Lough Mask & Lough Carra (Mayo)

Priority Area for Action

Claureen (Mayo)_010

Significant Pressure Referral to

Mayo County Council – Section 4 licence

Emissions from Ringarraun Quarry

Document Control Sheet

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1 Introduction

The Claureen River was selected within the Lough Mask and Lough Carra (Mayo) Priority Area for Action (PAA) under the 2nd cycle River Basin Management Plan (RBMP). The PAA incorporates the Claureen_010 which flows into the lower Claureen_020 and onwards through Cloon MO lough before discharging into Lough Mask. The Claureen (Mayo)_010 waterbody is monitored for biology only at the EPA operational monitoring station RS30C120400, Bridge in Ballyhean. The waterbody including the main tributaries spans a length of 19 kilometres within a subbasin of 26 km^2, (**Figure 1**). The Claureen River is also included in the proposed expansion of the PAA under the 3rd cycle draft RBMP.

The Claureen (Mayo)_010 is a tributary of the Aille River. The waterbody is *At Risk* of not meeting its environmental objective due to Poor ecological status (2016-2021). The waterbody has remained at a Q3 in 2021. Macronvertebrates is the element driving status. The deskstudy for the PAA suggest that sedimentation and nutrient enrichment are the significant issues for this waterbody.

Initial characterisation (EPA 2015) identified channelisation and extractive activities associated with quarries as the significant pressures on this waterbody. Channelisation is a pressure on the water body as a result of routine maintenance under the Corrib-Mask-Robe arterial drainage scheme. Quarries are point source pressures that can contribute sediment to a waterbody. The quarry located within in the subbasin is approximately 2.7km upstream of the monitoring station Bridge in Ballyhean.

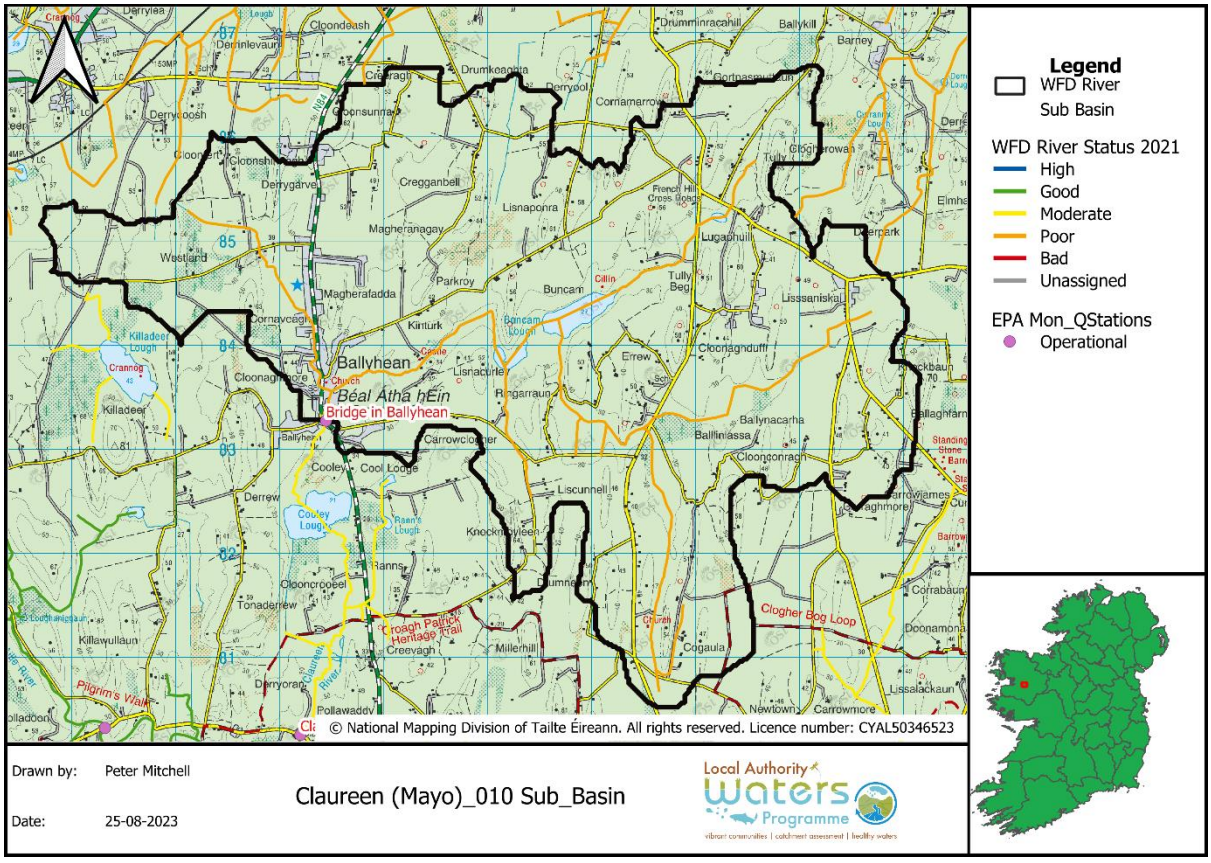

Figure 1: Claureen (Mayo)_010 river sub-basin

2 Ringarraun quarry

Pressures information recorded on the EPA EDEN WFD App states that "*heavy siltation and compacted substrate was recorded during invertebrate sampling*". In combination with impacts associated with arterial drainage operations, the quarry located to the southwest and upstream of Buncam Lough (**Figure 2**) is considered a likely source of sedimentation to the tributary of the Claureen River. Quarry operations at the Ringarraun site are carried out by Corcoran Concrete, whom are based in Westport, Co. Mayo.

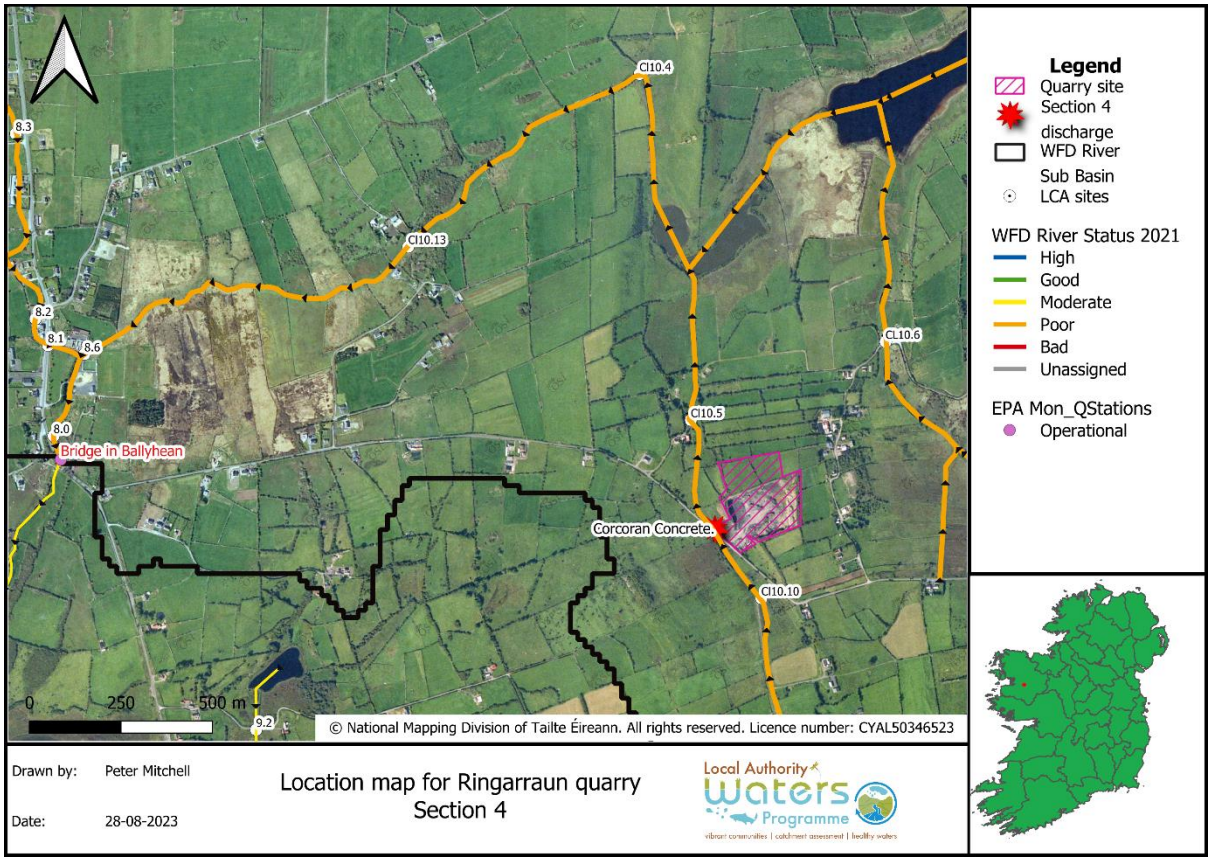

Figure 2: Location of Ringarraun quarry

The enterprise supplies a range of sand and gravel aggregate products. Corcoran Concrete are operating under a Section 4 discharge licence (Ref: **QS-01380**) issued by Mayo County Council. **Table 1** below details the emission limit values (ELV) for trade effluent from the quarry which must be compiled to.

Table 1:Section 4 (QS-01380) discharge licence limits

Parameter	**ELV (mg/litre)**
Maximum BOD	10
Maximum COD	100
Total Suspended Solids	35
Nitrate (NO_3)	50
Total hydrocarbons	1

3. Local catchment assessment

Heavily channelised waterbodies such as the Claureen_010 are often difficult to survey using biological kick sampling due to lack of suitable habitat and compacted benthic substrate caused by morphological and hydrological alterations. During 2023, within this waterbody there was a focus on carrying out chemical and physico-chemical sampling as well as recording physical observations.

During January and July 2023 a sweep of chemistry samples were taken within the Claureen_010 waterbody. Samples were analysed for nutrient parameters (total phosphorus, orthophosphate, ammonia and nitrate) and BOD. In-situ physico-chemical parameters (dissolved oxygen, conductivity, pH and temperature) were also recorded. On both dates sampling included the active outfall discharge from the Ringarraun quarry, which was also analysed for parameters including COD, suspended solids and alkalinity. The results for samples upstream and downstream of the quarry also including that of the EPA monitoring station (Bridge at Ballyhean) are presented in **Table 2** below.

Dissolved oxygen saturation throughout the waterbody was almost uniformly below the concentration that could sustain healthy invertebrate communities (80% saturation). Ammonium breached the Good EQS threshold (0.065 mg/l) at site Cl10.5 D/S Ringarraun quarry during both sampling dates. January's exceedance (2.19 mg/L) was ten times that of July's exceedance (0.212 mg/l). The concentrations of ammonium on both dates were commensurate of that of the level discharging from the quarry outfall on both dates. While ammonium level upstream of the quarry were elevated (0.048 mg/l) in January, there were no ammonium exceedances upstream.

During January sampling a suspended solids level of 45 mg/l was determined from the discharge, which exceeds the ELV of 35mg/l. On any given sampling date, it was not possible to determine the depth of sediment deposition upstream and downstream of the quarry. Surface sedimentation was excessive, and the benthic substrate was too soft to measure with a graduated stick or pole. While the level of suspended solids contravened the discharge licence during January, extensive sediment deposition can be characteristic of a heavily modified waterbody impacted by arterial drainage such as the Claureen_010. To that end it can be difficult to perceive likely improvements with the associated pressure of channelisation continuing.

While there has always been evidence of a sediment issue at the downstream EPA monitoring station Bridge in Ballyhean (RS30C120400) from LCA undertaken by LAWPRO since 2019, it is most likely attributed to channelisation and agricultural pressures throughout the waterbody. A useful methodology for assessing sedimentation in watercourses commonly used by LAWPRO Catchment Scientists is the Shuffle Index. Please refer to **Appendix 1** for an illustrative explanatory guide.

This referral report concludes that extractive industry (i.e Ringarraun quarry) is a significant pressure on the Claureen (Mayo)_010 waterbody and contributing to the sediment issue at the monitoring point which is a significant issue impacting water quality. Elevated ammonium levels immediately downstream of the quarry discharge is also a concern.

Table 2: Chemistry results from the analysis of the foul discharge

Site Name	Location description	Grid Reference ING	Date of assessment	Physico-chemical			Chemistry							
				D.O (%)	Cond. (µS/cm)	pH	OrthoP (mg/l)	Ammonia (mg/l)	Nitrate (mg/l)	T. Phos (mg/l)	BOD (mg/l)	COD (mg/l)	S/S (mg/l)	Alkalinity (mg/l $CaCO_3$)
Cl10.10	U/S of Ringarraun quarry	515332/ 782904	19/01/2023	70	582	7.44	0.018	0.048	1.314	<0.02	<1			
Cl10.5.1	Ringarraun Quarry outfall	515197/ 783104			614	7.6	<0.006	1.33	2.699	0.02	<1	20	45	256
Cl10.5	D/S of Ringarraun quarry	515143/ 783393		73.6	611	7.56	<0.006	2.19	2.808	0.02	<1			
8.0	Br. in Ballyhean (RS30C120400)	513405/ 783261		74.3	467	7.09	0.032	0.023	1.154	0.04	<1			
Cl10.10	U/S of Ringarraun quarry	515332/ 782904	19/07/2023	52.1	673	7.26	<0.006	<0.02	0.883		<1			
Cl10.5.1	Ringarraun Quarry outfall	515197/ 783104		58.2	687	7.41	<0.006	0.207			<1	26	<2.5	336
Cl10.5	D/S of Ringarraun quarry	515143/ 783393		18.9	688	7.57	<0.006	0.212	0.95		<1			
8.0	Br. in Ballyhean (RS30C120400)	513405/ 783261		89.4	538	7.73	0.007	<0.02	0.335		1.5			

Figure 3: Quarry outfall actively discharging to tributary of Claureen_010 (January 2023)

Figure 4: Murky waters around quarry outfall (January 2019)

Figure 5: Site Cl10.5 Downstream of quarry outfall (July 2023

APPENDIX 1

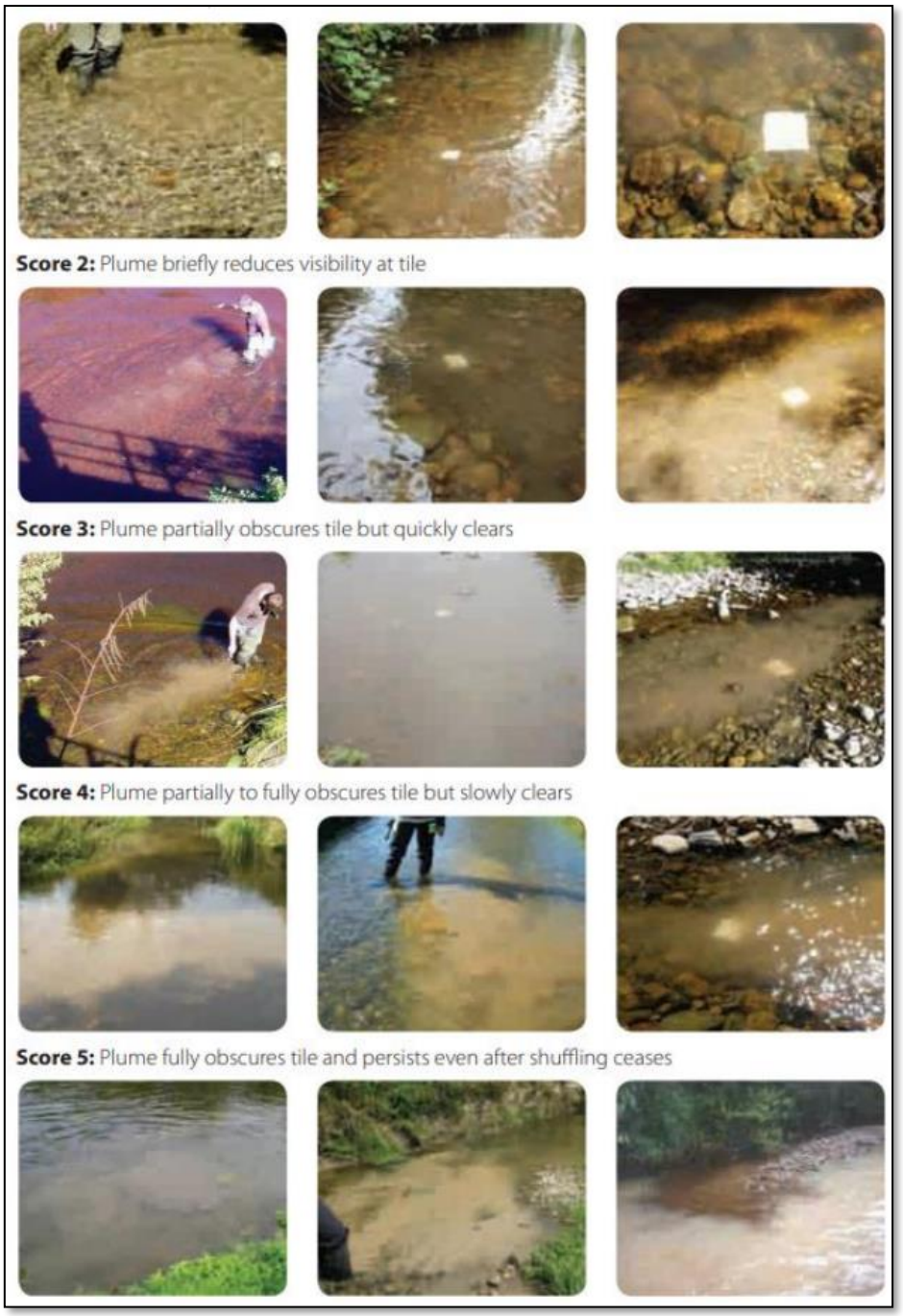

Figure 1: Shuffle Index examples (source: Clapcott et al., 2011. Copyrights: Cawthron Institute