

**ARRABAWN CO-OPERATIVE CREAMERY, NENAGH,
COUNTY TIPPERARY**

**BIOLOGICAL ASSESSMENT OF SURFACE WATER
QUALITY**

July 2018



**REPORT PREPARED FOR
ARRABAWN CO-OPERATIVE CREAMERY**

by

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1. INTRODUCTION

Conservation Services, Ecological & Environmental Consultants have been commissioned by Arrabawn Co-Operative Creamery to carry out biological sampling and water quality assessment in accordance with EPA Q-rating methodology at two locations on the Nenagh River at Nenagh, Co. Tipperary.

Sampling was carried out on 26th July 2018. Sampling was previously carried out by Conservation Services at these sites, most recently in July 2017.

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2. METHODOLOGY

2.1. SITE LOCATIONS

Biological sampling and water quality assessment was carried out at the following sites. Grid references were recorded at all sites using a GPS.

SITE	GRID REFERENCE (GPS)
Site ASW1	R 87433 79197
Site ASW2	R 87413 79304

The location of the sites is shown on Map 1.

2.2. HABITAT ASSESSMENT

Habitat assessment was carried out at each of the sites selected for invertebrate/water quality assessment. These sites were assessed in terms of:

- Stream width and depth
- Substrate type, listing substrate fractions in order of dominance, i.e. large rocks, cobble, gravel, sand, mud etc.
- Flow type, listing percentage of riffle, glide and pool in the sampling area
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampling site
- Dominant bankside vegetation, listing the main species overhanging the stream

- Estimated summer cover by bankside vegetation, giving percentage shade of the sampling site
- Rating of the site as habitat for trout adult, nursery and spawning on a scale of Poor/Fair/Good/Very Good/Excellent. This rating assesses the physical suitability of the habitat; the presence/absence/density of salmonids at the site will also depend on present and historical water quality and accessibility of the site to fish.

2.3. INVERTEBRATE SAMPLING AND WATER QUALITY ASSESSMENT

A kick and stone wash invertebrate sample was taken at each site (ISO 7828:1985) using standard methodology employed by EPA. Each sample was retained in a large plastic bag at the sampling site. Sample processing and preservation was carried out under laboratory conditions within 24 hours of sampling. Mud was removed from each sample by sieving under running water through a 500 μ sieve. Sieved samples were then live sorted for 30 minutes in a white plastic sorting tray under a bench lamp (ISO 5667-3:1994) and if necessary using a magnifying lens. Macroinvertebrates were stored in 70% alcohol. Preserved invertebrates were identified to the level required for the EPA Q-rating method (McGarrigle *et al*, 2002) using high-power and low-power binocular microscopes when necessary. The preserved samples were archived for future examination or verification. Based on the relative abundance of indicator species, a biotic index (Q-rating) was determined for each site in accordance with the biological assessment procedure used by the Environmental Protection Agency (Statutory Instruments No. 258 of 1998) and more detailed unpublished methodology (McGarrigle, Clabby and Lucey pers. comm.)

Biotic Index	Water Framework Directive Ecological Quality	Quality Status
Q5	High	Unpolluted Waters
Q4-5	High	
Q4	Good	
Q3-4	Moderate	Slightly Polluted Waters
Q3	Poor	Moderately Polluted Waters
Q2-3	Poor	
Q2	Bad	Seriously Polluted Waters
Q1-2	Bad	
Q1	Bad	

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MAP 1 LOCATION OF BIOLOGICAL ASSESSMENT SITES
Locations shown are approximate; for exact locations, see Grid References in text



3. RESULTS

Detailed habitat assessment for each sampling site, including aquatic plant assessment, is contained in Appendix 1.

3.1. SITE ASW1

The invertebrate community tabulated below merits a Q-rating of Q4 indicating unpolluted conditions and Good ecological quality, an improvement compared with Q3-4 in 2017.

INDICATOR GROUP	TAXON	2018
Group A - Pollution Sensitive	<i>Ecdyonurus sp.</i>	11
	<i>Heptagenia sp.</i>	1
Group B - Less Pollution Sensitive	<i>Leuctra sp.</i>	16
	<i>Baetis muticus</i>	10
	<i>Agapetus sp.</i>	6
	Hydroptilidae	13
	Limnephilidae	2
Group C - Pollution Tolerant	<i>Ancylus fluviatilis</i>	1
	<i>Bathymphalos contortus</i>	1
	<i>Potamopyrgus antipodarum</i>	c.110
	<i>Theodoxus fluviatilis</i>	20
	<i>Gammarus duebeni</i>	9
	Hydracarina	20
	<i>Baetis rhodani</i>	5
	<i>Serratella ignita</i>	37
	<i>Hydropsyche sp.</i>	2
	<i>Polycentropus sp.</i>	7
	<i>Rhyacophila sp.</i>	9
	Dytiscidae	2
	Elmidae	14
	Chironomidae (excl. <i>Chironomus</i>)	39
	Simuliidae	1
Tipulidae s.s.	3	
Group D - Very Pollution Tolerant	<i>Lymnaea peregra</i>	2
	Sphaeriidae	1
Group E - Most Pollution Tolerant	None recorded	

INDICATOR GROUP	TAXON	2018
Not assigned to an indicator group	Nematomorpha	1
	Lumbricidae	2
	Lumbriculidae	4

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3.2. SITE ASW2

The invertebrate community tabulated below merits a Q-rating of Q4 indicating unpolluted conditions and Good ecological quality, an improvement compared with Q3-4 in 2017.

INDICATOR GROUP	TAXON	2018
Group A - Pollution Sensitive	<i>Ecdyonurus sp.</i>	4
Group B - Less Pollution Sensitive	<i>Leuctra sp.</i>	1
	<i>Baetis muticus</i>	4
	<i>Agapetus sp.</i>	5
	<i>Glossosoma sp.</i>	3
	Hydroptilidae	7
Group C - Pollution Tolerant	<i>Ancylus fluviatilis</i>	4
	<i>Potamopyrgus antipodarum</i>	c.160
	<i>Theodoxus fluviatilis</i>	16
	<i>Gammarus duebeni</i>	4
	Hydracarina	9
	<i>Baetis rhodani</i>	10
	<i>Serratella ignita</i>	32
	<i>Polycentropus sp.</i>	1
	<i>Rhyacophila sp.</i>	12
	Elmidae	29
	Ceratopogonidae	1
	Chironomidae (excl. <i>Chironomus</i>)	25
	Pediciidae	1
	Tipulidae s.s.	8
Group D - Very Pollution Tolerant	<i>Glossiphonia complanata</i>	2
	<i>Lymnaea peregra</i>	4
	Sphaeriidae	1
	<i>Asellus aquaticus</i>	1
Group E - Most Pollution Tolerant	None recorded	
Not assigned to an indicator group	Lumbricidae	1
	Lumbriculidae	7

4. SUMMARY OF Q-RATINGS

	Site ASW1	Site ASW2
June 2016	4	4
July 2017	3-4	3-4
July 2018	4	4

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5. CONCLUSIONS

The invertebrate fauna at both the upstream and downstream sites is indicative of unpolluted conditions and Good ecological quality (Q4). There was an improvement in water quality at both the upstream and downstream sites compared with 2017.

Whereas both sites merit good status, the biological assessment indicates a slight deterioration between the upstream and downstream sites, with a reduction in the relative abundance of pollution sensitive organisms and an increase in the relative abundance of pollution tolerant organisms at the downstream site.

Signed on behalf of Conservation Services



Handwritten signature of Helena Twomey in blue ink.

Helena Twomey BA(Mod.) PhD

8 August 2018

6. REFERENCES

McGarrigle *et al* (2002) Water Quality in Ireland 1998-2000. Environmental Protection Agency.

SNIFFER (2007) Revision and Testing Of BMWP Scores. Project WFD72A Final Report. Environment Agency.


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APPENDIX 1


HABITAT ASSESSMENT AT SAMPLING SITES

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SITE ASW1

Grid Reference	R 87433 79197		
Site Photograph			
Width (m)	9	Depth (cm)	10-15
DO (% sat)	109	DO (mg/l)	9.6
pH	7.2	Conductivity	507
Temperature °C	17.4	Water clarity	Clear
Substrate (in order of dominance)	1. Cobble 2. Gravel 3. Sand		
Flow Type	Riffle 80% Glide 20%		
Instream Vegetation	Bryophytes 10% Filamentous algae 25% <i>Ranunculus sp.</i> 10% <i>Phalaris arundinacea</i> <1%		
Dominant Bankside Vegetation	Willow, Alder, Elder, Willowherb		
Estimated % Summer Shade of Stream by Bankside Vegetation	<5		
Salmonid Adult Habitat	Fair		
Salmonid Nursery Habitat	Good		
Salmonid Spawning Habitat	Fair-Good		

SITE ASW2

Grid Reference	R 87413 79304		
Site Photograph			
Width (m)	10-12	Depth (cm)	10-20
Temperature °C	17.5	Water clarity	Clear
DO (% sat)		DO (mg/l)	9.5
pH	7.2	Conductivity	667
Substrate (in order of dominance)	<ol style="list-style-type: none"> 1. Cobble 2. Large rocks 3. Gravel 4. Sand 5. Mud 		
Flow Type	Riffle 80% Glide 20%		
Instream Vegetation	Filamentous algae 20% Bryophytes 15% <i>Ranunculus sp.</i> 30%		
Dominant Bankside Vegetation	Alder, <i>Phalaris arundinacea</i> , <i>Sparganium erectum</i> , Nettles		
Estimated % Summer Shade of Stream by Bankside Vegetation	5		
Salmonid Adult Habitat	Good - Fair		
Salmonid Nursery Habitat	Good		
Salmonid Spawning Habitat	Fair		