established relationships with other catchment stakeholders, and building on the upswell in public awareness of environmental issues, CAA intends to broaden the base of active voluntary participants in project work, and to provide appropriate opportunites to all who wish to become involved. In the coming cycle we hope to see more 'boots on the ground' and in the water where appropriate and safe.