Carrigeenduff Commonage

2020 Ecological Survey



Final Report

20th April 2021

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Carrigeenduff Commonage

2020 Ecological Survey

1. Introduction

A baseline habitat condition and ecological survey and habitat management plan was prepared for the Carrigeenduff Commonage in 2019¹ and the measures within same underwent screening for Appropriate Assessment².

A Commonage Management group was established for the commonage and the implementation of the management prescriptions in the plan began in 2020.

The management prescriptions in the plan set out to address the impacts highlighted in the report and to ensure that progress is made towards attaining **Favourable status** for the Annex I habitats present on the site- principally severely damaged 7130 Blanket Bog, 4030 Dry Heath, 4010 Wet Heath and 4060 Alpine and Boreal Heath in the long term as well as protection of the existing acid grassland resource. The management prescriptions in the SUAS plan for the commonage also need to ensure that **Favourable status** is achieved for the Annex I bird species, which form the Special Conservation Interests for this SPA: Peregrine falcon (*Falco peregrinus*), Merlin (*Falco columbarius*).

The major negative impacts on these habitats arise from a legacy of decades of uncontrolled burning resulting in extensive areas of peat erosion along the summits and ridges (impacting on upland blanket bog and montane heath) with subsequent severe peat erosion, damage and losses to dry heath habitat with subsequent invasion by dense bracken, inappropriate grazing (from sheep and also from deer), which has not allowed burnt areas to recover, and has also favoured the development of species-poor acid grassland over heath. Overgrazing is also contributing to erosion on the ridges and summits coupled with natural exposure and erosion following burning activities. Self-seeding of Sitka spruce into the commonage and the encroachment of bracken into grassland areas are also being addressed.

The extent of habitats present within the commonage and their affinities to either Fossitt (Level 3) or Annex I habitats on the Carrigeenduff Commonage were mapped as presented on **Figures 1** and **2** (See Appendix 1) and their conservation status was assessed and mapped as shown on **Figure 3** (See Appendix 1). A series of management prescriptions were drawn up for the commonage as detailed in **Table 1** below and mapped on **Figure 4** (See Appendix 1).

2. SUAS Vegetation Management Measures

The proposed management measures for the Carrigeenduff commonage as set out in 2019 under SUAS were as follows:

Year 1 (2020)

- 1. No burning to be carried out on any of the site.
- 2. Open up the access route on the old laneway from the enclosed lower fields on to the commonage for machinery.

¹ Wilson, F. (2019). Ecological Baseline Survey prepared for Carrigeenduff Commonage as part of the Commonage Management Plan for SUAS. Unpublished report for SUAS EIP.

² Wilson, F. (2020). Report for Screening for Appropriate Assessment for a Commonage Management Plan at Carrigeenduff, Co. Wicklow in accordance with the requirements of Article 6(3) of the EU Habitats Directive. 16th January 2020. Unpublished report for SUAS EIP.

- 3. Some trial mechanical cutting of small areas of gorse and strong heather in area 4 (5, 6, 60, 72 & 73) specialist machinery to be trialled.
- 4. Spray bracken in areas 4 (1 Only in upper reaches of 1 as the lower slopes important for whinchat, 7, 76, 78 & 80) with Asulox. This may be done by quad with hand lance or with knapsack sprayers as it is inaccessible for tractors. Concentrate on the fringes where the bracken is spreading into surrounding areas and where there is still other vegetation growing underneath the bracken. Can spray up to 3ha in year 1.
- 5. Pull/cut self-seeded sitka spruce trees in area 2 (5) and area 4 (3 & 6).
- 6. Block some of the eroding gullies in blanket bog in area 1 (1 & 2) to restore the hydrology in this area.
- 7. Fence off at least 2 enclosure areas to see what recovery rates are like in Area 1 and discuss restoration options with NPWS for trial work. Enclosures will need to be stock and deer proof.
- 8. Repair boundary fence of the commonage along the north east of area 4.
- 9. Reinstate boundary fence between Areas 1, 2 and 14 in Area 1 to assist in management of sheep on the hill and keep them off upper damaged slopes will need to have a defined access point for future management of sheep and walking access (signage to inform walkers at access point in Coillte plantation advising of function of fence and provision of gate)
- 10. Restoration of gully woodland along the Inchavore Stream and the establishment of similar small stands of native upland woodland along Crickgarr and Duff Brook. These species could also be used to diversify the small area of remnant planting at Mountain Lodge, Carrigshouk in Area 2 (2 and 4).
- 11. Look at trialling some peatland restoration measures in at least one area of bare peat.

Year 2 (2021)

- 1. No burning to be carried out on any of the site.
- 2. Spray bracken in areas 4 (1 Only in upper reaches of 1 as the lower slopes important for whinchat, 7, 76, 78 & 80), (approx. 3ha in total) with Asulox to control Bracken. This may be done by quad with hand lance or with knapsack sprayer.
- Some trial mechanical cutting of small areas of gorse and strong heather in area 4 (5, 6, 60, 72 & 73) specialist machinery to be trialled.
- 4. Block some of the eroding gullies in blanket bog in Area 1 (1 & 2) to restore the hydrology in this area.
- 5. Cut/pull more of the self-seeded sitka spruce trees in Area 2 and 4.
- 6. Discuss repairs to walking track on Kanturk/Bracket Rocks ridge with NPWS to see what is possible or practical.
- 7. Plant additional native trees in existing stands in Area 2 (2 and 4) and protect new plantings from browsing.
- 8. Establishment of gully woodland along the tributaries of the Inchavore River in Area 1.

Year 3 (2022)

To be reviewed at the end of Year 2.

Shepherding

Average time per shepherding: 6 Hours

No of times sheep are to be shepherded: 2-3 Times 2-3 Ti

2-3 Times per week from 1st May to 30th November.

Identified objective of the shepherding;

- Move off sheep from neighbouring commonages, especially off the ridge in areas 1 & 2
- Sheep to be moved off area 1 and along ridges regularly to reduce grazing pressure there and allow vegetation to recover. Move sheep into the taller vegetation regularly to get them to graze these areas.
- Monitor sheep health for signs of ticks or other diseases.
- Count numbers of deer grazing the commonage and areas they are grazing.

Other works to be carried out for entire commonage

Use feed buckets to encourage more sheep grazing on the northern slopes of area 4 of the commonage in the Jan/Feb and April/May period, particularly in the areas of stronger vegetation.

Use feed buckets in April/May for the hogget's on the lower slopes of Area 2 where dense heather is to encourage sheep off the ridge in Area 1 & 2.

Discuss repairs to walking tracks on Kanturk/Bracket Rocks with NPWS to see what is possible or practical.

Discuss the blocking of the drain along the military road with Wicklow County Council & NPWS and track damage along forestry with Coillte & NPWS.

Set up a number of exclosure sites for deer & sheep in the bare peat areas to see if natural regeneration will take place. May carry out some peat restoration work following discussion with NPWS.

Details of sheep stocking rates proposed

There are only 4 active shareholders using the commonage. In 2019, two of the graziers, had approx. 450 ewes on the hill for most of the year.

The plan is to have 600 to 700 sheep (ewes & hoggets) on the hill for 9-10 months of the year, which will happen over the next 2 to 3 years and will involve a change in breeding for some of the graziers. Numbers will be recorded accurately in 2020 and if amendments need to be made to this plan, it will be done at the end of 2020.

Sheep grazing on Areas 1 & 2 will be closely monitored and any necessary amendments to numbers will then be made.

Ecological Assessment

The commonage was surveyed in November 2020 by Faith Wilson to examine and review the implementation of the proposed measures and make any recommendations regarding same. The observations and recommendations from this visit are set out below.

3. 2020 Walkover Survey

The following observations, comments on same and recommendations on the works completed in 2020 are presented. To date the works have focused in Area 4.

3.1 Mulched Areas

A specialist machine was used to trial the mulching of gorse on the hill in Area 105 in Management Area 4. Regrowth in this area will be monitored in 2021.



Plate 1. Areas cut by a specialist mulching machine in 2020.

The machine was also used to mulch European gorse along either side of the track at the foot of the commonage in Area 4 to create a fire break. This was done sensitively with due regard for the native broadleaf trees which are found here.

This action was not included in the SUAS commonage management plan but was done with the permission of NPWS following a series of large illegal camps set up during the summer when Covid 19 restrictions were in place. Large numbers of campers set up at the head of Lough Dan near the Inchavore River where camper triggered wild fire was identified as a real risk to the commonage.



Plate 2. Areas of gorse either side of the track were cut by a specialist mulching machine in 2020 on foot of risk of wildfires from illegal campers.

3.2 Previously Burnt Areas

The ridge in Management Area 4 is slowly recovering following previous burns.



Plate 3. Vegetation on the ridge recovering following previous uncontrolled burning – note uniformity of height.



Plate 4. Vegetation on the ridge recovering following previous uncontrolled burning – note abundance of purple moor grass within the vegetation.

3.3 Acid Grassland Habitats

Grazing impacts are continuing to favour acid grassland over heath in location 2, 3, 4 and 106 in Area 4.

3.4 Track Erosion

Areas of acid grassland now mark the walking route up Kanturk on the ridge and are indicative of trampling pressure and in some areas the pressure is so great that the underlying peat is beginning to erode. Sheep are tending to favour these areas also. Grazing pressure in these areas needs to be managed through active shepherding and hunting out of sheep from these areas.

The trampling associated with hill walkers is localised on the ridge but nevertheless needs to be addressed. Once the old boundary ditch is crossed the trampling pressure here is more severe with eroding peat and damage to wet flushes and blanket bog habitat. Similarly on the ridge between Bracket Rocks and Kanturk.



Plate 5. Trampling pressure is resulting in localised erosion and the creation of acid grassland at the expense of blanket bog/heath. Sheep also tend to favour these areas and should be shepherded out. Track repair works will need to be conducted here.



Plate 6. Eroding blanket bog along the track in location 22 in Area 4.

3.5 Sitka Spruce Removal

Sitka spruce has been removed from within location 3 and 6 in Area 4. Surrounding areas of European gorse were mulched with a machine to create a fire break.



Plate 7. Felling of Sitka Spruce near the track in location 2 in Area 4.

3.6 Vegetation Cutting

There has been some manual cutting of leggy Ling Heather in location 100 and 107 in Area 4 near the adjoining forestry. A series of small patches (27) have been manually cut and cleared by a crew of contractors using brush cutters in the rough and stony areas. Regeneration in these areas will be monitored.



Plate 8. Small patches of heather were manually cut with brushcutters in the vicinity of the forestry on the slopes below Bracket Rocks (several are highlighted by the red arrows).

3.7 Access Lane Works

An old laneway that historically provided access to the hill had become overgrown and was opened up with a digger. Parts of the lane are very wet and muddy and will need further works to divert water off it through the use of water bars at appropriate locations.

The digger continued work out onto the commonage which is state owned land without discussion or permission. This was not part of the proposed works in the SUAS commonage management plan. NPWS, as the land owner, need to review this and decide if they wish any amelioration works to take place.



Plate 9. Works to the access lane - will require further work to prevent erosion.



Plate 10. Track works on NPWS owned land - this work was not included within the SUAS commonage plan.



Plate 11. Track works on NPWS owned land - this work was not included within the SUAS commonage plan.

3.8 Upland Gully Woodland

The establishment of gully woodland along the watercourses in the commonage through a variety of techniques is to be conducted in early 2021.

Several stands of remnant gully woodland are present and these should be expanded and connected with additional planting and tree establishment measures. The terrain along the Inchavore Stream will provide some shelter for trees from exposure and wind but they will need significant protection from browsing pressure and deer. Likewise on the other five watercourses within the commonage.



Plate 12. Remnants of Upland Gully Woodland on the slopes surrounding the Inchavore Stream.



Plate 13. Remnants of Upland Gully Woodland adjoining the Inchavore Stream.



Figure XX. There are six headwater streams within the Carrigeenduff Commonage.

3.9 Deer control

Five invasive Sitka deer hybrids were recorded during the site visit. Deer populations on the commonage need to be addressed and culled in a collaborative programme with NPWS, Coillte and adjoining commonage shareholders.

3.10 Management Measures for Areas 1, 2 and 3

The biggest challenges on the commonage are faced in Management Area 1 where there is severe peat erosion which is impacting on the Annex I habitats present here. Proposed works to these areas under the SUAS project in collaboration with NPWS include:

- Block some of the eroding gullies in blanket bog in area 1 (1 & 2) to restore the hydrology in this area.
- Fence off at least 2 enclosure areas to see what recovery rates are like in Area 1 and discuss restoration options with NPWS for trial work. Enclosures will need to be stock and deer proof.
- Reinstate boundary fence between Areas 1, 2 and 14 in Area 1 to assist in management of sheep on the hill and keep them off upper damaged slopes will need to have a defined access point for future management of sheep and walking access (signage to inform walkers at access point in Coillte plantation advising of function of fence and provision of gate).
- Restoration of gully woodland along the Inchavore Stream and the establishment of similar small stands of native upland woodland along Crickgarr and Duff Brook. These species could also be used to diversify the small area of remnant planting at Mountain Lodge, Carrigshouk in Area 2 (2 and 4).
- Look at trialling some peatland restoration measures in at least one area of bare peat.

A field meeting of SUAS project staff (Declan Byrne, Brian Dunne, Pat Dunne and Faith Wilson) with various staff members of the research section of NPWS (Dr Caitriona Douglas and Shane Regan, Enda Mullen and Ciara Flynn), local NPWS conservation staff (Hugh Mc Lindon, and Ann Fitzpatrick) and Department of Agriculture staff (Pamela Boyle and Niall Ryan) was held in November 2019 to look at this part of the commonage and to get some further guidance and agreement on measures that can be implemented on the ground. These discussions are ongoing.

3.11 Faunal Observations

Two pairs of Red Grouse were flushed during the walkover. Grouse were favouring the areas which are recovering from previous burns on the hill.

Skylark and Meadow Pipit were recorded on the ridge.

3.12 Management for 2021

A review of the works which were proposed for 2020 in the plan, coupled with the outcomes from the 2020 walkover was conducted. Items highlighted in red have not been completed. This has informed the proposed works for 2021.

2020

1.	Open up the access route on to the commonage for machinery.
2.	Some mechanical cutting of gorse and strong heather in area 4 (5, 6, 60, 72 & 73).
3.	Spray bracken in areas 4 (1, 7, 56, 76, 78 & 80) with Asulox. This may be done by quad
	with hand lance or with knapsack sprayers as it is inaccessible for tractors. Concentrate
	on the fringes where the bracken is spreading into surrounding areas and where there is
	still other vegetation growing underneath the bracken. Can spray up to 3ha in year 1.
4.	Pull/cut self-seeded sitka spruce trees in area 2 (5) and area 4 (3 & 6).
5.	Block some of the drains in area 1 (1 & 2) to restore the hydrology in this area.
6.	Fence off at least 2 enclosure areas to see what recovery rates are like in area 1 and discuss
	restoration options with NPWS for trial work.
7.	Repair boundary fence along north east of area 4.
Works	in red were not carried out in 2020

2021

1.	Spray bracken in areas 4 (1, 7, 56, 76, 78 & 80), (approx. 3ha in total) with Asulox to control
	Bracken. This may be done by quad with hand lance or with knapsack sprayer.
2.	Some manual cutting of gorse and strong heather with brushcutters in area 4 (67 & 74 and
	3, 5, 6, 72 & 73), up to 5 ha in total in small areas of approx. 10-15m by 10-15m.
3.	Block some of the drains in area 1 (1 & 2) to restore the hydrology in this area. This work
	to be carried out under supervision from NPWS. At least one day with 3 CG members to
	be allocated.
4.	Discuss repairs to walking track with NPWS to see what is possible or practical.
5.	Plant 150 native trees along the river gullies in spring 2021.
6.	Look at trialling some peatland restoration measures in at least one area of bare peat and
	fencing off exclosure sites under direction from NPWS.

Use feed buckets to encourage more sheep grazing in area 1 of the commonage in the Jan/Feb and April/May period, particularly up in the areas of stronger vegetation.

4. Appendix 1. Maps & Management Recommendations



Figure 1. Habitats mapped to Level Three (Fossitt, 2000) within the Carrigeenduff commonage.



Figure 2. Habitats mapped to Level Three (Fossitt, 2000) within the Carrigeenduff commonage.



Figure 3. Habitats mapped according to their correspondence with Annex I habitats within the Carrigeenduff commonage.



Figure 4. Habitats mapped according to their correspondence with Annex I habitats within the Carrigeenduff commonage.



Figure 5. Habitat Condition Assessment for Carrigeenduff Commonage.



Figure 6. General Management Areas for Carrigeenduff.



Figure 7. Carrigeenduff Management Area 1.



Figure 8. Carrigeenduff Management Area 2.



Figure 9. Carrigeenduff Management Area 3.



Figure 10. Carrigeenduff Management Area 4.

Area	Recommendation
1, 2, 3, 4	No further burning
1, 2, 3, 4	Control deer
1,2, 3, 4	Shepherd out trespassing sheep
1,4	Protection and restoration of existing gully woodland remnants, additional planting and protection for same
1,2	Destock the hill of grazing animals and allow the habitats to recover
1, 2	Restoration measures for eroding bog on the ridges
1, 2	Restoration measures for areas of bare peat on the ridges
1, 2	Restoration measures for areas of montane heath on the ridges
1, 2	Erect deer exclosures to determine effects of deer and trespassing sheep
2 – location 5	Consider the establishment of native woodland on this rocky outcrop where bracken is encroaching and protect from grazing
	Remove self-seeded Sitka spruce from this area
2 – location 4	Enrichment planting of native species into the existing stand to diversify same, protect new planting from browsing
3	Reduce grazing pressure in this area
3 – location 5	Block drain to restore hydrology along the road
3 – location 4 and 5	Liaise with Wicklow County Council re. recent drainage works at roadside margins - restore hydrology by blocking drains
3 – location 6	Resolve track damage caused – accessed from Coillte?
4 - location 1, 7, 76, 78, 80	Bracken control – being mindful of whinchat habitat on lower slopes of location 1
4 – location 73	Bracken control
4 - 10cation 3/6	Remove Sitka spruce from this area
4 - summit ridge of	Track repairs
Kanturk/Bracket Rocks	

Table 1. Habitats present on Carrigeenduff Commonage and Management Recommendations.

5. Appendix 2. Water Quality

Water samples were taken from six sampling locations, one in each of the headwater streams, which rise within the Carrigeenduff commonage as shown on **Figure 5** below.

Lavarnia Brook, Cornagrainya Brook, and Cywock Brook all rise on the slopes below Mullaghcleevaun East Top and Duff Hill. These watercourses are all tributaries of the Inchavore River, which flows into Lough Dan. The Inchavore Brook and Duff Brook rise on the slopes of Kanturk Mountain and also flow into Lough Dan.

The water samples were assessed by Carl Dixon and the majority of headwater streams (CD1, CD2, CD3, CD4 and CD5) were assessed as a stream 'At Risk' of not achieving 'Good' water quality status. The exception was CD6, which was assessed as 'Indeterminate' – where the stream is at risk of not achieving 'Good' water quality status.

The Small Streams Risk Score (SSRS) is a biological risk assessment system for identifying rivers that are definitely 'at risk' of failing to achieve the 'good' water quality status goals of the Water Framework Directive (WFD). It was developed by the Environmental Protection Agency (EPA) in association with the Western River Basin District (WRBD) in 2006. The main aim of the SSRS is to support the programme of measures for the WFD which has its main objective to achieve 'good' water quality status in all water bodies by 2020.



Figure 11. Water quality sample locations at Carrigeenduff.

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Lavarnia Brook	IE_EA_10A050020	01.212.2019	Faith Wilson
(Inchavore River)			
· · ·			
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 1	Upstream of northern	1 st order	O 10565 08049
	end of forestry within		
	the Carrigeenduff		
	commonage		
Velocity:	Clarity:	Colour:	Discharge:
Torrential	Very clear	None	Flood
Fast	Clear	Slight	Normal
Moderate	Slightly turbid	Moderate	Low
Slow	Highly turbid	High	Very low
Very Slow			Dry
			Recent flood
Modifications: N	Dominant Types:	Slope:	Geology:
Canalised	Bedrock	Low	Calcareous
Widened	Boulder (>128mm)	Medium	Siliceous
Bank erosion	Cobble (32 - 128mm)	High	Mixed
Arterial drainage	Gravel (8 – 32mm)	Very high	
	Fine gravel (2 - 8mm)		
	Sand (0.25mm – 2mm)		
	Silt (<0.25mm)		
Substratum	Substratum:	Degree of Siltation:	Depth of Mud:
Condition:			
Compacted	Stoney bottom	Clean	None
Loose	Muddy bottom	Slight	<1cm
Normal	Mud over stones	Moderate	1-5cm
		Heavy	5-10cm
			>10cm
Litter:	Filamentous Algae:	Stream Flow:	Shading:
None	None	Riffle	High
Present	Present	Riffle/glide	Moderate
Moderate	Moderate	Slow flow	Low
Abundant	Abundant		None
Stock Access:	Sewage Fungus:	Sample Type (Mins):	Main Land Use
			Adjacent/Upstream:
Deer	None	Kick sample – 4 mins	Pasture
Sheep	Present	Stone washing	Bog
	Moderate	Weed sweep	Forestry
	Abundant		Tillage
			Urban
			Other



Plate 1. Photographic record of sampling location.

Carrigeendull

River:		Code:	Date		Time:		-
Station no.		Location:			Grid (6 figure):		-
		Stream Orde	er:		Stream flow: Riffle		
Field Ch	emistry		Y/N Canalised-wid	ered-bank erosion-	Riffle/Glide		
DO%		arterial drainage			Slow flow		
DO mg/l		Dominant Type Bedrock	5;				
Temp (*C)		Boulder (> 128mr	-1				
Conductivity		Cobble (32-128m	m)				-
pH		Gravel (8-32mm)					
Bank width (cm)		Fine Gravel (2-8n	nm)				-
Wet width (cm)		- Sand (0.25-2mm)			_	-
Avg Depth (cm)		Silt (<0.25mm)					-
Staff gauge		Slope: Low - Me	edium – High – Ve	ery High	Shading: High - Modera	te I en lles	
Velocity	Colour	Geology: Calcar	eous-Sliceous-Mi	ved	Shading: righ-model	NE-LON-140	-
Torrential	None	Substratum Co			Cattle access Y: upstrea	m-downstrea	mor
Fast	Slight	Loose - Normal	noncione Calcares	ous-compacteo-			
Moderate	Moderate	Substratum:					
Slow	High	Stoney bottom-M	uddy bottom-Mux	d over stones	Photo: Y / N		-
Very slow	Discharge	Degree of siltat	and the second second				
Clarity Very clear	Discharge Flood			and the second sec			
				cm: 5-10cm: > 10cm			
Clear	Normal	Litter: None - Pr	esent – Moderate	e-Abundant			
		Filamentous Al	gae:		Sewage Fungus:	-	-
Slightly turbid	Low	Filamentous Al None - Present -		dant	None - Present - Moderat	te - Abundant	
Highly turbid	Very Low	Main land use u		Sample	Sampled in Minutes:	_	-
	Dry	Pasture	Urban	retained:	Pondnetx		
	Recent Flood	Bog	Tillage Other	Y/N	Stone wash x		
		Forestry	Other				
		Macroinvertel	brate Compo	osition	Weed sweep x	Relative	
	ates are divided int phemeroptera (3-ta	Macroinvertel o the following 5 spe alls) – note thattails	cific groups: may be damaged	dduring sampling	Weed sweep x	Abundan 1-5	1
The macroinvertabr Group 1 = E Group 2 = P	ates are divided int phemeroptera (3-t lecoptera (2-tails)-	Macroinvertel	cific groups: may be damaged	dduring sampling	Weed sweep x	Abundan 1-5 6-20	1
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The macroinverteb Group 1 = E Group 2 = 8 Group 3 = I Group 4 = G Group 5 = A	ates are divided in phemeroptera (3-ti ecoptera (2-tails)- richoptera OL.D. (Gastropoda sellur	Macroinvertel o the following 5 spe alls) – note that tails note that tails may o Oigochesta and Di	cific groups may be damaged be damaged duri ptera)	dduring sampling ng sampling		Abundan 1-5 6-20	123
The macroinverteb Group 1 = E Group 2 = 8 Group 3 = I Group 4 = G Group 5 = A	ates are divided in phemeroptera (3-ti ecoptera (2-tails)- richoptera OL.D. (Gastropoda sellur	Macroinvertel o the following 5 spe alls) – note that tails note that tails may o Oigochesta and Di	cific groups may be damaged be damaged duri ptera)	dduring sampling ng sampling	Weed sweep x	Abundan 1-5 6-20 21-50 51-100	123
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NOTE *Bactis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.



SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Cornagrainya Brook	IE_EA_10A050020	01.12.2019	Faith Wilson
East (Inchavore River)			
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 2	Eastern tributary of	1 st order	O 10246 07622
	Cornagrainya Brook		
	within the		
	Carrigeenduff		
	commonage, upstream		
	of forestry		
Velocity:	Clarity:	Colour:	Discharge:
Torrential	Very clear	None	Flood
Fast	Clear	Slight	Normal
Moderate	Slightly turbid	Moderate	Low
Slow	Highly turbid	High	Very low
Very Slow			Dry
			Recent flood
Modifications: N	Dominant Types:	Slope:	Geology:
Canalised	Bedrock	Low	Calcareous
Widened	Boulder (>128mm)	Medium	Siliceous
Bank erosion	Cobble (32 - 128mm)	High	Mixed
Arterial drainage	Gravel (8 – 32mm)	Very high	
	Fine gravel (2 - 8mm)		
	Sand (0.25mm – 2mm)		
	Silt (<0.25mm)		
0.1.4.4			
Substratum	Substratum:	Degree of Siltation:	Depth of Mud:
Condition:	Stoney hettern	Clean	None
Compacted Loose	Stoney bottom		<1cm
	Muddy bottom	Slight	
Normal	Mud over stones	Moderate	1-5cm
		Heavy	5-10cm
			>10cm
Litter:	Filamentous Algae:	Stream Flow:	Shading:
None	None	Riffle	High
Present	Present	Riffle/glide	Moderate
Moderate	Moderate	Slow flow	Low
Abundant	Abundant		None
Stock Access:	Sewage Fungus:	Sample Type (Mins):	Main Land Use
	0 0 0		Adjacent/Upstream:
Deer	None	Kick sample – 4 mins	Pasture
Sheep	Present	Stone washing	Bog
-	Moderate	Weed sweep	Forestry
	Abundant		Tillage
			Urban
			Other



Plate 1. Photographic record of sampling location.

CANnigeedungs J

Ch. Lines and		Code:	Date		Time:		_
Station no.		Location:			Grid (6 figure):		
		Stream Orde	r:		Stream flow:		
Field Ch	emistry	Modifications: Y	/N Canalised-wid	dened-bank erosity	Riffle Riffle/Glide		
D0%		arterial drainage	Ne mana	Come Carrier Constant of	Slow flow		
DO mg/l		Dominant Types			20011121		
Temp (*C)		- Bedrock					_
Conductivity		Boulder (>128mm)				-
and the second se		Cobble (32-128mm	n)				
рH		Gravel (8-32mm)					
Bank width (cm)		Fine Gravel (2-8m) Sand (0.25-2mm)	mj			1000	
Wet width (cm)		Silt (<0.25-2000)					-
Avg Depth (cm)		- Contraction of Contraction					
Staff gauge	1.000	- Slope: Low - Med			Shading: High - Mode	ate - Low - No	one
Velocity	Colour	Geology: Calcare	ous-Sliceous-Mi	xed			10.00
Torrential	None	Substratum Con	dition: Calcare	us-Comparted-	Cattle access Y: upstre	am-downstr	eamo
Fast	Slight	Loose - Normal		our compactar			
Moderate	Moderate	Substratum:					
Slow	High	Stoney bottom-Mu	ddy bottom-Mut	d over stones	Photo: Y / N		
Very slow Clarity	Discharge	Degree of siltati	on: Clean-Slight	Moderate-Heavy			
Very clear	Flood						
	1000	Depth of mud: N			m		
Clear	Normal	Litter: None - Pre	sent – Moderate	e - Abundant			
		Filamentous Alg	aet		Sewage Fungus:		_
Slightly turbid	Low	None - Present - N	Aderate - Abun	dant	None - Present - Modera	ite - Abundant	6
Highly turbid	Very Low	Main land use u/		Sample	Sampled in Minutes:		
	Dry	Pasture	Urban	retained:	Pond net x		
	Recent Flood	Bog	Tillage	Y/N	Stone wash x		
		Forestry	Other		Weed sweep x		
Seneral Commer		Macroinverteb	rate Comp	osition	weed sweep x	Relative	•
The macroinverteb Group 1 = E	rates are divided int phemeroptera (3-t	Macroinverteb o the following 5 spec ails) – note that tails n	ific groups nay be damaged	dduring sampling	And The Party of t	Relative Abunda	
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The macroinvertab Group 1 = E Group 2 = B Group 2 = D	rates are divided int phemeroptera (3-t lecoptera (2-tails)- ischootera	to the following5 spec ails) – note that tails n - note that tails may b	ific groups nay be damaged e damaged duri	dduring sampling	I HERD SHEEP X	Abunda 1-5 6-20 21-50	
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The macroinvertab Group 1 = E Group 2 = B Group 3 = J Group 4 = C Group 5 = A	rates are divided int phemeroptara (3-t locoptera, (2-tails)- ischootera, s.OL.D. (Sastropoda seellus	to the following 5 spec ails) – note that tails n - note that tails may b • Oligochesta and Dip	ific groups nay be damaged e damaged duri tera)	dduring sampling ng sampling	roup below: (Abundance – Ab	Abunda 1-5 6-20 21-50 51-100	
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NOTE Bactis is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that Bactis is not counted in SSRS. See Appendix B for more details on how to identify Bactis


River:	Code:	Date:	Sample Taken By:
Cornagrainya Brook	IE_EA_10A050020	01.12.2019	Faith Wilson
West (Inchavore River)			
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 3	Western tributary of	1 st order	O 09756 06901
	Cornagrainya Brook		
	within the		
	Carrigeenduff		
	commonage, upstream		
	of forestry		
77.1.1/			D' I
Velocity: Torrential	Clarity:	Colour:	Discharge: Flood
	Very clear	None	
Fast	Clear	Slight	Normal
Moderate	Slightly turbid	Moderate	Low
Slow	Highly turbid	High	Very low
Very Slow			Dry Dry
			Recent flood
Modifications: N	Dominant Types:	Slope:	Geology:
Canalised	Bedrock	Low	Calcareous
Widened	Boulder (>128mm)	Medium	Siliceous
Bank erosion	Cobble (32 - 128mm)	High	Mixed
Arterial drainage	Gravel (8 – 32mm)	Very high	Wilked
Therein aranage	Fine gravel (2 - 8mm)	very men	
	Sand (0.25mm – 2mm)		
	Silt (<0.25mm)		
Substratum	Substratum:	Degree of Siltation:	Depth of Mud:
Condition:			
Compacted	Stoney bottom	Clean	None
Loose	Muddy bottom	Slight	<1cm
Normal	Mud over stones	Moderate	1-5cm
		Heavy	5-10cm
			>10cm
Litter:	Filamentous Algae:	Stream Flow:	Shading:
None	None	Riffle	High
Present	Present	Riffle/glide	Moderate
Moderate	Moderate	Slow flow	Low
Abundant	Abundant		None
01 1 4			
Stock Access:	Sewage Fungus:	Sample Type (Mins):	Main Land Use Adjacent/Upstream:
Deer	None	Kick sample – 4 mins	Pasture
Sheep	Present	Stone washing	Bog
Jucep	Moderate	Weed sweep	Forestry
	Abundant	теси энеер	Tillage
			Urban
	1		Ulban



Plate 1. Photographic record of sampling location.

consiger dulk 3

River:		Code:	Date	*	Time:		
Station no.		Location:			Grid (6 figure):		
		Stream Order	r:		Stream flow:		-
Field Ch	amlater	He diller of the other	I Contract of	dened-bank erosion-	Riffle		
DO%	emistry	arterial drainage	n canaliseo-w	dened-bank erosion-			
DO mg/l		Dominant Types			Slow flow		-
		Bedrock					
Temp (°C)		Boulder (>128mm))			ALC: NOT SAVE OF	
Conductivity		Cobble (32-128mm)				-
pH		Gravel (8-32mm)	-				
Bank width (cm)		Fine Gravel (2-8mm	n)				
Wet width (cm)		- Sand (0.25-2mm)					-
ava Depth (om)		Silt (<0.25mm)					
taff gauge		Slope: Low - Med	ium – High – W	ery High			-
Velocity	Colour	Geology: Calcareo	Strang.Mi	havi	Shading: High - Mod	erate - Low - N	one
Torrential	None				Cattle access Y: upstr		
Fast	Slight	Substratum Cond	dition: Calcarei	ous-Compacted	Cattle access 1: upsu	ream - oownen	eam
Moderate	Moderate	Loose - Normal Substratum:					
Slow	High	Stoney bottom-Muc	dd. homen to	d au no stanoor	Photo: Y / N		-
Very slow					PHOLO: 1/ N		
Clarity	Discharge	Degree of siltatio	an: Clean-Slight	-Moderate-Heavy			
Very clear	Flood	Depth of mud: No	one: <1cm: 1-5	cm: 5-10cm: > 10m			
Clear	Normal	Litter: None - Pres					
Uncar	winner				and the second second		
Slightly turbid	Low	Filamentous Alga None - Present - M	ies .		Sewage Fungus:	and the second second	
		None - Present - M	ioderate - Abun		None - Present - Mode		t
Highly turbid	Very Low	Main land use u/s		Sample	Sampled in Minutes:	1	-
	Dry Recent Flood	Pasture Bog	Urban Tillage	retained:	Pond net x		
	Necent Papag	Forestry	Other	1/1	Stone wash x		
		rulesuy	other				
ieneral Commen					Weed sweep x		
he macroinvertebr	ates are divided into	Macroinvertebr	fic groups		Weed sweep x	Relativ	-
 Group 1 = E 	ates are divided into phemercoptera (3-ta	o the following 5 specif ails) – note that tails m	fic groups av be damaged	durino samplino	Weed sweep x	Abunda	-
The macroinvertebr Group 1 = E Group 2 = P	ates are divided into phemeroptera (3-ta econtera (2-tails)-	o the following 5 specif	fic groups av be damaged	durino samplino	Weed sweep x	Abunda 1-5 6-20	-
he macroinvertebr Group 1 = E Group 2 = R Group 3 = 1	ates are divided into phemeroptera (3-ta ecoptera (2-tails)- icchoptera	o the following 5 specif alls) – note that tails m note that tails may be	fic groups ay be damaged damaged durin	durino samplino	Weed sweep x	Abunda 1-5 6-20 21-50	-
he macroinvertebr Group 1 = E Group 2 = B Group 3 = I Group 4 = G Group 5 = A	ates are divided (in- phemeroptera (in-tr ecoptera (2-tails)- richontera .OL.D. (Gastorpoda	o the following 5 specif eils) – note that tails m note that tails may be Oligochesta and Dipte	fic groups ay be damaged damaged durin era)	dduring sampling ng sampling		Abunda 1-5 6-20 21-50 51-100	-
he macroinvertebr Group 1 = E Group 2 = B Group 3 = I Group 4 = G Group 5 = A	ates are divided (in- phemeroptera (in-tr ecoptera (2-tails)- richontera .OL.D. (Gastorpoda	o the following 5 specif eils) – note that tails m note that tails may be Oligochesta and Dipte	fic groups ay be damaged damaged durin era)	dduring sampling ng sampling		Abunda 1-5 6-20 21-50 51-100	-
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he macroinvertebr Group 1 = E Group 2 = P Group 3 = T Group 4 = G Group 5 = A Calculate th	ates are divided (in- phemeroptera (in-tr ecoptera (2-tails)- richontera .OL.D. (Gastorpoda	o the following S specifies ils) - note that tails m note that tails may be Oligochesta and Dipte on and relative abunda Ecologoware Ab	fic groups ay be damaged damaged durin era)	dduring sampling ng sampling acroinvertabrate gro		Abunda 1-5 6-20 21-50 51-100 101+ b)	-
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NOTE Bactis is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that Bactis is not counted in SSRS. See Appendix B for more details on how to identify Bactis.



River:	Code:	Date:	Sample Taken By:
Cyowck Brook	IE_EA_10A050020	01.12.2019	Faith Wilson
(Inchavore River)			
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 4	Cyowck Brook within	1 st order	O 09433 06359
	the Carrigeenduff		
	commonage, upstream		
	of forestry		
Velocity:	Clarity:	Colour:	Discharge:
Torrential	Very clear	None	Flood
Fast	Clear	Slight	Normal
Moderate	Slightly turbid	Moderate	Low
Slow	Highly turbid	High	Very low
Very Slow			Dry
			Recent flood
Modifications: N	Dominant Types:	Slope:	Geology:
Canalised	Bedrock	Low	Calcareous
Widened	Boulder (>128mm)	Medium	Siliceous
Bank erosion	Cobble (32 - 128mm)	High	Mixed
Arterial drainage	Gravel (8 – 32mm)	Very high	
	Fine gravel (2 - 8mm)		
	Sand (0.25mm – 2mm)		
	Silt (<0.25mm)		
Substratum	Substratum:	Degree of Siltation:	Depth of Mud:
Condition:			
Compacted	Stoney bottom	Clean	None
Loose	Muddy bottom	Slight	<1cm
Normal	Mud over stones	Moderate	1-5cm
		Heavy	5-10cm
			>10cm
Litter:	Filamentous Algae:	Stream Flow:	Shading:
None	None	Riffle	High
Present	Present	Riffle/glide	Moderate
Moderate	Moderate	Slow flow	Low
Abundant	Abundant		None
Stock Access:	Sewage Fungus:	Sample Type (Mins):	Main Land Use
			Adjacent/Upstream:
Deer	None	Kick sample – 4 mins	Pasture
Sheep	Present	Stone washing	Bog
•	Moderate	Weed sweep	Forestry
	Abundant	1	Tillage
			Urban
		t in the second se	Other



Plate 1. Photographic record of sampling location.

CAMPIS	eenduFF
J	eenduiFF 4

River:		Code:	Date		Time:		
Station no.		Location:			Grid (6 figure)		
		Stream Ord	er:		Stream flow:	2011	
			No. of Concession, Name		Riffle		
D0%	hemistry			dened-bank erosion			
Nom OC					Slow flow		_
		- Bedrock	est				
Temp (°C)		Boulder (>128m	m		1		
Conductivity	1.1.1.1.1.1.1.1.1	Cobble (32-128m					-
pH		Gravel (8-32mm)				-
Bank width (cm)		Fine Gravel (2-8)	mm)			State of State of State	_
Wet width (cm)	-)				
Avg Depth (cm)		Silt (<0.25mm)					1
		Slope: Low - M	edium - High - Ve	ery High	here and the second		
Staff gauge	Colour	Geology: Calcar			Shading: High - M	oderate - Low - N	lone
Velocity Torrential	None			and the second se			
Fast	Slight	Substratum Co	ndition: Calcare	ous-Compacted-	Cattle access Y: up	stream - downst	reamo
Moderate	Moderate	Loose - Normal					
Slow	High	Substratum:	1.1.1	10			-
Very slow	ringer	Stoney bottom-M	luddy bottom-Mu	d over stones	Photo: Y / N		
Clarity	Discharge	Degree of silta	tion: Clean-Sliph	-Moderate-Heavy			
Very clear	Flood						
		Depth of mud:	None: <1cm: 1-5	icm: 5-10cm: > 10cm			
Clear	Normal	Litter: None - P	resent - Moderate	e - Abundant			
1000000		Filamentous A	and		Sewage Fungus:		_
Slightly turbid	Low	None - Present -	Moderate Ahun	tech	None - Present - Mo	down Abiadaa	10
Highly turbid	Very Low	Main land use	1/5:	Sample	Sampled in Minute		ц.
	Dry	Pasture	Urban	retained:	Pood net x	-	
	Recent Floor		Tillage	Y/N			
		Forestry	Other		Stone wash x		
		(WHENDY	Ucher				
General Comme	nts:				Weed sweep x		
General Comme	rates are divided	Macroinvertel	brate Compo		Weed sweep x	Relativ	
The macroinvertet	rates are divided	Macroinvertel into the following S spi 3-tails) - note thattai	brate Compo ecific groups may be damager	durino samolino	Weed sweep x	Relativ Abundi 1-5	
The macroinvertet Group 1 = 1 Group 2 = 1	rates are divided Ephemeroptera (2-tai	Macroinvertel	brate Compo ecific groups may be damager	durino samolino	Weed sweep x	Abunda 1-5 6-20	
The macroinvertet Group 1 = 1 Group 2 = 1 Group 2 = 1	rrates are divided Ephemeroptera (2-tait Viccoptera (2-tait	Macroinverte into the following 5 spi 3-tails) – none that tails may s) - note that tails may	brate Compo ecfic groups may be damaged be damaged duri	durino samolino	Weed sweep x	Abunda 1-5 6-20 21-50	
The macroinverted Group 1 = 1 Group 2 = 1 Group 3 = 1 Group 4 = 0 Group 4 = 0	rates are divided Ephemeroptera (Recoptera (2-tail Licchoptera 3. OL. D (Slastropc Acalin:	Macroinverte into the following S sp 3-tails) – note that tails may de. Oligocherta and Di	brate Compo colic groups may be damaged be damagedduri ptera)	dduring sampling ng sampling		Abunda 1-5 6-20 21-50 51-100	
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The macroinverted Group 1 = i Group 2 = i Group 3 = i Group 4 = i Calculate th	rates are divided Ephemeroptera (Recoptera (2-tail Licchoptera 3. OL. D (Slastropc dealin:	Macroinverte into the following 5 sp -aile) – nore thattails -nore that tails may xde. Olgochesta and Di f taza and relative abu Estitonouna Ab Bhithmaena Ab	brate Compo crific groups: may be damaged be damaged duri ptera) ndance of eachm	dduring sampling ng sampling acroinvertebrate gro	up belov: (Abundance-	Abunda 1-5 6-20 21-50 51-100 101+ Ab) Leuctra Ab Isonerly Ab	
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Total no. of tax	rates are divided phemeroptera (2-atility) incorptera (2-atility) inchootera 5.0L.D (Gastoppo deally e total number of e total number of deally deally deally Polycentrospoc Rhyaospot Polycentrospoc Rhyaospot Biologotaen Limnephil Sericostomat Giossosmat	Macroinvertel into the following 5 pp Stallo - note that tails allo - note that tails allowing the that tails allowing that tails allowing the that tails allowing t	Prate Competing groups may be damaged duri ptera) ndance of eachm Plescog Dr Lymnes Anontogy of Ranged Range Ran	during sampling ng sampling acroinvertabrate growth atteration atteration	up below: (Abundance- 4 A Control (Abundance- 0 (Control (Abundance)) Abundance (D) Ab Stroutides (D) Ab Abarangta (D) Ab	Abunda 1-5 6-20 21-50 21-50 51-100 101+ <i>Leuctra Ab</i> <i>Brannela Ab</i> <i>Brannela Ab</i> <i>Brannela Ab</i> <i>Brannela Ab</i> <i>Chinocas Ab</i> <i>Chin</i>	2 1 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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NOTE Baetic is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that Baetics is not counted in SSRS. See Appendix B for more details on how to identify Baetic.



River:	Code:	Date:	Sample Taken By:
Carrigeenshinnagh/Duff	IE_EA_10A050020	03.12.2019	Faith Wilson
Brook (Inchavore River)			
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 5	Carrigeenshinnagh/Duff	1 st order	O 13855 03035
	Brook below the		
	confluence within the		
	Carrigeenduff		
	commonage		
Velocity:	Clarity:	Colour:	Discharge:
Torrential	Very clear	None	Flood
Fast	Clear	Slight	Normal
Moderate	Slightly turbid	Moderate	Low
Slow	Highly turbid	High	Very low
Very Slow		111511	Dry
• C1 y 010 W			Recent flood
Modifications: N	Dominant Types:	Slope:	Geology:
Canalised	Bedrock	Low	Calcareous
Widened	Boulder (>128mm)	Medium	Siliceous
Bank erosion	Cobble (32 - 128mm)	High	Mixed
Arterial drainage	Gravel (8 – 32mm)	Very high	
	Fine gravel (2 - 8mm)		
	Sand (0.25mm – 2mm)		
	Silt (<0.25mm)		
Substratum Condition:	Substratum:	Degree of Siltation:	Depth of Mud:
Compacted	Stoney bottom	Clean	None
Loose	Muddy bottom	Slight	<1cm
Normal	Mud over stones	Moderate	1-5cm
		Heavy	5-10cm
			>10cm
Litter:	Filamentous Algae:	Stream Flow:	Shading:
None	None	Riffle	High
Present	Present	Riffle/glide	Moderate
Moderate	Moderate	Slow flow	Low
Abundant	Abundant		None
Stock Access:	Sewage Fungus:	Sample Type	Main Land Use
JIULK ALL 233.	Sewage Fungus.	(Mins):	Adjacent/Upstream:
Deer	None	Kick sample – 4	Pasture
		mins	
Sheep	Present	Stone washing	Bog
	Moderate	Weed sweep	Forestry
	Abundant		Tillage
			Urban
			Other



Plate 1. Photographic record of sampling location.

CANNE EADLY HE

Station no.		Code:	Date		Time:			_
	1 10 10 10 10 10 10 10 10 10 10 10 10 10	Location:			Grid (6 figure)	:	2.3	
		Stream Orde	**		Stream flow:	-	-	-
					Riffle			
Field Che	emistry		/N Canalised-wid	sened-bank erosion-	Riffle/Glide			
		arterial drainage Dominant Type			Slow flow			
D0 mg/l		- Bedrock	K					
Temp (*C)		Boulder (>128mm	1				-	
Conductivity		Cobble (32-128mr	(m)				1000	
pH		Gravel (8-32mm)				_		-
Bank width (cm)		Fine Gravel (2-8m	m)			-		
Wet width (cm)		- Sand (0.25-2mm)				-		
Avg Depth (cm)		Silt (<0.25mm)				_	-	
		Slope: Low - Mer	dium - High - Ve	ry High				
Stalf gauge Velocity	Colour	Geology: Calcare			Shading: High - Mo	oderate -	-Low-Nor	ne
Torrential	None	and the second			Cattle access Y: up	-	devenue	-
Fast	Slight	Substratum Cor	dition: Calcareo	ous-Compacted-	Cattle access 1: up	stream-	- cownere	amo
Moderate	Moderate	Loose - Normal Substratum:						
Slow	High			AL RESIDENCE	Photo: Y / N			-
Very slow		Stoney bottom-Mu	and the second second second		PROLO: T/ IN			
Clarity	Discharge	Degree of siltati	ion: Clean-Slight	-Moderate-Heavy				
Very clear	Flood	Depth of mud-	lone <1m 1.5	cm: 5-10cm: >10cm				
Clear	Normal							
Gear	Normal	Litter: None - Pre		e-Abundant	in a second			
Slightly turbid	Low	Filamentous Alg	jae:		Sewage Fungus:	-		-
		None - Present - 1	Moderate - Abun		None - Present - Mo		Abundant	
Highly turbid	Very Low	Main land use u	/s:	Sample	Sampled in Minute	es:		-
	Dity	Pasture	Urban	retained:	Pond net x			
	Recent Flood	Bog	Tillage	Y/N	Stone wash x			
		Forestry	Other		Weed sweep x			
		Macroinverteb	rate Compo	osition		R	telative	
 Group 1 = Ep 	ates are divided intr abemeroptera (3-ta	o the following5 sper ails) – note that tails r	cific groups may be damaged	during sampling		A	bunda	
 Group 1 = Er Group 2 = Pl 	ates are divided intr abemeroptera (3-ta ecoptera (2-tails)-	o the following 5 sper	cific groups may be damaged	during sampling		A 1. 6	-5 -20	
 Group 1 = Er Group 2 = P Group 3 = Tr 	ates are divided intr obemeroptera (3-ta ecoptera (2-tails) - ichoptera	o the following5 sper alls) – note thattails note that tails may b	cific groups may be damaged be damaged duri	during sampling		A 167	-5 -20 1-50	
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NOTE Baetis is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that Baetis is not counted in SSRS. See Appendix B for more details on how to identify Baetis.

CAME eendulle 5

Step.1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from *each macroinvertebrate group* calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.



River:	Code:	Date:	Sample Taken By:
Inchavore Brook	IE_EA_10A050020	03.12.2019	Luke Drea
(Inchavore River)			
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 6	Inchavore Brook below	1 st order	O 13956 04212
	within the		
	Carrigeenduff		
	commonage		
Velocity:	Clarity:	Colour:	Discharge:
Torrential	Very clear	None	Flood
Fast	Clear	Slight	Normal
Moderate	Slightly turbid	Moderate	Low
Slow	Highly turbid	High	Very low
Very Slow			Dry
			Recent flood
Modifications: N	Dominant Types:	Slope:	Geology:
Canalised	Bedrock	Low	Calcareous
Widened	Boulder (>128mm)	Medium	Siliceous
Bank erosion	Cobble (32 - 128mm)	High	Mixed
Arterial drainage	Gravel (8 – 32mm)	Very high	
	Fine gravel (2 - 8mm)		
	Sand (0.25mm – 2mm)		
	Silt (<0.25mm)		
	, , , , , , , , , , , , , , , , , , , ,		
Substratum	Substratum:	Degree of Siltation:	Depth of Mud:
Condition:			
Compacted	Stoney bottom	Clean	None
Loose	Muddy bottom	Slight	<1cm
Normal	Mud over stones	Moderate	1-5cm
		Heavy	5-10cm
			>10cm
Litter:	Filamentous Algae:	Stream Flow:	Shading:
None	None	Riffle	High
Present	Present	Riffle/glide	Moderate
Moderate	Moderate	Slow flow	Low
Abundant	Abundant		None
Stock Access:	Sewage Fungus:	Sample Type (Mins):	Main Land Use
			Adjacent/Upstream:
Deer	None	Kick sample - 4 mins	Pasture
Sheep	Present	Stone washing	Bog
	Moderate	Weed sweep	Forestry
	Abundant	4	Tillage
			Urban
			Other



Plate 1. Photographic record of sampling location.

CARRIGEENduFF

River: Station no.		Code: Location:	Date	C.r	Time:	
Station no.					Grid (6 figure):	
		Stream Ord	er:		Stream flow: Riffle	
Field Ch	emistry	Modifications:	Y/N Canalised-v	videned-bank erosion	Riffle/Glide	
D0%		arterial drainage			Slow flow	
DO mg/l		DominantTyp	es:			
Temp (*C)	-	Bedrock				
Conductivity		Boulder (>128m Cobble (32-128m	m)			
oH	-	Gravel (8-32mm	nm)			
		Fine Gravel (2-8				a first to the
Bank width (cm)		- Sand (0.25-2mm	a)			
Wet width (cm)		Silt (<0.25mm)				
log Depth (cm)		Slope: Low - M	adien - Minh - 1	fan: Hinh		
Staff gauge	1	A STATE OF CONTRACTOR CONTRACTOR	and the second sec	and the second	Shading: High - Moo	derate - Low - None
Velocity	Colour	Geology: Calca	reous-bliceous-N	loved		
Torrential	None		ondition: Calcar	eous-Compacted-	Cattle access Y: ups	tream - downstream o
Fast Moderate	Slight Moderate	Loose - Normal				
Slow	High	Substratum:	Contraction of the	100 C	at a with	A REAL PROPERTY AND
Very slow	raga	Stoney bottom-I	and the second		Photo: Y / N	
Clarity	Discharge	Degree of silta	tion: Clean-Slig	ht-Moderate-Heavy		
Very clear	Flood			Som: 5-10cm: >10cm		
Clear	Normal	Litter: None - P		ite - Abundant		
Chabits a short	1.011	Filamentous A	Igae:		Sewage Fungus:	
Slightly turbid	Low	None - Present -	-Moderate - Abu	indant	None - Present - Mod	erate - Abundant
Highly turbid	Very Low	Main land use		Sample	Sampled in Minutes	2
	Dry	Pasture	Urban	retained:	Pond net x	
	Recent Flood	Bog	Tillage	Y/N	Stone wash x	
		Forestry	Other			
he macroinverteb	rates are divided int	Macroinverte	ecific groups		Weed sweep x	Relative
he macroinverteb Group 1 = E Group 2 = B Group 3 = J Group 4 = G	rates are divided int phemeroptera (3-tails)- ischoptera JoL.D (Gasstopoda	Macroinverte o the following 5 sp ails) – note that tails may note that tails may	ecific groups s may be damag y be damaged du	ed during sampling	Weed sweep x	Abundance 1-5 6-20 21-50 51-100
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NOTE Bactis is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that Bactis on how to identify Bactis.

CARDIGEEndiff 6

Step.1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from *each macroinvertebrate group* calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.

