



APPENDIX 6-4

AQUATIC MACROINVERTEBRATE SURVEY

Aquatic Macroinvertebrate Sampling Report

Aquatic Macroinvertebrate
Survey





DOCUMENT DETAILS

Client: **Wingleaf Ltd.**

Project Title: **Aquatic Macroinvertebrate Survey**

Project Number: **190301**

Document Title: **Aquatic Macroinvertebrate Sampling**

Document File Name: **AMS F -2020.06.25 - 2020**

Prepared By: **MKO
Tuam Road
Galway
Ireland
H91 VW84**



Rev	Status	Date	Author(s)	Approved By
01	Final	25.06.2020	LK	JH

Table of Contents

1.	INTRODUCTION	1
1.1	Survey Background and Methodology	1
2.	RESULTS	1
2.1	Sample Station 1 (Lee Catchment).....	1
2.2	Sample Station 2 (Dumanus-Bantry-Kenmare Catchment).....	2
2.3	Sample Station 3 (Dumanus-Bantry-Kenmare Catchment).....	4
2.4	Sample Station 4 (Dumanus-Bantry-Kenmare Catchment).....	5
2.5	Sample Station 5 (Dumanus-Bantry-Kenmare Catchment).....	6
2.6	Sample Station 6 (Dumanus-Bantry-Kenmare Catchment).....	8
2.7	Sample Station 7 (Dumanus-Bantry-Kenmare Catchment).....	9

TABLE OF TABLES

<i>Table 2-1 Invertebrate Sample Station 1 Results</i>	1
<i>Table 2-2 Invertebrate Sample Station 2 Results</i>	3
<i>Table 2-3 Invertebrate Sample Station 3 Results</i>	4
<i>Table 2-4 Invertebrate Sample Station 4 Results</i>	5
<i>Table 2-5 Invertebrate Sample Station 5 Results</i>	7
<i>Table 2-6 Invertebrate Sample Station 6 Results</i>	8
<i>Table 2-7 Invertebrate Sample Station 7 Results</i>	9

TABLE OF PLATES

<i>Plate 2- 1 Sample Station 1 E1251900 N063450</i>	2
<i>Plate 2- 2 Sample Station 2 E108808 N063553</i>	3
<i>Plate 2- 3 Sample Station 3 E108249 N062363</i>	5
<i>Plate 2- 4 Sample Station 4 107398 N061297</i>	6
<i>Plate 2- 5 Sample Station 5 E110377 N062053</i>	7
<i>Plate 2- 6 Sample Station 6 E10408 061337</i>	9
<i>Plate 2- 7 Sample Station 7 E10469 061749</i>	10

1. INTRODUCTION

1.1 Survey Background and Methodology

MKO were appointed by Wingleaf Ltd. to conduct surveys for aquatic macroinvertebrates for Q-Value determination in the rivers and streams that are located within and downstream of the proposed development. The survey work was conducted by suitably qualified ecologists, Laoise Kelly (B. Sc. Env) and Aoife Joyce (B. Sc., M. Sc.).

Sampling was carried out at 7 sites on the 22nd and 23rd of January 2020. The method used was the same as that used by the EPA for their national water sampling regime (Toner *et al.* 2003). A two minute kick sample was collected from a stream bed area of approximately one square metre with a standard handnet (250 mm x 250 mm, with a 300 mm bag depth and a 1 mm mesh size). Rock washing was also carried out.

Figure 6-4-1 provides a site location map showing the location of the surveys. The survey locations were located both within and downstream of the proposed infrastructure such as turbines, borrow pits and sub-station.

2. RESULTS

The following sections outline the findings of the surveys.

2.1 Sample Station 1 (Lee Catchment)

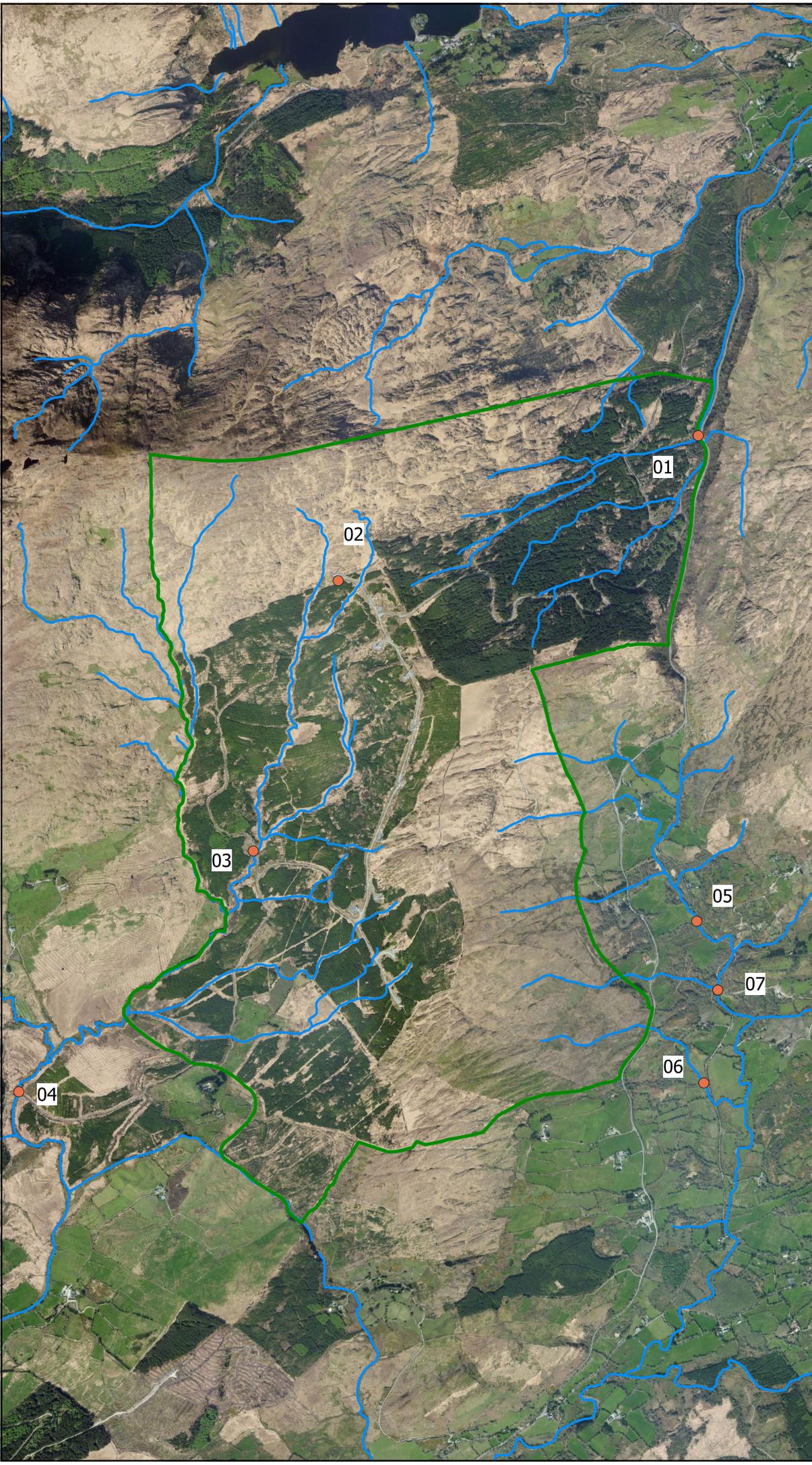
Sample Station 1 was located along a riffle area within the Oak-Ash-Hazel Woodland (WN2) along the north eastern boundary of the site (Grid Ref: E1251900 N063450). The sample was taken downstream of a confluence of a number of small streams in the north eastern section of the site. The watercourse was approximately 3-5 metres wide with an average depth of 0.2 metres. The benthic substrate was dominated by bedrock, boulders cobbles and sand. There was a low discharge, moderate flow rate and the water was running clear.

The only instream macrophyte was the aquatic moss *Fontinalis antipyretica*. No emergent vegetation was recorded. The bankside vegetation was dominated by Sessile Oak (*Quercus petraea*) and Birch (*Betula pubescens*) canopy with a *bryophyte* dominated ground flora in addition to species such as Wood Sorrel (*Oxalis acetosella*), Great Woodrush (*Luzula sylvatica*) and Hard Fern (*Blechnum spicant*).

The Q rating assigned to the channel was Q3-4. It was assigned this value as Group A and B invertebrates were few and Group C invertebrates were numerous. Group D invertebrates were absent and Group E invertebrates had one representative.

Table 2-1 Invertebrate Sample Station 1 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Heptagenidae</i>	Few
	<i>Plecoptera (except Leuctra)</i>	Few
Group B - Moderately Pollution Sensitive	<i>Plecoptera (Leuctra)</i>	Few



Map Legend

- EIAR Site Boundary
- Kick Sample Stations
- Watercourses



Microsoft product screen shots reprinted with permission from Microsoft Corporation

Drawing Title Aquatic Macroinvertebrate Survey Stations	
Project Title Curraglass Renewable Energy Development, Co. Cork	
Drawn By Laosie Kelly	Checked By John Hynes
Project No. 190301	Drawing No. Figure 6-4-1
Scale 1:22500	Date 07.05.2020

MKO
 Planning and Environmental Consultants
 Tuam Road, Galway
 Ireland, H91 WW84
 +353 (0) 91 735611
 email: info@mkoireland.ie
 Website: www.mkoireland.ie

Indicator Group	Taxon	Dominance
Group C - Moderately Pollution Tolerant	<i>Trichoptera</i> (Uncased)	Few
	<i>Baetis rhodani</i>	Common
	<i>Chironomidae</i> (ex. <i>Chironomus</i>)	Few
	<i>Lumbriculidae</i>	Few
	<i>Simuliidae</i>	Numerous
Group D - Very Pollution Tolerant	None	None
Group E - Most Pollution Tolerant	<i>Tubificaidae</i>	Present



Plate 2- 1 Sample Station 1 E1251900 N063450.

2.2

Sample Station 2 (Dumanus-Bantry-Kenmare Catchment)

Sample Station 2 was located along a riffle and pool area of a mountain stream adjacent to Conifer Plantation (WD4) near the proposed Turbine 01 (Grid Ref: E108808 N063553). The watercourse was approximately 1-2 metres wide with an average depth of 0.2 metres. There was very little flow in the stream and the uneven stream bed made it difficult to sample. The benthic substrate was dominated by bedrock, boulders cobbles and sand. There was a low discharge, moderate flow rate and the water was running clear.

No instream vegetation was recorded. The bankside vegetation was dominated by Purple Moor-grass (*Molinia caeruleae*), Ling Heather (*Calluna vulgaris*) and Soft Rush (*Juncus effuses*) with Conifer

Plantation (WD4) adjacent. The stream is culverted by two cylindrical pipes where it crosses the existing access road upstream of the sampling point.

The Q rating assigned to the channel was Q4. It was assigned this value as Group A invertebrates were numerous and Group B invertebrates were few, Group C invertebrates were common and Group D and E invertebrates were absent.

Table 2-2 Invertebrate Sample Station 2 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Heptagenidae</i>	Numerous
Group B - Moderately Pollution Sensitive	<i>Plecoptera (Leuctra)</i>	Few
Group C - Moderately Pollution Tolerant	<i>Trichoptera (Uncased)</i>	Few
	<i>Baetis rhodani</i>	Common
	<i>Simuliidae</i>	Few
Group D - Very Pollution Tolerant	<i>None</i>	<i>None</i>
Group E - Most Pollution Tolerant	<i>None</i>	<i>None</i>



Plate 2- 2 Sample Station 2 E108808 N063553.

2.3

Sample Station 3 (Dumanus-Bantry-Kenmare Catchment)

Sample Station 3 was located along a riffle and glide section in a tributary to the Owenbeg River towards the western boundary of the site (Grid Ref: E108249 N062363) with the nearest turbine location being Turbine 5. The watercourse was approximately 3-5 metres wide with an average depth of 0.2 metres. The benthic substrate was dominated by bedrock, boulders cobbles, gravel and sand. There was a moderate flow rate and the water was running clear.

No emergent instream vegetation was recorded however there was evidence of some algae on the surface of the rocks. The bankside vegetation was dominated by Creeping Bent-grass (*Agrostis stolonifera*), Purple Moor-grass (*Molinia caeruleae*), Soft Rush (*Juncus effuses*) and Gorse (*Ulex europaeus*).

The Q rating assigned to the channel was Q4. It was assigned this value as Group A and B invertebrates were common, Group C invertebrates were dominated by *Baetis rhodani* and Group D and E invertebrates were absent.

Table 2-3 Invertebrate Sample Station 3 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Nemouridae</i>	Common
Group B - Moderately Pollution Sensitive	<i>Plecoptera (Leuctra)</i>	Common
Group C - Moderately Pollution Tolerant	<i>Trichoptera (Uncased)</i>	Few
	<i>Baetis rhodani</i>	Dominant
	<i>Simuliidae</i>	Numerous
Group D - Very Pollution Tolerant	<i>None</i>	<i>None</i>
Group E - Most Pollution Tolerant	<i>None</i>	<i>None</i>



Plate 2-3 Sample Station 3 E108249 N062363

2.4

Sample Station 4 (Dumanus-Bantry-Kenmare Catchment)

Sample Station 4 was located along a riffle and glide section in the Owenbeg River outside the south western boundary of the site (Grid Ref: E107398 N061297). The watercourse was approximately 5-6 metres wide with an average depth of 0.25 metres. The benthic substrate was dominated by bedrock, boulders cobbles, gravel and sand. There was a moderate flow rate and the water was running clear.

The only instream macrophyte was the aquatic moss *Fontinalis antipyretica* and there was evidence of some algae on rock surfaces. An access road crosses the river at this location. The bankside vegetation was dominated by Soft Rush (*Juncus effuses*) and Purple Moor-grass (*Molinia caeruleae*), and Gorse (*Ulex europaeus*) and Willow (*Salix spp.*) scrub.

The Q rating assigned to the channel was Q4. It was assigned this value as Group A and B invertebrates were common, Group C invertebrates were dominated by *Baetis. rhodani* and Group D and E invertebrates were absent.

Table 2-4 Invertebrate Sample Station 4 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Heptagenidae</i>	Common
	<i>Nemoridae</i>	Few
Group B - Moderately Pollution Sensitive	<i>Plecoptera (Leuctra)</i>	Common
Group C - Moderately Pollution Tolerant	<i>Trichoptera (Uncased)</i>	Few

Indicator Group	Taxon	Dominance
	<i>Baetis rhodani</i>	Dominant
	<i>Chironomidae (ex. Chironomus)</i>	Few
	<i>Simuliidae</i>	Numerous
Group D - Very Pollution Tolerant	<i>None</i>	<i>None</i>
Group E - Most Pollution Tolerant	<i>None</i>	<i>None</i>



Plate 2- 4 Sample Station 4 107398 N061297

2.5

Sample Station 5 (Dumanus-Bantry-Kenmare Catchment)

Sample Station 5 was located to the east of the site, outside of the site boundary. The sample was taken in a riffle and glide section of the river (Grid Ref: E110377 N062053). The watercourse was approximately 4 metres wide with an average depth of 0.3 metres. The benthic substrate was dominated by cobble, gravel and sand. There was a moderate flow rate and the water was running clear.

Instream vegetation included Fool's Watercress (*Apium nodiflorum*) and *Fontinalis antipyretica*. Bankside vegetation Creeping Bent-grass (*Agrostis stolonifera*), Soft Rush (*Juncus effuses*), Foxglove (*Digitalis purpurea*), Creeping Buttercup (*Ranunculus repens*) and Bramble (*Rubus fruticosus agg.*)

The Q rating assigned to the channel was Q4. It was assigned this value as Group A and B invertebrates were common and Group C invertebrates were dominated by *Baetis rhodani* Group D invertebrates were absent however, there were a few invertebrates in Group E.

Table 2.5 Invertebrate Sample Station 5 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Heptageniidae</i>	Fair
	<i>Nemouridae</i>	Fair
	<i>Plecoptera (excl. Leuctra)</i>	Fair
Group B - Moderately Pollution Sensitive	<i>Plecoptera (Leuctra)</i>	Fair
Group C - Moderately Pollution Tolerant	<i>Trichoptera (Uncased)</i>	Fair
	<i>Baetis rhodani</i>	Dominant
	<i>Tipulidae</i>	Present
	<i>Piscicola</i>	Present
Group D - Very Pollution Tolerant	N/A	N/A
Group E - Most Pollution Tolerant	<i>Chironomid</i>	Few
	<i>Tubificidae</i>	Present



Plate 2- 5 Sample Station 5 E110377 N062053

Sample Station 6 (Dumanus-Bantry-Kenmare Catchment)

Sample Station 6 was located to the east of the site, outside of the site boundary. The sample was taken in a riffle and glide section of the river (Grid Ref: E10408 061337). The watercourse was approximately 1.5-3m metres wide with an average depth of 0.2 metres. The benthic substrate was dominated by boulder, cobble, gravel, fine gravel and sand. There was a moderate flow rate and the water was running clear.

Instream vegetation included *Fontinalis antipyretica* moss. Bankside vegetation comprised Creeping Bentgrass (*Agrostis stolonifera*), Foxglove (*Digitalis purpurea*), Creeping Buttercup (*Ranunculus repens*), Bracken (*Pteridium aquilinum*), Ivy (*Hedera helix*) and tree species such as Willow (*Salix spp.*), Ash (*Fraxinus excelsior*) and Holly (*Ilex aquifolium*).

The Q rating assigned to the channel was Q5. It was assigned this value as Group A invertebrates included one *Heptageniidae* species plus three *Plecoptera* species. Group B invertebrates were few, Group C invertebrates were dominated by *Baetis rhodani* and Group D and E invertebrates were absent.

Table 2-6 Invertebrate Sample Station 6 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Heptageniidae</i>	Common
	<i>Plecoptera (excl. Leuctra)</i>	Common
	<i>Plecoptera (excl. Leuctra)</i>	Few
Group B - Moderately Pollution Sensitive	<i>Plecoptera (Leuctra)</i>	Few
	<i>Trichoptera (Uncased)</i>	Few
Group C - Moderately Pollution Tolerant	<i>Baetis rhodani</i>	Numerous
	<i>Simuliidae</i>	Few
	Gammarus	Few
Group D - Very Pollution Tolerant	None	N/A
	None	N/A



Plate 2- 6 Sample Station 6 E10408 061337

2.7

Sample Station 7 (Dumanus-Bantry-Kenmare Catchment)

Sample Station 7 was located to the east of the site, outside of the site boundary. The sample was taken in a glide section of the river (Grid Ref: E10469 061749). The watercourse was approximately 5-6 metres wide with an average depth of 0.2 metres. An instream road crossed the river immediately downstream of the sampling point. The benthic substrate was dominated by bedrock, boulder, cobble, gravel and fine gravel. There was a moderate flow rate and the water was running clear.

Instream vegetation comprised *Fontinalis antipyretica*. The banks supported treeline on both sides which included Ash (*Fraxinus excelsior*), Willow (*Salix spp.*) and Hazel (*Coryllus avellana*). Ground flora included Creeping Bent-grass (*Agrostis stolonifera*), Ivey (*Hedera helix*) and Bracken (*Pteridium aquilinum*).

The Q rating assigned to the channel was Q4. It was assigned this value as Group A invertebrates were common, Group B invertebrates were absent. Group C invertebrates were dominated by *Baetis rhodani* and Group D and E invertebrates were absent.

Table 2-7 Invertebrate Sample Station 7 Results

Indicator Group	Taxon	Dominance
Group A - Very Pollution Sensitive	<i>Heptageniidae</i>	Common
	<i>Nemouridae</i>	Few
	<i>Plecoptera (excl. Leuctra)</i>	Present
Group B - Moderately Pollution Sensitive	<i>None</i>	N/A

Indicator Group	Taxon	Dominance
Group C - Moderately Pollution Tolerant	<i>None</i>	N/A
	<i>Baetis rhodani</i>	Dominant
	<i>Simuliidae</i>	Few
Group D - Very Pollution Tolerant	<i>None</i>	N/A
Group E - Most Pollution Tolerant	<i>Tubificidae</i>	N/A



Plate 2- 7 Sample Station 7 E10469 061749