

Ballybeg Commonage

2020 Ecological Survey



Final Report

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Ballybeg Commonage

2020 Ecological Survey

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Ballybeg Commonage

2020 Ecological Survey

1. Introduction

A baseline habitat condition and ecological survey and habitat management plan was prepared for the Ballybeg Commonage in 2018¹ and the measures within same underwent screening for Appropriate Assessment².

The implementation of the management prescriptions in the plan began in 2019. The management prescriptions in the SUAS plan for this commonage set out to address the impacts highlighted in that report so progress is made towards attaining **Favourable status** for the Annex I habitats present on the site – principally 4010 Northern Atlantic Wet Heaths with *Erica tetralix* and 4030 Dry Heath.

The major impacts to the habitats in this commonage arise predominantly from under grazing, timing of grazing, lack of active shepherding which has resulted in more areas becoming acid grassland as sheep congregate in certain areas, and bracken and gorse encroachment and a legacy of uncontrolled burning.

The extent of habitats present within the Ballybeg Commonage and their affinities to either Fossitt (Level 3) or Annex I habitats 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 Ballybeg Commonage as detailed in **Table 1** and mapped on **Figure 4** (See **Appendix 1**).

2. SUAS Vegetation Management Measures

The proposed management measures for the Ballybeg Commonage as initially proposed in 2019 under SUAS were as follows:

Year 1 (2019)

1. Cut a number of small sections in the wetter parts on the west side of area 1. Cut sections of up to 0.5ha in size. It is recommended to cut these in the autumn as the ground will be drier at that time of the year.
2. Control burn a section on the south of area 1, avoiding the areas burned in the last fire which can be clearly seen on the management map, to encourage sheep to spread out more over these areas. Fire control lines, at least 3m wide shall be cut around each section, either by tractor mounted machine or by hand, to ensure these controlled burning areas are contained. Controlled burning may be carried out either in the spring or the autumn (or both) so long as it is within the legal burning season. The total area between cutting and burning should not exceed 3ha in 2019.
3. Cut gorse in areas 23 & 38 to open up where it is starting to dominate. Cut up to 2ha in 2019 and encourage grazing by stock afterwards.
4. Cut/roll bracken in areas 24, 27 & 34, where a machine will travel. This is to be done at least twice; once in early June and again in late August. This will act as a trial to test the practicality of this method of controlling bracken.

¹ Wilson, F. (2019). Ecological Baseline Survey prepared for Ballybeg Commonage as part of the Commonage Management Plan for SUAS. 27th January 2019. Unpublished report for SUAS EIP.

² Wilson, F. (2019). Report for Screening for Appropriate Assessment for a Commonage Management Plan at Ballybeg, Tinahely, Co. Wicklow in accordance with the requirements of Article 6(3) of the EU Habitats Directive. 12th February 2019. Unpublished report for SUAS EIP.

5. Increase grazing in spring in areas 22, 19, 8 and 9 to see if trampling will assist in reducing the vigour of bracken, making sure that lazy beds are not damaged. Spray could be considered in area 22 away from the flushes.
6. Spray Bracken in areas 36 & 28 with Asulox using a tractor mounted sprayer if the machine can travel here or spray using hand held equipment.

Year 2 (2020)

1. Cut or burn a further number of sections in areas 1, up to 2ha in total. Follow the guidelines for year 1 in relation to the size and distribution of controlled burning/cutting areas.
2. Control further small areas of gorse in areas 23 & 38 by either cutting or burning, up to 2ha in total.
3. Increase grazing levels in area 7 to control bracken during 2020. If required follow up with cutting or strimming up to 3ha with either a machine or using hand held equipment if desired and feasible.
4. Spray Bracken in areas 36 & 28 with Asulox using a tractor mounted sprayer if the machine can travel here or spray using hand held equipment.
5. Cut/roll bracken in areas 24, 27 & 34, where a machine will travel. This is to be done at least twice; once in early June and again in late August.
6. Increase grazing in spring in areas 22, 19, 8 and 9 to see if trampling will assist in reducing the vigour of bracken making sure that lazy beds are not damaged. Spray could be considered in area 22 away from the flushes.

Year 3 (2021)

1. Cut or burn a further number of sections in areas 1, up to 2ha in total. Follow the guidelines for year 1 in relation to the size and distribution of controlled burning/cutting areas.
2. Increase grazing levels in area 7 to control bracken during 2021. If required follow up with cutting or strimming up to 3ha with either a machine or using hand held equipment if desired and feasible.
3. Spray Bracken in areas 36 & 28 with Asulox using a tractor mounted sprayer if the machine can travel here or spray using hand held equipment.
4. Cut/roll bracken in areas 24, 27 & 34, where a machine will travel. This is to be done at least twice; once in early June and again in late August.
5. Increase grazing in spring in areas 22, 19, 8 and 9 to see if trampling will assist in reducing the vigour of bracken making sure that lazy beds are not damaged. Spray could be considered in area 22 away from the flushes.

Year 4 (2022)

1. Cut or burn a further number of sections in areas 1, up to 2ha in total. Follow the guidelines for year 1 in relation to the size and distribution of controlled burning/cutting areas.
2. Increase grazing levels in area 7 to control bracken during 2022. If required follow up with cutting or strimming up to 3ha with either a machine or using hand held equipment if desired and feasible.
3. Spray Bracken in areas 36 & 28 with Asulox using a tractor mounted sprayer if the machine can travel here or spray using hand held equipment.
4. Cut/roll bracken in areas 24, 27 & 34, where a machine will travel. This is to be done at least twice; once in early June and again in late August.
5. Increase grazing in spring in areas 22, 19, 8 and 9 to see if trampling will assist in reducing the vigour of bracken making sure that lazy beds are not damaged. Spray could be considered in area 22 away from the flushes.

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;

- Sheep are to be kept from straying off the commonage onto surrounding areas.
- Move off sheep from other commonages.
- Monitor sheep health for signs of tick diseases.
- Count numbers of deer grazing the commonage and areas they are grazing.

Other works to be carried out for entire commonage:

Repair the sheep fence in area 7, joining the forestry in year 1 to stop sheep getting out into the forestry.

Use feed buckets to encourage more sheep grazing the commonage in the Jan/Feb and the April/May period.

Use the feed buckets to move grazing pressure away from the grassy areas in Jan/Feb and April/May periods.

Details of sheep stocking rates proposed

Accurate sheep numbers will be obtained in year 1 and over the remaining 3 years, they will be increased gradually up to GLAS stocking rates.

Ecological Assessment

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

An earlier inspection of the commonage had been conducted in May 2020 after a track had been developed across the commonage to erect a fence in Area 7. This measure was outside the programme of works agreed with SUAS. The results of that inspection are presented in **Appendix 2**.

3. 2020 Walkover Survey

The following observations, comments on same and recommendations on the works completed in 2020 are presented.

3.1 Controlled Burning

A number of firebreaks for controlled burning were created on the 26th February 2019 on the hillside using a flail mulcher behind a tractor. These can be seen in the Bing Maps imagery of the commonage as presented on **Figure 1** below.



Figure 1. New firebreaks cut on Ballybeg in 2019 (Bing Maps). The area which was burnt in 2019 is indicated by the blue arrow.

The prepared control burning areas were located up towards the top of the commonage near the forestry to encourage the sheep up out of the sheltered valley slopes. The areas prepared varied in size from 0.2ha to 0.8ha.

One area was burnt on 28th February 2019. The burning here appeared to be very intense and uniform compared with what was done on Glasnamullen which allowed some areas to have remained unburnt. The burn here may have been too intense as there are large areas of bare peat (this may be what was beneath the leggy heather if no bryophyte (moss) layer was present and had been shaded out by the tall heather).

A very large congregation of sheep was recorded here in November 2019 as evidenced by significant dunging and browsing pressure as can be seen in **Plate 1**. When surveyed in November 2019 there was some regeneration of bilberry with some deergrass, tormentil, sedges (*Carex flacca* and *Carex binervis*) and some parts of moss remain intact. It was noted that the peat and moss layer was

generally more intact in the flailed areas. The recommendations were that this may be the more appropriate management technique to use than burning.



Plate 1. Congregation of sheep within the flailed/burnt areas was noted in November 2019 resulting in bare peat and dunging and intense grazing pressure which is limiting the regeneration of ling heather and bilberry.

The burnt area was re-examined in November 2020 and there are still areas of exposed peat which have not regenerated, which would indicate that the burn was too intense. Other areas are beginning to recover slowly as recorded in November 2019.



Plate 2. Areas of bare peat remain amidst regrowth of ling heather one year later in November 2020.



Plate 3. There is some localised regeneration of the bryophyte layer in the burnt area – in 2020.

3.2 Firebreaks for Controlled Burning/Flailed Areas

New areas of habitat were mulched using a tractor mounted mulcher on 18th February 2020 as can be seen on **Figure 2** below. There was no weather available to do any controlled burning.

These areas have avoided those areas of heath, which had been historically recently burnt (as can be seen on the aerial photos in 2005, 2008 and 2012). These areas are being allowed to recover the bryophyte and lichen communities which they are currently lacking.

As recommended in 2020 these areas were reduced in size from those prepared in 2019.



Figure 2. New areas cut in 2020 (Google Maps).

Some areas within the flailed track areas are dominated by ling whilst others are dominated by purple moor grass whereas bilberry continued to remain relatively scarce.



Plate 4. Acid grassland in flailed areas – this may be indicative of dunging from sheep.



Plate 5. *Molinia* is dominating much of the recently flailed areas.

3.3 Bracken Control

It is great to see the results of the bracken control being implemented on this hill as this is one of the main challenges in many upland sites. Two techniques have been used to date at Ballybeg – spraying and bracken bruising.

This was first done using a bracken bruiser and was carried out on the 5th July 2019. The bracken bruiser was pulled by a quad and was used to cut/roll bracken in areas 24, 27 & 34. In areas 36 & 28 bracken was treated with Asulox on the 20th September 2019 using a small 40 hp tractor and mounted sprayer. A rate of 11 litres of asulox per ha was applied and an area of 3 ha was treated.

In 2020 spraying with Asulox was done on the 3rd September 2020 using a tractor mounted sprayer with a hand lance. Bracken bruising was done on the 31st July 2020 using a tractor & crumbler bar (on back of harrow). Bracken bruising using quad & bruiser was done on the 1st August 2020. There was no immediate obvious difference between which areas were done with each method when inspected in November 2020 but the results should be more apparent in the spring of 2021.

The use of Asulox in 2019 would appear to have had a more significant and immediate impact based on what was seen in 2020 but the ecological impacts of using sprays which are currently banned (but for which a derogation applies) are more questionable.

It is therefore recommended that another session of bracken bruising in early summer followed by a second session of bracken bruising at the end of the summer in 2021 will help to inform the long term outcome of using this non-chemical technique.

Areas should also be trialled for cutting – this could apply to some of the upper slopes where a machine cannot travel and where native non-invasive ferns are present, which should not be sprayed.

The relative costs of each method should also be assessed alongside their effectiveness.



Plate 6. Bracken control in Area 19 in 2020.



Plate 7. Bracken control in Area 8 in 2020.



Plate 8. Bracken bruiser in operation in Area 27 in 2019 showing previous density of bracken on these slopes.



Plate 8. Bracken control in Area 27 in 2020 following the use of the bracken bruiser.



Plate 9. Bruised v's unbruised areas in Area 27 in 2020 – exposing lazy beds on the hill previously visually obscured at this time of year.



Plate 10. Bracken control on the upper valley slopes will continue in 2021 and the treatment/control measure used will be influenced by the results from 2019/2020.

3.4 Track Development

A new access track was made on the commonage in May 2020. This development was not an agreed measure under the SUAS commonage management plan.

This track can be clearly seen on the Google Maps imagery for the commonage as shown on **Figure 3** below. This track was inspected from the perspective of ecology on 11th May 2020. The results of that inspection are presented in **Appendix 2**.

The inspection identified that the following ecological mitigation measures were required:

- Damaged areas of habitat across the commonage must be reinstated,
- Siltation risk to the Ballycumber Stream with subsequent impacts on water quality and fisheries habitat must be remediated,
- Erosion and landslide risk to the hillside slopes must be remediated;
- Alternative nesting habitat within the commonage must be provided;
- Erosion, landslide and siltation remediation works must be completed through detailed design, implementation of mitigation and amelioration measures (typical measures required would include; silt fencing, removal of all excavated material from the general slopes of the river, blocking of recently opened drains and reinstatement of the hydrological function of the floodplain/wetland areas of the river, reestablishment of vegetation on disturbed ground once reinstated to reduce silt and runoff risk, planting of trees and other vegetation to reinstate the riparian woodland habitat, re-instatement of the excavated track to reduce erosion, gullying and scouring risk, etc.).

A programme of remediation works was then agreed with members of the SUAS steering group who also inspected the impacts of the new track. These works are not yet complete. To date water bars have been installed, the drains blocked in the floodplain and the grass seeding was done in 2020. The

willow wattle fencing and tree planting has not yet been completed. On completion all the works will then be assessed.



Figure 3. New track (Google maps).

3.5 Gorse Control

Gorse mulching was not carried out due to a lack of availability of a contractor.

3.6 Stocking Levels

Cattle and horses are grazing away on the hill, but there is too much stock on the hill in the late summer period & this needs to be reduced in 2021.

3.7 Faunal Observations

A pair of red grouse were flushed during the walkover survey.

Three raven were recorded.

A snipe was flushed from the wet flushed areas.

3.8 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.

2019

1. Cut a number of small sections in the wetter parts on the west side of area 1. Cut sections of up to 0.5ha in size. It is recommended to cut these in the autumn as the ground will be drier at that time of the year.
2. Control burn a section on the south of area 1, avoiding the areas burned in the last fire which can be clearly seen on the management map, to encourage sheep to spread out more over these areas. Fire control lines, at least 3m wide shall be cut around each section, either by tractor mounted machine or by hand, to ensure these controlled burning areas are contained. Controlled burning may be carried out either in the spring or the autumn (or both) so long as it is within the legal burning season. The total area between cutting and burning should not exceed 3ha in 2019.
3. **Cut gorse in areas 23 & 38 to open up where it is starting to dominate. Cut up to 2ha in 2019 and encourage grazing by stock afterwards.**
4. Spray Bracken in areas 8 & 13 with Asulox using a tractor mounted sprayer.
5. Cut/roll bracken in areas 24, 27 & 34, where a machine will travel. This is to be done at least twice; once in early June and again in late August. This will act as a trial to test the practicality of this method of controlling bracken.

2020

1. Cut or burn a further number of sections in areas 1, up to 2ha in total. Follow the guidelines for year 1 in relation to the size and distribution of controlled burning/cutting areas.
2. **Control further small areas of gorse in areas 23 & 38 by either cutting or burning, up to 2ha in total.**
3. Spray a number of small sections in area 7 using hand held equipment, up to 3ha for bracken during 2020. Follow up with increased grazing levels afterwards.
4. Cut/roll bracken in areas 24, 27 & 34, where a machine will travel. This is to be done at least twice; once in early June and again in late August.

2021

1. Do a demonstration of controlled burning on the sections with firebreaks prepared in south of area 1.
2. Cut gorse in areas 23 & 38 with a suitable tractor & mulcher.
3. Spray a number of small sections in areas 7, 17, 22, 25, 30, 36 & 40 using hand held equipment, up to 3ha for bracken during 2021. Follow up with increased grazing levels afterwards.
4. Cut/roll bracken in any areas where a machine will travel. This is to be done at least twice; once in early June and again in late August
5. Continue cattle & horse grazing to deliver a more diverse sward and help with controlling strong vegetation. Limit the grazing activity in the late summer period to GLAS max figures as parts of the hill are overgrazed.
6. Plant at least 150 native trees along the river, open drain and other suitable areas on the commonage.

4. Appendix 1. Maps & Management Recommendations

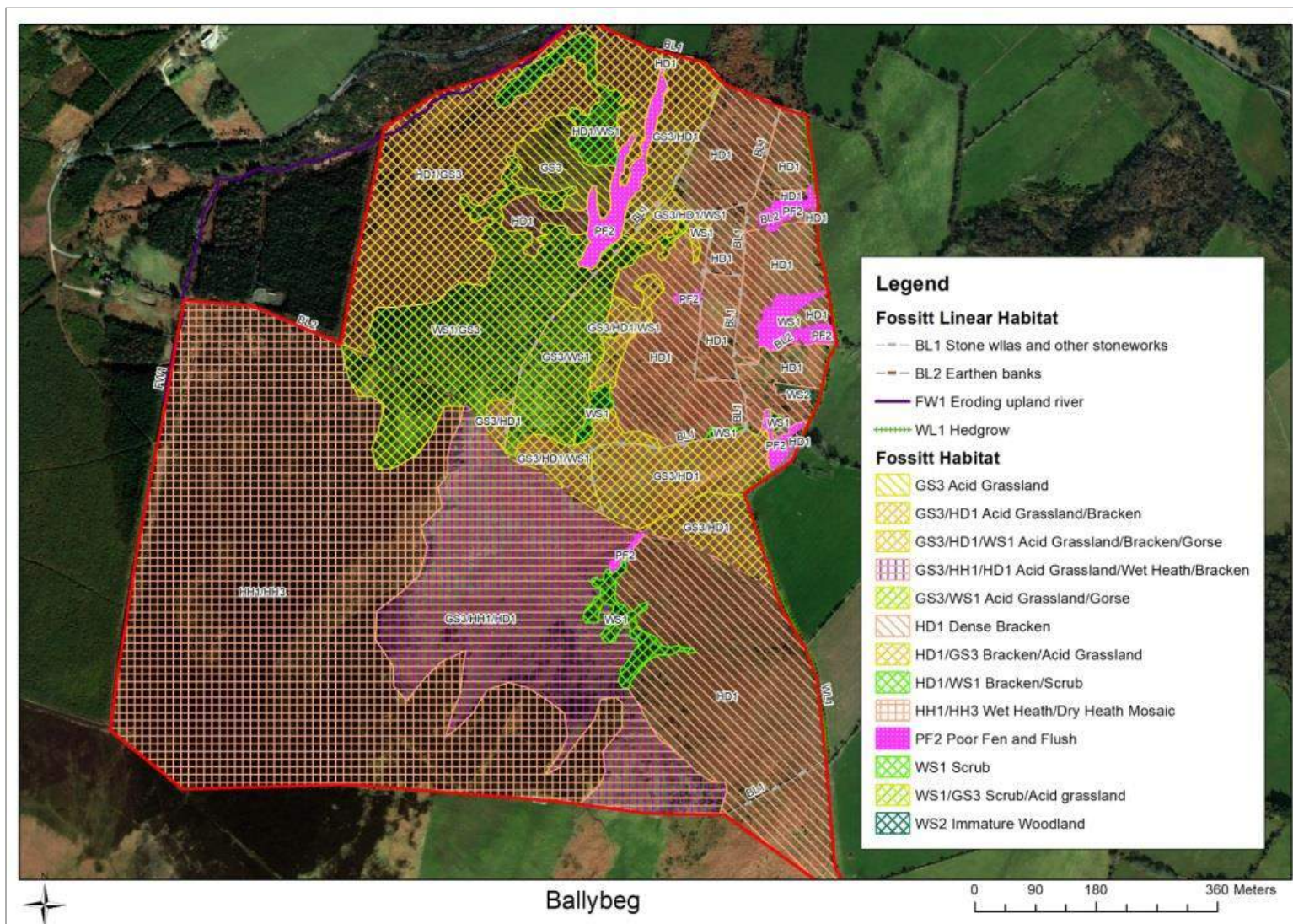


Figure 1. Habitats mapped to Level Three (Fossitt, 2000) within Ballybeg.



Figure 2. Habitats mapped according to their correspondence with Annex I habitats within Ballybeg.

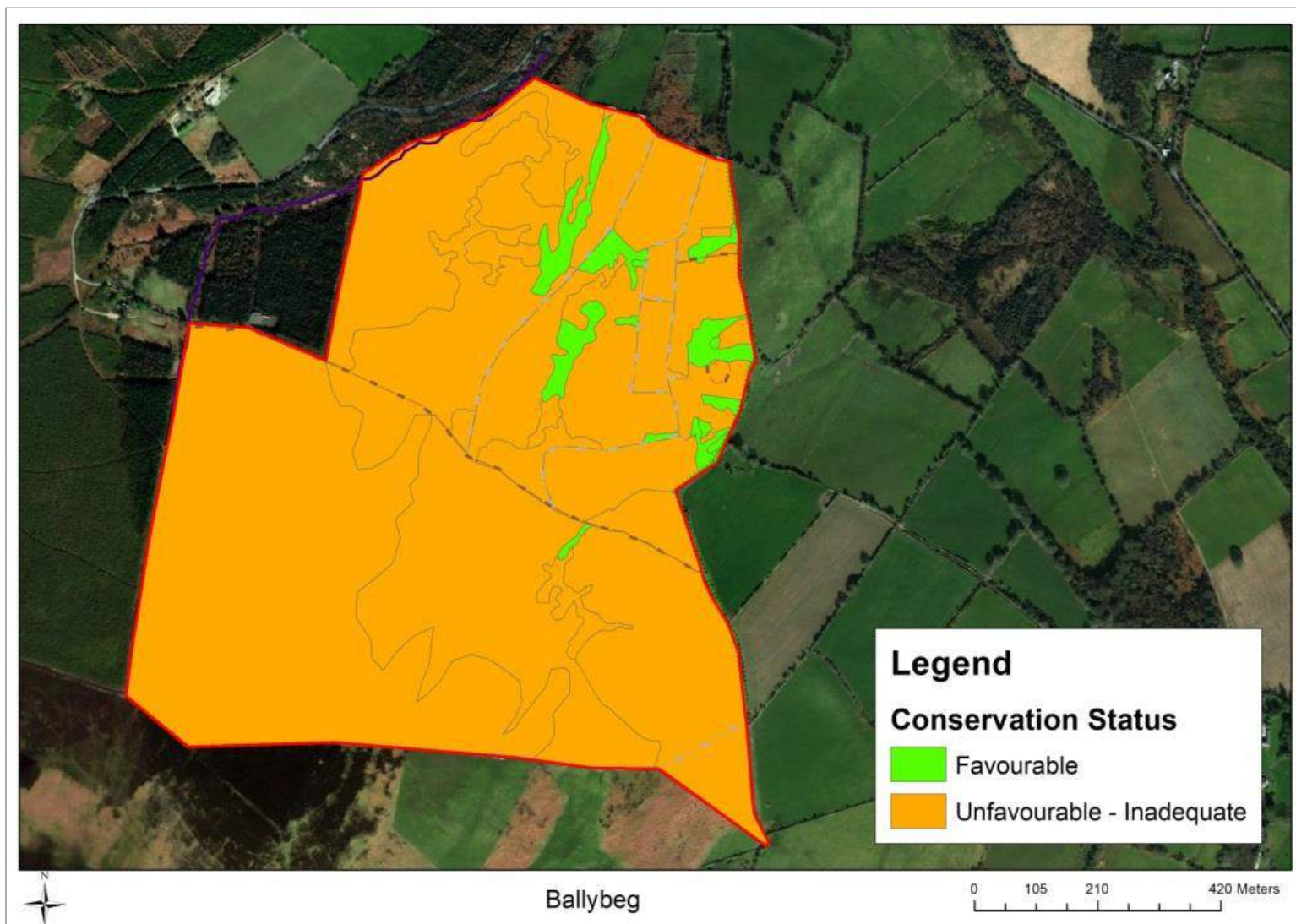


Figure 3. Habitat Condition Assessment for Ballybeg.

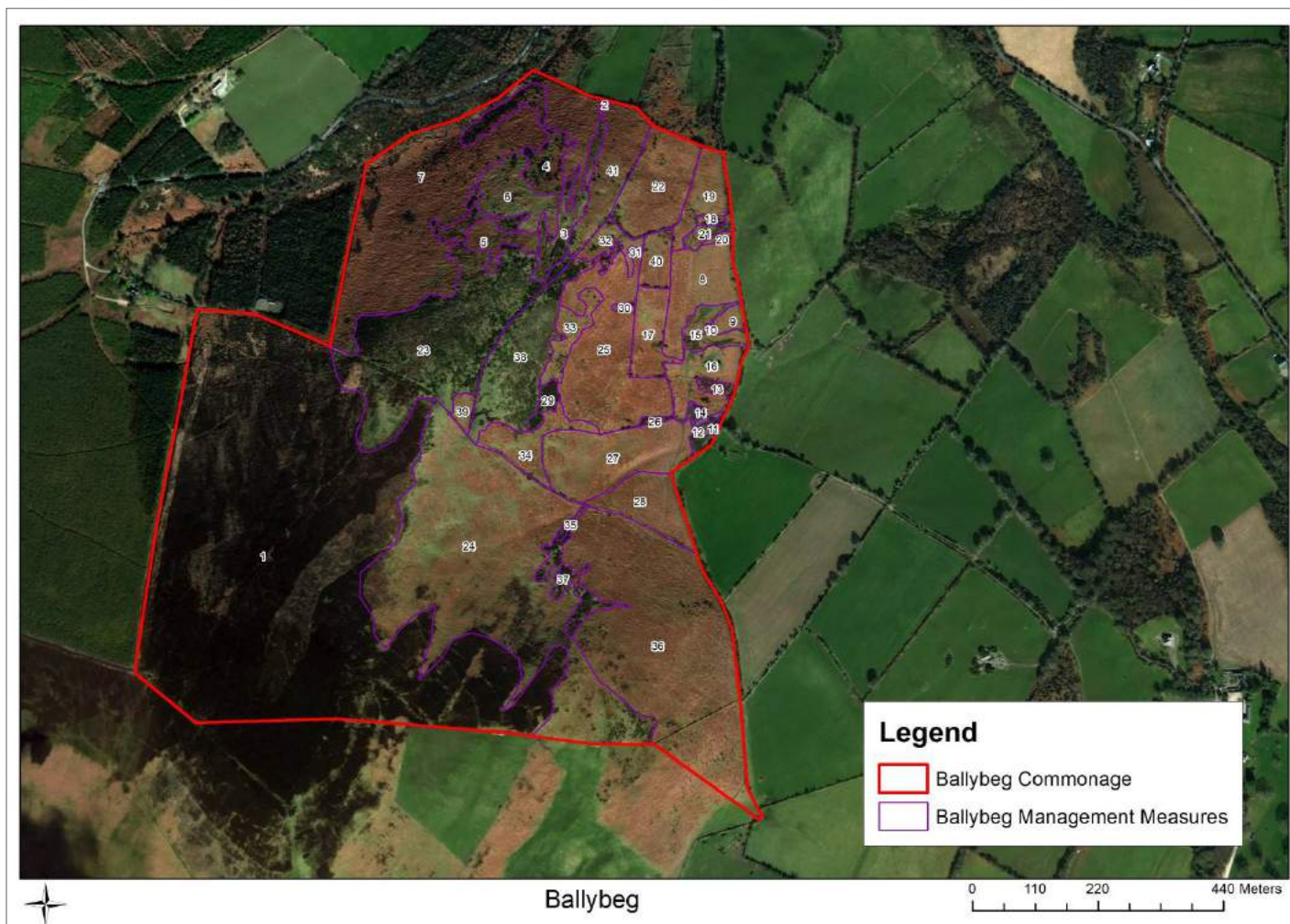


Figure 4. Management measures for Ballybeg.

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

Id	Annex I Code	Annex I Description	Fossitt Code	Habitat	Area (m)	Area (Ha)	Conservation Status	Management Measures
1	4030/4010	Dry Heath/Northern Atlantic Wet Heaths with <i>Erica tetralix</i>	HH1/HH3	Dry Heath/ Wet Heath	305365	30.54	Unfavourable - Inadequate	<p>Ensure no further uncontrolled burning</p> <p>Monitor grazing and sheep movements to return to good condition.</p> <p>Graze with sheep/cattle/horses to open up</p>
2			HD1	Dense bracken	218	0.02	Unfavourable - Inadequate	<p>Control bracken</p> <p>Graze with sheep/cattle/horses to open up</p>
3			PF2	Poor fen and flush	9049	0.90	Favourable	<p>Control bracken surrounding the flush</p> <p>Monitor condition and move livestock if becoming poached</p>
4			HD1/WS1	Dense bracken/scrub	11967	1.20	Unfavourable - Inadequate	<p>Control bracken</p> <p>Graze with sheep/cattle/horses to open up</p> <p>Flail 50% of gorse if possible (retaining areas near the river as breeding habitat for birds)</p>
5			HD1	Dense bracken	5385	0.54	Unfavourable - Inadequate	Control bracken
6			GS3	Acid grassland	11868	1.19	Unfavourable - Inadequate	<p>Bracken beginning to encroach</p> <p>Graze with sheep/cattle/horses to open up</p>
7			HD1/GS3	Dense bracken/acid grassland	81015	8.10	Unfavourable - Inadequate	<p>Control bracken</p> <p>Graze with sheep/cattle/horses to open up</p>

Id	Annex I Code	Annex I Description	Fossitt Code	Habitat	Area (m)	Area (Ha)	Conservation Status	Management Measures
8			HD1	Dense bracken	15402	1.54	Unfavourable - Inadequate	Archaeological/cultural heritage interest Recommend the use of sprays in this area to prevent damage to lazy beds or light stocking
9			HD1	Dense bracken	2099	0.21	Unfavourable - Inadequate	Bracken beginning to encroach Graze with sheep/cattle/horses to open up Ensure no significant poaching to adjoining flushed area
10			WS1	Scrub	271	0.03	Favourable	No measures required
11			HD1	Dense bracken	608	0.06	Favourable	Monitor bracken but adds diversity and cover in this area for breeding birds
12			PF2	Poor fen and flush	2325	0.23	Favourable	Monitor condition and move livestock if becoming poached
13			WS2	Immature woodland	1349	0.13	Favourable	Fence to allow natural regeneration and woodland development to continue
14			WS1	Scrub	448	0.04	Favourable	Provides cover for breeding birds - retain
15			PF2	Poor fen and flush	5407	0.54	Favourable	Monitor condition and move livestock if becoming poached
16			HD1	Dense bracken	11641	1.16	Unfavourable - Inadequate	Archaeological/cultural heritage interest Recommend the use of sprays in this area to prevent damage to ring fort or light stocking
17			HD1	Dense bracken	9311	0.93	Unfavourable - Inadequate	Control bracken Recommend trialling the use of horses or cattle in this enclosed field to see the effects of trampling on spring growth

Id	Annex I Code	Annex I Description	Fossitt Code	Habitat	Area (m)	Area (Ha)	Conservation Status	Management Measures
18			HD1	Dense bracken	773	0.08	Unfavourable - Inadequate	Archaeological/cultural heritage interest Recommend the use of sprays in this area to prevent damage to lazy beds or light stocking
19			HD1	Dense bracken	8995	0.90	Unfavourable - Inadequate	Archaeological/cultural heritage interest Recommend the use of sprays in this area to prevent damage to lazy beds or light stocking
20			HD1	Dense bracken	699	0.07	Unfavourable - Inadequate	Archaeological/cultural heritage interest Recommend the use of sprays in this area to prevent damage to lazy beds or light stocking
21			PF2	Poor fen and flush	2363	0.24	Favourable	Monitor condition and move livestock if becoming poached
22			HD1	Dense bracken	19060	1.91	Unfavourable - Inadequate	Archaeological/cultural heritage interest Recommend the use of sprays in this area to prevent damage to lazy beds or light stocking
23			WS1/GS3	Scrub/acid grassland	67312	6.73	Unfavourable - Inadequate	Gorse beginning to dominate – open up with appropriate levels of grazing
24			GS3/HD1	Acid grassland/bracken mosaic	124040	12.40	Unfavourable - Inadequate	Bracken beginning to encroach Monitor grazing and sheep movements. Move sheep out of this area where they tend to congregate as this is favouring grassland over heath and the heath is being browsed out. Control bracken through grazing rather than sprays as bluebells beneath this layer which could be impacted.

Id	Annex I Code	Annex I Description	Fossitt Code	Habitat	Area (m)	Area (Ha)	Conservation Status	Management Measures
25			HD1	Dense bracken	35319	3.53	Unfavourable - Inadequate	Control bracken Recommend trialling the use of horses or cattle in this enclosed field to see the effects of trampling on spring growth
26			WS1	Scrub	624	0.06	Favourable	Provides cover for breeding birds - retain
27			GS3/HD1	Acid grassland/bracken mosaic	25248	2.52	Unfavourable - Inadequate	Bracken beginning to encroach Graze with sheep/cattle/horses to open up
28			GS3/HD1	Acid grassland/bracken mosaic	12603	1.26	Unfavourable - Inadequate	Bracken beginning to encroach Graze with sheep/cattle/horses to open up
29			WS1	Scrub	2330	0.23	Unfavourable - Inadequate	Dense gorse in this area. Has a biodiversity value for nesting birds. Recommend that other areas of scattered gorse are controlled and to see if grazing prevents gorse from returning before effort is put into clearing this
30			PF2	Poor fen and flush	505	0.05	Favourable	Monitor condition and move livestock if becoming poached
31			WS1	Scrub	277	0.03	Favourable	Provides cover for breeding birds - retain
32			GS3/HD1/WS1	Acid grassland/bracken/scrub mosaic	4281	0.43	Unfavourable - Inadequate	Bracken (and minor gorse) beginning to encroach Graze with sheep/cattle/horses to open up
33			GS3/HD1/WS1	Acid grassland/bracken/scrub mosaic	6309	0.63	Favourable	Bracken (and minor gorse) beginning to encroach Graze with sheep/cattle/horses to open up

Id	Annex I Code	Annex I Description	Fossitt Code	Habitat	Area (m)	Area (Ha)	Conservation Status	Management Measures
34			GS3/HD1/WS1	Acid grassland/bracken/scrub mosaic	9770	0.98	Unfavourable - Inadequate	Bracken beginning to encroach Graze with sheep/cattle/horses to open up
35			PF2	Poor fen and flush	792	0.08	Favourable	Monitor condition and move livestock if becoming poached
36			HD1	Dense bracken	95785	9.58	Unfavourable - Inadequate	Control bracken. Monitor grazing and sheep movements.
37			WS1	Scrub	6868	0.69	Unfavourable - Inadequate	Some localised control of gorse may be required to ensure that it does not spread further on the hill – grazing should keep it in check. Adds some value for breeding birds in this part of the hill.
38			GS3/WS1	Acid grassland/scrub mosaic	26256	2.63	Unfavourable - Inadequate	Some localised control of gorse Graze with sheep/cattle/horses to open up
39			GS3/HD1	Acid grassland/bracken mosaic	2074	0.21	Unfavourable - Inadequate	Bracken beginning to encroach Graze with sheep/cattle/horses to open up
40			HD1	Dense bracken	5182	0.52	Unfavourable - Inadequate	Control bracken Recommend trialling the use of horses or cattle in this enclosed field to see the effects of trampling on spring growth of bracken
41			GS3/HD1	Acid grassland/bracken mosaic	15345	1.53	Unfavourable - Inadequate	Bracken beginning to encroach Graze with sheep/cattle/horses to open up

5. Appendix 2. Damage Assessment Walkover – May 2020

Ballybeg commonage was visited by Faith Wilson, the SUAS project ecologist, on the 11th May 2020 following a site visit from the SUAS project manager Declan Byrne. The commonage was initially accessed via the Wicklow Way walking track.

The following images document the observations of damage to the natural and built heritage of the commonage.



Disturbance to the Wicklow Way walking track.



Damage to the field boundary/earthen bank accessing the commonage from the Wicklow Way.



Unnecessary removal of vegetation, which was conducted during the bird breeding season in contravention of the Wildlife Act 1976 (amended 2000).



The machine has accessed the area adjoining the springs and seeps in compartment 15.

This area was flagged in the ecological baseline report as being of very high sensitivity with 'fragile habitats, whose hydrology can be easily damaged by poaching and overgrazing or machinery tracking'.



The spring/seep has been damaged by machinery and a deep drainage ditch has been excavated in this area.



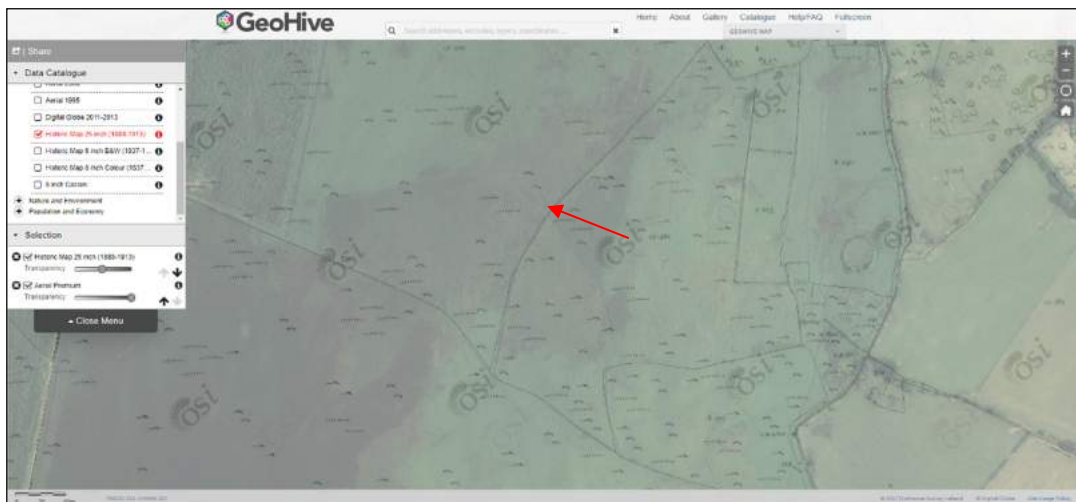
The gorse scrub in this area (compartment 13 and environs) was to be fenced to allow natural regeneration and woodland development to continue.



There has been widespread clearance of gorse vegetation in some areas – during the bird breeding season.



Damage to the built heritage of the commonage – these original field boundaries date from the late 1800s.



Damage to the historic field boundaries of the commonage.



Stone faced bank on the commonage - recorded in 2018. Note rich lichen communities.



Damage to the commonage caused by track development.



The track has been developed through an area dominated by dense bracken with underlying acid grassland, ling heather and bilberry (which is recovering Annex I habitat).



The track poses a serious runoff and erosion risk to the commonage.



The steep slopes which the track has been developed on can be seen here. No water bars or other design features have been incorporated into the track to prevent gullying and significant erosion. The track leads downhill towards the Ballycumber Stream.



Clearance of gorse scrub and emergent woodland adjoining the steep slopes of the Ballycumber Stream. This habitat was to be protected to protect the water quality in Ballycumber Stream.



Removal of vegetation on stream banksides.



Earth movement and spreading of spoil in very close proximity to the watercourse with subsequent runoff and siltation risk.



Excavated material and dislodged boulders have entered the watercourse.



The natural floodplain of the river has been completely destroyed through vegetation clearance, disturbance and drainage with subsequent hydrological and water quality impacts.



Extensive drainage works and disturbance within the floodplain of the river.



Excavation of ground in some locations is in excess of c.2m.



Spoil and excavated material has been pushed into the riparian zone with damage to mature trees and other vegetation.

Water Quality and Fisheries

The water quality and fisheries information contained within the Baseline Survey Report for the commonage prepared in 2018 is presented in **Appendix 1**. In summary:

Water quality monitoring on the Derry Water by The EPA/Wicklow County Council at Ballinglen Bridge immediately downstream of the commonage indicates that the River at this location is currently assigned a Q value of 4.5, which has declined from the 1990s and early 2000s when Q values of 5 were recorded. Water quality monitoring associated with the Ballycumber Windfarm of the Ballycumber South Stream showed a decrease in water quality from Q4-5 in 2009 to Q4 in 2012. The SUAS water quality sampling conducted in 2019 on this watercourse showed this stream to be 'indeterminate – the stream may be at risk'.

Small water bodies such as the Ballycumber South Stream provide a number of important ecosystem services. These include:

- Natural flood/drought control;
- Thermal regulation;
- Trapping sediment and contaminants;
- Nutrient retention and cycling;
- Maintaining biological diversity.

all of which extend into downstream river reaches, lakes and estuaries.

Anthropogenic impacts on small water bodies such as the Ballycumber Stream arise from:

- Channelization for drainage;
- Intensive adjacent land-uses for agriculture, forestry and urban/industrial development;
- Sediment, nutrient and contaminant run-off;
- Climate change;
- Invasive non-native species.

These effects on hydrological, chemical and biological processes threaten native species and disrupt natural ecosystem function. The SUAS project aims to improve the water quality of watercourses within the project commonages.

Assessed Impacts

The development of this track, removal of field boundaries, destruction of habitat and damage to built heritage was unauthorised by the SUAS project and was not part of any planned works for the commonage as agreed in the commonage management plan. These works not only threaten water quality and fisheries habitat in the area, but also increase the risk of land slides, soil erosion and compromise slope stability. The removal of vegetation during the breeding bird season is illegal. The visual impact of the track within a protected landscape area of high amenity use is also of concern.

Water Quality and Fisheries

The recent damage caused to the commonage has serious implications for water quality in the Ballycumber Stream and the other fisheries habitats downstream in the catchment including the suite of legally protected species these water courses support. As stated in the baseline report for the commonage:

“Under the Water Framework Directive this section of the Derry Water River was deemed ‘not at risk’ of not achieving ‘good’ status by 2015. It is very important that whatever measures are implemented on the commonage in SUAS do not lead to a decrease in water quality in the tributary of the Ballycumber Stream”.

Habitat Damage

As outlined above a number of habitats have been damaged including the small springs and fen/flush on the eastern side of the commonage as well as the areas of acid grassland/developing dry heath/bracken on the north-west facing slopes above the river and areas of emerging woodland/scrub.

The wetland habitats which form the floodplain of the river have also been damaged through the drainage works. Under the Planning and Development (Amendment) (No. 2) Regulations 2011 these works would constitute drainage of a wetland and would require planning permission from the statutory local authority (Wicklow County Council). No planning permission was sought for these works by the project.

Built Heritage

The damage to the built heritage features within the commonage should be discussed with relevant built heritage experts and the damage to field boundaries remediated and associated stonework reinstated.

Landscape Impact

Under the County Wicklow Development Plan 2016 – 2022 this part of the county is listed as an Area of High Amenity and the landscape protected under same. The impact of the excavated track on the landscape of Ballybeg Hill should be assessed by a suitably qualified landscape architect/professional.

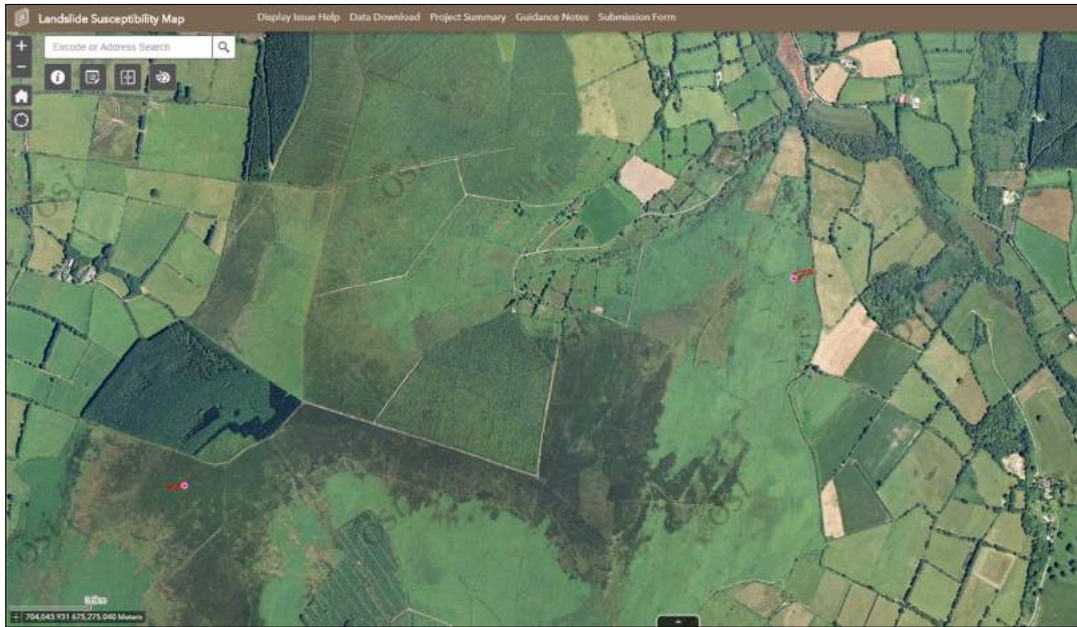
Landscape Category	Landscape Area	Description
Area of High Amenity	Southern Hills	<p>Lands generally following the 300m contour line comprising of 1) the mountainous leg from Moylisha running north-west of Shillelagh, Tinahely and Aughrim 2) the Croghan Mountain area south of Aughrim and Woodenbridge and 3) the Kilcavan Gap and Hillbrook area.</p> <p>This area comprises of a large proportion of elevated transitional lands, forestry lands including Tomnafinnogue Wood, the Coolattin Estate a number of views and prospects. This area also includes sections of the Wicklow way walking route.</p>

Amenity Importance

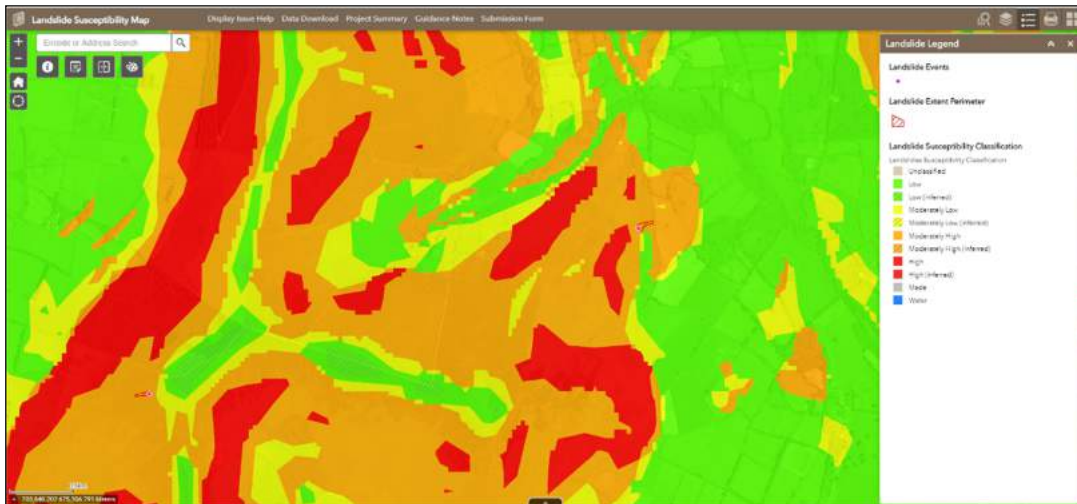
Considerable effort and investment has been made by the Tinahely Community Project in developing walking tracks and highlighting the area for hill walking purposes. These damaging works (both to built heritage and landscape) detract from the visitor expectations and experience of same.

Landslide and Soil Erosion Risk

The Geological Survey of Ireland have mapped a historic landslide event on the commonage and the north western facing slopes of the commonage above the Ballycumber Stream are mapped as high risk on their landslide susceptibility mapping as shown below.



Historic landslide event within the Ballybeg Commonage (Source: GSI).



These slopes are mapped as having a high susceptibility to landslides by the GSI.

Ecological Requirements

As outlined above the following ecological mitigation measures are required:

- Damaged areas of habitat across the commonage must be reinstated,
- Siltation risk to the Ballycumber Stream with subsequent impacts on water quality and fisheries habitat must be remediated,
- Erosion and landslide risk to the hillside slopes must be remediated;
- Alternative nesting habitat within the commonage must be provided;
- Erosion, landslide and siltation remediation works must be completed through detailed design, implementation of mitigation and amelioration measures (typical measures required would include; silt fencing, removal of all excavated material from the general slopes of the river, blocking of recently opened drains and reinstatement of the hydrological function of the floodplain/wetland areas of the river, reestablishment of vegetation on disturbed ground once reinstated to reduce silt and runoff risk, planting of trees and other vegetation to reinstate the riparian woodland habitat, re-instatement of the excavated track to reduce erosion, gullying and scouring risk, etc.).

These measures will need to be discussed and agreed with the various relevant statutory agencies including:

- Geological Survey of Ireland (re. slope stability/landslide risk),
- Wicklow County Council (re. unauthorised drainage of a wetland, which would have required planning permission – planning process would then have triggered protective measures for built heritage, protection of amenity, protection of landscape values),
- Inland Fisheries Ireland (re. damage/risk to fisheries habitat),
- EPA (re. damage to water quality and Water Framework Directive obligations),
- National Parks and Wildlife Service (re. illegal activity (Wildlife Act)).

Appendix 1. Water quality and fisheries of Ballycumber Stream.

As reported in the baseline survey report prepared in 2018:

‘The commonage is located within the Eastern River Basin District within the Ovoca-Vartry catchment (10) and the DerryWater Sub Catchment (10).

A tributary of the Ballycumber South Stream (IE_EA_10D020600 Ballycumber South) rises within the commonage on the north-western boundary of the commonage adjoining a forestry plantation and flows north eastwards to join a tributary of the Derry Water, which is then joined by the Askanagap Stream, upstream of Ballinglen Bridge. This tributary of the Derry Water River then joins the main channel of the Derry Water, which flows north easterly towards Aughrim Village.

Recent water quality monitoring on the Derry Water by the EPA/Wicklow County Council at Ballinglen Bridge immediately downstream of the commonage indicates that the River at this location is currently assigned a Q value of 4.5, which has declined from the 1990s and early 2000s when Q values of 5 were recorded (see **Table 2.4** below). The Derry Water (and its tributary within the commonage) was deemed a ‘Moderate Status’ watercourse in 2007 – 2009 and showed some recovery since then and was assessed as ‘Good Status’ in 2010 – 2012 and 2012 - 2015³.

Table 2.4. Water Quality values for the Derry Water at Ballinglen Bridge (1990 – 2015).

Water Quality Monitoring Results								
1990	1994	1997	2000	2003	2006	2009	2012	2015
5.0	5.0	4.5	4.5	5.0	4.5	5.0	4.5	4.5

The Ow/ Derry Water, Aughrim River catchment is an important salmonid system, with excellent stocks of Brown Trout (*Salmo trutta*), Sea Trout (*Salmo trutta morpha trutta*) and Atlantic Salmon (*Salmo salar*). The freshwater pearl mussel (*Margaritifera margaritifera*) is a freshwater mollusc, which is listed under Annex II of the EU Habitats Directive (92/43/EEC). There are records of freshwater pearl mussel in the Aughrim River main channel. The Aughrim catchment hasn’t been surveyed systematically to date but freshwater pearl mussel have been recorded from the Ow River (about half way up), from the Derry Water not far upstream from the confluence and from the Aughrim all the way down to Woodenbridge. The records are indicative of a wider distribution for the species and some of the records are quite old – the population has been recorded in the area since 1893. Recent living records (2000’s) confirm a presence still in at least the Ow and Aughrim, and there was a recently dead shell out of the Derry Water in 2005, so it has been assumed that all three waterbodies still have populations of freshwater pearl mussel. None of the watercourses in this catchment are designated as a SAC to protect the freshwater pearl mussel or other Annex II aquatic species that are known to occur in them. Three species of lamprey occur in Irish waters – the sea lamprey (*Petromyzon marinus*), the river lamprey (*Lampetra fluviatilis*), and the brook lamprey (*Lampetra planeri*). All three species are listed under Annex II of the EU Habitats Directive (92/43/EEC). Brook Lamprey river lamprey and sea lamprey are known to exist in the Aughrim River main channel.

Under the Water Framework Directive this section of the Derry Water River was deemed ‘not at risk’ of not achieving ‘good’ status by 2015. It is very important that whatever measures are implemented on the commonage in SUAS do not lead to a decrease in water quality in the tributary of the Ballycumber Stream’.

³ The EPA data has been updated since the baseline survey report was prepared in 2018. The Derry Water (and its tributary within the commonage) was deemed a ‘Good Status’ watercourse for the Water Framework Directive reporting period 2013 -2018. For the reporting period 2010 – 2015 it was listed as a waterbody ‘Not at Risk’. Water quality monitoring conducted in 2018 on the Derry Water by the EPA/Wicklow County Council at Ballinglen Bridge indicates that the River at this location was assigned a Q value of 4.5. (Source: www.catchments.ie).

2019 Water Sampling

In 2019 the commonage was resurveyed and water sampling in the Ballycumber stream was conducted as summarised below:

‘A water sample was taken on the Ballycumber South Stream in February 2019 at one sampling location as shown on **Figure 5** below. This location was chosen as the other areas of the watercourse in the commonage adjoin a conifer plantation (WD4). The water sample was assessed by Carl Dixon. The Ballycumber South Stream (BB1) was assessed as ‘Indeterminate – may be at risk of not achieving ‘Good’ water quality status ‘.

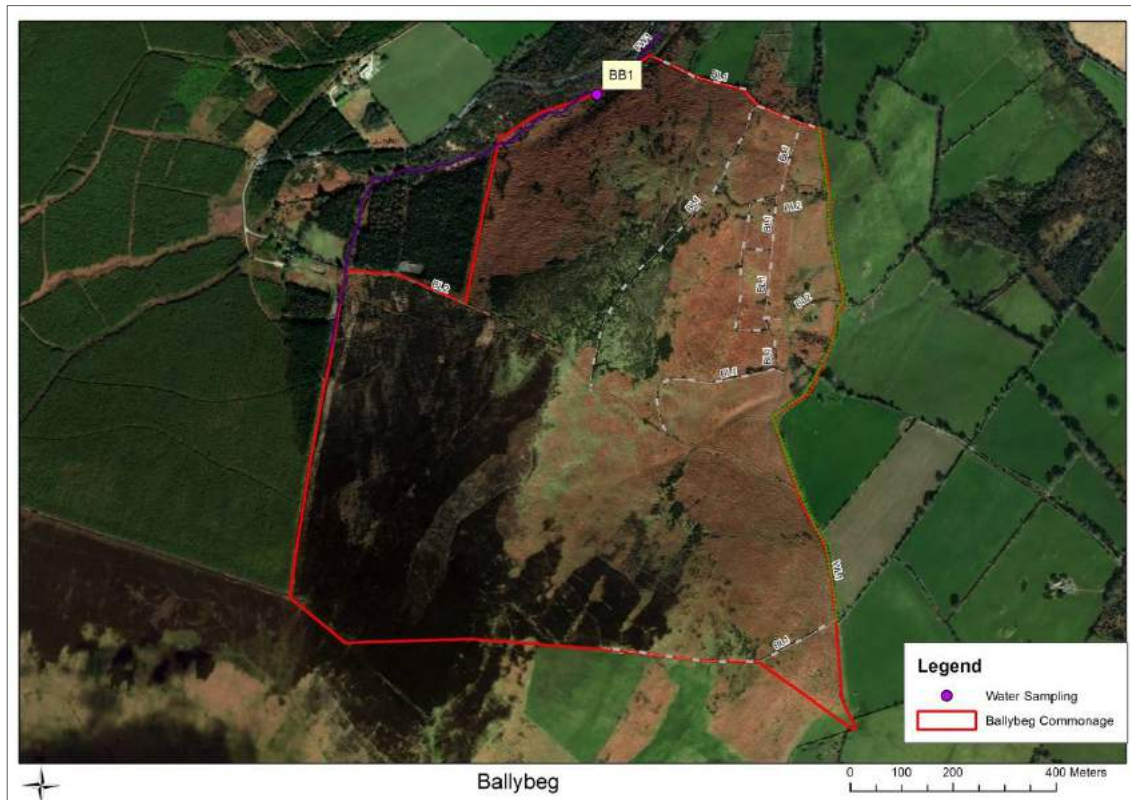


Figure 5. Water quality sample location at Ballybeg.

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.

Previous Data

There has been some previous water quality monitoring on streams and watercourses in the area associated with the development of the nearby Ballycumber Windfarm⁴.

⁴ Sweeney, P. & N. Sweeney (2012). Biological Water Quality of Streams and Rivers in the Vicinity of the Proposed Windfarm at Ballycumber, Co. Wicklow. Ballycumber Windfarm Environmental Impact Statement.

Three sampling points, which are in close proximity to the Ballybeg commonage (**Sites 1, 2 and 3**), are described below in **Table 1** and their locations are shown below on **Figure 6**. Site 4 was located on the Derry River near Tinahealy village.

Table 1. Water sampling locations associated with the Ballycumber Windfarm.

TABLE 1				
	Site 1	Site 2	Site 3	Site 4
Location	Stream 1. Upstream of small public road, c. 400m upstream of confluence with Derry Water.	Stream 2 c. 5m upstream of confluence with Derry Water.	Derry Water. Immediately downstream of the ford downstream of the confluence of Stream 2	Derry River. c. 250m upstream of the bridge in Tinahealy.
Grid Reference	T0440 7774	T0498 7713	T0499 7712	T0364 7334
Width (m.)	2.5	2.0	8	8
Depth (cm.)	5	20	30 - 60	30 - 50
Substrate Composition (in order of occurrence)	1. Gravel 2. Sand	1. Cobble 2. Sand 3. Gravel	1. Large rocks 2. Sand 3. Cobble 4. Gravel	1. Gravel 2. Sand 3. Cobble
Flow Type	Riffle: 100%	Riffle: 100%	Riffle: 100%	Riffle: 100%
Shade	High	High	High	Moderate
Dominant Bankside Vegetation	Ash, Hawthorn, Sitka Spruce	Birch, Holly	Alder Ash, Birch	Alder, Willow

The results of water sampling in these streams conducted by Sweeney in 2009 and 2012 are presented below:

TABLE 6. Q-values 2009 & 2012		
	2009	2012
Site 1: Stream 1	Not suitable for Q-scheme	Not suitable for Q-scheme
Site 2: Stream 2	Q4-5	Q4
Site 3: Derry Water	Q4-5	Q4
Site 4: Derry River	Q4-5	Q3-4

These results show a decline in biological water quality from 2009 to 2012 at the three sites where the Q-scheme can be applied. The drop to Q3-4 at the bridge at Tinahealy on the Derry River was also reported by EPA in 2010 (Appendix 3).

This water sampling shows that Stream 2, which is the stream coming off the Ballycumber Ridge and through the commonage, has shown a decrease in water quality from Q4-5 in 2009 to Q4 in 2012.

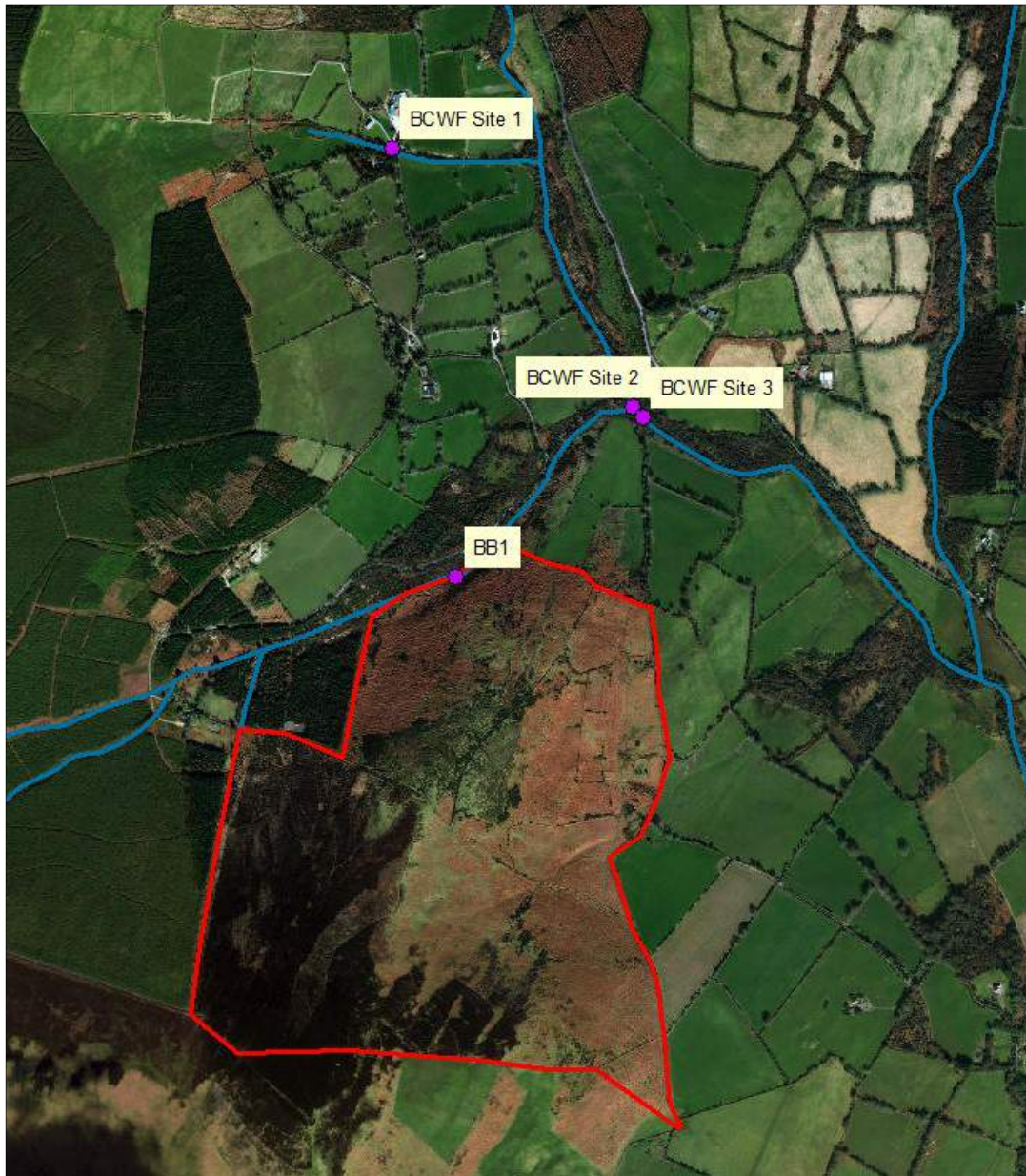


Figure 6. Water sampling locations associated with the Ballycumber Windfarm near Ballybeg Commonage. Site 2 is located downstream of the commonage on Ballycumber Stream South.

SUAS Water Quality Sampling – Ballycumber South Stream

River:	Code:	Date:	Sample Taken By:
Ballycumber South Stream	IE_EA_10D020600	19/02/2019	Faith Wilson
Sample Number:	Location:	Stream Order:	Grid Reference:
BB1	Adjacent to Ballybeg commonage	1 st order	T 04582 76775
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): 3	Main Land Use Adjacent/Upstream:
Yes - from the adjoining commonage	None	Kick sample - 2	Pasture
	Present	Stone washing - 1	Bog
	Moderate	Weed sweep	Forestry
	Abundant		Tillage
			Urban
			Other - windfarm



Plate 1. Photographic record of sampling location.

Ballybeg 1

River:		Code:		Date:		Time:	
Station no.		Location:		Grid (6 figure):			
Field Chemistry		Stream Order:		Stream flow:			
DO mg/l		Modifications: 1/N Canalised-widened-bank erosion- artificial drainage		Riffle			
Temp (°C)		Dominant Types:		Riffle/Glide			
Conductivity		Bedrock		Slow flow			
pH		Boulder (>128mm)					
Bank width (cm)		Cobble (32-128mm)					
Wet width (cm)		Gravel (8-32mm)					
Rip Depth (cm)		Fine Gravel (2-8mm)					
Staff gauge		Sand (0.25-2mm)					
Velocity		Silt (<0.25mm)					
Colour		Slope: Low - Medium - High - Very High		Shading: High - Moderate - Low - None			
Turbidity		Geology: Calcareous-Siliceous-Mixed		Cattle access Y: upstream - downstream or N			
F&T		Substratum Conditions: Calcareous-Compacted-		Photo: Y / N			
Moderate		Loose - Normal					
Slow		Substratum:					
Very slow		Stony bottom-Muddy bottom-Mud over stones					
Clarity		Degree of siltation: Clean-Slight-Moderate-Heavy					
Very clear		Depth of mud: None < 1cm 1-5cm 5-10cm > 10cm					
Clear		Litter: None - Present - Moderate - Abundant					
Slightly turbid		Filamentous Algae:		Sewage Fungus:			
Highly turbid		None - Present - Moderate - Abundant		None - Present - Moderate - Abundant			
Recent Flood		Main land use u/s:		Sample retained:			
		Pasture		Y / N			
		Urban					
		Bog					
		Forestry					
General Comments:							
<p>Macroinvertebrate Composition</p> <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 = Anellus <p>Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)</p>							
Ephemeroptera:		Plecoptera:		Relative Abundance			
Ecdyonurus Ab		Leuctra Ab		1-5			
Rhithropanopea Ab		Siphonura Ab		6-20			
Heptagenia Ab		Pseudosiphonura Ab		21-50			
Ephemerella Ab		Amphipetura Ab		51-100			
Chironomus Ab		Pteronarcys Ab		101+			
Baetis Ab		Dolania Ab					
Psephenops Ab		Other Plecop Ab					
Ephemerella Ab		Other Plecop Ab					
Other Ephem Ab		Total Relative Abundance		8			
Total no. of taxa		Total no. of Taxa		Total Relative Abundance			
Trichoptera:		G.O.L.D.:		Anellus:			
Hydropsychidae Ab		Limnoria (G) Ab		Chironomidae (D) Ab			
Polycentropodidae Ab		Psephenops (G) Ab		Chironomidae (D) Ab			
Rhyacophila Ab		Blattaria (G) Ab		Simuliidae (D) Ab			
Phlebotomidae Ab		Anisura (G) Ab		Diptera (D) Ab			
Limnephilidae Ab		Rhyac (G) Ab		Tipulidae (D) Ab			
Sericostomatidae Ab		Lumbriculus (X) Ab		Carabidae (D) Ab			
Glossosomatidae Ab		Eisenia (X) Ab		Other G.O.L.D. Ab			
Leptostomatidae Ab		Tubificidae (X) Ab					
Other Trichoptera Ab		Total no. of Taxa		Total Relative Abundance			
Total no. of Taxa		Total no. of Taxa		Total Relative Abundance			

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.

BALLYBEG 2

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.

<p>Group 1 - 3 Tails Ephemeroptera</p> <p>No. of taxa</p> <p>0 1 2+</p> <p>Relative Abundance</p> <p>Score</p> <p>0 4 6 4 8</p>	<p>Group 2 - 2 Tails Plecoptera</p> <p>No. of taxa</p> <p>0 1 2 3+</p> <p>Relative Abundance</p> <p>Score</p> <p>0 4 6 6 8</p>
<p>Group 3 Trichoptera</p> <p>No. of taxa</p> <p>0 1-2 3+</p> <p>Relative Abundance</p> <p>Score</p> <p>0 2 4 4</p>	<p>Group 4 G.O.L.D.</p> <p>No. of taxa</p> <p>0 1-2 3+</p> <p>Relative Abundance</p> <p>Score</p> <p>0 4 2 0 4 0</p>
<p>Group 5 Amphibia</p> <p>No. of taxa</p> <p>Absent Few (1-20) Common (>20)</p> <p>Score</p> <p>4 2 0</p>	<p>Step 2</p> <p>a) Index Score Group 1 0</p> <p>b) Index Score Group 2 8</p> <p>c) Index Score Group 3 2</p> <p>d) Index Score Group 4 4</p> <p>e) Index Score Group 5 4</p>

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 ☐ > 6.5 - 7.25 ☒ < 6.5 ☐

Probably not at risk Indeterminate Stream at risk

Surveyor (signed): CARL DIXON Name (print): CARL DIXON Date: 1 / 1 / 1

Fisheries Habitat Restoration on the Ballinglen River

The 'Wicklow Bridges Project - An Assessment of the risk of barriers to migration of fish species in County Wicklow' was conducted by Inland Fisheries Ireland in November 2012. The Ballinglen River

(along with other numerous smaller tributaries of the Avoca system) was one of the channels identified as being most impacted by a structure (a scour protection apron below Ballinglen Bridge) which forms a significant impediment to fish passage. The survey reports that 'A significant proportion of the fish spawning and nursery habitat potential upstream of 'high risk' structures is likely to remain unrealised without intervention'.

Discussions are currently underway between Wicklow County Council, Inland Fisheries Ireland and the East Wicklow Rivers Trust to remove this barrier to improve the fisheries habitat upstream of Ballinglen Bridge and highlights the importance of this watercourse for salmonids.



Ballinglen Bridge: This photo demonstrates the fish passage issues associated with laminar flow, flow velocity and the perching associated with this scour protection apron.

6. Appendix 3. Remediation Assessment

Remediation Programme for Ballybeg Commonage

There are 4 areas of work which require remediation since the track and fence were installed in May 2020. These are:

1. The banks of the stream
2. The wet area beside the stream
3. The banks of the spring
4. The Track

All these measures are to protect the water quality in the stream and spring. This is critical because there are known Freshwater Pearl Mussel sites downstream near Annacurra. These animals are protected under the Wildlife Acts 1976-2018 and are killed when silt covers them. Further offences could occur under the Fisheries Acts and under Local Authority legislation.

The Stream (Marked A on the map in appendix 3)

IMPORTANT: NO WORK SHOULD TAKE PLACE IN-STREAM

- All dumped spoil is to be brought back 2m from the edge of the stream
- It should be graded into a gentle slope
- The two drains in the spoil must be closed up, (using straw bales in the short term and filled in with soil in the longer term)
- The bare soil is to be seeded with a grass-seed mix to stabilise the soil and natural vegetation, including bramble and willow, is to be permitted to re-grow. The seed mix is detailed in appendix 1.
- At the bend in the stream where the track comes very close, the bank must be stabilised using willow wattle (spiling). This is available from wicklowwillow.ie (087 9587503/087 9773622) and costs €100/m. This fence will grow and will help to stabilise the bank. The best time for this work is October (further details in appendix 2).

Wet area beside the stream (Marked B on the map in appendix 3)

- There is to be no further compaction of the soil there from vehicles and it is not to be used as a parking place
- This area should be seeded with grass seed mix in appendix 1 and then natural vegetation should be permitted to return

The Spring (Marked C on the map in appendix 3)

- The banks of the spring are to be re-graded to create a gentle slope. The current steep slopes will be easily undercut during strong flow and may collapse.
- The re-graded slopes are to be planted with the grass seed mix in appendix 1.
- Shrubs like hawthorn are to be allowed to re-grow
- No further vegetation clearance work on the banks of this drain are to ever take place between 1 March -31 August any year
- *"It shall be an offence for a person to cut, grub, burn or otherwise destroy any vegetation growing in in hedge or ditch during the period mentioned in paragraph (a) of this subsection."* Wildlife Act Section 40(1)(b)

The Track (Marked D on the map in appendix 3)

- Water bars are to be created on straight sections of the track and at other suitable locations to prevent water running straight down the track. Additional information on the construction of the water bars can be made available.
- Gaps in the bank should be created at the down slope side of the water bars, to channel water off the track and out into vegetation
- The banks of the track are to be seeded with the grass seed mix in appendix 1

Timescale

- Straw bales to block up drains in the spoil should be put in immediately. The drains are to be blocked up by the 20th July 2020.
- Water bars and grading work to be completed by 20th July 2020.
- The grass seed mix to be spread as early as conditions allow, but by mid-August at the latest.
- The willow wattle fencing can be installed in October to give it the best chance of growth and should be completed by the end of October at the latest.

**Prepared by: Enda Mullen NPWS
 Dr. Helen Sheridan UCD**

Appendix 1 Grass seed mix to stabilise loose soil

Species	Common Name	Recommended sowing rate	Sowing rate (went with 50% sowing rate for bent and 25% for other three)
<i>Agrostis capillaris</i>	Common bentgrass	1kg/acre (2.5kg/ha)	0.5kg
<i>Festuca rubra rubra</i>	Red fescue	30kg/acre (75kg/ha)	7.5 kg
<i>Anthoxanthum odoratum</i>	Sweet vernal	8kg/acre (20kg/ha)	2kg
<i>Dactylis glomerata</i>	Cocksfoot	8kg/acre (20kg/ha)	2kg
			12kg/ac

The above seeds are available from Cotswolds seeds in the UK (cotswoldseeds.com). While they won't be native seed, it's fine given the objective here i.e. fast stabilisation of the banks and it's not likely that native seed can be sourced.

In terms of the species listed, sweet vernal is the most expensive, but the logic for its inclusion is that it was obvious from our visit that it grows particularly well in this area. Cocksfoot is a deep rooter, so that might be very helpful to provide stability in the lower levels, while both the bent grass and creeping red fescue are both creeping species that will help to hold the soil together on the surface.

It is recommended that 24kg of seed (sufficient to cover 2 acres at standard seeding rates), should be purchased to allow for higher seeding rates than used for conventional reseeding, where the seedbed is prepared.

Appendix 2

Willow spiling

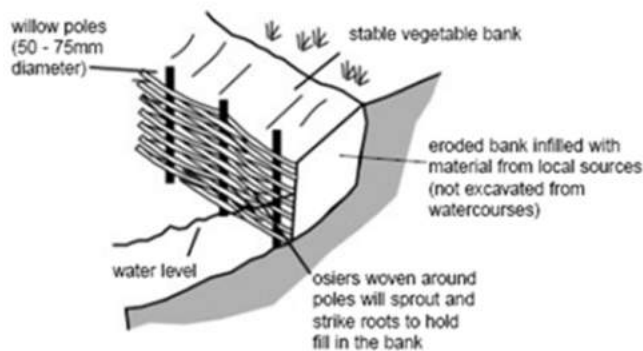
Willow spiling is a traditional soft engineering technique used to stabilise eroding banks. It consists of weaving live willow rods between live willow stakes set into the affected bank at regular intervals. The space behind the willow wall to the existing bank is then filled with soil to provide an area for the willow roots to grow. (Figure 5 & 6)

Osier willow is considered to be the most appropriate species to provide poles, due to its pliable nature and the fact that it is an indigenous species (RRC, 2002). Alternatively, commercially available alternatives could be used, but these will require more vertical support posts (RRC, 2002). Willow spiling is normally carried out between November and April during the harvesting of the willow (dependent upon the season) and should be installed within three weeks of harvest.

Spiling is generally considered to be effective in most fluvial environments, with the exception of high-energy gravel bed channels which may be too mobile. The technique can be applied on steep and vertical banks, but cannot be used as a retaining structure (Environment Agency, 1999).

Willow spiling has been successfully applied on the River Skerne in Darlington, County Durham, where it was used in conjunction with rock reinforcement below the waterline, wooden toe boarding at the low water level, and synthetic geotextiles (RRC, 2002).

The RRC (2002) note that this technique does not have the flexibility to accommodate natural bank settlement, and the use of geotextiles or mattressing may be preferable if there is not a plentiful local supply of osier willow. However, this technique can be used in relatively narrow spaces, which may be an advantage in some situations. It should be noted that willow spiling does require regular maintenance and is not suitable for small river channels where vegetation growth could potentially obstruct flow.



Schematic diagram of a bank protected using willow spiling (Source: WWF, 2000, p. 32).



Example of willow spiling used in a river channel (Source: H. Dangerfield, Royal Haskoning.

From <http://evidence.environment-agency.gov.uk/FCERM/en/SC060065/MeasuresList/M5/M5T6.aspx?pagenum=2>

Appendix 3 Map of Ballybeg Commonage

