

Carrigeenduff Commonage

2020 Ecological Survey



Final Report

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Table of Contents

1. Introduction	2
2. SUAS Vegetation Management Measures	2
3. 2020 Walkover Survey	5
3.1 Mulched Areas.....	5
3.2 Previously Burnt Areas	6
3.3 Acid Grassland Habitats	7
3.4 Track Erosion	7
3.5 Sitka Spruce Removal	9
3.6 Vegetation Cutting	9
3.7 Access Lane Works	10
3.8 Upland Gully Woodland.....	12
3.9 Deer control.....	14
3.10 Management Measures for Areas 1, 2 and 3	14
3.11 Faunal Observations	14
3.12 Management for 2021	15
4. Appendix 1. Maps & Management Recommendations	16
5. Appendix 2. Water Quality	28

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.
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. 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 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 enclosure 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.

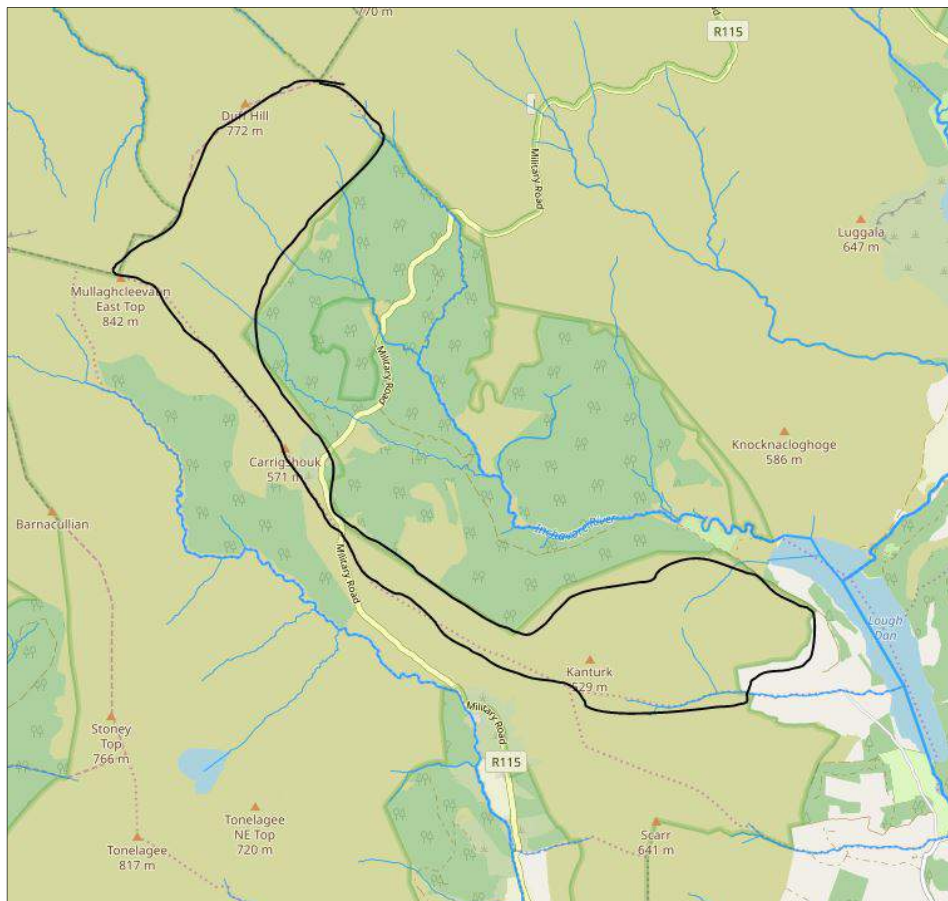


Figure XX. There are six headwater streams within the Carrigeenduff Commonage.

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 enclosure 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

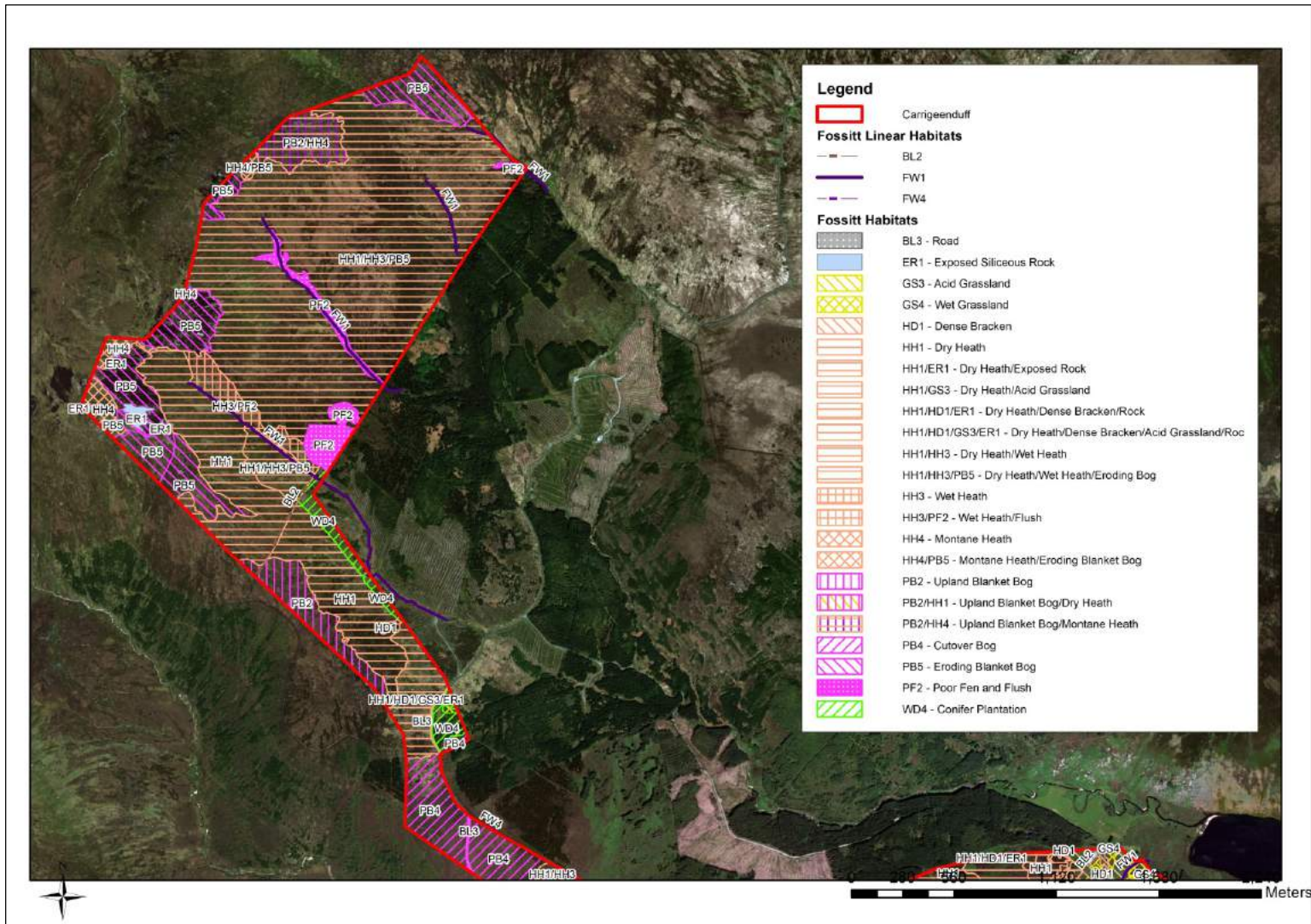


Figure 1. Habitats mapped to Level Three (Fossitt, 2000) within the Carrigeenduff commonage.

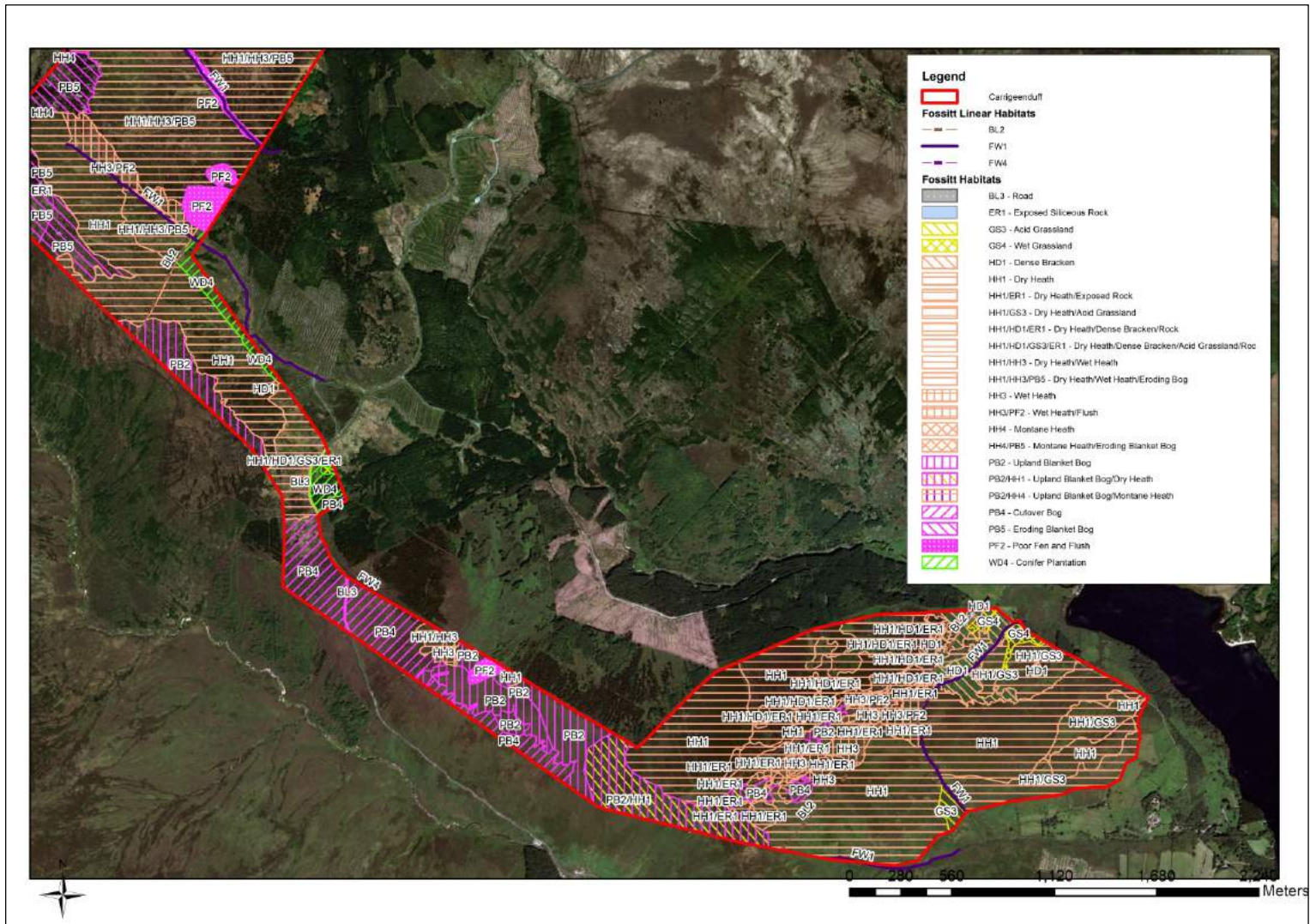


Figure 2. Habitats mapped to Level Three (Fossitt, 2000) within the Carrigeenduff commonage.

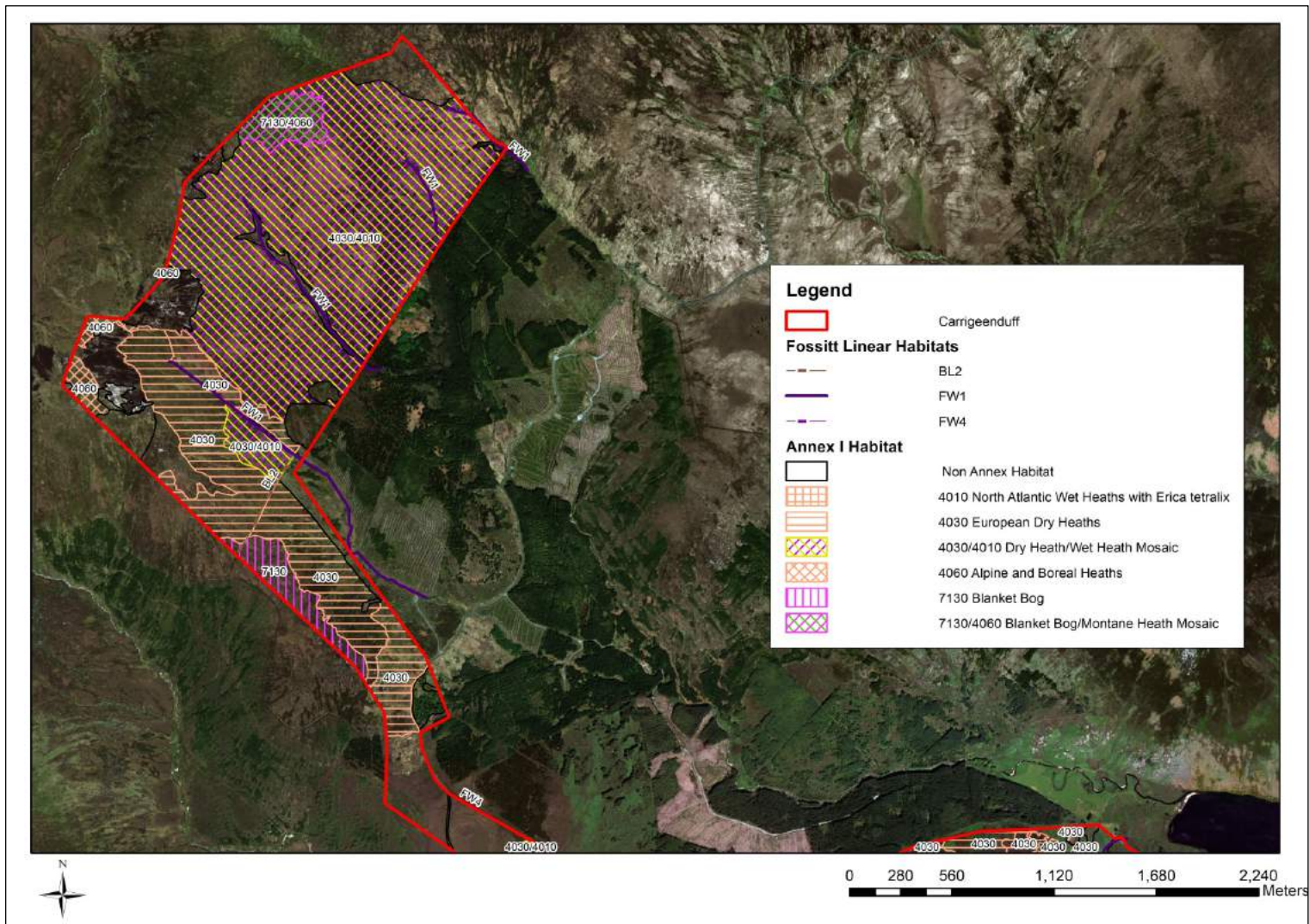


Figure 3. Habitats mapped according to their correspondence with Annex I habitats within the Carrigeenduff commonage.

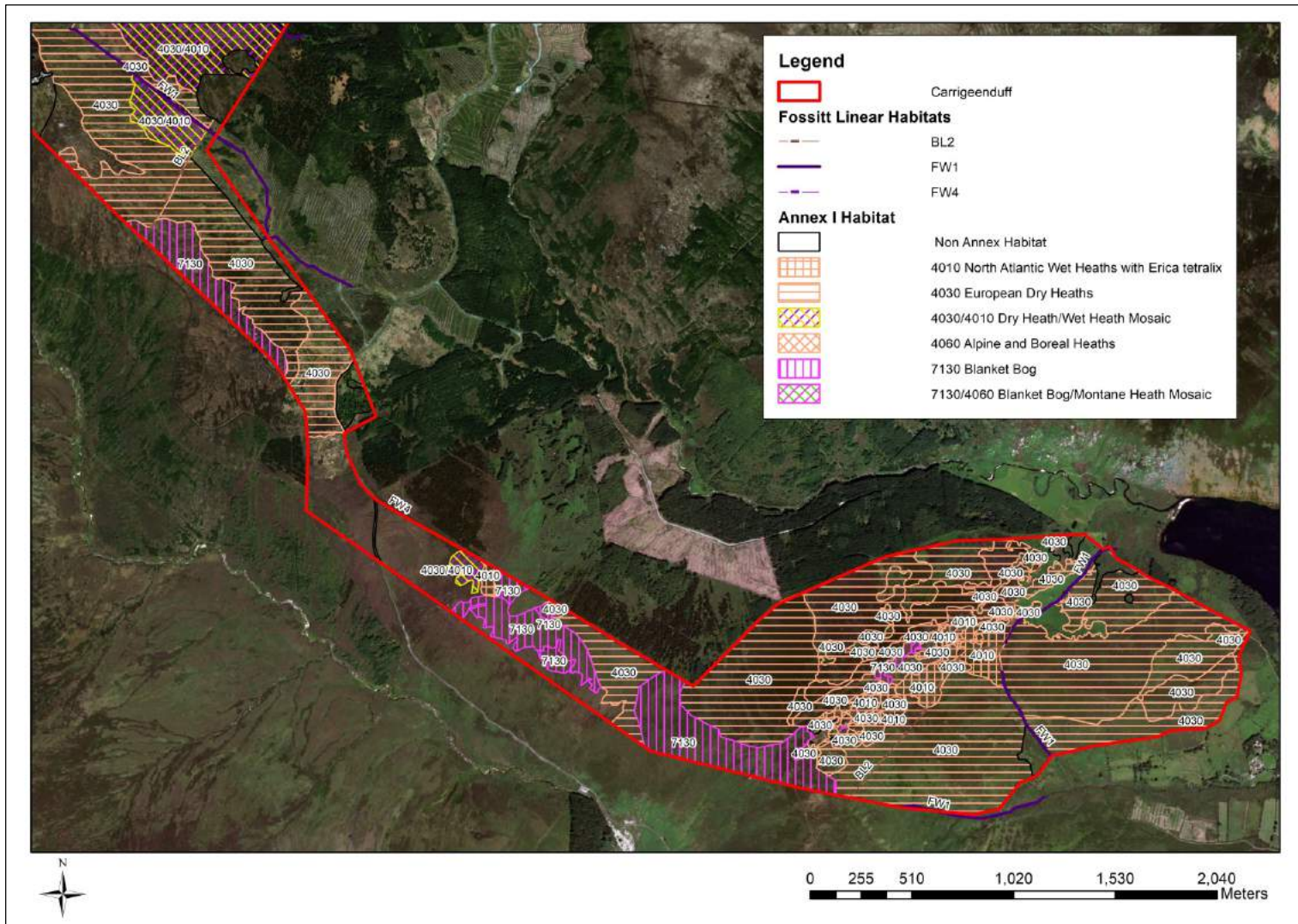


Figure 4. Habitats mapped according to their correspondence with Annex I habitats within the Carrigeenduff commonage.

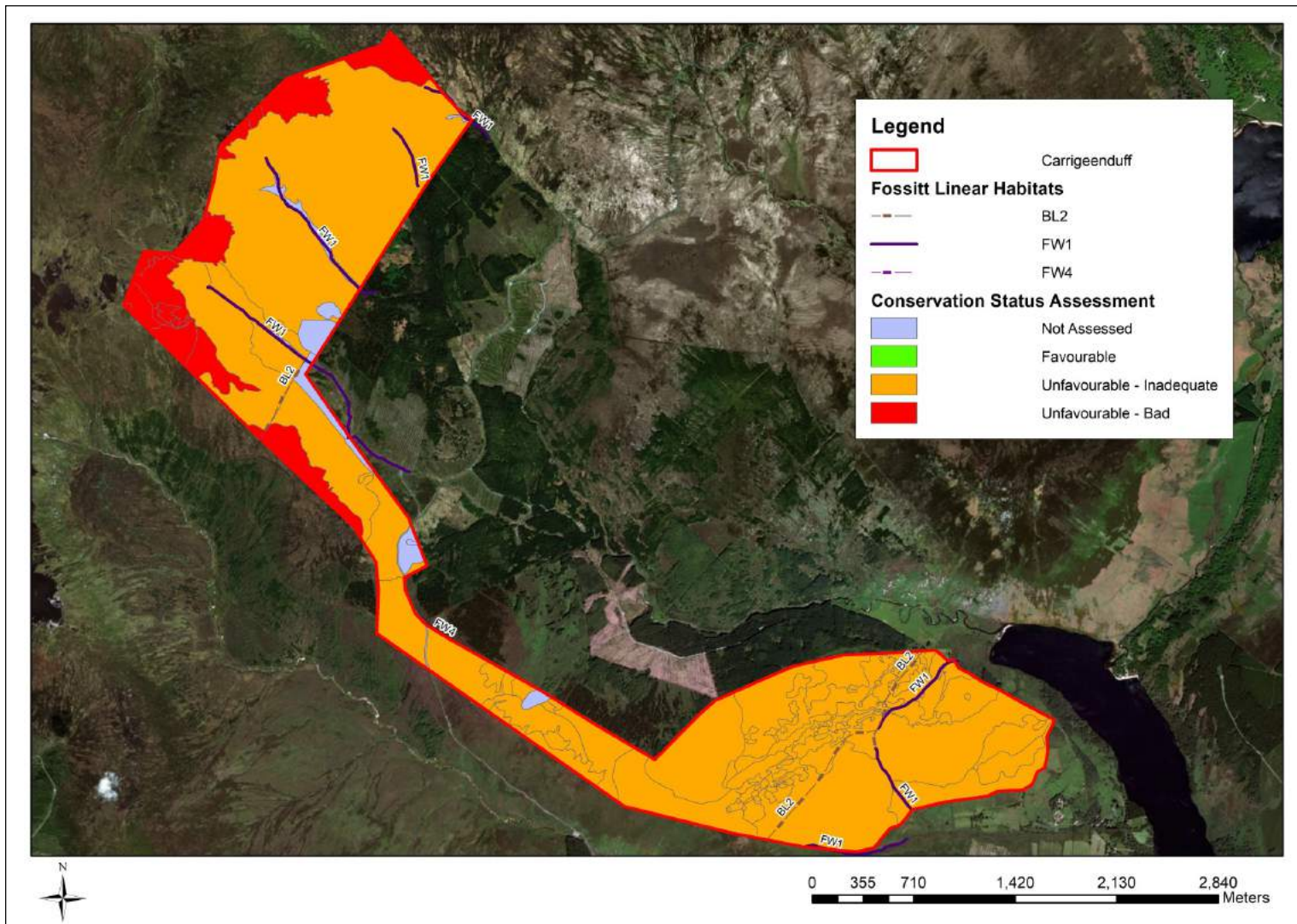


Figure 5. Habitat Condition Assessment for Carrigeenduff Commonage.

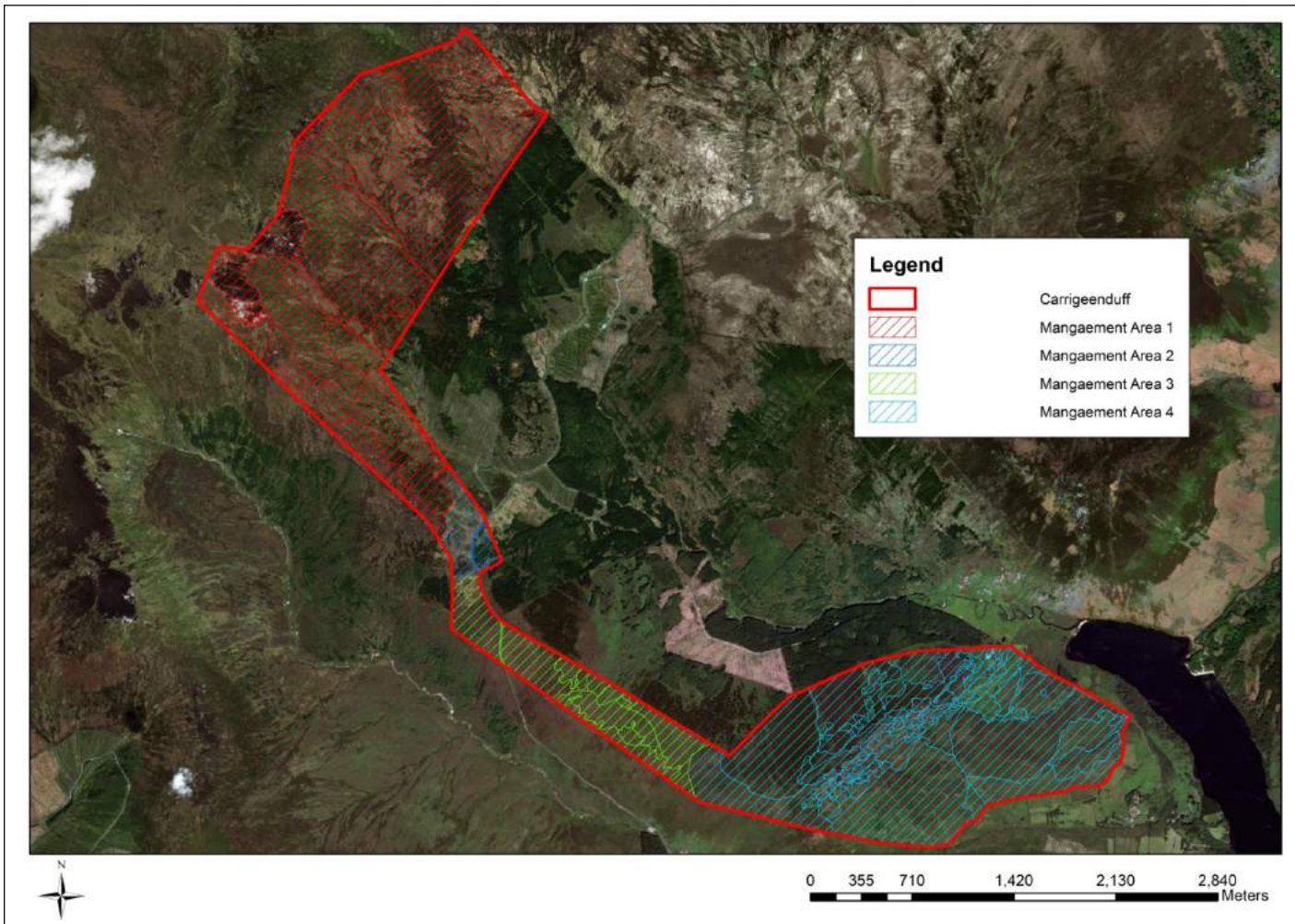


Figure 6. General Management Areas for Carrigeenduff.

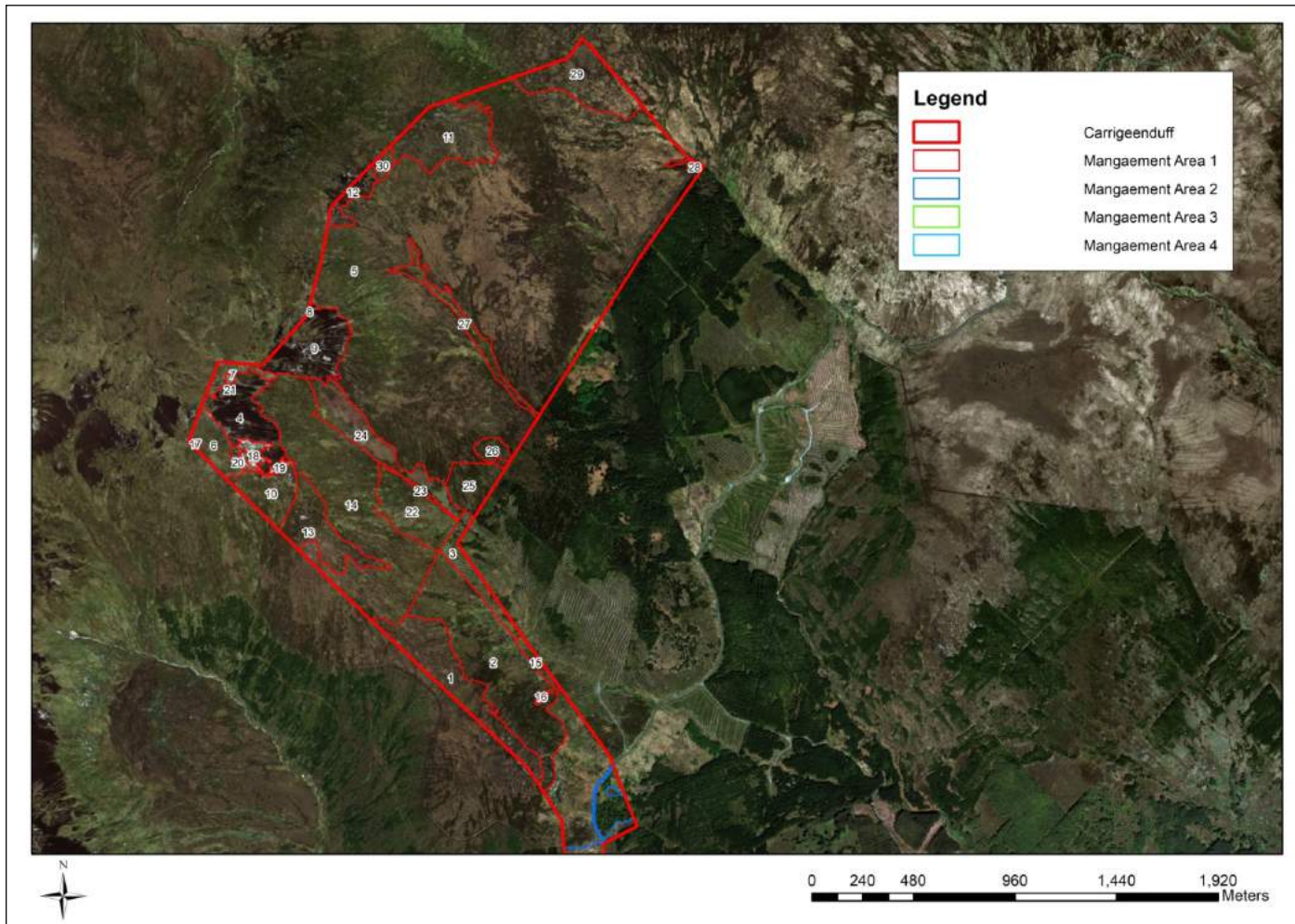


Figure 7. Carrigeenduff Management Area 1.

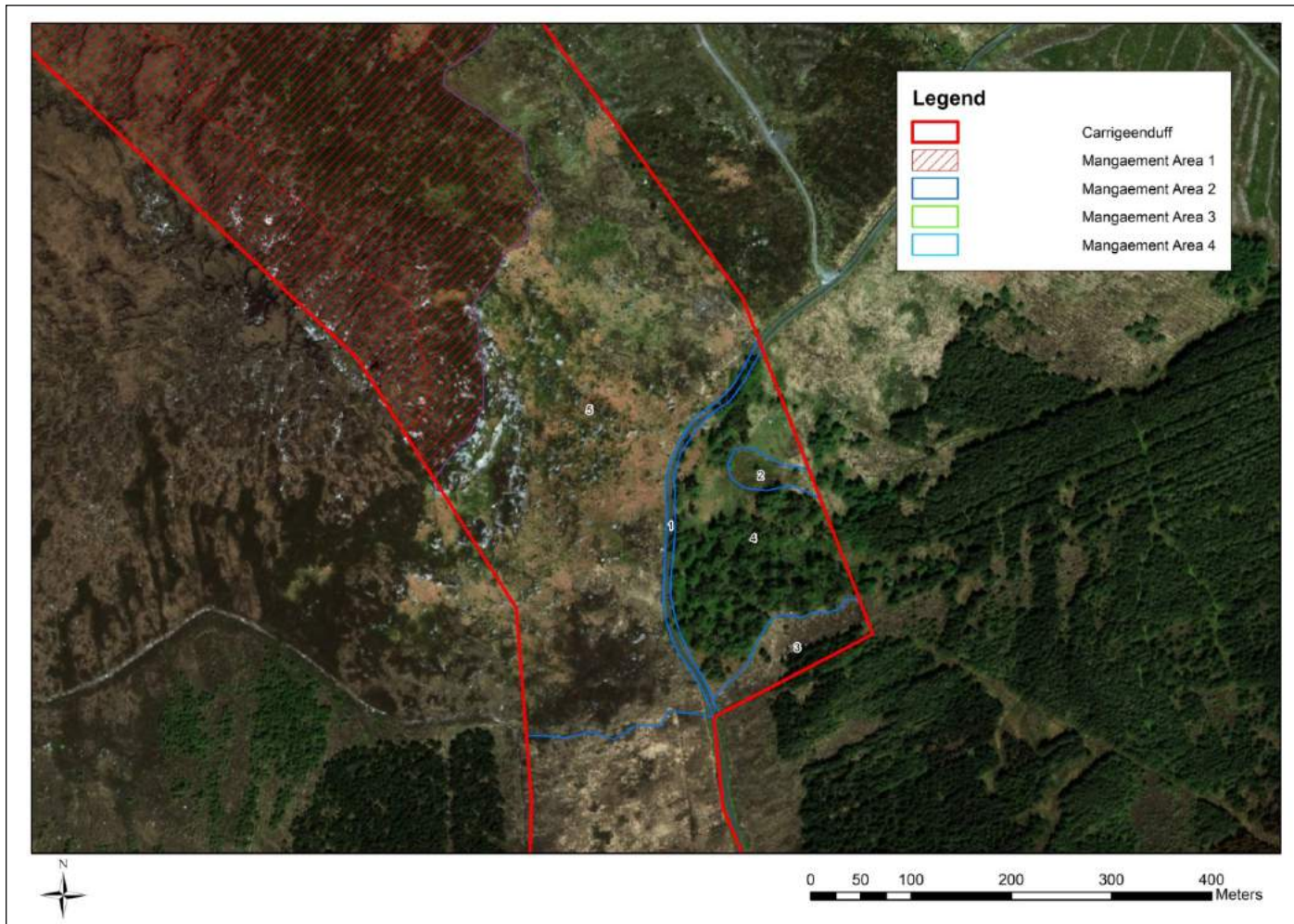


Figure 8. Carrigeenduff Management Area 2.

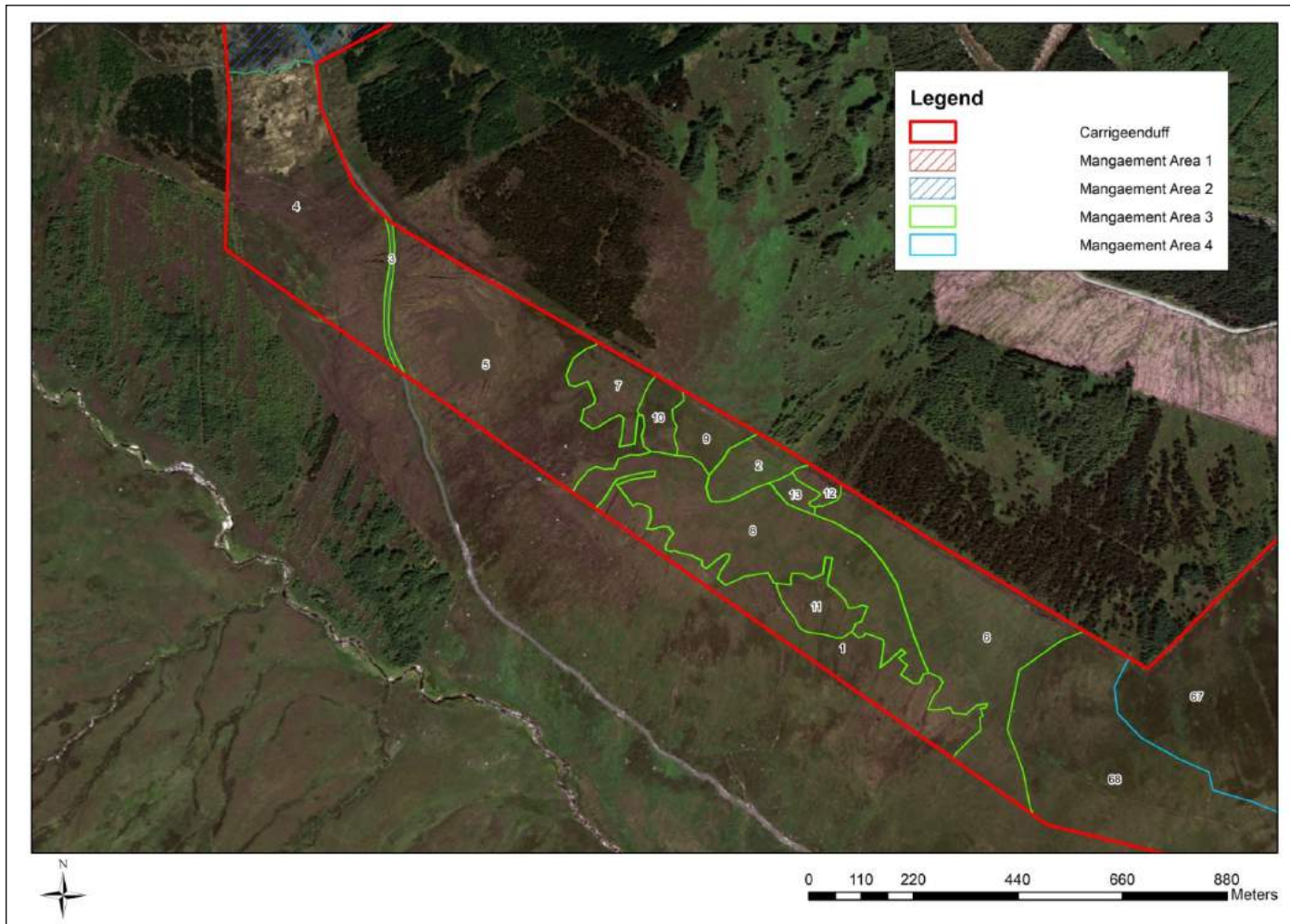


Figure 9. Carrigeenduff Management Area 3.

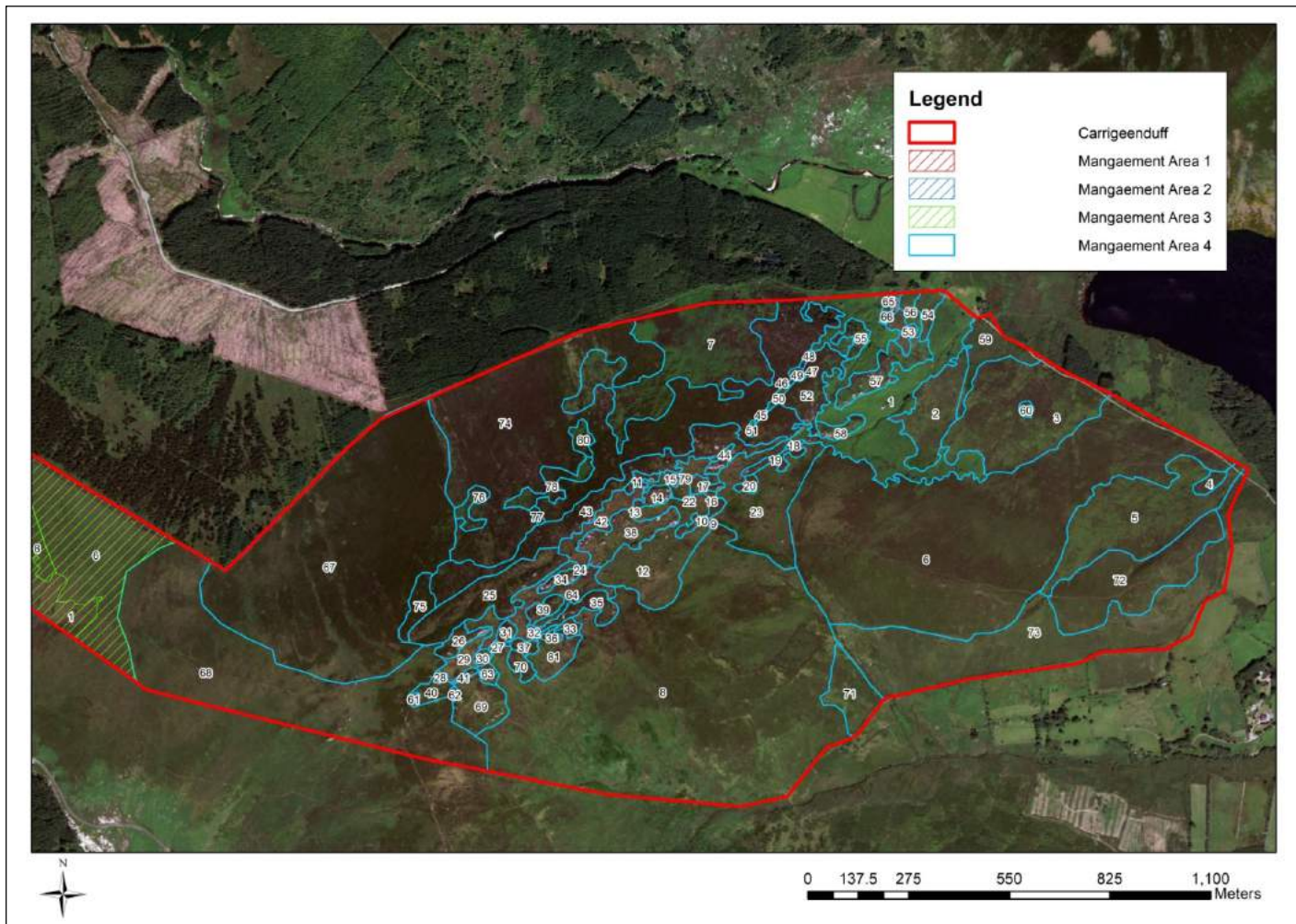


Figure 10. Carrigeenduff Management Area 4.

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

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 - location 3/6	Remove Sitka spruce from this area
4 - summit ridge of Kanturk/Bracket Rocks	Track repairs

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.

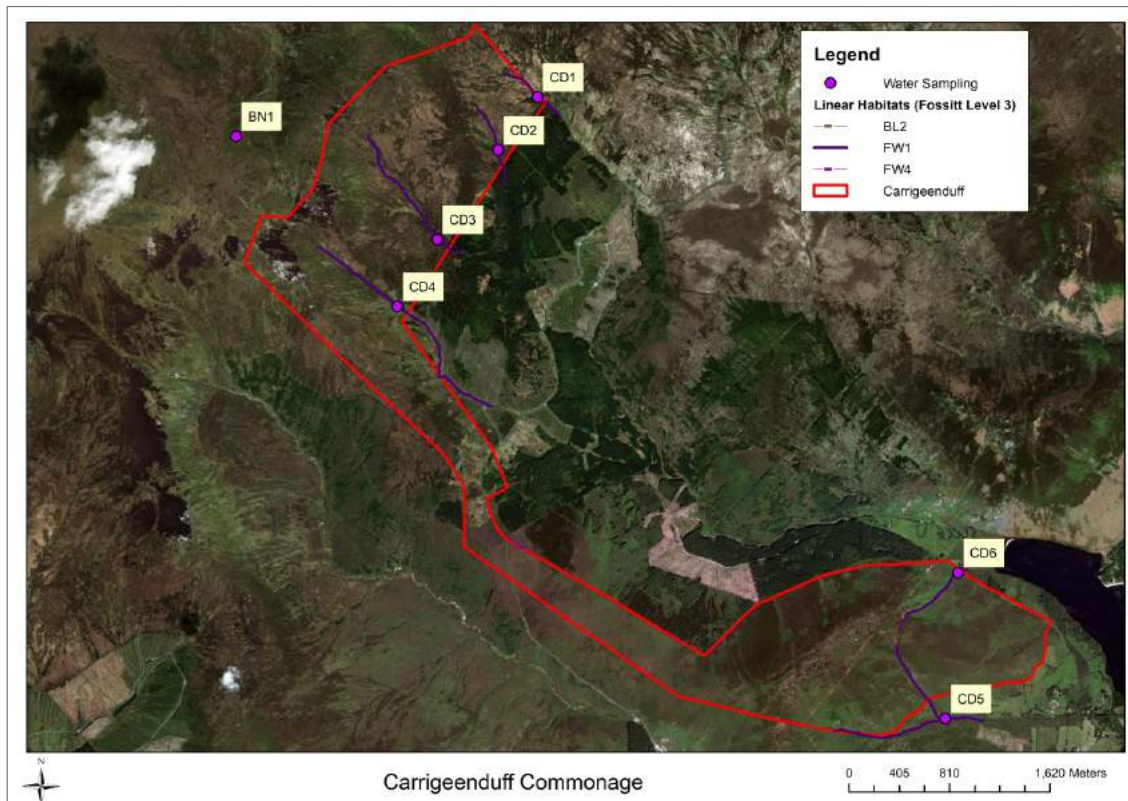


Figure 11. Water quality sample locations at Carrigeenduff.

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Lavarnia Brook (Inchavore River)	IE_EA_10A050020	01.212.2019	Faith Wilson
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 1	Upstream of northern end of forestry within the Carrigeenduff commonage	1 st order	O 10565 08049
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 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 (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.

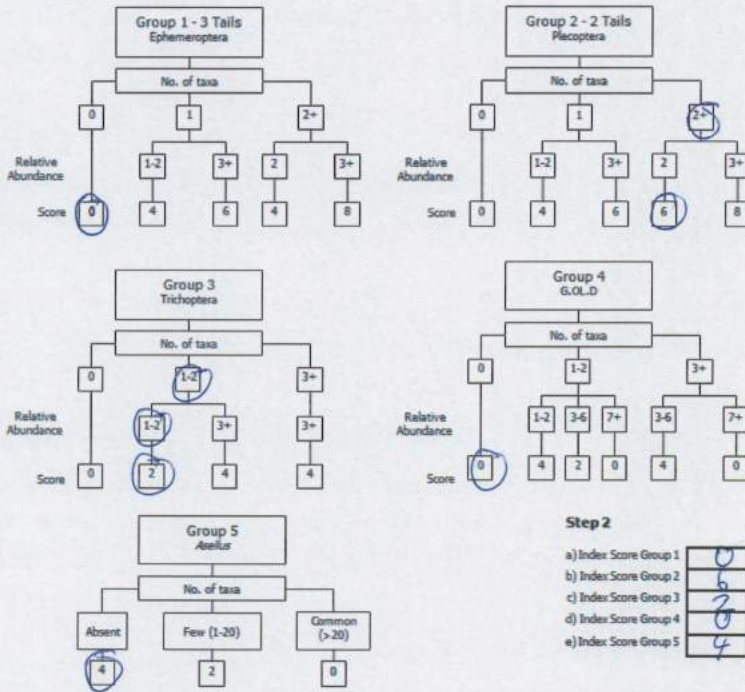
Carrigreenuff
1

River:		Code:	Date:	Time:
Station no.		Location:		Grid (6 figure):
Field Chemistry		Stream Order:		Stream flow:
DO%		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage		Riffle
DO mg/l		Dominant Types:		Riffle/Glide
Temp (°C)		Bedrock		Slow flow
Conductivity		Boulder (>128mm)		
pH		Cobble (32-128mm)		
Bank width (cm)		Gravel (8-32mm)		
Wet width (cm)		Fine Gravel (2-8mm)		
Avg Depth (cm)		Sand (0.25-2mm)		
Staff gauge		Silt (<0.25mm)		
Velocity	Colour	Slope: Low - Medium - High - Very High		Shading: High - Moderate - Low - None
Torrential	None	Geology: Calcareous-Siliceous-Mixed		Cattle access: Y: upstream - downstream or N
Fast	Slight	Substratum Condition: Calcareous-Compacted-Loose - Normal		
Moderate	Moderate	Substratum		Photo: Y / N
Slow	High	Stoney bottom-Muddy bottom-Mud over stones		
Very slow		Degree of siltation: Clean-Slight-Moderate-Heavy		
Clarity	Discharge	Depth of mud: None: <1cm: 1-5cm: 5-10cm: >10cm		
Very clear	Flood	Litter: None - Present - Moderate - Abundant		
Clear	Normal	Filamentous Algae: None - Present - Moderate - Abundant		Sewage Fungus: None - Present - Moderate - Abundant
Slightly turbid	Low	Main land use u/s:		Sample retained: Y / N
Highly turbid	Very Low	Pasture	Urban	Sampled in Minutes:
	Dry	Bog	Tillage	Pond net x
	Recent Flood	Forestry	Other	Stone wash x
				Weed sweep x
General Comments:				
Macroinvertebrate Composition				
The macroinvertebrates are divided into the following 5 specific groups:				Relative Abundance
• Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling				1-5 1
• Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling				6-20 2
• Group 3 = Trichoptera				21-50 3
• Group 4 = G.O.L.D. (Gastropoda, Oligochaeta and Diptera)				51-100 4
• Group 5 = Aseellus				101+ 5
• Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)				
Ephemeroptera:		Plecoptera:		
<i>Ecdyonurus</i> Ab		<i>Leuctra</i> Ab	1	
<i>Rhyacoptera</i> Ab		<i>Isoperla</i> Ab		
<i>Hecagenia</i> Ab		<i>Plecoptera</i> Ab		
<i>Ephemera</i> Ab		<i>Amphineura</i> Ab	1	
<i>Caenis</i> Ab		<i>Baetis</i> Ab		
<i>Pseudostenophlebia</i> Ab		<i>Dicranota</i> Ab		
<i>Ephemera clausa</i> Ab		Other Plecop Ab		
Other Ephem Ab		Other Plecop Ab		
Total no. of taxa 0	Total Relative Abundance 0	Total no. of Taxa 2	Total Relative Abundance 2	
Trichoptera:		G.O.L.D.:		Aseellus:
<i>Hydropsychidae</i> Ab		<i>Lumbriculus</i> (G) Ab	<i>Chironomidae</i> (D) Ab	Absent
<i>Polychaetopodidae</i> Ab		<i>Biotropus</i> (G) Ab	<i>Chironomus</i> (D) Ab	Few (1-20)
<i>Rhyacophila</i> Ab		<i>Blattella</i> (G) Ab	<i>Simulidae</i> (D) Ab	Common (>20)
<i>Phlebotomidae</i> Ab		<i>Anisus</i> (G) Ab	<i>Dicranota</i> (D) Ab	
<i>Limnephilidae</i> Ab	1	<i>Ptyca</i> (G) Ab	<i>Tipulidae</i> (D) Ab	
<i>Sericostomatidae</i> Ab		<i>Lumbriculus</i> (O) Ab	<i>Geratopogonidae</i> (O) Ab	
<i>Glossosomatidae</i> Ab		<i>Eisenilla</i> (O) Ab	Other GOLD Ab	
<i>Limnephilidae</i> Ab		<i>Tubificidae</i> (O) Ab		
Other Trichoptera Ab				
Total no. of Taxa 1	Total Relative Abundance 1	Total no. of Taxa 0	Total Relative Abundance 0	NOTE: Aseellus must be recorded as absent if none are found

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*.

Canby Creek duff
1

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.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a+b+c+d+e) **12** Average Index Score (AIS) TIS/5 (5 for 5 groups) **2.4** SSR Score (AIS x 2) **4.8**

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

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

Surveyor (signed): *[Signature]* Name (print): **Carol Ryan** Date: **1/1/11**

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Cornagrainya Brook East (Inchavore River)	IE_EA_10A050020	01.12.2019	Faith Wilson
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 2	Eastern tributary of Cornagrainya Brook within the Carrigeenduff commonage, upstream of forestry	1 st order	O 10246 07622
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 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 (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.

Canigeeedukf
2

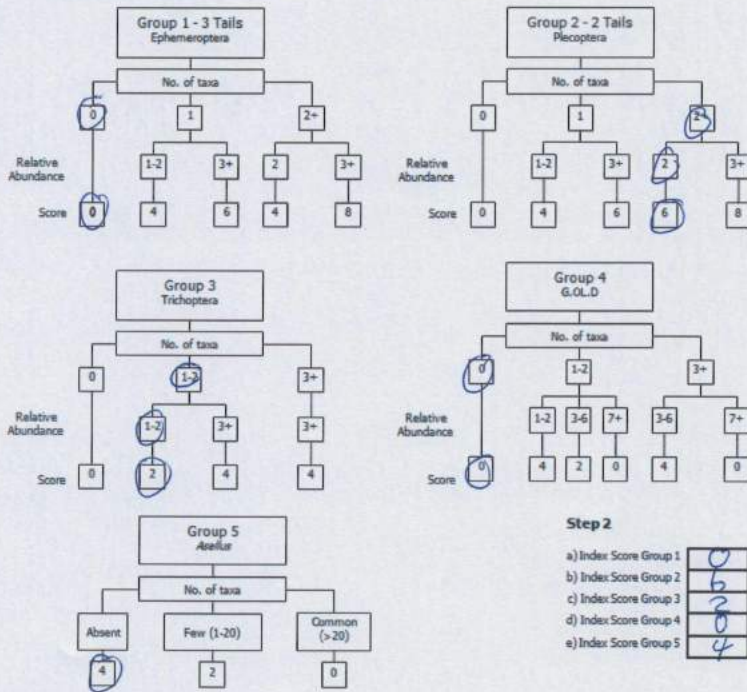
River:		Code:	Date:	Time:
Station no.		Location:		Grid (6 figure):
Field Chemistry		Stream Order:		Stream flow:
DO%		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage		Riffle
DO mg/l		Dominant Types:		Ruffle/Glide
Temp (°C)		Bedrock		Slow flow
Conductivity		Boulder (>128mm)		
pH		Cobble (32-128mm)		
Bank width (cm)		Gravel (8-32mm)		
Wet width (cm)		Fine Gravel (2-8mm)		
Avg Depth (cm)		Sand (0.25-2mm)		
Staff gauge		Silt (<0.25mm)		
Velocity	Colour	Slope: Low - Medium - High - Very High		Shading: High - Moderate - Low - None
Torrential	None	Geology: Calcareous-Siliceous-Mixed		Cattle access: Y: upstream - downstream or N
Fast	Slight	Substratum Condition: Calcareous-Compacted-		
Moderate	Moderate	Loose - Normal		
Slow	High	Substratum:		Photo: Y / N
Very slow		Stoney bottom-Muddy bottom-Mud over stones		
Clarity	Discharge	Degree of siltation: Clean-Slight-Moderate-Heavy		
Very clear	Flood	Depth of mud: None <1cm: 1-5cm: 5-10cm: >10cm		
Clear	Normal	Litter: None - Present - Moderate - Abundant		
Slightly turbid	Low	Filamentous Algae:		Sewage Fungus:
Highly turbid	Very Low	None - Present - Moderate - Abundant		None - Present - Moderate - Abundant
	Dry	Main land use u/s:		Sampled in Minutes:
	Recent Flood	Pasture	Urban	Pond net x
		Bog	Tillage	Stone wash x
		Forestry	Other	Weed sweep x
General Comments:				
Macroinvertebrate Composition				
The macroinvertebrates are divided into the following 5 specific groups:				
<ul style="list-style-type: none"> Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling Group 3 = Trichoptera Group 4 = G.O.L.D. (Gastropoda, Oligochaeta and Diptera) Group 5 = Aseflus 				
Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)				
Ephemeroptera:		Plecoptera:		Relative Abundance
<i>Ephoronus</i> Ab		<i>Leuctra</i> Ab		1-5
<i>Rhyacopaena</i> Ab		<i>Isoperla</i> Ab		6-20
<i>Hoptagenia</i> Ab		<i>Protonemura</i> Ab		21-50
<i>Ephemerella</i> Ab		<i>Anahimemura</i> Ab		51-100
<i>Creatis</i> Ab		<i>Baetis</i> Ab		101+
<i>Bailetonohelia</i> Ab		<i>Dinocras</i> Ab		
<i>Ephemeria clausica</i> Ab		Other Plecop Ab		
Other Ephem Ab		Other Plecop Ab		
Total no. of taxa	0	Total Relative Abundance	0	
Trichoptera:		G.O.L.D.:		
<i>Hydropsychidae</i> Ab		<i>Lymnaea</i> (G) Ab		Chironomidae (D) Ab
<i>Polycerropodidae</i> Ab		<i>Potamopygus</i> (G) Ab		<i>Chironomus</i> (D) Ab
<i>Rhyacophila</i> Ab		<i>Panorbia</i> (G) Ab		<i>Simulidae</i> (D) Ab
<i>Rhyacoptamidae</i> Ab		<i>Anodis</i> (G) Ab		<i>Dicranota</i> (D) Ab
<i>Limnephilidae</i> Ab		<i>Abyasa</i> (G) Ab		<i>Tipulidae</i> (D) Ab
<i>Sericostomatidae</i> Ab		<i>Lumbriculus</i> (O) Ab		<i>Ceratopogonidae</i> (C) Ab
<i>Glossosomatidae</i> Ab		<i>Eiseniella</i> (O) Ab		Other GOLD Ab
<i>Lepidostomatidae</i> Ab		<i>Tubificidae</i> (O) Ab		
Other Trichoptera Ab				
Total no. of Taxa	1	Total Relative Abundance	1	
Aseflus:		NOTE: Aseflus must be recorded as absent if none are found		

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*.

Camryeendijk
2

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.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a.e.b.c.c.d.e.a) **12** Average Index Score (AIS) TIS/5 (5 for 5 groups) **2.4** SSR Score (AIS x 2) **4.8**

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

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

Surveyor (signed): *[Signature]* Name (print): *Camryeendijk* Date: *1/1/1*

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Cornagrainya Brook West (Inchavore River)	IE_EA_10A050020	01.12.2019	Faith Wilson
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 3	Western tributary of Cornagrainya Brook within the Carrigeenduff commonage, upstream of forestry	1 st order	O 09756 06901
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 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 (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.

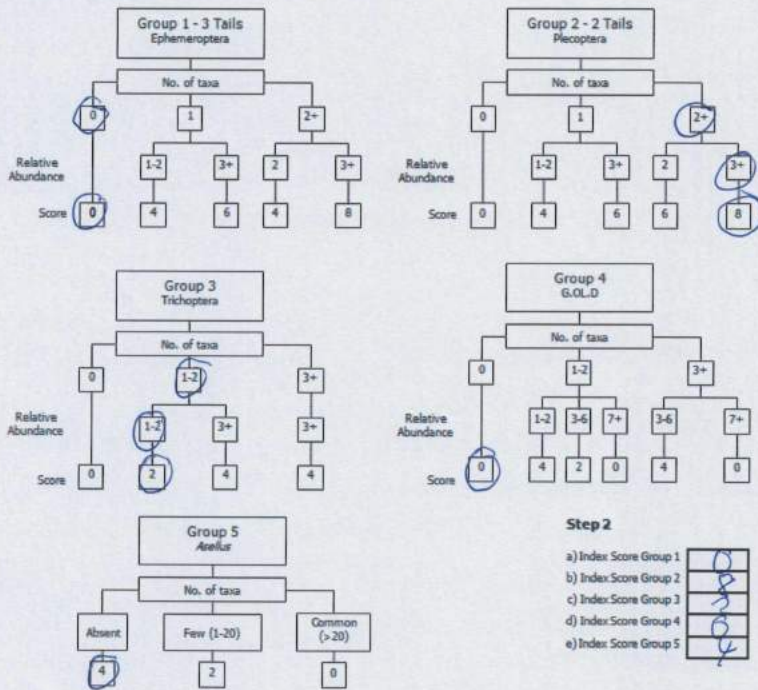
Carugeonduff S

River:	Code:	Date:	Time:
Station no.	Location:	Grid (6 figure):	
Field Chemistry		Stream Order:	Stream flow:
DO% DO mg/l Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Avg Depth (cm) Staff gauge	Modifications: Y/N Canalised-widened-bank erosion-arterial drainage Dominant Types: Bedrock Boulder (>128mm) Cobble (32-128mm) Gravel (8-32mm) Fine Gravel (2-8mm) Sand (0.25-2mm) Silt (<0.25mm) Slope: Low - Medium - High - Very High Geology: Calcareous-Siliceous-Mixed Substratum Condition: Calcareous-Compacted-Loose - Normal Substratum: Stoney bottom-Muddy bottom-Mud over stones Degree of siltation: Clean-Slight-Moderate-Heavy Depth of mud: None <1cm: 1-5cm: 5-10cm: >10cm Litter: None - Present - Moderate - Abundant	Riffle Riffle/Glide Slow flow	
Velocity Torrential Fast Moderate Slow Very slow Clarity Very clear Clear	Colour None Slight Moderate High Discharge Flood Normal	Shading: High - Moderate - Low - None Cattle access: Y: upstream - downstream or N	Photo: Y / N
Slightly turbid Highly turbid	Low Very Low Dry Recent Flood	Filamentous Algae: None - Present - Moderate - Abundant Main land use u/s: Pasture Bog Forestry	Sewage Fungus: None - Present - Moderate - Abundant Sampled in Minutes: Pond net x Stone wash x Weed sweep x
General Comments:		Urban Tillage Other	Sample retained: Y / N
Macroinvertebrate Composition			
<p>The macroinvertebrates are divided into the following 5 specific groups:</p> <ul style="list-style-type: none"> Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling Group 3 = Trichoptera Group 4 = G.O.L.D. (Gastropoda, Oligochaeta and Diptera) Group 5 = Asellus <p>Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)</p>			Relative Abundance
<p>Ephemeroptera:</p> <p><i>Ecdyonurus</i> Ab <i>Rhyacogenus</i> Ab <i>Heptagenia</i> Ab <i>Ephemerella</i> Ab <i>Gaernei</i> Ab <i>Paraleptostelebia</i> Ab <i>Ephemera danica</i> Ab Other Ephem Ab</p>			<p>Plecoptera:</p> <p><i>Leuctra</i> Ab <i>Isoperla</i> Ab <i>Protonemura</i> Ab <i>Amphinemura</i> Ab <i>Pleco</i> Ab <i>Dicranus</i> Ab Other Plecop Ab</p>
<p>Total no. of taxa: 0 Total Relative Abundance: 0</p>			<p>Total no. of Taxa: 4 Total Relative Abundance: 6</p>
<p>Trichoptera:</p> <p><i>Hydropsychidae</i> Ab <i>Polycntrropodidae</i> Ab <i>Rhyacophila</i> Ab <i>Philoptamidae</i> Ab <i>Limnephilidae</i> Ab <i>Sericostomatidae</i> Ab <i>Glossosomatidae</i> Ab <i>Lepidostomatidae</i> Ab Other Trichoptera Ab</p>		<p>G.O.L.D.:</p> <p><i>Lymnaea</i> (G) Ab <i>Potamogeton</i> (G) Ab <i>Pleurocheilus</i> (G) Ab <i>Ancylus</i> (G) Ab <i>Bryoa</i> (G) Ab <i>Lumbriculus</i> (O) Ab <i>Eisenella</i> (O) Ab <i>Tubificidae</i> (O) Ab</p>	
<p>Total no. of Taxa: 1 Total Relative Abundance: 1</p>		<p>Total no. of Taxa: 0 Total Relative Abundance: 0</p>	
		<p>Chironomidae (D) Ab <i>Chironomus</i> (D) Ab <i>Simuliidae</i> (D) Ab <i>Dicranota</i> (D) Ab <i>Tipulidae</i> (D) Ab <i>Ceratopogonidae</i> (D) Ab Other GOLD Ab</p>	
		<p>Asellus: Absent Few (1-20) Common (>20)</p>	
<p>NOTE: <i>Asellus</i> must be recorded as absent if none are found</p>			

NOTE: *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

CANIS eed u FF
3

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.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a-e) **14** Average Index Score (AIS) TIS/5 (5 for 5 groups) **2.8** SSR Score (AIS x 2) **5.6**

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

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

Surveyor (signed) [Signature] Name (print): CANIS Date: / /

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Cyowck Brook (Inchavore River)	IE_EA_10A050020	01.12.2019	Faith Wilson
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 4	Cyowck Brook within the Carrigeenduff commonage, upstream of forestry	1 st order	O 09433 06359
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 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 (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.

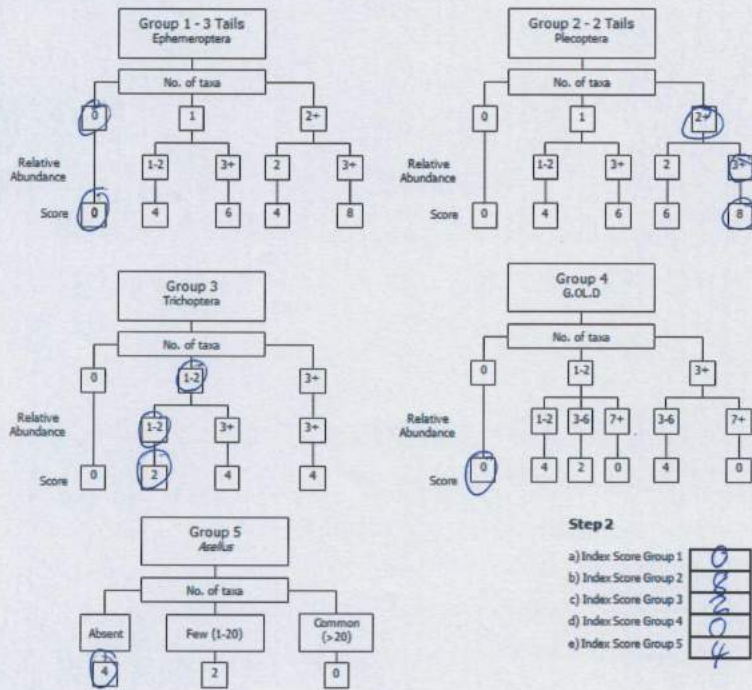
Camry eenduff
4

River:		Code:		Date:		Time:	
Station no.		Location:				Grid (6 figure):	
Field Chemistry		Stream Order:				Stream flow:	
DO%		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage				Rifle	
DO mg/l		Dominant Types:				Rifle/Glide	
Temp (°C)		Bedrock				Slow flow	
Conductivity		Boulder (>128mm)					
pH		Cobble (32-128mm)					
Bank width (cm)		Gravel (8-32mm)					
Wet width (cm)		Fine Gravel (2-8mm)					
Avg Depth (cm)		Sand (0.25-2mm)					
Staff gauge		Silt (<0.25mm)					
Velocity	Colour	Slopes Low - Medium - High - Very High				Shading: High - Moderate - Low - None	
Torrential	None	Geology: Calcareous-Siliceous-Mixed				Cattle access: Y: upstream - downstream or N	
Fast	Slight	Substratum Condition: Calcareous-Compacted-Loose - Normal					
Moderate	Moderate	Substratum:				Photo: Y / N	
Slow	High	Stoney bottom-Muddy bottom-Mud over stones					
Very slow		Degree of siltation: Clean-Slight-Moderate-Heavy					
Clarity	Discharge	Depth of mud: None < 1cm: 1-5cm: 5-10cm: > 10cm					
Very clear	Flood	Litter: None - Present - Moderate - Abundant					
Clear	Normal	Filamentous Algae:				Sewage Fungus:	
Slightly turbid	Low	None - Present - Moderate - Abundant				None - Present - Moderate - Abundant	
Highly turbid	Very Low	Main land use u/s:		Sample retained:		Sampled in Minutes:	
	Dry	Pasture	Urban	Y / N	Pond net x		
	Recent Flood	Boag	Tillage		Stone wash x		
		Forestry	Other		Weed sweep x		
General Comments:							
Macroinvertebrate Composition							
The macroinvertebrates are divided into the following 5 specific groups:						Relative Abundance	
* Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling						1-5 1	
* Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling						6-20 2	
* Group 3 = Trichoptera						21-50 3	
* Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)						51-100 4	
* Group 5 = Asellus						101+ 5	
* Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)							
Ephemeroptera:		Plecoptera:					
Ecdyonurus Ab		Leuctra Ab		2			
Rhyacozera Ab		Rhyacops Ab					
Heptagenia Ab		Pteronarcys Ab					
Ephemerella Ab		Amphinemura Ab		1			
Caenis Ab		Baetis Ab					
Psephenopsylla Ab		Dicosoza Ab					
Ephemera clausa Ab		Other Plecop Ab					
Other Ephem Ab		Other Plecop Ab					
Total no. of taxa	0	Total Relative Abundance	0	Total no. of Taxa	2	Total Relative Abundance	3
Trichoptera:		G.O.L.D:		Asellus:			
Hydropsychidae Ab		Lymnaea (G) Ab		Chironomidae (D) Ab		Absent	
Polycentropodidae Ab		Psephenopsylla (G) Ab		Chironomus (D) Ab		Few (1-20)	
Rhyacophila Ab		Blattella (G) Ab		Simuliidae (D) Ab		Common (>20)	
Rhyacopsidae Ab		Anisus (G) Ab		Dicosoza (D) Ab			
Limnephilidae Ab		Phaen (G) Ab		Tipulidae (D) Ab			
Sericostratiidae Ab		Lumbriculus (D) Ab		Gastropogonidae (D) Ab			
Glossosomatidae Ab		Eisenella (D) Ab		Other GOLD Ab			
Lenticostomatidae Ab		Tubificidae (D) Ab				NOTE: Asellus must be recorded as absent if none are found	
Other Trichoptera Ab							
Total no. of Taxa	1	Total Relative Abundance	1	Total no. of Taxa	0	Total Relative Abundance	0

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*.

Canigeenduff
4

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.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a+b+c+d+e) **14** Average Index Score (AIS) TIS/5 (5 for 5 groups) **2.8** SSR Score (AIS x 2) **5.6**

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

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

Surveyor (signed): C Name (print): GARC OLKIN Date: / /

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Carrigeenshinnagh/Duff Brook (Inchavore River)	IE_EA_10A050020	03.12.2019	Faith Wilson
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 5	Carrigeenshinnagh/Duff Brook below the confluence within the Carrigeenduff commonage	1 st order	O 13855 03035
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 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 (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.

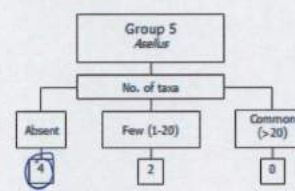
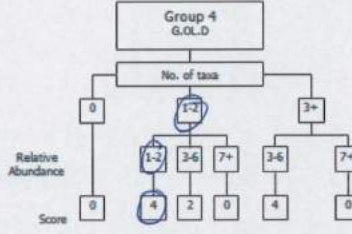
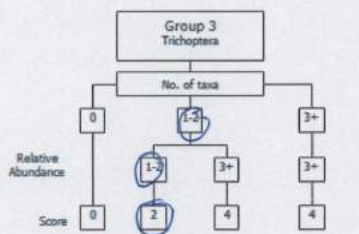
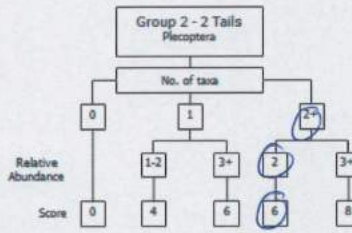
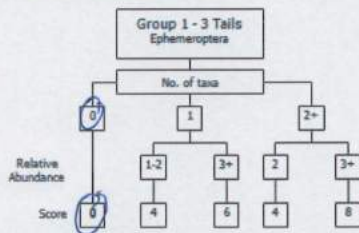
CANAL - eaduff
5

River:		Code:	Date:	Time:
Station no.		Location:		Grid (6 figure):
Field Chemistry		Stream Order:		Stream flow:
DO%		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage		Rifle
DO mg/l		Dominant Types:		Rifle/Glide
Temp (°C)		Bedrock		Slow flow
Conductivity		Boulder (>128mm)		
pH		Cobble (32-128mm)		
Bank width (cm)		Gravel (8-32mm)		
Wet width (cm)		Fine Gravel (2-8mm)		
Avg Depth (cm)		Sand (0.25-2mm)		
Staff gauge		Silt (<0.25mm)		
Velocity	Colour	Slope: Low - Medium - High - Very High		Shading: High - Moderate - Low - None
Torrential	None	Geology: Calcareous-Siliceous-Mixed		Cattle access: Y: upstream - downstream or N
Fast	Slight	Substratum Condition: Calcareous-Compacted-Loose - Normal		Photo: Y / N
Moderate	Moderate	Substratum:		
Slow	High	Stoney bottom-Muddy bottom-Mud over stones		
Very slow		Degree of siltation: Clean-Slight-Moderate-Heavy		
Clarity	Discharge	Depth of mud: None < 1cm: 1-5cm: 5-10cm: > 10cm		
Very clear	Flood	Litter: None - Present - Moderate - Abundant		
Clear	Normal	Filamentous Algae:		Sewage Fungus:
Slightly turbid	Low	None - Present - Moderate - Abundant		None - Present - Moderate - Abundant
Highly turbid	Very Low	Main land use u/s:		Sample retained:
	Dry	Pasture	Urban	Y / N
	Recent Flood	Bog	Tillage	
		Forestry	Other	
General Comments:				
Macroinvertebrate Composition				
The macroinvertebrates are divided into the following 5 specific groups:				Relative Abundance
• Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling				1-5 1
• Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling				6-20 2
• Group 3 = Trichoptera				21-50 3
• Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)				51-100 4
• Group 5 = Asellus				101+ 5
• Calculate the total number of taxa and relative abundances of each macroinvertebrate group below: (Abundance - Ab)				
Ephemeroptera:		Plecoptera:		
<i>Ecdyonurus</i> Ab		<i>Leuctra</i> Ab	1	
<i>Rhyacophila</i> Ab		<i>Baetis</i> Ab	1	
<i>Heptagenia</i> Ab		<i>Protonotera</i> Ab		
<i>Ephemerella</i> Ab		<i>Amphinemura</i> Ab		
<i>Gaillardetia</i> Ab		<i>Baetis</i> Ab		
<i>Psephenopsis</i> Ab		<i>Dinocras</i> Ab		
<i>Ephemerella danica</i> Ab		Other Plecop Ab		
Other Ephem Ab		Other Plecop Ab		
Total no. of taxa 0	Total Relative Abundance 0	Total no. of Taxa 2	Total Relative Abundance 2	
Trichoptera:		G.O.L.D:		Asellus:
<i>Hydropsychidae</i> Ab		<i>Lygosea</i> (G) Ab	<i>Chironomidae</i> (D) Ab	Absent ✓
<i>Polycentropodidae</i> Ab		<i>Psephenopsis</i> (G) Ab	<i>Chironomus</i> (D) Ab	
<i>Rhyacophila</i> Ab		<i>Baetis</i> (G) Ab	<i>Simuliidae</i> (D) Ab	Few (1-20)
<i>Phlebotomidae</i> Ab		<i>Ancylus</i> (G) Ab	<i>Dicranota</i> (D) Ab	Common (>20)
<i>Limnephilidae</i> Ab		<i>Rhyss</i> (G) Ab	<i>Tipulidae</i> (D) Ab	
<i>Sericostomatidae</i> Ab		<i>Limbobolus</i> (D) Ab	<i>Ceratopogonidae</i> (D) Ab	
<i>Glossostomatidae</i> Ab	1	<i>Eisenella</i> (D) Ab	Other GOLD Ab	
<i>Leucostomatidae</i> Ab		<i>Tubificidae</i> (D) Ab		
Other Trichoptera Ab				
Total no. of Taxa 1	Total Relative Abundance 1	Total no. of Taxa 1	Total Relative Abundance 1	NOTE: Asellus must be recorded as absent if none are found

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*.

CAMUS eendijk
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.



Step 2

a) Index Score Group 1	0
b) Index Score Group 2	6
c) Index Score Group 3	2
d) Index Score Group 4	4
e) Index Score Group 5	4

Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a,b,c,d,e) **16** Average Index Score (AIS) TIS/5 (5 for 5 groups) **3.2** SSR Score (AIS x 2) **6.4**

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

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

Surveyor (signed): [Signature] Name (print): CAMUS Dijk Date: / /

SUAS Water Quality Sampling

River:	Code:	Date:	Sample Taken By:
Inchavore Brook (Inchavore River)	IE_EA_10A050020	03.12.2019	Luke Drea
Sample Number:	Location:	Stream Order:	Grid Reference:
CD 6	Inchavore Brook below within the Carrigeenduff commonage	1 st order	O 13956 04212
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 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 (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.

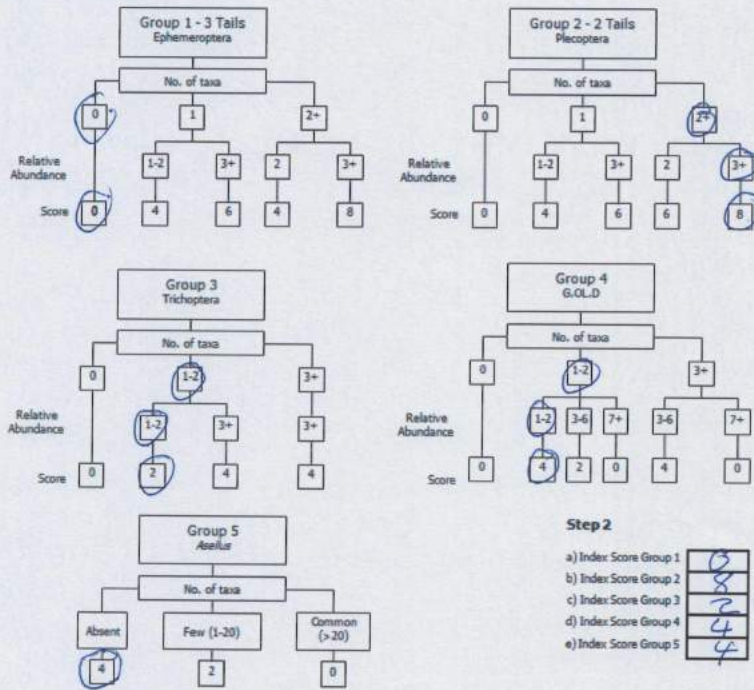
CARRIGEENDUFF
6

River:	Code:	Date:	Time:
Station no.	Location:	Grid (6 figure):	
Field Chemistry	Stream Order:	Stream flow:	
DO% DO mg/l Temp (°C) Conductivity pH Bank width (cm) Wet width (cm) Aug Depth (cm) Staff gauge Velocity Colour Turbidity Fast Moderate Slow Very slow Clarity Very clear Clear	Modifications: Y/N Canalised-widened-bank erosion-arterial drainage Dominant Types: Bedrock Boulder (>128mm) Cobble (32-128mm) Gravel (8-32mm) Fine Gravel (2-8mm) Sand (0.25-2mm) Silt (<0.25mm) Slope: Low - Medium - High - Very High Geology: Calcareous-Siliceous-Mixed Substratum Condition: Calcareous-Compacted-Loose - Normal Substratum: Stoney bottom-Muddy bottom-Mud over stones Degree of siltation: Clean-Slight-Moderate-Heavy Depth of mud: None <1cm 1-5cm 5-10cm >10cm Litter: None - Present - Moderate - Abundant	Riffle Ruffle/Glide Slow flow	
		Shading: High - Moderate - Low - None	
		Cattle access: Y: upstream - downstream or N	
		Photo: Y / N	
Slightly turbid Highly turbid	Low Very Low	Sewage Fungus: None - Present - Moderate - Abundant	
	Dry Recent Flood	Main land use a/s: Pasture Bog Forestry	Sample retained: Y / N
		Urban Tillage Other	Sampled in Minutes: Pond net x Stone wash x Weed sweep x
General Comments:			
Macroinvertebrate Composition			Relative Abundance
The macroinvertebrates are divided into the following 5 specific groups:			
<ul style="list-style-type: none"> Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling Group 3 = Trichoptera Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera) Group 5 = Aseflus 			1-5 6-20 21-50 51-100 101+
Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)			1 2 3 4 5
Ephemeroptera:	<i>Ectoporus</i> Ab <i>Rhyacopaena</i> Ab <i>Heptagenia</i> Ab <i>Ephemerella</i> Ab <i>Carex</i> Ab <i>Paralimnobia</i> Ab <i>Ephemerella danica</i> Ab Other Ephem Ab	Plecoptera:	<i>Leuctra</i> Ab 2 <i>Isoperla</i> Ab <i>Protonemura</i> Ab 1 <i>Amphinemura</i> Ab 1 <i>Pteronarcys</i> Ab <i>Dinocras</i> Ab Other Plecop Ab
Total no. of taxa 0	Total Relative Abundance 0	Total no. of Taxa 3	Total Relative Abundance 4
Trichoptera:	<i>Hydropsychidae</i> Ab <i>Polycentropodidae</i> Ab <i>Rhyacophila</i> Ab <i>Phlebotamidae</i> Ab <i>Limnephilidae</i> Ab <i>Sericostomatidae</i> Ab <i>Glossostomatidae</i> Ab <i>Leucostomatidae</i> Ab Other Trichoptera Ab	G.O.L.Ds:	<i>Lymnaea</i> (G) Ab <i>Procladius</i> (G) Ab <i>Panorpa</i> (G) Ab <i>Ancylus</i> (G) Ab <i>Rhyssalus</i> (G) Ab <i>Lumbriculus</i> (O) Ab <i>Eisenia</i> (O) Ab <i>Tubificoides</i> (O) Ab
		Chironomidae (D) Ab	Aseflus:
		<i>Chironomus</i> (D) Ab <i>Simulium</i> (D) Ab 2 <i>Dicranota</i> (D) Ab <i>Tipulidae</i> (D) Ab <i>Ceratopogonidae</i> (D) Ab Other GOLD Ab	Absent Few (1-20) Common (>20) NOTE: Aseflus must be recorded as absent if none are found
Total no. of Taxa 1	Total Relative Abundance 1	Total no. of Taxa 1	Total Relative Abundance 2

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*.

Campenduff 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.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a+b+c+d+e) **18** Average Index Score (AIS) TIS/5 (5 for 5 groups) **3.6** SSR Score (AIS x 2) **7.2**

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

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

Surveyor (signed): Name (print): **CAM O'HARA** Date: **1/1/11**