

Annual Environmental Report

2023



Moate

D0097-01

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1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0097-01, Moate, in Westmeath in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports where relevant are included as an appendix to the AER.

1.1 ANNUAL STATEMENT OF MEASURES

A summary of any improvements undertaken is provided where applicable.

There were no capital works, significant changes or operational changes undertaken in 2023.

1.2 TREATMENT SUMMARY

The agglomeration is served by a wastewater treatment plant(s)

- Moate WWTP with a Plant Capacity PE of 4500, the treatment type is 3P - Tertiary P removal.

1.3 ELV OVERVIEW

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is shown below. More detailed information on the below ELV's can be found in Section 2.

Discharge Point Reference	Treatment Plant	Discharge Type	Compliance Status	Parameters failing if relevant
TPEFF3200D0097SW001	Moate WWTP	Treated	Non-Compliant	ortho-Phosphate (as P) - unspecified mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report

Small Stream Risk Score Assessment Report

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 MOATE WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - MOATE WWTP

A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

Parameters	Number of Samples	Annual Max	Annual Mean
pH pH units	12	7.90	7.59
Total Phosphorus (as P) mg/l	12	18	5.58
BOD, 5 days with Inhibition (Carbonaceous) mg/l	12	349	117
Ammonia-Total (as N) mg/l	12	49	26
Suspended Solids mg/l	12	444	149
Total Nitrogen mg/l	12	72	38
COD-Cr mg/l	12	653	367
ortho-Phosphate (as P) - unspecified mg/l	12	6.40	3.19
Hydraulic Capacity	N/A	941	472

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 2.1.5 if applicable.

Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional 'Operational Performance Summary'.

2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF3200D0097SW000

Parameter	WWDL ELV (Schedule A)	ELV with Condition 2 Interpretation included Note 1	Interim % reduction from influent concentration	Number of sample results	Number of exceedances	Number of exceedances with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	125	250	N/A	13	N/A	N/A	24	Pass
Suspended Solids mg/l	35	87.5	N/A	13	N/A	N/A	5.91	Pass
BOD, 5 days with Inhibition (Carbonaceous) mg/l	20	40	N/A	13	N/A	N/A	1.84	Pass
pH pH units	6	9	N/A	13	N/A	N/A	7.35	Pass
ortho-Phosphate (as P) - unspecified mg/l	1	1.2	N/A	13	1	1	0.394	Fail
Ammonia-Total (as N) mg/l	1	2	N/A	13	N/A	N/A	0.243	Pass
Conductivity @20°C µS/cm	N/A	N/A	N/A	13	N/A	N/A	657	

Parameter	WWDL ELV (Schedule A)	ELV with Condition 2 Interpretation included Note 1	Interim % reduction from influent concentration	Number of sample results	Number of exceedances	Number of exceedances with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
Total Phosphorus (as P) mg/l	N/A	N/A	N/A	13	N/A	N/A	0.533	
Total Nitrogen mg/l	N/A	N/A	N/A	13	N/A	N/A	12	
Nitrite (as N) mg/l	N/A	N/A	N/A	13	N/A	N/A	0.381	
Total Oxidised Nitrogen (as N) mg/l	N/A	N/A	N/A	13	N/A	N/A	10	
Nitrate (as N) mg/l	N/A	N/A	N/A	13	N/A	N/A	9.83	

Notes:

1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied

2 – For pH the WWDA specifies a range of pH 6 - 9

Cause of Exceedance(s):

Inadequate Operational Procedures/Training

Significance of Results:

The WWTP is non compliant with the ELV's set in the Wastewater Discharge Licence. The impact on receiving waters is assessed further in Section 2.

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF3200D0097SW000

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	River Station Code	Bathing Water	Drinking Water	FWPM	Shellfish	WFD Ecological Status
Upstream	218491, 238039	RS25M050100	No	No	No	No	Poor
Downstream	218396, 236055	RS25M050250	No	No	No	No	Poor

The table below provides a summary of monitoring results for designated ambient monitoring points. The upstream and downstream annual mean values are shown (mg/l), and the difference between both monitoring stations is given as a percentage of the Environmental Quality Standard (EQS) where relevant.

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
BOD - 5 days (Total) mg/l	RS25M050100	1.02	RS25M050250	1.06	1.50	2.8
Ammonia-Total (as N) mg/l	RS25M050100	0.057	RS25M050250	0.059	0.065	2.5
ortho-Phosphate (as P) - unspecified mg/l	RS25M050100	0.011	RS25M050250	0.011	0.035	0.8
Dissolved Oxygen % Saturation	RS25M050100	83	RS25M050250	79	N/A	

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
Conductivity @20°C µS/cm	RS25M050100	615	RS25M050250	693	N/A	
Total Phosphorus (as P) mg/l	RS25M050100	0.057	RS25M050250	0.077	N/A	
pH pH units	RS25M050100	7.66	RS25M050250	7.59	N/A	
Temperature °C	RS25M050100	13	RS25M050250	13	N/A	
Total Nitrogen mg/l	RS25M050100	2.01	RS25M050250	2.66	N/A	
Dissolved Oxygen mg/l	RS25M050100	8.65	RS25M050250	8.26	N/A	
COD-Cr mg/l	RS25M050100	23	RS25M050250	25	N/A	

Significance of Results:

The WWTP discharge was not compliant with the ELV's set in the wastewater discharge licence for the following: ortho-Phosphate (as P) - unspecified mg/l.

The ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

Based on ambient monitoring results a deterioration in Ammonia, BOD & Ortho-P concentrations downstream of the effluent discharge is noted.

A deterioration in water quality has been identified, however it is not known if it or is not caused by the WWTP.

As per the 3rd Cycle Lower Shannon (Brosna) Catchment Report (HA 25A), the significant pressures on the At Risk Moate Stream_010 waterbody include Agriculture, Urban Run-off and Urban Waste Water. The Moate WWTP is listed as a significant pressure in At Risk Waterbodies in the Cycle 3 report.

The 2023 SSRS Report indicates a poorer condition upstream (SSRS 2.4) of the discharge when compared to downstream (SSRS 5.6).

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

2.1.4 OPERATIONAL PERFORMANCE SUMMARY - MOATE WWTP

2.1.4.1 Treatment Efficiency Report - Moate WWTP

Treatment efficiency is based on the removal of key pollutants from the influent wastewater by the treatment plant. In essence the calculation is based on the balance of load coming into the plant versus the load leaving the plant. The efficiency is presented as a percentage removal rate.

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:

Parameter	Influent mass loading (kg/year)	Effluent mass emission (kg/year)	Efficiency (% reduction of influent load)
TP	1056	74	93
cBOD	22186	257	99
COD	69459	3281	95
TN	7186	1629	77
SS	28160	825	97

Note: The above data is based on sample results for the number of dates reported.

2.1.4.2 Treatment Capacity Report Summary - Moate WWTP

Treatment capacity is an assessment of the hydraulic (flow) and organic (the amount of pollutants) load a treatment plant is designed to treat versus the current loading of that plant.

Moate WWTP	
Peak Hydraulic Capacity (m ³ /day) - As Constructed	3375
DWF to the Treatment Plant (m ³ /day)	1125
Current Hydraulic Loading - annual max (m ³ /day)	941
Average Hydraulic loading to the Treatment Plant (m ³ /day)	472
Organic Capacity (PE) - As Constructed	4500
Organic Capacity (PE) - Collected Load (peak week) ^{Note1}	3960
Organic Capacity (PE) - Remaining	540
Will the capacity be exceeded in the next three years? (Yes/No)	No

Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

2.1.5 SLUDGE / OTHER INPUTS - MOATE WWTP

'Other inputs' to the waste water treatment plant are summarised in the table below.

Input type	Quantity	Unit	P.E.	% of load to WWTP	Included in Influent Monitoring (Y/N)?	Is there a leachate/sludge acceptance procedure for the WWTP?	Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N)
Waterworks Sludge	1898	Volume (m ³)	23.1	1.1	Yes	Yes	Yes

3 COMPLAINTS AND INCIDENTS

3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature related to the discharge(s) to water from the WWTP and network is included below.

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints
There were no relevant environmental complaints in 2023.			

3.2 REPORTED INCIDENTS SUMMARY

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Uisce Éireann but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

3.2.1 SUMMARY OF INCIDENTS

Incident Type	Cause	Recurring (Y/N)	Closed (Y/N)
Breach of ELV	Inadequate Operational Procedures/Training	No	No

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2023	1
Number of Incidents reported to the EPA via EDEN in 2023	1
Explanation of any discrepancies between the two numbers above	N/A

4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT

A summary of the operation of the storm water overflows and their significance where known is included below:

4.1.1 SWO IDENTIFICATION

WWDL Name / Code for Storm Water Overflow (chamber) where applicable	Irish Grid Ref. (outfall)	Included in Schedule of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2023 (No. of events)	Total volume discharged in 2023 (m ³)	Monitoring Status
SW2	218670,237766	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SW2	218670,237766	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	TBC
SW2	218670,237766	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	TBC

Any TBC SWO(s) were identified as part of the on-going National SWO programme and will be updated in subsequent AER(s) once the information is confirmed.

SWO Summary	
How much wastewater discharge by metered SWOs during the year (m³)?	Unknown
Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?	N/A
The SWO Assessment included the requirements of relevant of WWDL schedules?	Yes
Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?	No

4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS

4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

Specified Improvement Programmes (under Schedule A and C of WWDL)	Description	Licence Schedule	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works	Timeframe for Completing the Work	Comments
D0097-SIP:01	Phase 1 upgrade of WWTP and ancillary works	C	01/01/2015	Yes	Works Completed		
D0097-SIP:02	Re-location of primary discharge to R. Brosna	C	01/01/2015	Yes	Not Started		
D0097-SIP:03	SW000 to Moate stream & any other discharges identified under conditions 4.12 & 5.1 to be discontinued	A	01/01/2015	Yes	Works Completed		
D0097-SIP:04	SW003 to Moate stream & any other discharges identified under conditions 4.12 & 5.1 to be discontinued	A	01/01/2015	Yes	Works Completed		

Specified Improvement Programmes (under Schedule A and C of WWDL)	Description	Licence Schedule	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works	Timeframe for Completing the Work	Comments
D0097-SIP:05	Upgrade and rehabilitation of sewer network (phase I and phase II)	C	01/01/2015	Yes	Works Completed		
D0097-SIP:06	Upgrade to storm water management system	C	01/01/2015	Yes	Not Started		

A summary of the status of any other improvements identified by under Condition 5 assessments- is included below.

4.2.2 IMPROVEMENT PROGRAMME SUMMARY

Improvement Identifier	Improvement Description / or any Operational Improvements	Improvement Source	Expected Completion Date	Comments
No additional improvements planned at this time.				

4.2.3 SEWER INTEGRITY RISK ASSESSMENT

N/A

5 LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

Licence Specific Report	Required by licence	Included in this AER
Priority Substances Assessment	Yes	No
Small Stream Risk Score Assessment	Yes	Yes

6 CERTIFICATION AND SIGN OFF

6.1 SUMMARY OF AER CONTENTS

Parameter	Answer
Does the AER include an Executive Summary?	Yes
Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?	Yes
Is there a need to advise the EPA for Consideration of a Technical Amendment/Review of the Licence?	N/A
List reason e.g. additional SWO identified	N/A
Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc	Yes
List reason e.g. changes to monitoring requirements	Ambient Monitoring Location Changes
Have these processes commenced?	No
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER	N/A

I certify that the information given in this Annual Environmental Report is truthful, accurate and complete:

Date: 27/02/2024

This AER has been produced by Uisce Éireann's Environmental Information System (EIMS) and has been electronically signed off in that system for and on behalf of,

Eleanor Roche

Head of Environmental Regulation.

7 APPENDIX

Appendix

Appendix 7.1 – Small Stream Risk Score Assessment Report

SSRS Compliance Monitoring: *Moate* Waste Water Treatment Plant 2023



**Report to Uisce Éireann
Limnos Consultancy, January 2024**

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Moate WWTP

Introduction

Small Streams Risk Score (SSRS) assessments on the Moate Stream upstream and downstream of the Moate waste water treatment plant (WWTP) are outlined in this report. The assessments were made on 27 October 2023. Limnos Consultancy was contracted by Irish Water to undertake the surveys.

Methodology

Small Streams Risk Score (SSRS)

Samples were taken using an ISO compliant kick-sampling sampling method compatible with the Environmental Protection Agency (EPA) Standard Operating Procedure for sampling aquatic macroinvertebrates. Samples were taken upstream and downstream of the discharge from the WWTP. SSRS results were assigned based on the macroinvertebrate fauna.

The author was the main initiator of the SSRS system developed by the Western River Basin District and the EPA under his supervision in 2005–2006 (McGarrigle 2014). He has undertaken SSRS training of local authority and other professional staff at the Local Government Water Services Training Centres around the country for over 100 personnel.

The SSRS was calculated based on selected sub-groups of the macroinvertebrates recorded. The score is calculated based on the number of taxa and their relative abundance in four main invertebrate groups as follows:

Group 1: Ephemeroptera (excluding *Baetis rhodani*)

Group 2: Plecoptera

Group 3: Trichoptera

Group 4: GOLD (Gastropoda, Oligochaeta, Diptera)

Group 5: *Asellus*

The first three groups above, mayflies, stoneflies, and caddis flies, are regarded as pollution-sensitive whereas gastropods, oligochaetes, dipterans and *Asellus* are relatively pollution-tolerant. The maximum score that can be achieved is 11.2 and threshold scores deciding the degree of risk of not being at good ecological status are as follows:

SSRS Compliance Monitoring: Moate WWTP

- > 7.25 Probably not at risk
- > 6.5 to 7.25 Indeterminate
- < 6.5 Stream may be at risk.

Samples were taken with a standard 1 mm mesh pond net. A 3-minute kick sample was combined with a 1-minute stonewash. Samples were placed on a white tray and, once cleaned of debris such as leaves and twigs and excessive sand or gravel by decanting and hand picking, the sample was examined carefully to identify the macroinvertebrates. At least 25 minutes were spent identifying and assigning each taxon found to a relative abundance category. Table 1 gives the definition of the relative abundance terms Few, Common, Numerous, Dominant and Excessive. The numeric code is used in the results tables below.

Table 1. Relative abundance table.

Abundance	Number of Individual Specimens	Relative abundance numeric code
Few:	1 to 5 individuals	1
Common:	6 to 20	2
Numerous:	21-50	3
Dominant:	51 to 100	4
Excessive:	>100	5

Physico-Chemical Measurements

Physico-chemical measurements were also made for dissolved oxygen, temperature and conductivity using a HACH HQ40d meter with appropriate compatible probes.

Location of Sites Sampled

Figure 1 maps the sampling sites and Table 2 gives the details of the locations sampled.



Figure 1. Location of upstream and downstream monitoring sites for Moate WWTP. The river flows southwards.

Table 2. Location of sites sampled upstream and downstream of Moate WWTP.

Location	Moate WWTP Upstream	Moate WWTP Downstream
EPA Code	RS25M050100	RS25M050250
Station	Upstream Moate WWTP	Br W Boston Crossroads
River	Moate Stream	Moate Stream
Easting	218491	218396
Northing	238039	236055

Results

Site Photographs

Figure 2 shows photographs for the upstream and downstream of the Moate WWTP taken on 27 October 2023.

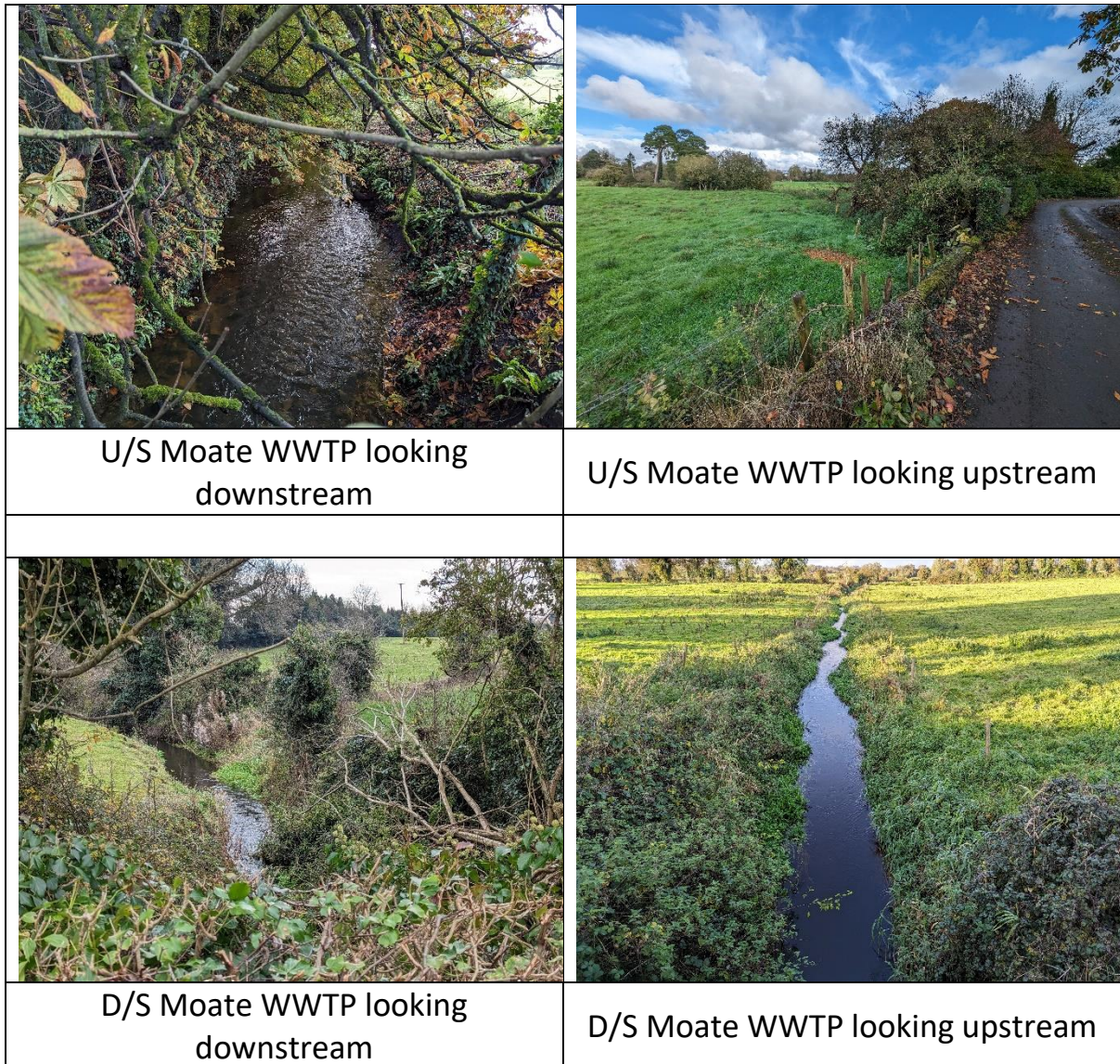


Figure 2. Upstream (U/S) and downstream (D/S) of Moate WWTP.

Macroinvertebrates – SSRS

Table 3 gives the recorded macroinvertebrate taxa for the standard kick samples taken at these sites.

Table 3. Relative abundances of macroinvertebrates recorded upstream and downstream of Moate WWTP discharge point.

		Moate Stream	Moate Stream
		Upstream WWTP	Downstream WWTP
		Date of Sampling	
SSRS Group	Taxon	27/10/2023	27/10/2023
1, Ephem	<i>Alainites muticus</i>	-	Few
2, Plec	<i>Brachyptera risi</i>	-	Few
3, Trich	<i>Hydropsyche</i>	-	Few
3, Trich	Limnephilidae	-	Few
3, Trich	Odontoceridae	-	Few
3, Trich	<i>Rhyacophila</i>	-	Few
4, GOLD	Ancylidae	Few	-
4, GOLD	<i>Eiseniella</i>	-	Few
4, GOLD	<i>Radix balthica</i>	-	Few
4, GOLD	<i>Potamopyrgus antipodarum</i>	Few	Few
4, GOLD	Simuliidae	Numerous	Dominant
4, GOLD	Tubificidae	Few	-
5, Asellus	<i>Asellus</i>	Common	Common
n/a	<i>Baetis rhodani</i>	Few	Few
n/a	<i>Elmis aenea</i>	Few	Few
n/a	<i>Erpobdella octoculata</i>	-	Few
n/a	<i>Gammarus</i>	Dominant	Numerous
n/a	<i>Glossiphonia complanata</i>	Few	-
n/a	Gyrinidae	-	Few
n/a	Hydrachnidae	Few	-
	Number Taxa	10	16
	SSRS	2.4	5.6
		At Risk!	At Risk!
	Q-Value	Q2-3	Q3

The taxa are ordered from top to bottom in terms of their SSRS Group and general sensitivity to pollution with mayflies and stoneflies, *Alainites* and *Brachyptera* at the top and Tubificidae and *Asellus* at the bottom. Note that not all taxa recorded are included in the SSRS scheme.

The upper site appears to be in poorer condition than the lower site some 1500 m downstream. With 10 taxa the site was dominated by *Gammarus* and Simuliidae with *Asellus* common. There were no stoneflies or caddisflies and just one mayfly, *Baetis rhodani*, and the remaining taxa comprised four GOLD taxa and five non-scoring taxa. It scored an SSRS of 2.4, which is the same as in December 2022. Its Q-Value was Q3. The downstream site is some 1500 m downstream, and in contrast had 16 taxa with representatives of all the SSRS Groups and scored 5.6. This is an improvement on the score of 3.2 assigned in October 2022.

Physico-Chemical Results

The Moate Stream’s water chemistry upstream and downstream of the WWTP was examined as a cross-check on the biology. Figure 3 graphs the annual average *ortho*-phosphate or molybdate reactive phosphorus (MRP) for 2016 to 2023, based on 10 to 14 measurements per annum at each site – 199 results in all. The downstream site had higher concentrations until 2021/2022 when the upstream site exceeded the downstream concentration before dropping back to almost equal in 2023. This suggests changeable conditions in the catchment. Figure 4 is a similar graph for total ammonia and shows a distinct upstream/downstream difference until 2019 when the downstream concentration drops to very close to the upstream concentration. It is assumed that this is a result of measures implemented in the WWTP in or around 2019.

The physico-chemical measurements made in the field on the day of sampling (Table 4) show low dissolved oxygen at both sites and high conductivity values.

Table 4. Physico-chemical results for Moate River, 27 October 2023.

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity µS/cm	pH
Upstream Moate WWTP	74.0	7.71	13.3	722	7.35
Downstream Moate WWTP	76.9	7.65	15.4	711	7.43

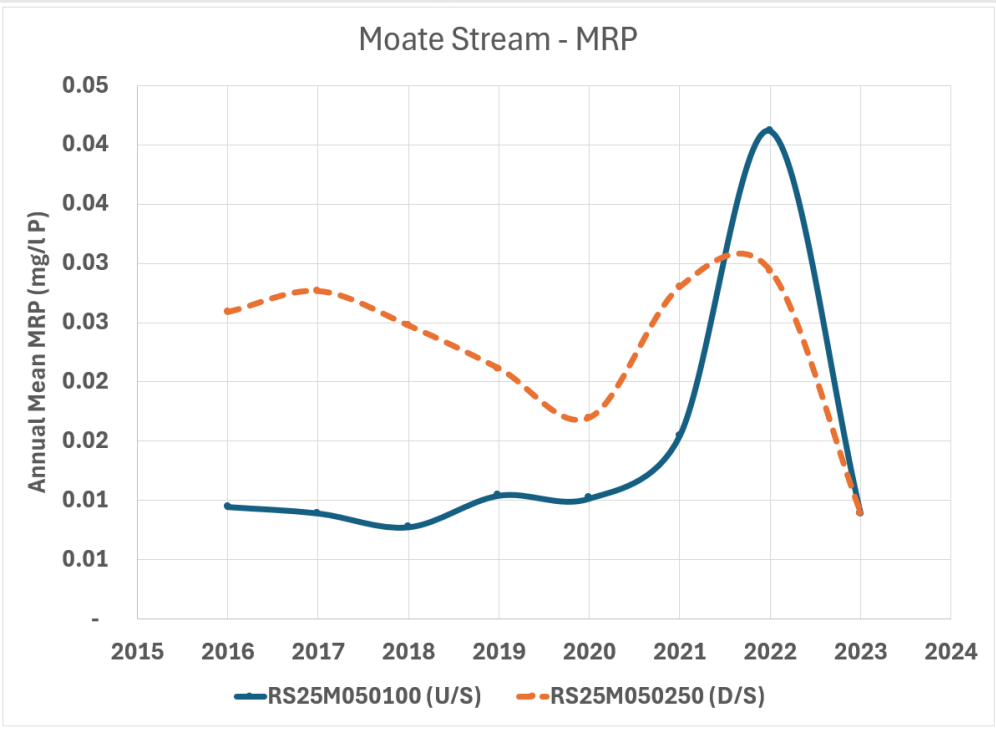


Figure 3. Annual average ortho-phosphate concentrations upstream and downstream of Moate WWTP discharge point.

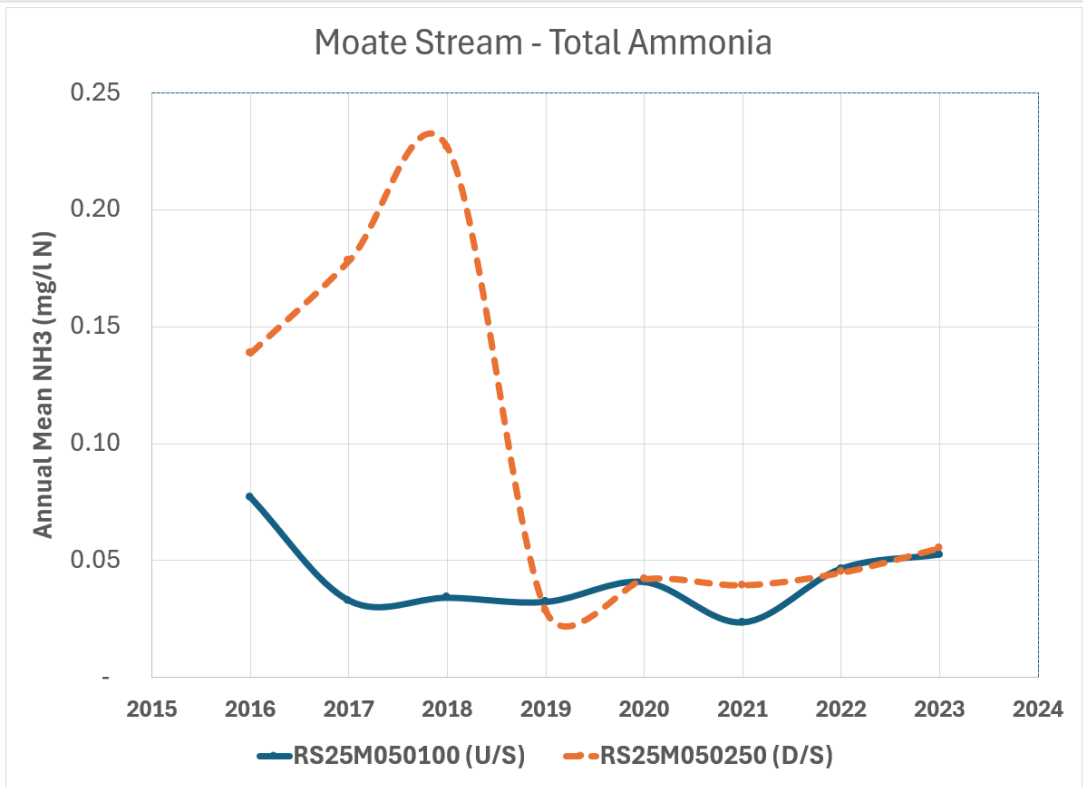


Figure 4. Average annual total ammonia concentrations upstream and downstream of Moate WWTP discharge point.

Summary

The upstream site appears to be in poorer condition than the downstream site based on the SSRS values reported here. The water chemistry results for MRP suggest that there may be issues in recent years in the upstream catchment and this requires further investigation. The downstream site had improved from an SSRS of 3.4 in December 2022 to 5.6 in October 2023.

Reference

McGarrigle, M. 2014. "Assessment of Small Water Bodies in Ireland." *Biology and Environment* 114B(3). doi: 10.3318/BIOE.2014.15.