

Developing a field boundary evaluation and grading system in Ireland

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Abstract

The purpose of this study was to develop an evaluation and grading system for the main field boundaries in Ireland – hedgerows and dry stone walls. It is shown that there is a lack of scientific information on Irish field boundaries and very little research has been carried out on what are possibly the most prominent countryside landscape features on the island. In the absence of Irish data, values were extrapolated from research in other countries. In addition, verbal consultation was carried out with prominent landscape ecologists, scientists and environmental consultants. This consultation led to the creation of a draft survey form modeled on an earlier Hedgerow Evaluation and Grading System (HEGS) (Clements and Tofts, 1992) in the UK. The draft Irish survey, described here, is entitled the Field Boundary Evaluation and Grading System or FBEGS for short. The FBEGS was field-tested in four locations in Ireland by a number of users to obtain usefulness and accuracy. Feedback from volunteer surveyors led to an amended FBEGS survey form. This was then tested in ten locations nation-wide. Results are given and a grading system is proposed. It is shown that it may be possible to evaluate a field boundary using a simple grading system but the accuracy of such a survey cannot be confirmed due to the lack of baseline data in an Irish context. However, preliminary trial surveys indicate that values assigned to a particular boundary approximate well to professional opinion. Discussion concludes with some recommendations for continued research.

Key Index Words: Dry stone wall, FBEGS, field boundary, hedgerow, landscape management, wallow, values.

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Introduction

Since the introduction of the Rural Environment Protection Scheme (REPS) programme in 1994 agriculture in Ireland has been altered and our view of the role of the farm in the landscape has changed. The EU legislation that gave rise to the REPS, the Common Agricultural Policy (Council Regulation No. 2078/92), places on farmers the dual role of producers of agricultural goods and custodians of the rural environment (Mannion, 2001). But it is not clear how one is to gauge the success (or lack thereof) of the Scheme. Ecological monitoring and evaluation that was to be part of the REPS has not been carried out. It has been shown that, in certain ecological terms, REPS farms may not be any different than non-REPS farms and the lack of baseline data is a severe impediment to ascertaining if conservation measures are successful (Jane Feehan *et al.*, 2002). Measure 5 of the REPS deals exclusively with field boundary management and conservation. This study looks exclusively at hedgerows and dry stone walls.

A conservation strategy for farm field boundaries cannot be devised unless there is accurate evaluation and grading prior to any management prescriptions. In order present arguments for hedgerow conservation in Ireland, conservation professionals often utilise functional corollaries that have been extrapolated from detailed hedgerow studies from the UK, France and other European countries. This is because it is assumed that Irish hedgerows share the same ecological significance as their European counterparts. Though most practicing ecologists agree that this is probably true, there are very little data in relation to Irish field boundaries (Smal, 1995). Using survey forms designed in other countries may not be sufficient in an Irish context as field boundaries in Ireland may differ in form, function and context. Boundary evaluations are usually based on surveyor opinion, which, in turn, reflect experience and, possibly, bias. In designing a conservation programme it is essential to have a base study with which to compare the results of any strategy. Ecological evaluation is a difficult subject and there are many ecologists with their own personal opinions as to the value of certain aspects of, in this case, field boundaries. The idea of devising a field boundary evaluation and grading system for Ireland is to begin to organize and formalise the ideas and expert opinions of those whose advice to farmers will result in the alteration of the landscape for an ecological benefit.

The four principal aims of this study were:

- *To develop an objective field boundary evaluation system for Ireland*
- *To produce a simple, user-friendly survey for both landowner and farm advisor*
- *To devise a numerical grading system for hedgerow and dry stone wall field boundaries*
- *To ensure the new survey can be integrated with the existing UK HEGS surveys*

Materials and methods

Needs Analysis

In order to establish the potential usefulness of a new survey as well as to gauge the extent to which it would be utilized a *needs analysis* was conducted. This needs analysis took the form of in-person and telephone interviews with 21 professional landscape ecologists, academics and land managers taking hedgerow evaluation as a starting point. This opinion-based survey enabled a list of potential boundary attributes to be compiled. It was found that many of these attributes corresponded with the existing Hedgerow Evaluation & Grading System or HEGS (Clements & Tofts, 1992) for the hedgerow section of the FBEGS but there was no stone wall equivalent. Assumptions for walls were also made on personal experience and interviews with ecologists.

Literature Review

In an attempt to establish numerical values for field boundary attributes, a review of available literature was carried out. Much ecological data are available on hedgerows and very little on walls. Table 1 contains a list of key research that was used to determine initial values associated with field boundaries in Ireland.

Table 1: A survey list of the structural, ecological and cultural values of field boundaries. These values are attached to the various attributes on the FBEGS survey form.

Structural Values	Ecological Values	Cultural Values
Enclosure of agricultural fields in order to prevent livestock from wandering or intermingling Morgan Evans 1994	Important wildlife corridors that provide habitat linkage Dawson 1994 Moonen & Marshall 2001 (a & b)	Linkage to past management regimes and folk memory Morgan Evans 1994 Oreszczyn & Lane 2000 Oreszczyn 2000
Provision of shade to livestock from the sun Pollard <i>et al.</i> 1974 Greaves & Marshall 1987	Linear reserves for reptiles and amphibians Pollard <i>et al.</i> 1974 Saint-Girons & Duguy 1976	Marking townland boundaries as well as parish limits Anon 1999
Delineating property lines Greaves & Marshall 1987	Connectivity between habitats Fry 1994	Store of medicinal plants Podlech 1996
Provision of shelter for livestock and crops from high winds and driving rain Pollard <i>et al.</i> 1974 Carborn 1976 Helps 1994	Biodiversity content Pollard <i>et al.</i> 1974 Forman 1983 Forman & Baudry 1984 Burel & Baudry 1994 Smart <i>et al.</i> 2001	Local cultural distinctiveness (walls) Feehan 1993 McAfee 1997 Ó Maithiú & O'Reilly 1997 Brooks & Adcock 1999 Conry 2000 Fossitt 2000 Garner 2001
Screening buildings Biber 1988 Anon 1999	Plant seed reserves and genetic heritage Pollard <i>et al.</i> 1974 Bunce <i>et al.</i> 1993 Cummins & French 1994 Smart <i>et al.</i> 2002	Hiding stolen objects, fugitives and to carry out illegal activities Garda Press Office <i>pers. comm.</i>
Improvement of drainage Harvey 1976 Millsopp 2001 Reif & Schmutz 2001	Importance to farm birds Arnold 1983 Osborne 1984 O'Connor & Shrubbs 1986 Lack 1992	Symbol of people's relationship to landscape (hedgerows) Pollard <i>et al.</i> 1974 Green 1981 Oreszczyn & Lane 2000
Interception of agricultural spray drift Moonen & Marshall 2001 (a & b)	Vascular plant reserves Helliwell 1975 Bunce <i>et al.</i> 1994a Wilson 1994 McCollin <i>et al.</i> 2000	Amenity and hunting Rands & Sotherton 1987 Aebischer <i>et al.</i> 1994 Anon 1996
Reducing soil blow Pollard <i>et al.</i> 1974 Fry 1994 An Taisce 2000	Importance for small mammals Pollard <i>et al.</i> 1974 Poulton 1994 Tew 1994	To provide food for humans and livestock Reif & Schmutz 2001
Flood and erosion buffers Greaves & Marshall 1987 Mériot 1999 An Taisce 2000	Shelter for overwintering and predator invertebrates Holland, <i>et al.</i> 2001	Provision of craft materials Baudry <i>et al.</i> 2000 Maclean 2000 & <i>pers. comm.</i> Baudry & Bunce, 2001
Prevention of wetland pollution from runoff Vought <i>et al.</i> 1995 Viaud <i>et al.</i> 2001 Borin & Bigon 2002 Mezzalira <i>pers. comm.</i> ²	Shelter for pollinating invertebrates Lewis 1965 Pollard <i>et al.</i> 1974 Dover & Sparks 2000 Moreby & Southway 2001	Dividing soil types and thus cropping patterns Maclean 2000 Dowdswell 1987 Rackham 1986
Limiting evapotranspiration Pollard <i>et al.</i> 1974 Biber 1988 An Taisce 2000	Fungi reserves Montégut 1976 Dowdswell 1987	Protecting livestock and property from theft or sabotage Kelly 1997
Increasing local precipitation Biber 1988	Lichens and mosses (walls) Darlington 1981 Carr & Bell 1991 Pilcher & Hall 2001	Provision of wood fuel An Taisce 2000 Biber 1988 Baudry <i>et al.</i> 2000
Improvement of crop yields Biber 1988	Local microclimate Guyot & Verbrugge 1976	

² Dr. Giustino Mezzalira, Veneto Agricoltura (a regional counterpart to Teagasc in Italy). Personal communication with Dr. Mezzalira indicated that the Italian Government is investing over €50m (2002 – 2004) in the planting of linear, woody buffer strips (which they refer to as hedgerows) to protect the Venice lagoon from the effects of agricultural pollution in the form of nitrate and phosphate runoff.

Pilot Test with Draft Instrument 1

A pilot trial using a draft of the FBEGS survey form was carried out. This was to test the survey form and to identify any shortfalls and significant problems. The trial was also intended to test the assigned attribute values and to examine if there is any correlation between these values and the perceived value of the boundary. It was carried out in early July 2002 in the following locations:

- Location A** Balbriggan, Co. Dublin
- Location B** Ballinabracky, Co. Westmeath
- Location C** Ballyknockan, Co. Wicklow
- Location D** Tallaght, Co. Dublin

In total twenty-eight (28) boundaries were surveyed; eighteen (64%) were hedgerows and ten (36%) were dry stone walls. The locations were chosen for their familiarity with the landowners, but the individual boundaries were chosen at random. When completing the survey form, the surveyor selected an attribute on the survey sheet that best matched the particular attribute of the field boundary. A numerical score is allocated for the various attributes. This yielded an overall score at the end of the survey. This score was then used to identify the ecological value of that field boundary.

The surveyor had to follow a simple guide on how to fill out the survey form. This guide was verbally conveyed. Three surveyors carried out the first field tests of the FBEGS. Two surveyors had experience in using the HEGS survey form and were familiar with the attributes under examination. The third surveyor had never carried out a survey of this kind but was an experienced ecologist. All three carried out the FBEGS survey on the same twenty-eight boundaries independently of each other. Upon completion of the survey the data were gathered and compared to the surveyor's personal opinion of the boundary in question. The surveyors also gave their opinions on the user-friendliness of the form and other helpful comments.

Test with Draft Instrument 2

With the response of surveyors, opinions of other professionals and further research, the FBEGS survey form was adjusted to its current format. This survey was an A3 page that could be folded in half (A4) for practical usage in the field. On side 1 is the survey form itself. Side 2 contains a list of common field boundary tree and woody shrub species and suggested abbreviations as well as some hints for filling the form out. The FBEGS form has *five* basic sections:

- **Structure** (attributes 1 to 7)
- **Associated Features** (attributes 8 to 11)
- **Connectivity** (attributes 12 to 16)
- **Diversity** (attributes 17 and 18)
- **Overall Type** (attributes 19 to 21)

This is a total of 21 attributes in all, each of which is described using an icon or a written description. Not all attributes need to be completed and some are mutually exclusive of each other. Each of the five sections has a 'sub total' box at the end and the entire survey is a summing of the five 'sub-totals'. Illustration 1 shows side one of the survey form and Illustration 2 shows the reverse of the form. This is the survey sheet currently available for use.

The second draft of the FBEGS survey form was then tested on 60 hedgerows and 40 dry stone walls in 10 locations throughout Ireland. It was carried out at the end of July and in early August 2002 in the following ten locations:

Balbriggan, Co. Dublin
Ballinabracky, Co. Westmeath
Ballyknockan, Co. Wicklow
Clonmel, Co. Tipperary
Kilbeggan, Co. Westmeath
Rossinver, Co. Leitrim
Croghan, Co. Roscommon
Tallaght, Co. Dublin
Tralee, Co. Kerry
Westport, Co. Mayo

These locations were chosen in order to gather information in as wide a variety of locations as was possible given the very limited time available. The type of field boundary surveyed in each location was chosen at random. Each survey took an average of 20 to 30 minutes to complete but inclement weather for the time of year impeded many of the surveys and thus only a relatively small number of boundaries (100) could be surveyed. Prior to the start of each survey, the surveyor would note their professional opinion as to the ecological value of the field boundary based on their professional knowledge and experience in landscape assessment. The surveyor indicated their opinion of the ecological value of the boundary on the top of the survey form using one of the following annotations: 'High', 'Moderate', 'Low', 'None'. Consultation with the landowner was avoided as this may have impeded the survey and created a bias the surveyor. The surveyors were volunteers and consisted of professional ecologists, REPS planners, third level students and other experienced volunteers.

At the same time, the older HEGS UK survey was also completed for those field boundaries that were classed as hedgerows (60). There is no equivalent survey for dry stone walls. For hedgerows, the completed HEGS and the new FBEGS were attached and submitted together for compilation. In order to accelerate the pace of surveys in the time allotted the title attributes of Altitude, Slope and Soil Type were not completed. These do not have any bearing on the overall grade of the boundary as the survey form now stands and are merely for statistical purposes. Out of the 100 boundaries selected 79 surveys were completed correctly. 21 (27%) were later judged to have been carried out incompletely and 4 (5%) were discarded due to indecisiveness on the part of the surveyor or illegibility. This left 54 completed surveys of field boundaries – 24 (44%) were dry stone walls (numbers 1 to 24) and 30 (56%) were hedgerows (boundary numbers 25 to 54). The surveyors did not calculate or compile the numerical results themselves. All survey forms were analysed in the absence of the surveyors.

Results

Needs Analysis

The needs analysis poll overwhelmingly demonstrated that an Irish hedgerow evaluation survey was very necessary but that it should address *field boundaries* and not just hedgerows. This was mainly because the description of hedgerows derived from other countries was not necessarily suited to what most people consider a hedgerow in Ireland and that stone wall boundaries may have ecological values hitherto undefined or unexplored. Nearly all of the respondents agreed that the new survey would be useful and desirable and most suggested that it may be based on an earlier Hedgerow Evaluation & Grading System or HEGS (Clements & Tofts, 1992) both in form and simplicity of use. Though slightly amended version of the HEGS form is currently in use by REPS planners (Anon, 2001; Catherine Keena – Teagasc Training Centre, Kildalton, Co. Carlow, *pers. comm.*), it was felt that an amended HEGS would be better suited to Irish field boundaries. It might also make the Irish survey compatible with those in the UK (for hedgerows not stone walls) and thus may prove valuable in the exchange of data and in comparisons of regions at a future date.

Table 2 is a list of the main attributes that the needs analysis survey revealed as potential inclusions in a new survey.

Table 2: Suggested inclusions for a new field boundary survey.

Subject	Respondents who felt this should be included	
Adjacent land use	21	100%
Type of boundary	20	95%
Stone walls	18	86%
Orientation to wind	17	81%
Slope and aspect	16	76%
Altitude	16	76%
Soil type	15	71%
Dead wood estimation	13	62%
Stone-faced embankments	12	57%
Post and rail fences	2	9.5%
Wire fences	1	5%

In addition, nineteen respondents (91%) wished to see an expanded section dealing with standard trees. The current HEGS survey sheet merely asks for “mature” or “young” standards. This can be misleading and subjective. As there are little available data on the native or non-native woody shrub content of Irish hedgerows it was felt by almost all respondents (81%) that an attempt to gather such data should be made. A new survey could offer an opportunity for the initial collection of such data and having a standard survey form may facilitate a possible compilation survey in the future. Some of those polled thought that a question on the volume of dead wood in the boundary was important but did not have an opinion on how such a question would be phrased or such an attribute should be calculated. Six respondents (29%) said that the HEGS attribute for rare and notable species should be removed as it was not relevant to Irish hedgerows. As a result of this consultation, a list of fifteen guide points were drawn up and used to inform the shape and style of the survey. These points are shown in Table 3.

Table 3: List of guide-points used in preparing the Field Boundary Evaluation and Grading System (FBEGS).

<p>The FBEGS should:</p> <ul style="list-style-type: none"> • Focus on hedgerows and dry stone wall field boundaries and not just hedgerows alone • Record altitude, slope and soil type for future reference and statistical purposes • Use a simple numerical grading system • Use an expanded icon system similar to the HEGS • Use similar criterion for gaps, connectivity and other HEGS attributes shown to be of importance in UK research • Include a tree and woody species list and some information on completion of those attributes when in the field • Include adjacent land use, dead wood and drain type • Include an attribute on boundary orientation to the prevailing wind and slope • Include stone-faced embankments separate to earthbanks • Not seek information on rare or notable species • Not attempt to identify regional variation • Not estimate the age of the boundary • Omit other boundaries such as wire fences, motorway medians, new or young boundaries and domestic boundaries • Avoid the use of the word ‘ditch’ or any colloquialisms • Be easy to read in the field and as short and to the point as possible • Fit on one page or two A4 pages on an A3 page folded to A4 size
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Pilot Test with Draft Instrument 1

Table 4 contains the results of the pilot test. There was broad agreement between the three surveyors which is indicated by the scores being similar for almost all boundaries. Figures 1a and 1b show an analysis for the hedgerows and the dry stone walls surveyed. It is shown that for hedgerows opinion was very similar and for dry stone walls it is slightly at variance. It may be assumed that surveyors have more familiarity with hedgerows and their ecology given the wide number of data that are available from other countries. Data for walls, as was stated, are sparse and thus opinion varies.

Table 4: Comparison of surveyors scores for the FBEGS pilot test.

Boundary No.	Boundary type	Location	Surveyor 1 Scores	Surveyor 2 Scores	Surveyor 3 Scores
1	Hedgerow	D	49	50	50
2	Hedgerow	D	48	49	48
3	Hedgerow	D	48	48	49
4	Hedgerow	D	50	52	54
5	Hedgerow	B	55	55	60
6	Hedgerow	B	22	25	26
7	Hedgerow	D	34	34	36
8	Hedgerow	D	26	25	28
9	Hedgerow	D	38	39	44
10	Hedgerow	B	41	44	42
11	Hedgerow	C	18	20	21
12	Hedgerow	B	65	66	63
13	Hedgerow	B	56	54	58
14	Hedgerow	B	58	57	59
15	Hedgerow	A	48	47	45
16	Hedgerow	A	32	34	35
17	Hedgerow	A	61	59	56
18	Hedgerow	A	46	45	49
19	Wall	C	31	30	31
20	Wall	C	32	32	34
21	Wall	C	23	27	26
22	Wall	C	23	25	30
23	Wall	C	12	16	14
24	Wall	C	14	15	12
25	Wall	C	19	18	19
26	Wall	A	28	28	23
27	Wall	A	19	19	14
28	Wall	A	20	19	17

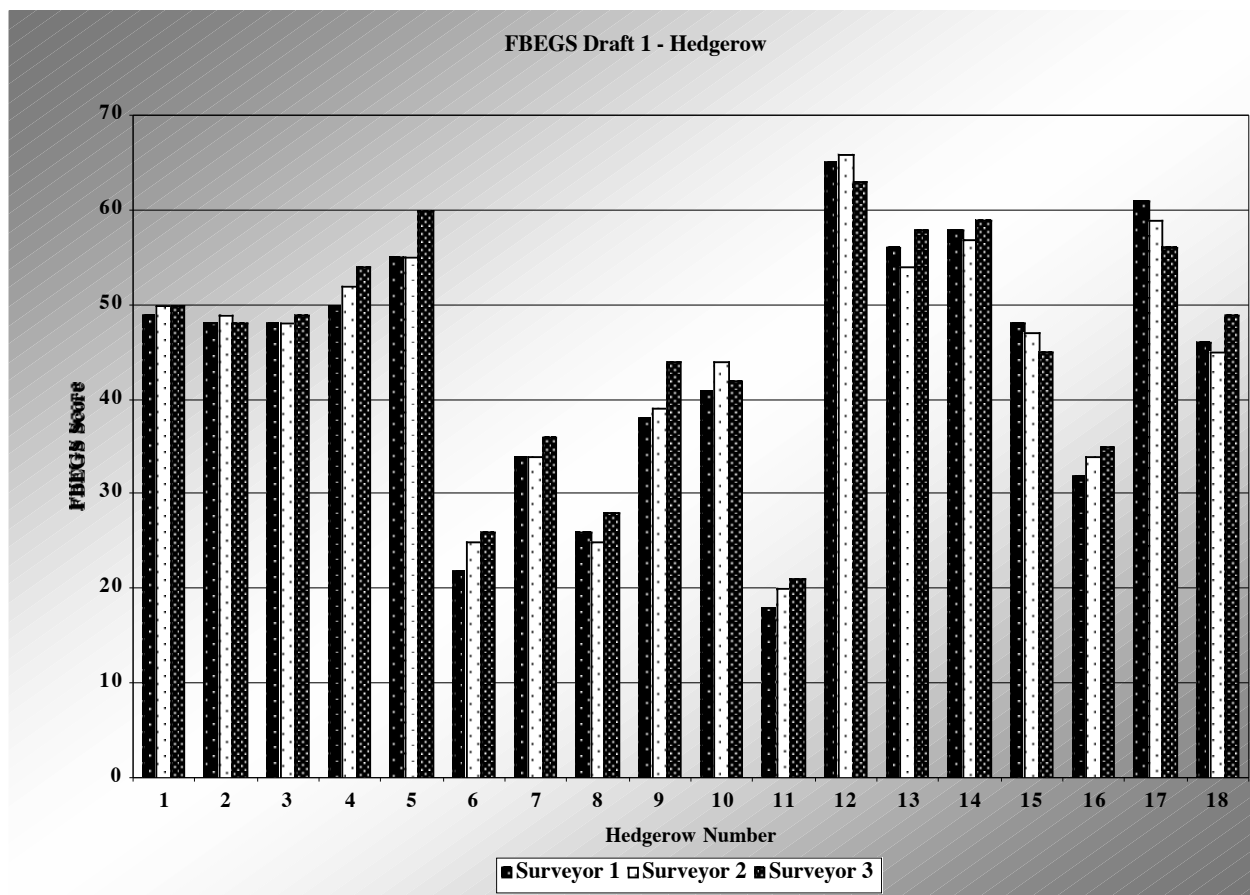


Figure 1a: Comparison of FBEGS pilot test surveyor results for hedgerows.

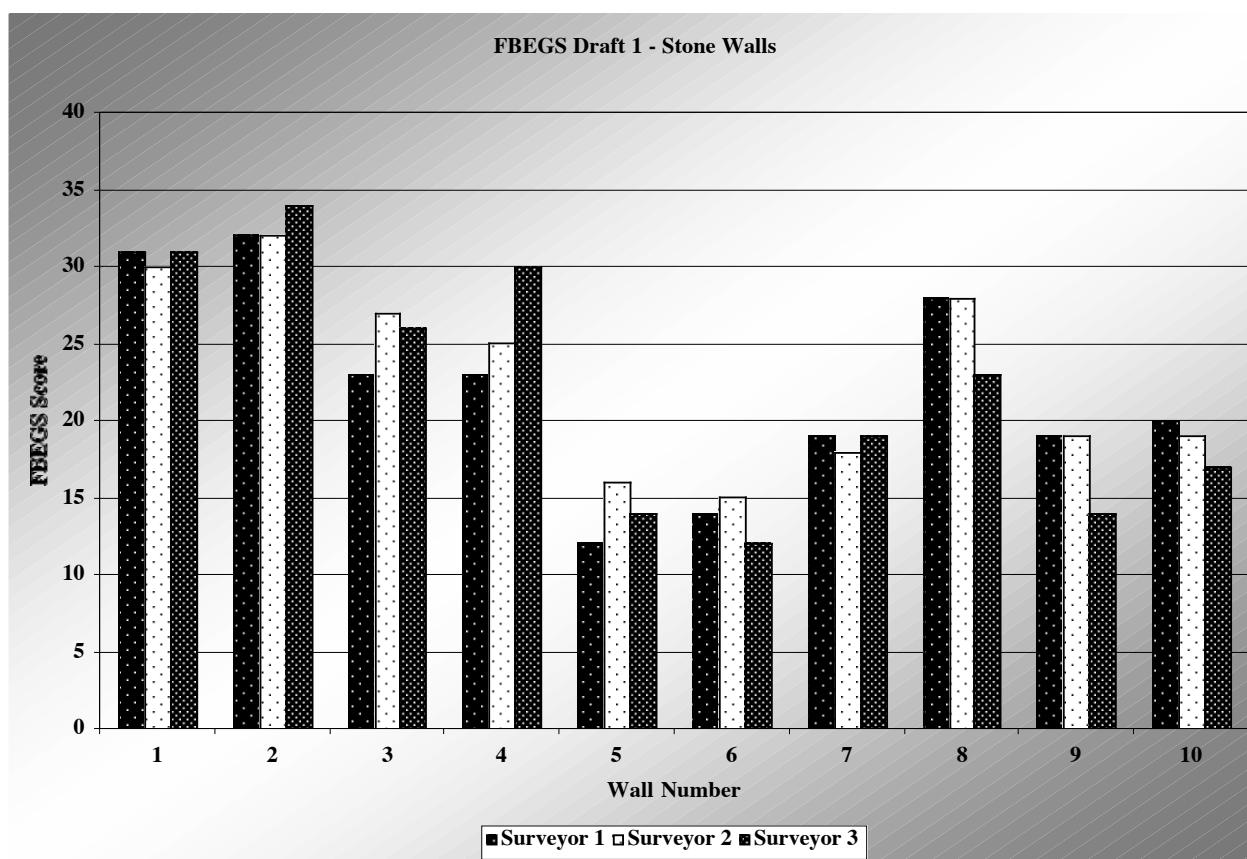


Figure 1b: Comparison of FBEGS pilot test surveyor results for dry stone walls.

Test with Draft Instrument 2

Table 5 contains the results of the expanded test and Figure 2 shows the correlation between surveyor’s opinion and the FBEGS scores for dry stone wall field boundaries. Table 6 contains the results and Figure 3 shows the correlation between surveyor’s opinions and FBEGS scores for hedgerow field boundaries. Figure 4 shown the comparison between the two survey results (FBEGS and HEGS) and professional opinion for hedgerow field boundaries.

Table 5: Survey results for dry stone wall field boundaries.

Location	Boundary no.	Initial opinion	FBEGS score
Co. Wicklow	1	High	38
Co. Roscommon	2	High	36
Co. Wicklow	3	High	34
Co. Wicklow	4	High	34
Co. Wicklow	5	High	31
Co. Westmeath	6	Moderate	28
Co. Westmeath	7	High	29
Co. Wicklow	8	High	29
Co. Leitrim	9	High	27
Co. Wicklow	10	Moderate	26
Co. Mayo	11	High	25
Co. Mayo	12	Moderate	25
Co. Wicklow	13	Moderate	23
Co. Kerry	14	High	22
Co. Kerry	15	Low	21
Co. Kerry	16	Low	21
Co. Mayo	17	Low	21
Co. Wicklow	18	Moderate	21
Co. Wicklow	19	Moderate	20
Co. Mayo	20	Low	20
Co. Roscommon	21	Low	20

Co. Roscommon	22	Low	20
Co. Roscommon	23	Low	20
Co. Roscommon	24	Low	19

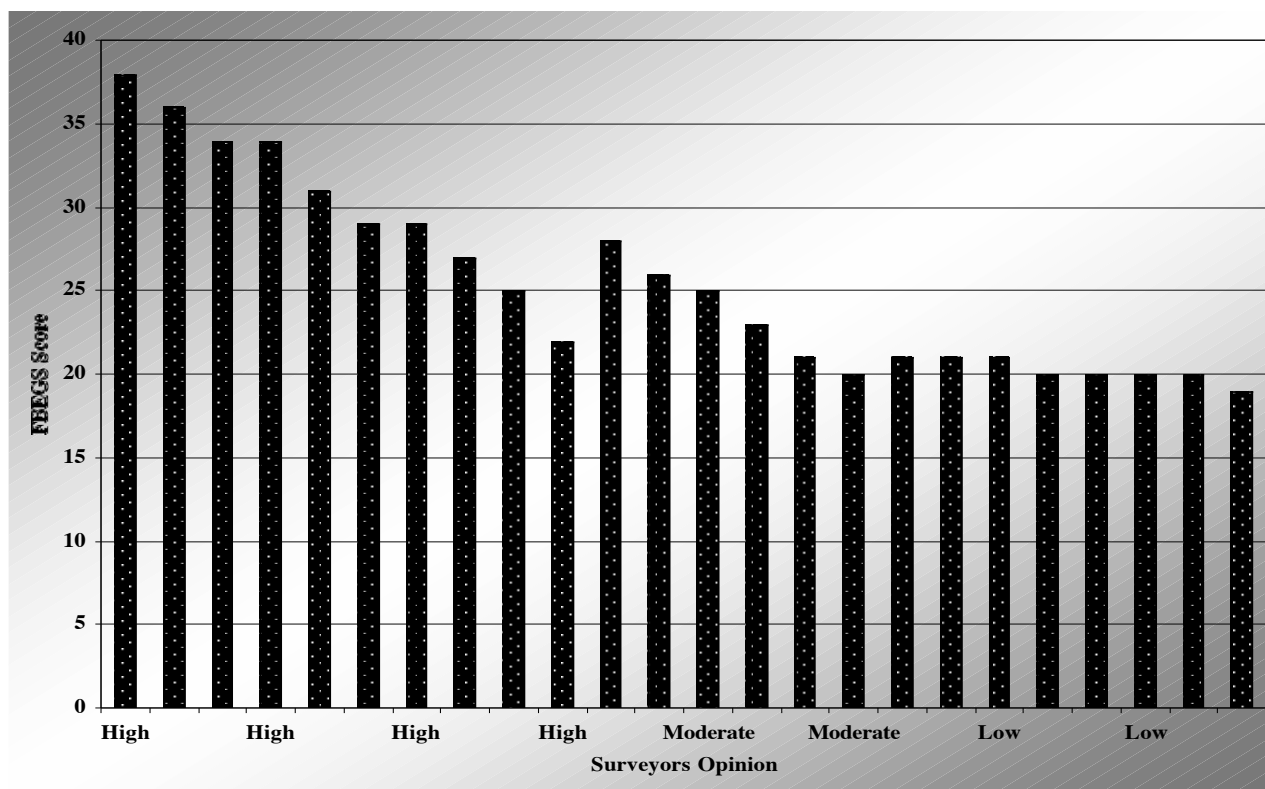


Figure 2: Correlation between surveyor's opinion and FBEGS scores for dry stone wall field boundaries.

Table 5: Survey results for hedgerow field boundaries.

Location	Boundary no.	Initial opinion	FBEGS score	HEGS score	Teagasc Score*
Co. Dublin	25	High	53	1	11
Co. Dublin	26	High	51	1	11
Co. Tipperary	27	High	51	-1	10
Co. Tipperary	28	High	48	2+	9
Co. Kerry	29	High	47	2+	9
Co. Dublin	30	Moderate	47	2+	9
Co. Dublin	31	High	47	2+	9
Co. Kerry	32	Moderate	45	2+	8
Co. Kerry	33	Moderate	45	2+	9
Co. Westmeath	34	High	42	2+	8
Co. Westmeath	35	High	41	2	7
Co. Tipperary	36	High	41	2+	8
Co. Leitrim	37	High	38	2	9
Co. Westmeath	38	High	37	2	9
Co. Wicklow	39	Moderate	36	2	9
Co. Wicklow	40	Moderate	35	-2	8
Co. Wicklow	41	High	35	-2	7
Co. Westmeath	42	Low	35	-2	7
Co. Kerry	43	Low	34	-2	7
Co. Kerry	44	Low	33	-2	7
Co. Kerry	45	Low	33	3+	6
Co. Kerry	46	Low	32	3+	6
Co. Westmeath	47	Low	31	3+	6
Co. Westmeath	48	Low	30	3+	6
Co. Leitrim	49	Low	29	3	5
Co. Westmeath	50	Low	29	3	5
Co. Dublin	51	Low	26	3	5
Co. Leitrim	52	Low	24	(-)3	4
Co. Tipperary	53	Low	21	-3	4
Co. Westmeath	54	Low	20	-3 / 4+	3

* In order to be able to compare data it was necessary to alter the HEGS scoring system slightly. This entailed the usage of a 1 to 12 score similar to the one used by Teagasc (Anon, 2001).

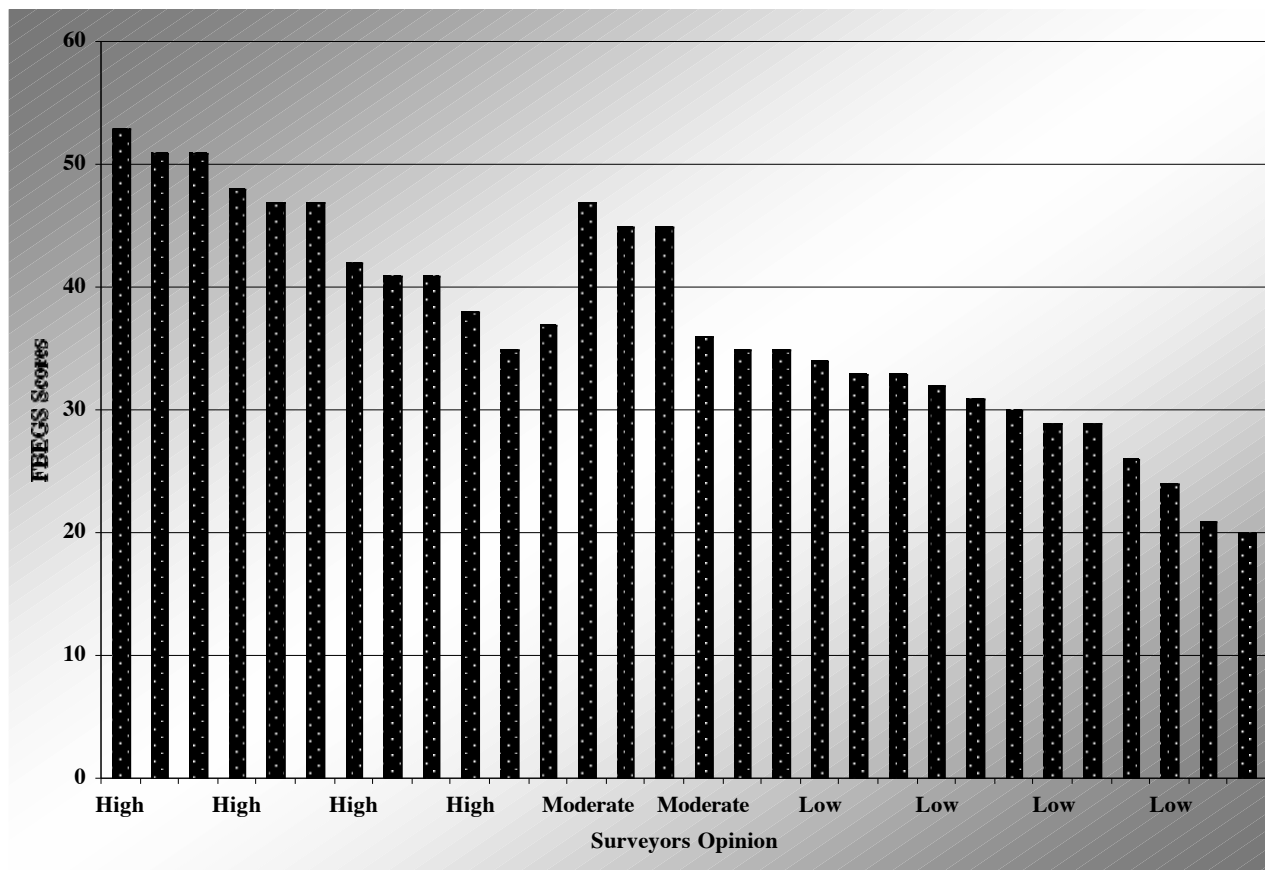


Figure 3: Correlation between surveyor's opinion and FBEGS scores for hedgerow field boundaries.

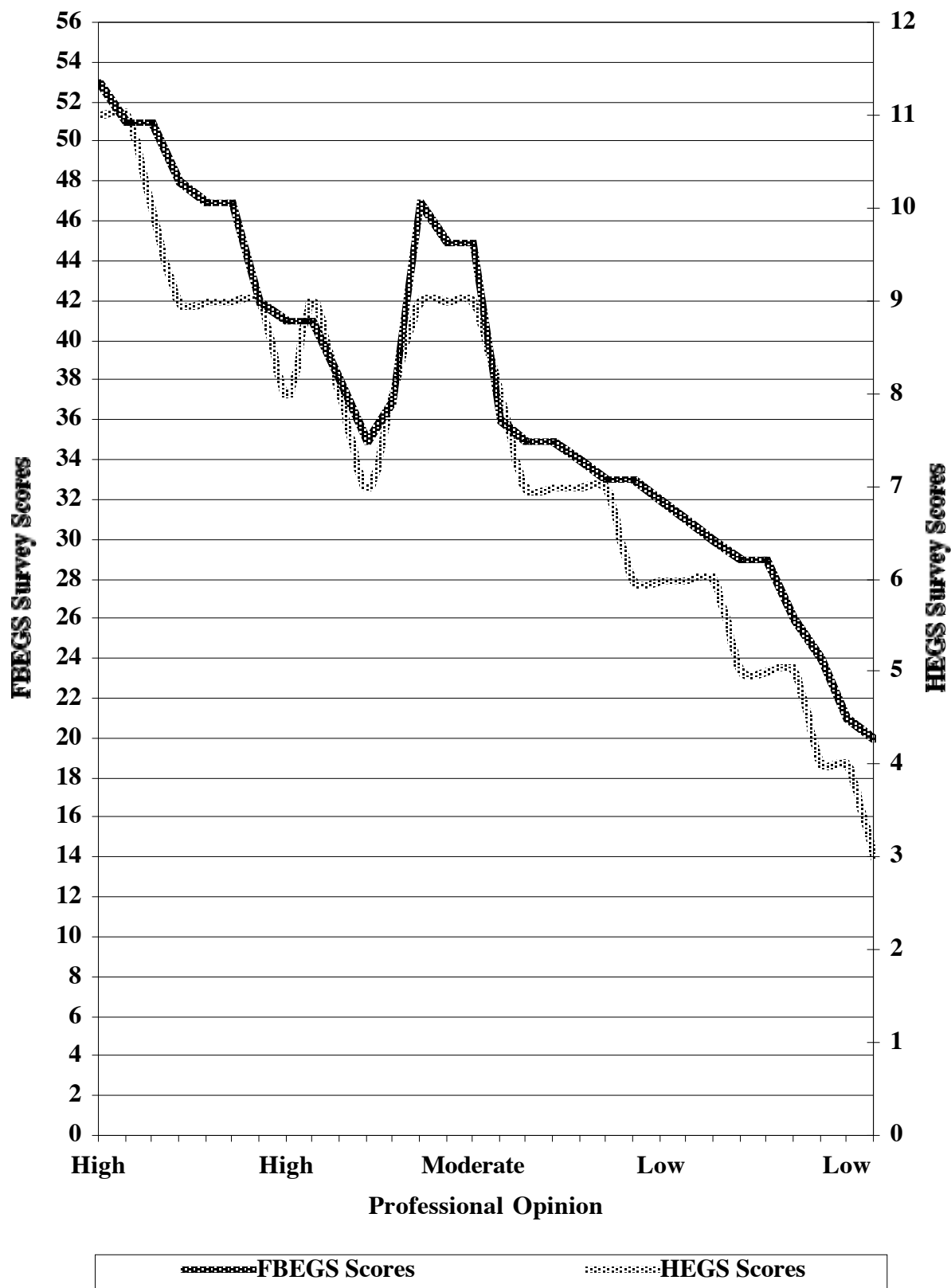


Figure 4: Comparison between the two survey results (FBEGS and HEGS) and professional opinion for hedgerow field boundaries.

Discussion

Needs Analysis and Pilot Test with Draft Instrument 1

Results from the initial phase of this study demonstrate that there was a need for a practical and objective field boundary evaluation and grading system. The similarity of scores shown in Figure 1 illustrates clearly the desired objectivity and that the selected attributes and their corresponding scoring values were sufficiently accurate. Feedback from surveyors was positive and most indicated that the survey was user-friendly and practical. This was also an aim of the study but further testing will be needed to confirm if this second aim of the study has actually been achieved.

Test with Draft Instrument 2

The second and larger FBEGS trial confirms that there is good correlation between surveyor's opinion and FBEGS scores for both hedgerows and dry stone walls. Tables 4 and 5 show that, as the opinion of the surveyor increases from 'low' to 'high' so too does the FBEGS score. Where the surveyors' opinion is that the field boundary is of 'low' ecological value the score values are low in comparison to the higher score values where the surveyor has indicated that the field boundary is of 'high' value. One area where the surveyors' opinion and the scores deviate slightly is where the assessment is "moderate". There are some inconsistencies in the scores at the centre of both graphs (figures 2 and 3). This is to be expected and it is not to be assumed that the scores are unreflective of the value of the field boundary. Professional opinion may often be variance and that this is in the nature of such subjective, opinion-based surveys. This is a consistent finding where values are to be decided upon. In the case of hedgerow field boundaries there appears to be a high level of agreement. This was also noted at the time of the development of the HEGS survey (Tofts & Clements, 1994). In the case of dry stone wall field boundaries there is good agreement also, but opinions appear to be more disparate. The results indicate that the attributes allocated to each section of the FBEGS survey form were appropriate though a more thorough and larger trial may be necessary to confirm this.

It is not be appropriate to include both field boundaries in the same grading system despite their similarity. It will also be necessary to carry out more detailed field research so the exact grades can be confirmed. Therefore, based on the results acquired during the sample field tests of the FBEGS, two grading systems are proposed. It is now possible to propose an evaluation grading system as is shown in Tables 6 and 7.

Table 6: Proposed grading system for dry stone wall field boundaries.

FBEGS Score	Grade
≤19	Low
20 – 29	Poor
30 – 39	Good
≥40	High

Table 7: Proposed grading system for hedgerow field boundaries.

FBEGS Score	Grade
≤19	Low
20 – 29	Poor
30 – 39	Good
40 – 49	High
≥50	Very High

The scores acquired in the FBEGS test surveys can be compared to the HEGS scores with little difficulty, but only in the case of hedgerows for which the HEGS survey was exclusively designed. From the FBEGS grades indicated in Table 7 it is shown that there is a corresponding HEGS value of a similar grade. This implies that, in the case of hedgerow data, the two surveys are compatible. The demonstration of this compatibility was one of the main aims of this study as it may now be

possible to compare data from Ireland to data acquired in the UK. Table 8 shows the overlap of the two grading systems adjusted to make the two surveys compatible.

Table 8: Compatibility between HEGS and FBEGS survey grades.

FBEGS Score	Grade	HEGS Score
≤19	Low	-4 to 4+
20 – 29	Poor	-3 to 3+
30 – 39	Good	-2 to 2
40 – 49	High	2+ to -1
≥50	Very High	1 to 1+

Conclusion

There are some difficulties associated with the FBEGS grades. Initially, the correlation between field boundaries of high value in the opinion of the surveyor and the high scores of the survey (and visa versa for the low scores) may presuppose accuracy in the grading system. However, in the absence of scientific studies to confirm or refute the findings, this is not possible. Indeed, since there are little data on the ecological values of Irish field boundaries, it could be a long time before the FBEGS can be confirmed or even refined to be more accurate or appropriate. With this said, it is a contention that the FBEGS is a good indicator of where to begin and in basic conservation management assessment this survey is sufficient. The grading system by the FBEGS can be used, for example, by REPS assessors and farmers in deciding upon the value of a particular boundary and thus in devising conservation management prescriptions for that boundary. Having a physical database of survey sheets also means that the surveyor can return in time and re-assess any boundary using the same survey form. In the case of REPS planners, the FBEGS data may then be utilised to check on conservation management progress and respond accordingly. Linking the data of the survey to a GIS database may even be used in relation to payments for conservation activities. Having an Irish survey that is compatible with the UK HEGS survey might also be of assistance in cross-comparison studies.

There is no doubt that the lack of published information on the ecological values of hedgerows and dry stone walls in Ireland detracts significantly from this study. The ecological value of stone walls is unknown, even among professionals, but without data the debate cannot continue. Ecologists and conservationists appear to take more interest in hedgerows yet, in Ireland, little evidence exists as to their value to, and function in, the Irish landscape. The same might also be said for earthen and stone-faced embankment field boundaries. However, it has been shown that the FBEGS survey is a starting point as well as a sufficient interim survey for day-to-day landscape management and assessment.

Recommendations

This study was carried out by using some assumptions and opinions of professionals. This makes the FBEGS survey function practically and up to a certain point. However, if further qualitative research is to be continued more information and data are required. The key recommendations of this dissertation are:

- The lack of information and data relating to Irish field boundaries should be addressed
- The use of ecological field surveys to test FBEGS results is urgently required
- Detailed information on field boundary types and status in Ireland is necessary
- The ecological values of dry stone walls should be established
- Large scale testing of FBEGS is necessary and can only be brought about by its adoption on a wider scale

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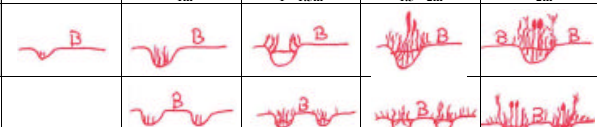
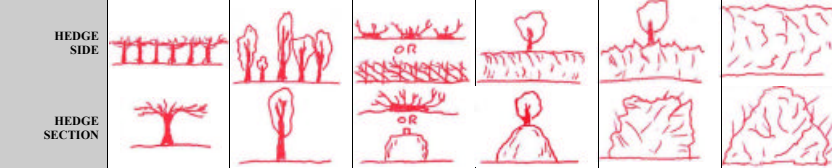
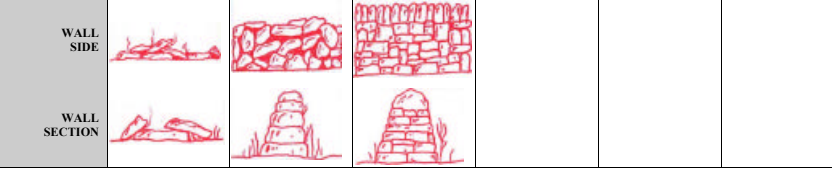
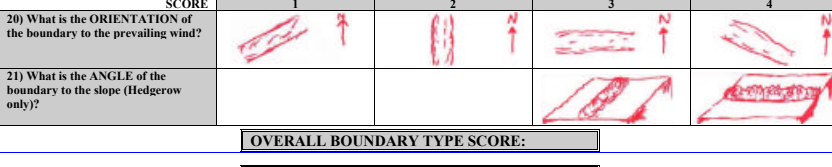
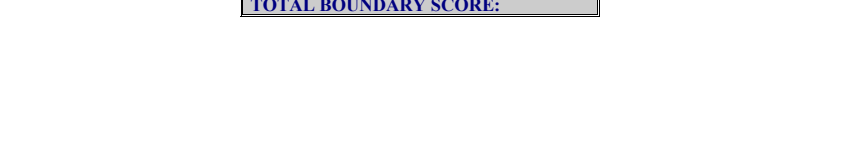
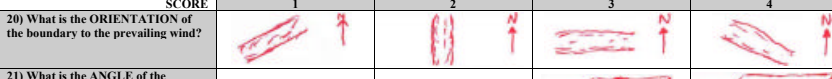
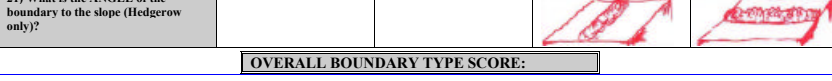
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Illustration 1: The FBEGS survey form – side 1

Survey Grid:	Boundary Number:	Name:	Date:	Altitude:	Slope:	Soil Type:	Boundary Length (m)																																								
BOUNDARY STRUCTURE				BOUNDARY CONNECTIVITY																																											
1) Boundary type is: a. A dry stone wall b. A recently coppiced or laid hedgerow c. A hedgerow that is severely flailed to within 1m of the ground				SCORE 1 2 3 4 5																																											
Yes or No Yes or No Yes or No				If yes, score 3 and ignore questions 2 and 3 - if no go to 2 If yes, score 9 and ignore questions 2 to 4 - if no go to 2 If yes, score 1 and ignore questions 2 and 3 - if no go to 2																																											
2) Average HEIGHT: 3) Average WIDTH at base: 4) Average CROSS-SECTION:				SCORE 1 2 3 4 5																																											
HEDGEROW 																																															
DOUBLE-SIDED DRY STONE WALL 																																															
SINGLE DRY STONE WALL 																																															
STONE FACED EMBANKMENTS 																																															
Standard Tree Species Checklist and Size - L = > 50cm dbh / M = 20 - 50cm dbh / S = <20cm dbh (for abbreviations consult species list overlay)																																															
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																																															
Total Number of Standard Tree Species per 100m:																																															
SCORE 1 2 3 4 5																																															
5) LARGE Trees / 100m: >1.4 1.5 - 2.5 2.6 - 3.5 3.5 - 4.5 >4.6																																															
6) MEDIUM Trees / 100m: >1.4 1.5 - 2.5 2.6 - 3.5 3.5 - 4.5 >4.6																																															
7) SMALL Trees / 100m: >1.4 1.5 - 2.5 2.6 - 3.5 3.5 - 4.5 >4.6																																															
TOTAL STRUCTURAL SCORE:																																															
ASSOCIATED FEATURES OF THE BOUNDARY																																															
SCORE 1 2 3 4 5																																															
8) Earthbank Height: <1m 1 - 1.5m 1.5 - 2m >2m																																															
9) Drain: (If there is no drain go to question 10.) Note 'B' = Boundary as noted by you in 4.																																															
																																															
10) Field Margin (>2m): <2m 1 Side Cut 2 Sides Cut 1 Side Un-cut 2 Sides Un-cut																																															
11) Agricultural or other activities for up to 20m on either side of the boundary:																																															
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Road</td> <td>Silage Cereals</td> <td>Plantation Forestry (>20 ya)</td> <td>Unused Orchard</td> <td>Mature or Mixed Broadleaved Forestry (>50 ya)</td> <td>Nature Reserve</td> <td> </td> <td> </td> </tr> <tr> <td>Domestic Garden</td> <td>Sheep Grazing</td> <td>Cattle Grazing</td> <td>Derelict Land</td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Industry</td> <td>Quarry</td> <td>Horticulture</td> <td>Amenity</td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>School</td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>								Road	Silage Cereals	Plantation Forestry (>20 ya)	Unused Orchard	Mature or Mixed Broadleaved Forestry (>50 ya)	Nature Reserve			Domestic Garden	Sheep Grazing	Cattle Grazing	Derelict Land					Industry	Quarry	Horticulture	Amenity					School															
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TOTAL ASSOCIATED FEATURES SCORE:																																															
BOUNDARY DIVERSITY																																															
Woody Shrub Layer Species and Percentages (for abbreviations consult species list overlay)																																															
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SCORE 1 2 3 4 5																																															
17) Total Native Woody Shrubs: 1 - 2 3 - 5 6 - 9 10 - 12 >12																																															
18) Total Non-native Woody Shrubs: 3 - 5 >5																																															
TOTAL DIVERSITY SCORE:																																															
OVERALL BOUNDARY TYPE																																															
19) Indicate, as near as possible, the overall boundary type:																																															
SCORE 1 2 3 4 5 6																																															
HEDGE SIDE 																																															
HEDGE SECTION 																																															
WALL SIDE 																																															
WALL SECTION 																																															
SCORE 1 2 3 4																																															
20) What is the ORIENTATION of the boundary to the prevailing wind?																																															
																																															
21) What is the ANGLE of the boundary to the slope (Hedgerow only)?																																															
																																															
OVERALL BOUNDARY TYPE SCORE:																																															
TOTAL BOUNDARY SCORE:																																															

