Monitoring Recommendations for *Saxifraga hirculus* in Ireland

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Prepared by Caoimhe Muldoon & Dr Steve Waldren

Department of Botany, School of Natural Sciences, Trinity College, Dublin 2

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1 Saxifraga hirculus

1.1 Global distribution

Saxifraga hirculus has a circumpolar distribution in the northern hemisphere, with extensions south to the Himalayan region (Webb and Gornall, 1989, Hulten, 1962) (see Fig. 1). Outside the Northern Polar Regions *S. hirculus* is highly fragmented and has experienced a sharp decline in the 19th century due to a variety of reasons including habitat degradation and fragmentation, afforestation, drainage and overgrazing (Vittoz et al., 2006, Warncke, 2003, Lockhart, 1989, UK Biodiversity Report, 2010).

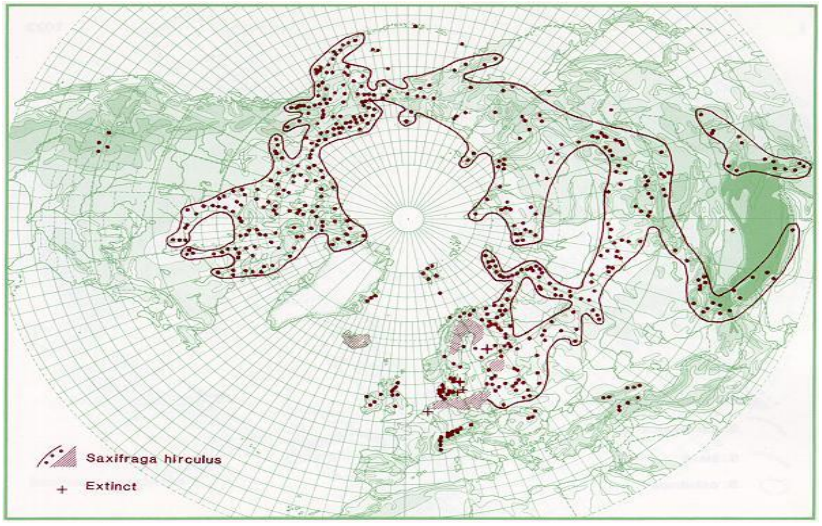

Figure 1. Worldwide distribution of *S. hirculus* taken from Hultén 1962.

This trend is well documented across Europe with the species now extinct in Austria, the Czech Republic and the Netherlands (Jalas et al., 1999). Severe depletion has been documented in other countries such as Switzerland, where 27 sites were reduced to 1 by the 1960's (Christe et al., 1990, Kaesermann and Moser, 1999), and France, where 25 sites were reduced to 3 (Hallam et al., 2005). In the UK over 20 sites containing *S. hirculus* were recorded from 13 vice-counties (Preston et al., 2002) but the plant is now restricted to around 20 sites in approximately ten 10km squares throughout Northern Ireland, Scotland and northern England. The northern Pennines in England hold the main concentration of sites, with 80-90% of the UK population (www.ukbap.org.uk). Scotland has six sites with only four sites recorded in the past 80 years (Welch, 1995).

1.2 Irish distribution

In Ireland *S. hirculus* would have had a much broader altitudinal range when recorded by Praegar in 1937, however it is now considered (in common with most of Northern Europe) to be a montane species due to the loss of its lowland habitats. Previously, *S. hirculus* was

more widespread throughout the country with sites in a number of midland counties including Tipperary, Westmeath, Offaly, Laois (Moore and Moore, 1886, Praeger, 1937) and Meath (Herbarium specimen, Manchester), as well being found in five sites in Northern Ireland in Counties Derry and Antrim (Moore and Moore, 1886). It is currently one of the rarest flowering plants in Ireland (Lockhart, 1989); the Irish Red Data book (Curtis and Mc Gough, 1988) reported only two extant sites, one in Mayo and one in Antrim. The midlands sites have been lost due to drainage and peat removal (Lockhart, 1989). Since then additional sites have been located in Mayo by the National Parks and Wildlife Service staff (Lockhart, 1989; unpublished NPWS records). Currently *S. hirculus* is only recorded from 13 sites in the Republic of Ireland, all in County Mayo. Table 1 list the Site name SAC code and Grid reference for each extant site in Mayo.

Table 1. Extant *S. hirculus* sites in County Mayo.

Site	SAC Site code	Grid references
Sheean A	534	F91972 20034
Sheean B	534	F92028 20085
Sheean C	534	F91760 19919
Sheean D	534	F92114 20180
Uggool	534	F92546 18935
Largan Mor A	476	F89371 22564
Largan Mor B	476	F89922 24056
Sheskin A	1922	F98134 29147
Sheskin B	1922	F98457 28809
Bellacorick	466	G00613 24707
Formoyle	1922	G05400 22300
Barroosky	476	F93575 28595
Aghoo	500	G08312 35099

See Figure 2 for the location of each site in Ireland.

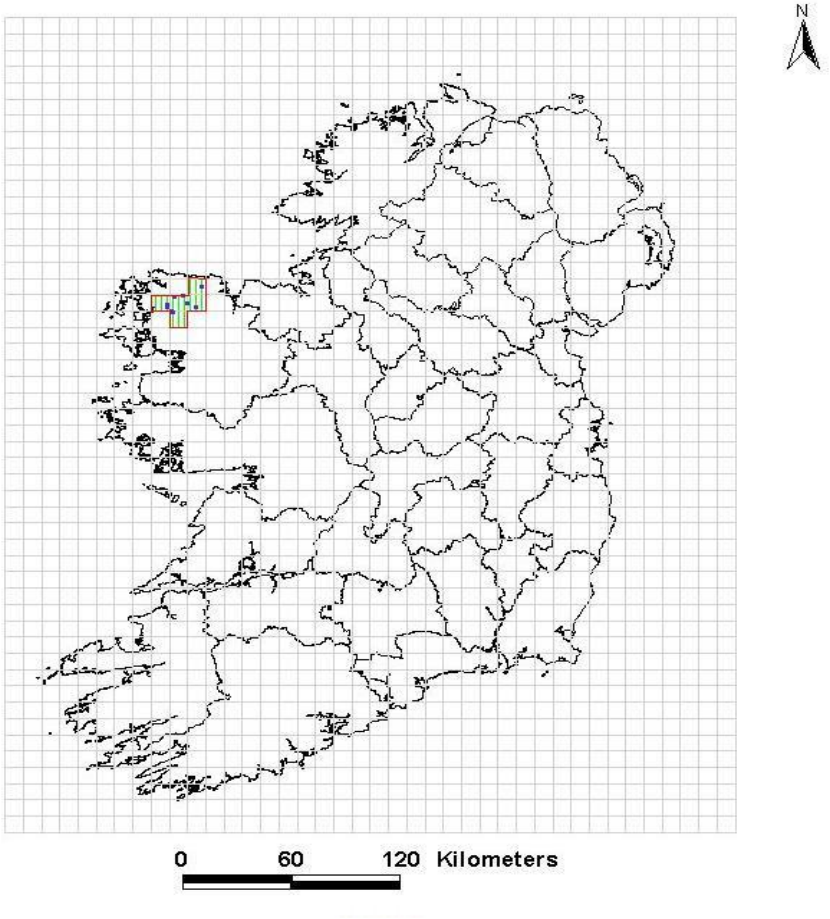

Figure 2. Current distribution of *S. hirculus* in the Republic of Ireland. Blue dots indicate individual sites and are enclosed in 10 x 10k squares.

The sites on the Garron Plateau, Co. Antrim (Northern Ireland) have been affected by similar threats resulting in two of the three sites identified by Praeger (1920) being lost. *S. hirculus* is now recorded from only one location on the Garron Plateau in Co. Antrim (Praeger, 1920, Wolfe-Murphy, 1996, Kelly, 2000).

1.3 Habitat of Saxifraga hirculus

In Ireland *S. hirculus* is to be restricted to mineral flushes in blanket bog. Flushes are areas of rising groundwater seepage found in bog and generally on sloping ground. The ground water forms small streams which are the principle source of electrolytes and other minerals to the flushes (Kelly, 2005) which allow plants not normally found in an ombrotrophic bog to flourish. The peats are iron-stained with a rusty red ferric iron precipitate and the flushes are generally small and are often linear. These flushes are visible to the naked eye in aerial photographs, or on the ground for some distances due to the contrasting brown/purple of

the bog and the green colour of the various herbs, grasses and sedges abundant in the flushes.

Figure 3. Example of a flush in Co. Mayo containing *S .hirculus*

Commonly associated herbaceous species with *S. hirculus* in Ireland include: *Anthoxanthum odoratum, Anagallis tenella, Epilobium palustre, Potamogeton polygonifolius, Galium palustre, Holcus lanatus, Lychnis flos-cuculi, Molinia caerulea, Potentilla palustris, Vaccinium oxycoccos. Juncus bulbosus, Cardamine pratensis, Equisetum palustre* and *Ranunculus flammula.* Bryophyte cover is extensive and includes such species as *Calliergon cuspidatum, Aulacomnium palustre, Homalothecium nitens, Hylocomium splendens* and various *Sphagnum spp*. (Lockhart, 1989, NPWS).

1.4 Description of Saxifraga hirculus.

In Ireland the flowering shoot of *S. hirculus* can vary in height from 4 - 35 cm with up to 7 flowers, although 2-3 are more common (Muldoon, 2011). The petals are bright yellow with orange spots near the base (Figure 4-C). The ovary is superior and sepals are turned downwards. Leaves are alternate and oblong in shape, with long stalks on the lowest leaves (Webb et al., 1996).

S. hirculus can reproduce sexually by insect pollination (Olesen and Warncke, 1989) with gravity-dispersed seeds, or clonally by means of slender rhizomes formed from decumbent

stems (normally 1-5) (Olesen and Warncke, 1990). Moss often covers these rhizomes which decay after one season thus separating ramets (Welch, 1993).

(A) Rosette

(B) Bud

(C) Flower

(D) Seedhead

Figure 4. Different stages of *S. hirculus* from (a) leafy rosette through the stages of the flowering stem: (b) bud, (c) flower and (d) seedhead.

The density of rosettes varies from flush to flush ranging from sites where the rosettes carpet the ground to sites with more sporadic patches. The first flowering stems appear in mid July with flowering ending in early September. The majority of seed capsules mature and dehisce in the first weeks of September.

S. hirculus in North West Ireland has moderately high levels of genetic diversity when compared with other studies of rare plants in Ireland. On a population level two groups appear to emerge with a river system acting as an incomplete barrier to geneflow. The possible existence of a large number of genets were identified in a relatively small area would indicate that sexual reproduction is occurring and the lack of correlation between population size and genetic diversity emphasise the importance of maintaining all known *S. hirculus* sites.

Although easily identified when in flower, the small rosettes can often be overlooked in the vegetative state, and field training is required for undertaking surveys out of flowering season.

2 Conservation obligations

Given its restricted distribution, Ireland has an international responsibility to protect this species. It is listed on Annex II and Annex IV of the EC Directive 92/43/EEC (Habitats Directive). Species listed on Annex II of this Directive are afforded protection through the designation of populations within Special Areas of Conservation. Any plans, projects or activities proposed within these areas require appropriate assessment under Article 6 of the Directive to ensure they will not negatively impact the species. Species listed on Annex IV of the Directive are strictly protected under Article 13 which details that it is prohibited to deliberately pick, collect, cut, uproot or destroy any plants within their natural range. The species is also protected nationally under the 1999 Flora Protection Order which additionally protects the habitats in which they occur.

All species listed on the Habitats Directive must be maintained or restored to Favourable Conservation Status. The conservation status of a species is perceived to favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats,
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis.

3 Monitoring

Article 11 of the Habitats Directive obliges Member States to undertake surveillance/monitoring of the conservation status of all species listed on the Directive. The assessment of conservation status is reported to the EU every 6 years as required under Article 17 of the Directive. The updated methodology for the national assessment of conservation status has been drawn up by the European Topic Centre for Nature Conservation (ETCNC) and EU Member States in 2011. The format for the national

assessment of conservation status for species brings together information on four attributes for each species: Range, Population, Habitat for the species and Future prospects. Each attribute is assessed following a rules-based approach as being "favourable" (good), "unfavourable – inadequate" (poor), "unfavourable – bad" (bad) or "unknown". Good, poor and bad assessments are colour-coded green, amber and red respectively. Green assessments mean that the species is stable and unlikely to be impacted by pressures; a red assessment is given where declines and impacts affect the long term viability; amber assessments fall between the two extremes.

For *Saxifraga hirculus* the approach has been scaled down to a site-based assessment. The sections of assessment described in section 5 are for the Population, Habitat for the species and Future Prospects attributes; the results are combined to provide an overall assessment for each site.

- "Population" assesses the number of individuals and whether a population is reproductively viable.
- "Habitat for the Species" assesses the area and quality of the habitat in which the species occurs.
- "Future Prospects" are assessed by examining whether any activities are affecting the other attributes (i.e. population and habitat for the species) and what their impact would be if they continue unchecked. Future prospects should balance any positive and negative activities to determine whether the species will survive at each site for the foreseeable future.

Following detailed research into the ecology of the species (Muldoon, 2011) a suite of indicators and targets were derived to assess each attribute. As there is no evidence of a decline in the area or density of the populations from previous surveys (NPWS) many of the current values have been set as target values.

Full field methodologies and assessment methodologies for ongoing monitoring are detailed in sections 4 and 5.

4 Pre-survey

Prior to the survey being carried out, the surveyor should insure they have the necessary skills to identify *S. hirculus* in both flowering and vegetative states.

Field survey equipment should include:

- An adequate number of site assessment sheets (see Appendix 1);
- Maps showing location of sites (see Appendix 3)
- A handheld GPS receiver capable of differential corrections accurate to 50cm or less with post processing (e.g. Trimble GeoExplorer range);
- Site polygons downloaded to the GPS;
- 2 metre bamboo canes (approx 10);
- 1 m quadrats sub divided into 25cm quadrats;
- A waterproof field notebook;
- Plant identification guides;
- Thorough familiarisation with previous surveys of the site under investigation - this will highlight any changes in status or threats from the previous visits.

Note: Care should be taken during all visits to minimise impact on these sites. Many of these flushes contain vulnerable and highly localised bryophyte and other vascular plants.

5 Methodology

5.1 Section A: Population Assessment

Methods for assessing the population of *S. hirculus* have often been based on flower heads alone. However this method is likely to severely underestimate a population as many rosettes do not support a flowering stem and count numbers will depend on the timing of the visit. Therefore methods for estimating the number and density of *S. hirculus* are proposed in addition to flowering head counts. Table 2 gives an example of a completed population assessment section. The details of how to assess each category are also outlined below.

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Table 2.Population Assessment indicators and targets

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>2800	>2800	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be	>30	Pass

	>30 when recorded in five or more 1m^2 relevés		
Number of flowering heads	>1000's	1000's	Pass

5.1.1 Total number of rosettes and density of rosettes.

The distribution and density of *S. hirculus* varies across the different sites. For instance in sites like Sheean and Uggool rosettes carpet the ground and a distinct area can be measured out. However, in Sheskin B and Bellacorick small clumps occur and these may be considerably isolated within the site. For this reason two approaches for population assessment are proposed here. The overall aim of these approaches is to generate a set of standardised and comparable data that can be used to determine trends in the distribution and abundance and density of the species.

1. Method one.

In the majority of sites where rosettes carpet the ground, a polygon of the area containing *S. hirculus* should be marked out using bamboo sticks to define the edges. To improve visibility placing red or blue tape on the top of the bamboo is highly recommended. The area is then marked out using a suitable GPS reciever (see above) and the density of rosette coverage within the polygon is then estimated in 1m^2 releves. Depending on the area of the colony five or less releves are **randomly** selected in each site (See details given in the Individual Site Assessments in Appendix 1). These should utilise1 m^2 quadrats subdivided into 25 X 25 cm divisions to facilitate counting of rosettes. The cover of indicator species for the Habitat Assessment should also be recorded at this stage (see Section 5.2.3).

2. Method two.

The second method for the more clumped and scattered populations involves recording of individual/groups of plants as geo-referenced points. A polygon is later created to encompass all points. In addition the five 1 m^2 quadrats should be placed in areas of *S. hirculus* and coverof indicator species for the Habitat Assessment recorded.

The total number of rosettes is then calculated from the product of the population area and density.

5.1.2 Number of flowering heads.

Number of flowering head is assessed visually and assigned into a category of magnitude e.g. 10's, 100's, 1000's or 10,000's.

5.2 Section B: Habitat Assessment

Table 3 gives an example of a completed Habitat Assessment section. The details of how to assess each category are also outlined below. The indicators used are the area occupied by *S. hirculus*, the water depth in the location within the flush containing *S. hirculus*, the vegetation height and the intensity of grazing. In addition, floristic work on these flushes (Muldoon, 2011) has indicated the negative indicators *Molinia caerulea* and *Holcus lanatus*, and the positive indicator *Sagina nodosa*.

Table 3. Habitat Assessment indicators and targets.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	>430m^2	470m^2	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two of five recorded 1m^2 relevés	Present in 2 or more	Pass
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 %	Cover <5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 %	Cover<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should be less than15 cm	Height <15cm	Pass
Grazing	Grazing levels should not exceed 26 – 50% in the five 1m^2 relevés	26 – 50%	Pass

5.2.1 Area occupied by S. hirculus

This has already been calculated from the polygons created in Section A. The baseline and previously recorded polygons should be uploaded to the GPS prior to surveying to allow comparison in the field.

5.2.2 Water level

This is a simple assessment of the wetness of the site. When the flattened hand is pressed into the vegetation the water level should cover the fingers.

5.2.3 Cover of indicator species

This will have already been calculated during the Population Assessment in Section A. The mean value across all quadrats should be calculated, including any where a zero value was obtained.

5.2.4 Vegetation Height

Vegetation height should be recorded in each relevé. This is estimated by taking four measurements with a ruler at 25cm intervals across the 1m quadrat and calculating the mean. In each case the highest vegetation at each point is recorded.

5.2.5 Grazing

Grazing levels are assigned to four categories; 0-25%, 26-50%, 51-75% and 76-100%. Each quadrat should be assigned to a category based on visual examination of the vegetation in each quadrat and an estimation of the percentage vegetation grazed.

- 0-25% - the vegetation is rank and no to little grazing is evident
- 26-50% - this is optimal where the vegetation is under moderate levels of grazing, some small open areas may be present and an examination of the vegetation would show evidence of grazing. However flowering should occur.
- 51-75% - the vegetation is cropped extremely short with no or very little flowering occurring, areas of bare peat more pronounced.
- 76-100% - very little vegetation present due to heavy overgrazing.

For individual flushes the median of each category should be calculated and these averaged to reassign the grazing levels to one of the four categories above.

5.3 Section C: Future Prospects Assessment

The site assessment sheet contains sections to record pressures and threats to the species at each site. Continued and standardised assessment of the local threat status will be important in monitoring trends over time, and will ultimately help inform management

decisions. The future prospects of *S. hirculus* are believed to be stable in the short/medium term. The distribution has declined historically, but those former sites were lost due to various activities such as agriculture and peat removal. As such those habitats no longer remain and the current sites are considered to be in Favourable Conservation Status. Grazing remains a concern as high levels of flower loss has been recorded. However the implementation of sheep destocking levels proposed by the Commonage Framework Plan through the Rural Environmental Scheme (REPS 4) and National Farm Plan Scheme should reduce the pressure from overgrazing.

These categories are assessed based on a visual examination of the flush ('inside', table 4), and its surrounding habitat ('outside', table 4). The intensity of the activity is graded low, medium or high. Additional activities should be recorded and included as observed. An example of a Future ProspectsAssessment section is given in Table 4 below.

Table 4. Example of Future Prospects Assessment

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive/ Neutral**	**Intensity** **High/Medium/Low**	**Area affected (m^2)**
Undergrazing	Inside	N/A		
Overgrazing	Inside	N/A		
Overgrazing	Outside	Negative	Low	> 100 m^2
Poaching	Inside	Positive	Low	2 m^2
Poaching	Outside	N/A		
Drainage	Inside	N/A		
Drainage	Outside	Negative	Low	>100 m^2
Vehicle damage	Inside	N/A		
Peat cutting	Outside	N/A		
Degraded Peat	Outside	Negative	Medium	>100 m^2

5.4 Section D: Overall Assessment

To derive an overall assessment, the Population, Habitat and Future Prospects Assessments are combined. Following the completion of all sections an overall score of green, amber or

red is assigned using the criteria set out below. An example of an Overall Assessment section is given in Table 5.

Table 5. Example of Overall Assessment

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	green
Overall	green

Population assessment

For the overall population assessment the following criteria was used;

- 2 passes = Favourable (green),
- 1 pass = Unfavourable Inadequate (amber), and
- 0 passes = Unfavourable Bad (red).

Habitat assessment

For the overall habitat assessment the following criteria was used;

- 7 passes = Favourable (green),
- 4 – 6 passes = Unfavourable Inadequate (amber), and
- 0 – 4 passes = Unfavourable Bad (red).

Future prospects

The assessment of Future prospects is more subjective. If there is no significant impact of the activities the Future Prospects should be assessed as green, moderated impact should be assessed as Amber and severe impact as bad.

Overall assessment

The overall assessment of the site is carried out by combining the results from all the other assessments using the following criteria.

- All green = Favourable (green),

- 1 – 3 amber = Unfavourable Inadequate (amber)
- 1 red = Unfavourable Bad (red).

Individual polygons are provided for each flush and should be downloaded to the GPS prior to surveying. A map showing the location of each flush is given in Appendix 3.

5.5 Field Assessment

All questions on the field survey sheets should be filled in on site to the best ability of the surveyor. The aim is to record the extent of the plant and any pressures or threats on an individual location basis. It is recommended that the sheet containing the previous monitoring results be used in the field and the current monitoring results added. This will enable the surveyor to ascertain is any changes have taken place between surveys. The sheet outlining the species composition found at each site should also be filled in.

5.6 Timing

Surveys should be carried between July and September to allow estimation of grazing levels and the identification of associated flowering species.

6 Recommendations for ongoing monitoring

The four sites at Sheean are considered to be in a favourable condition (see Appendix 1) as are those at Uggool, Largan Mor A, Largan Mor B, Sheskin A, Sheskin B, Formoyle and Aghoo. These sites should be monitored on a five yearly basis to ensure no adverse conditions have arisen but not more frequent than this in order to preserve the fragile habitats.

The site at Bellacorick may be in a precarious condition. *S. hirculus* coverage is extremely patchy with the number of rosettes recorded standing at 700. Immediate recommendations would be the removal of the fence surrounding it to encourage grazers such as sheep and deer. This should have the benefit of opening up the vegetation and reducing vegetation height. The blocking of the drains by Bord na Mona will hopefully cause rewetting of the site and reverse the damage caused by years of industrial peat removal. Strimming of the

vegetation is another management technique that has been suggested at other *S. hirculus* sites across Europe where an increase in a Swedish *S. hirculus* population following a period of haymaking which eliminated ligneous species and hummock forming mosses was noted by Ohlson as cited in Vittoz (2006). As in the past grazers have largely been excluded through fencing it is worthwhile trying the natural, less invasive method of unrestricted grazing first. If no beneficial results are seen through natural grazing, strimming prior to the *S. hirculus* flowering season may be worth considering with particular emphasis on the negative indicators species such as *M. caerulea* and *H. lanatus.* Yearly monitoring would be recommended at this site.

The situation at Barroosky, although generally considered favourable with a large *S. hirculus* population, also has conservation concerns although not as immediate as Bellacorick. Ongoing dialog with the owner of the land should continue to insure no improvements (e.g fertilizer inputs) are carried out on site. Monitoring the levels of *M. caerulea* on site is important here also. Monitoring on either a yearly basis or every second year would be recommended for this site.

The more intensive monitoring suggested for Barroosky and Bellacorick should be reviewed on a 5 year basis and a discussion taken to future monitoring levels at that time.

7 References

CHRISTE, P., GLAIZOT, O., DELARZE, R. & HAINARD, P. 1990. La vegatation du marais des Amburnex (Jura vaudois, Suisse). *Bulletin de la Société Vaudoise des Sciences Naturelles* 80**,** 127-139.

CURTIS, T. G. F. & MC GOUGH, H. N. 1988. *The Irish Red Data Book. I Vascular Plants,* Dublin.

HALLAM, C. J., KELLY, P. & SYDES, C. 2005. Effects of grazing on flower production and fruit survival in a rare plant species, marsh saxifrage, *Saxifraga hirculus*, in upland Britian. *Unpublished report.* Edinburgh. Scotish Natural Heritage.

HULTEN, E. 1962. *The circumpolar plant. I. Vascular Cryptogams, Conifers, Monocotyledons. ,* Stockholm, Almquist & Wiksell.

JALAS, J., SUOMINEN, J., LAMPIENIN, R. & KURTTO, A. 1999. *Atlas Florae Europaeae, Distribution of Vasular Plants in Europe 12; Resedacea to Platinaceae,* Helsinki.

KAESERMANN, C. & MOSER, D. M. 1999. Fiches pratiques pour la conservation Plantes a` fleurs et fouge` res. *L'environnement pratique, OFEFP, Berne*.

KELLY, M. (ed.) 2005. *Mineral Nutrient Analysis of Bog Flushes Containing Saxifraga hirculus in Co Mayo,* Dublin University of Dublin, Trinity College.

KELLY, P. 2000. Northern Ireland marsh Saxifrage project, 1999. *Unpuplished report to Countryside and Wildlife, Environment and Heritage Service.* Belfast.

LOCKHART, N. D. 1989. Three new localities for *Saxifraga hirculus* L in Ireland. *Irish Naturalists Journal,* 23**,** 65-68.

MOORE, D. & MOORE, A. G. 1886. *Contributions towards a Cybele Hibernica,* Dublin.

MULDOON, C. 2011. *Conservation Biology of Saxifraga hirculus L. in Ireland.* Ph.D, Trinity College Dublin

NPWS Nation Parks and Wildlife - Unpublished records.

OLESEN, J. & WARNCKE, E. 1990. Morphological, phenological and biochemical differentiation in relation to gene flow in a population of *Saxifraga hirculus. Sommerfeltia,* 11**,** 159-171.

OLESEN, J. M. & WARNCKE, E. 1989. Predation and Potential Transfer of Pollen in a Population of Saxifraga-Hirculus. *Holarctic Ecology,* 12**,** 87-95.

PRAEGER, R. L. 1920. Notes on Antrim Plants. *The Irish Naturalist's Journal,* 9**,** 317-326.

PRAEGER, R. L. 1937. *The Way That I Went.,* Cork.

PRESTON, C. D., PEARMAN, D. A. & DINES, T. D. 2002. *New Atlas of the British and Irish Flora*, Oxford University Press.

UK BIODIVERSITY REPORT 2010. Main Results of the 2008 UK Biodiversity Action Plan Reporting Round.

VITTOZ, P., WYSS, T. & GOBAT, J. M. 2006. Ecological conditions for *Saxifraga hirculus* in Central Europe: A better understanding for a good protection. *Biological Conservation,* 131**,** 594-608.

WARNCKE, E. 2003. Inbreeding and Extinction - on inbreeding in nature. *Aktuel Naturvidenskab* 5**,** 10-13.

WEBB, D., A & GORNALL, R., J 1989. A manual of saxifragas and their cultivation. Portland: Timber Press.

WEBB, D. A., PARNELL, L. J. & DOOGUE, D. 1996. *An Irish Flora (7th edn.),* Dundalk, Ireland, Dundalgan Press.

WELCH, D. 1993. Survey of *Saxifraga hirculus* in NE Scotland and a review of the information relevant to its conservation. *ITE report to Scotish Natural Heritage*.

WELCH, D. 1995. Habitat preference and status of *Saxifraga hirculus* L in Northeast Scotland. *Botanicla Journal of Scotland,* 48**,** 177-186.

WOLFE-MURPHY, S. A. 1996. A census of *Saxifraga hirculus* L. and proposed monitoring programmes for rare plants on the Garron Plateau, Antrim (VC H39) J21& J22. *Unpublished report to Countryside and Wildlife, Environment and Heritage Service.* Belfast.

Appendix 1

Blank Individual Site Assessment Sheets

Sheean A

Population Assessment of Sheean A.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>150,000m^2		
Density of rosettes	The mean number of *S. hirculus* rosettes should be > 84 when recorded in five or more 1m^2 relevés		
Number of flowering heads	>10000		

Habitat for the Species Assessment of Sheean A.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	>1620		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm		
Grazing	Over 5x1m^2 relevés grazing levels should not exceed 26 – 50%		

Future Prospects Assessment for Sheean A.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive/Neutral**	**Intensity** **High/Medium/Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Sheean A.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Sheean B

Population Assessment for Sheean B.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>36000m^2		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >70 when recorded in five or more 1m^2 relevés		
Number of flowering heads	10000's		

Habitat for the Species Assessment for Sheean B.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	>430m^2		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm		
Grazing	Over 5x1m^2 relevés grazing levels should not exceed 26 – 50%		

Future Prospects Assessment for Sheean B.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Sheean B.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Sheean C

Population Assessment for Sheean C.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>104,000		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >120 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	10000's		

Habitat for the Species Assessment for Sheean C.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	$>790m^2$		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should not exceed 26 – 50%		

Future Prospects Assessment for Sheean C.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Sheean C.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Sheean D

Population Assessment for Sheean D.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>19,000		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >33 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	1000's		

Habitat for the Species Assessment for Sheean D.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>510m^2$		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should not exceed 26 – 50%		

Future Prospects Assessment for Sheean D.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/ Positive/Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Sheean D.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Bellacorick

Population Assessment for Bellacorick.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>560		
Number of flowering heads	100's		

Habitat for the Species Assessment for Bellacorick.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>855m^2		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm		
Grazing	Over 5x1m^2 relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Bellacorick.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Bellacorick.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Barroosky

Population Assessment for Barroosky.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>52000		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >24 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	10000's		

Habitat for the Species Assessment for Barroosky.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>2025m^2$		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Barroosky.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Barroosky.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Uggool

Population Assessment for Uggool.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>24000		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >84 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	1000's		

Habitat for the Species Assessment for Uggool.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>283m^2$		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Uggool.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive/Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Uggool.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Largan Mor A

Population Assessment for Largan Mor A.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>2800		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >30 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	1000's		

Habitat for the Species Assessment for Largan Mor A.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>83m^2$		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Largan Mor A.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive/ Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Largan Mor A.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Largan Mor B

Population Assessment for Largan Mor B.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>440		
Density of Rosettes	>88		

Habitat for the Species Assessment for Largan Mor B.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>4.5m^2		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm		
Grazing	Over 2x1m^2 relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Largan Mor B.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Largan Mor B.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Sheskin A

Population Assessment for Sheskin A.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>288		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >18when recorded in five or more $1m^2$ relevés		
Number of flowering heads	100's		

Habitat for the Species Assessment for Sheskin A.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	$>14m^2$		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Sheskin A.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive/ Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Sheskin A.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Sheskin B

Population Assessment for Sheskin B.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>92		
Number of flowering heads	100's		

Habitat for the Species Assessment for Sheskin B.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>14		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Sheskin B.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Sheskin B.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Formoyle

Population Assessment for Formoyle.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>136		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >2 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	10's		

Habitat for the Species Assessment for Formoyle.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>65		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Formoyle.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Formoyle.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Aghoo

Population Assessment for Aghoo.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>960		
Density of rosettes	The mean number of *S. hirculus* rosettes should be >5 when recorded in five or more $1m^2$ relevés		
Number of flowering heads	10's		

Habitat for the Species Assessment for Aghoo.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>170		
Water level	Water level should cover hand when pressed into the vegetation.		
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.		
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.		
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.		
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm		
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%		

Future Prospects Assessment for Aghoo.

Activity	**Location** **Inside or Outside the flush**	**Influence** **Negative/Positive /Neutral**	**Intensity** **High/Medium/ Low**	**Area affected (m^2)**
Undergrazing	Inside			
Overgrazing	Inside			
Overgrazing	Outside			
Poaching	Inside			
Poaching	Outside			
Drainage	Inside			
Drainage	Outside			
Vehicle damage	Inside			
Peat cutting	Outside			
Degraded Peat	Outside			

Overall assessment for Aghoo.

Attribute	**Assessment**
Population	
Habitat for the species	
Future Prospects	
Overall	

Table giving overall conservation assessment of each *S. hirculus* flush.

Flush	Population	Species Habitat	Future Prospects	Overall	Comments
Sheean A					
Sheean B					
Sheean C					
Sheean D					
Bellacorick					
Barroosky					
Uggool					
Largan Mor A					
Largan Mor B					
Sheskin A					
Sheskin B					
Formoyle					
Aghoo					

Saxifraga hirculus Monitoring guidelines

Appendix 2

2010 results Individual Site Assessment Sheets

Sheean A

Population Assessment of Sheean A.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>150,000m^2	189,000m^2	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be > 84 when recorded in five or more 1m^2 relevés	>84	Pass
Number of flowering heads	>10000	>10000	Pass

Habitat for the Species Assessment of Sheean A.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	>1620	1,800m^2	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.	Present in more than 2	Pass
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm	13.25	Pass
Grazing	Over 5x1m^2 relevés grazing levels should not exceed 26 – 50%	26 – 50%	Pass

Future Prospects Assessment for Sheean A.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Sheean A.

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	green
Overall	green

Sheean B

Population Assessment for Sheean B.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>36000m^2	>36000m^2	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >70 when recorded in five or more 1m^2 relevés	>70	Pass
Number of flowering heads	10000's	10000's	Pass

Habitat for the Species Assessment for Sheean B.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	>430m^2	470m^2	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.	Present in 2 or more	Pass
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.	Coverage <15%	Pass
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm	> 15cm	Pass
Grazing	Over 5x1m^2 relevés grazing levels should not exceed 26 – 50%	26 – 50%	Pass

Future Prospects Assessment for Sheean B.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Sheean B.

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	green
Overall	green

Sheean C

Population Assessment for Sheean C.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>104,000	>104,000	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >120 when recorded in five or more $1m^2$ relevés	>120	Pass
Number of flowering heads	10000's	10000's	Pass

Habitat for the Species Assessment for Sheean C.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	$>790m^2$	$>790m^2$	
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Present in >2	Pass
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<10%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	> 15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should not exceed 26 – 50%	26 – 50%	Pass

Future Prospects Assessment for Sheean C.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Sheean C.

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	green
Overall	green

Sheean D

Population Assessment for Sheean D.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>19,000	>19,000	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >33 when recorded in five or more $1m^2$ relevés	>33	Pass
Number of flowering heads	1000's	1000's	pass

Habitat for the Species Assessment for Sheean D.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>510m^2$	$570m^2$	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	>2	Pass
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	> 15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should not exceed 26 – 50%	26 – 50%	Pass

Future Prospects Assessment for Sheean D.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Sheean D.

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	green
Overall	green

Bellacorick

Population Assessment for Bellacorick.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>560	700	Pass
Number of flowering heads	100's	100's	Pass

Habitat for the Species Assessment for Bellacorick.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>855m^2	>855m^2	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.	>5%	Fail
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm	< 15cm	Fail
Grazing	Over 5x1m^2 relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Bellacorick.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	High	Red
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	High	Red
Drainage	Outside	Negative	High	Red
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	High	Red
Degraded Peat	Outside	Negative	High	Red

Overall assessment for Bellacorick.

Attribute	Assessment
Population	green
Habitat for the species	red
Future Prospects	red
Overall	red

Barroosky

Population Assessment for Barroosky.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>52000	>52000	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >24 when recorded in five or more $1m^2$ relevés	>24	Pass
Number of flowering heads	10000's	10000's	Pass

Habitat for the Species Assessment for Barroosky.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>2025m^2$	$>2025m^2$	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	< 15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	26 - 50	Pass

Future Prospects Assessment for Barroosky.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	High	Red
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	High	Red
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Medium	Amber
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	High	Red

Overall assessment for Barroosky.

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	amber
Overall	amber

Uggool

Population Assessment for Uggool.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>24000	>24000	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >84 when recorded in five or more $1m^2$ relevés	>84	Pass
Number of flowering heads	1000's	1000's	Pass

Habitat for the Species Assessment for Uggool.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>283m^2$	$>283m^2$	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Present	Pass
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	>15%	Fail
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	< 15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	26 - 50	Pass

Future Prospects Assessment for Uggool.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Uggool.

Attribute	Assessment
Population	green
Habitat for the species	green
Future Prospects	green
Overall	green

Largan Mor A

Population Assessment for Largan Mor A.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>2800	>2800	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >30 when recorded in five or more $1m^2$ relevés	>30	Pass
Number of flowering heads	1000's	1000's	Pass

Habitat for the Species Assessment for Largan Mor A.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	$>83m^2$	$>83m^2$	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	< 15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Largan Mor A.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Largan Mor A.

Attribute	Assessment
Population	green
Habitat for the species	amber
Future Prospects	green
Overall	green

Largan Mor B

Population Assessment for Largan Mor B.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>440	>440	Pass
Density of Rosettes	>88	>88	Pass

Habitat for the Species Assessment for Largan Mor B.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>4.5m^2	>4.5 m^2	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded 1m^2 relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five 1m^2 relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five 1m^2 relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five 1m^2 relevés should not exceed 15cm	< 15cm	Pass
Grazing	Over 2x1m^2 relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Largan Mor B.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Largan Mor B.

Attribute	Assessment
Population	green
Habitat for the species	amber
Future Prospects	green
Overall	green

Sheskin A

Population Assessment for Sheskin A.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>288	>288	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >18when recorded in five or more $1m^2$ relevés	>18	Pass
Number of flowering heads	100's	100's	Pass

Habitat for the Species Assessment for Sheskin A.

Indicator	Target	Result	Pass/Fail
Area of *S. hirculus*	$>14m^2$	$>14m^2$	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	>15cm	Fail
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Sheskin A.

Activity code	Location	Influence	Intensity	Pass/Fail
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Sheskin A.

Attribute	Assessment
Population	green
Habitat for the species	amber
Future Prospects	green
Overall	green

Sheskin B

Population Assessment for Sheskin B.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>92	>92	Pass
Number of flowering heads	100's	100's	Pass

Habitat for the Species Assessment for Sheskin B.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>14	>14	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	>15cm	Fail
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Sheskin B.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Sheskin B.

Attribute	Assessment
Population	green
Habitat for the species	amber
Future Prospects	green
Overall	green

Formoyle

Population Assessment for Formoyle.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>136	>136	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >2 when recorded in five or more $1m^2$ relevés	>2	Pass
Number of flowering heads	10's	10's	Pass

Habitat for the Species Assessment for Formoyle.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>65	>65	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	>15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Formoyle.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Formoyle.

Attribute	Assessment
Population	green
Habitat for the species	amber
Future Prospects	green
Overall	green

Aghoo

Population Assessment for Aghoo.

Indicator	Target	Result	Pass/Fail
Total number of rosettes	>960	>960	Pass
Density of rosettes	The mean number of *S. hirculus* rosettes should be >5 when recorded in five or more $1m^2$ relevés	>5	Pass
Number of flowering heads	10's	10's	Pass

Habitat for the Species Assessment for Aghoo.

Indicator	Target	Result	Pass/Fail
Areas of *S. hirculus*	>170	>170	Pass
Water level	Water level should cover hand when pressed into the vegetation.	Water level covered hand	Pass
Cover of *Sagina nodosa* positive indicator species	*Sagina nodosa* should be present in at least two out of five recorded $1m^2$ relevés.	Not present	Fail
Cover of *Molinia caerulea* negative indicator species	Mean percent cover of *Molinia caerulea* recorded in five $1m^2$ relevés should not exceed 5 percent.	<5%	Pass
Cover of *Holcus lanatus* negative indicator species	Mean percent cover of *Holcus lanatus* recorded in five $1m^2$ relevés should not exceed 15 percent.	<15%	Pass
Vegetation height	Mean percent vegetation height recorded in five $1m^2$ relevés should not exceed 15cm	>15cm	Pass
Grazing	Over $5x1m^2$ relevés grazing levels should fall between 26 – 50%	0 - 25	Fail

Future Prospects Assessment for Aghoo.

Activity code	Location	Influence	Intensity	Colour Code
Undergrazing	Inside	Negative	Low	Green
Overgrazing	Inside	Negative	Low	Green
Overgrazing	Outside	Negative	Low	Green
Poaching	Inside	Negative	Low	Green
Poaching	Outside	Negative	Low	Green
Drainage	Inside	Negative	Low	Green
Drainage	Outside	Negative	Low	Green
Vehicle damage	Inside	Negative	Low	Green
Peat cutting	Outside	Negative	Low	Green
Degraded Peat	Outside	Negative	Low	Green

Overall assessment for Aghoo.

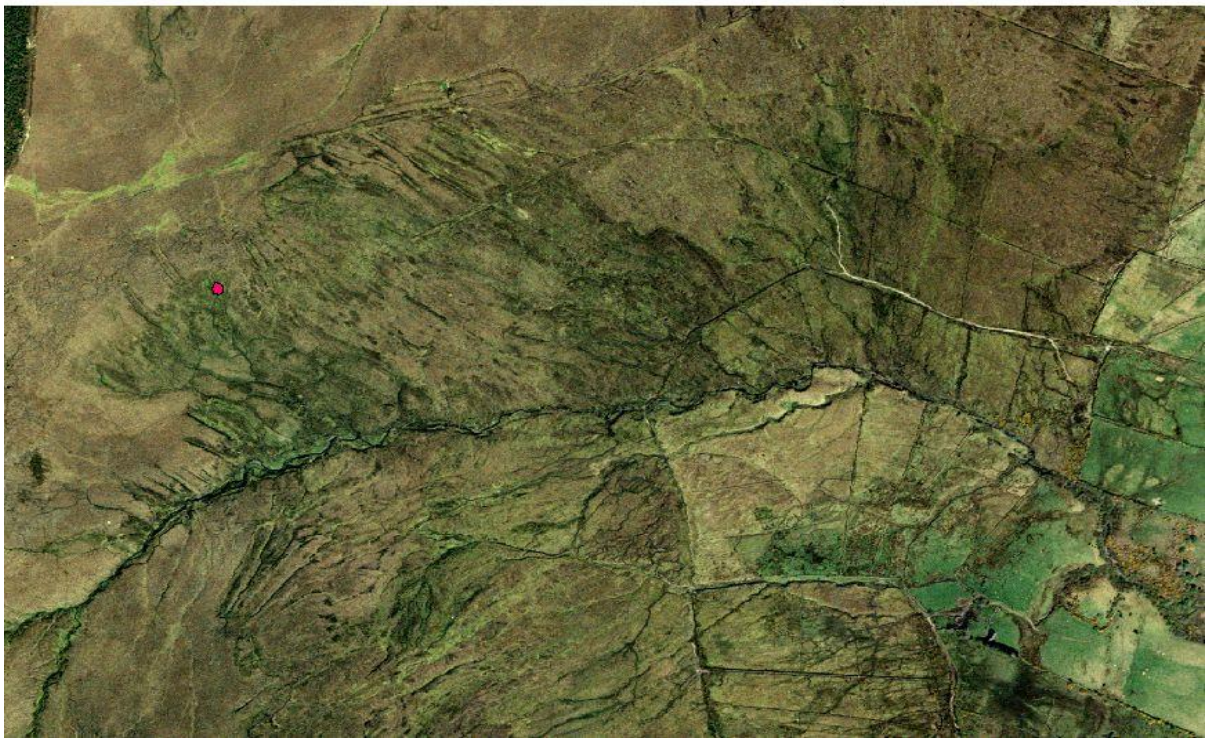
Attribute	Assessment
Population	green
Habitat for the species	amber
Future Prospects	green
Overall	green

Table giving overall conservation assessment of each *S. hirculus* flush.

Flush	Population	Species Habitat	Future Prospects	Overall	Comments
Sheean A	green	green	green	green	Currently no direct issues
Sheean B	green	green	green	green	Currently no direct issues
Sheean C	green	green	green	green	Currently no direct issues
Sheean D	green	green	green	green	Currently no direct issues
Bellacorick	green	red	red	red	Issues with former land use – industrial peat removal impacting on hydrology Issues with current grazing levels – too low. Issues with vegetation height and negative indicator species
Barroosky	green	amber	green	green	Issues with the condition of the surrounding bog. Issues with past vehicle damage.
Uggool	green	green	green	green	Currently no direct issues
Largan Mor A	green	amber	green	green	Low grazing was identified as an issue but vegetation height is within range.
Largan Mor B	green	amber	green	green	Low grazing was identified as an issue but vegetation height is within range.
Sheskin A	green	amber	green	green	Low grazing was identified as an issue, as was vegetation height.
Sheskin B	green	amber	green	green	Low grazing was identified as an issue as was vegetation height.
Formoyle	green	amber	green	green	Vegetation height was identified as an issue.
Aghoo	green	amber	green	green	Low grazing was identified as an issue.

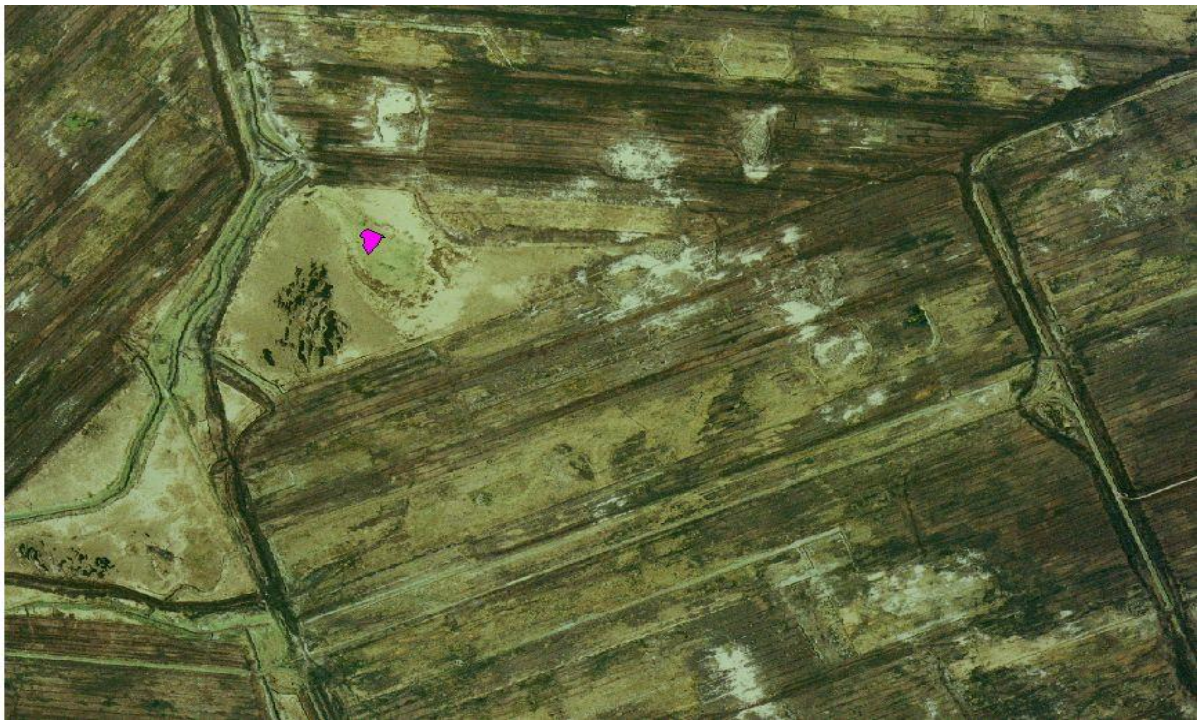
Appendix 3

Site Location maps



Arial photograph of the *S. hirculus* population at Aghoo.

Arial photograph of the *S. hirculus* population at Barroosky (note the small population south of the two larger areas).

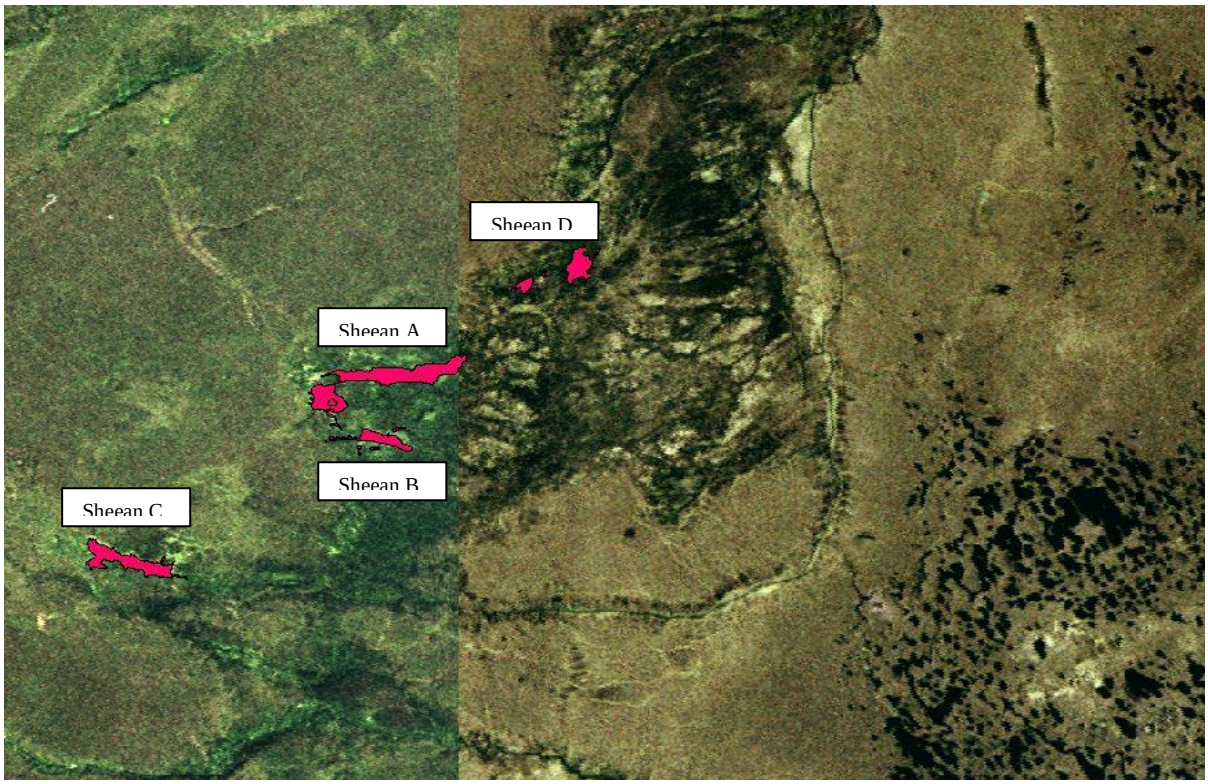


Arial photograph of the *S. hirculus* population at Bellacorick.

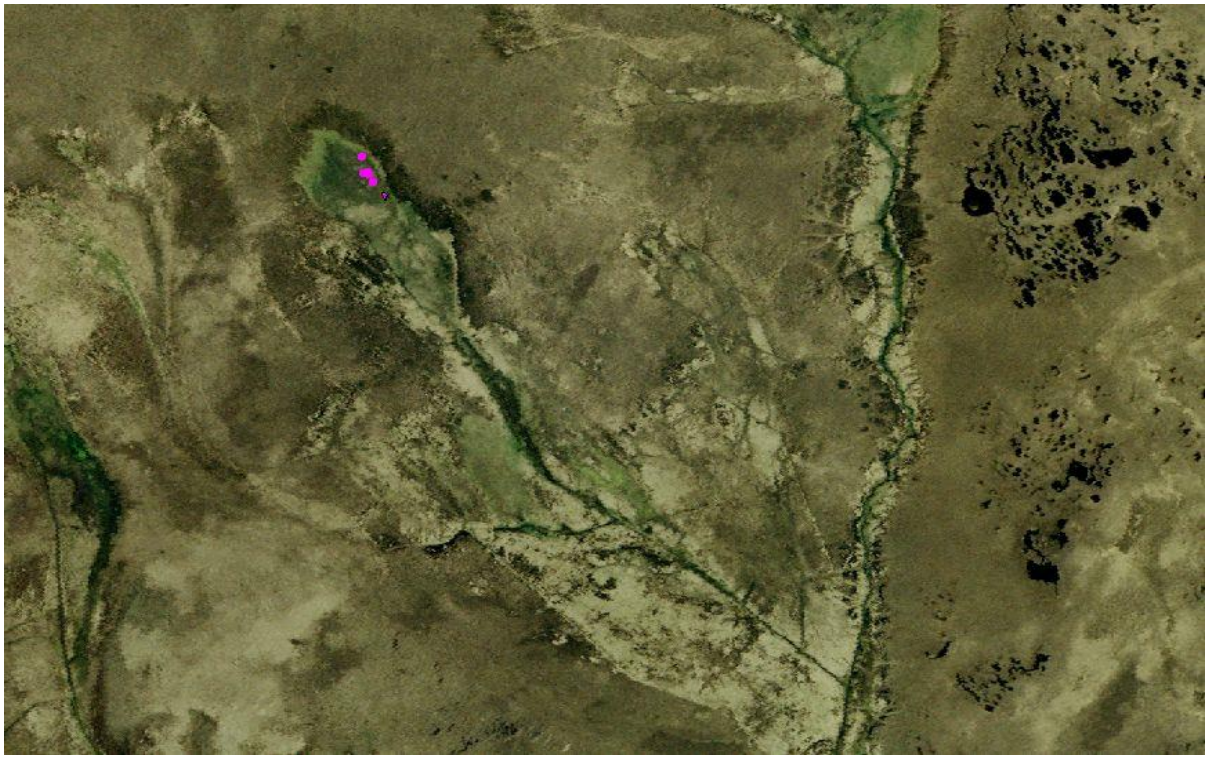
Arial photograph of the *S. hirculus* population at Formoyle

Arial photograph of the *S. hirculus* population at Largan Mor A

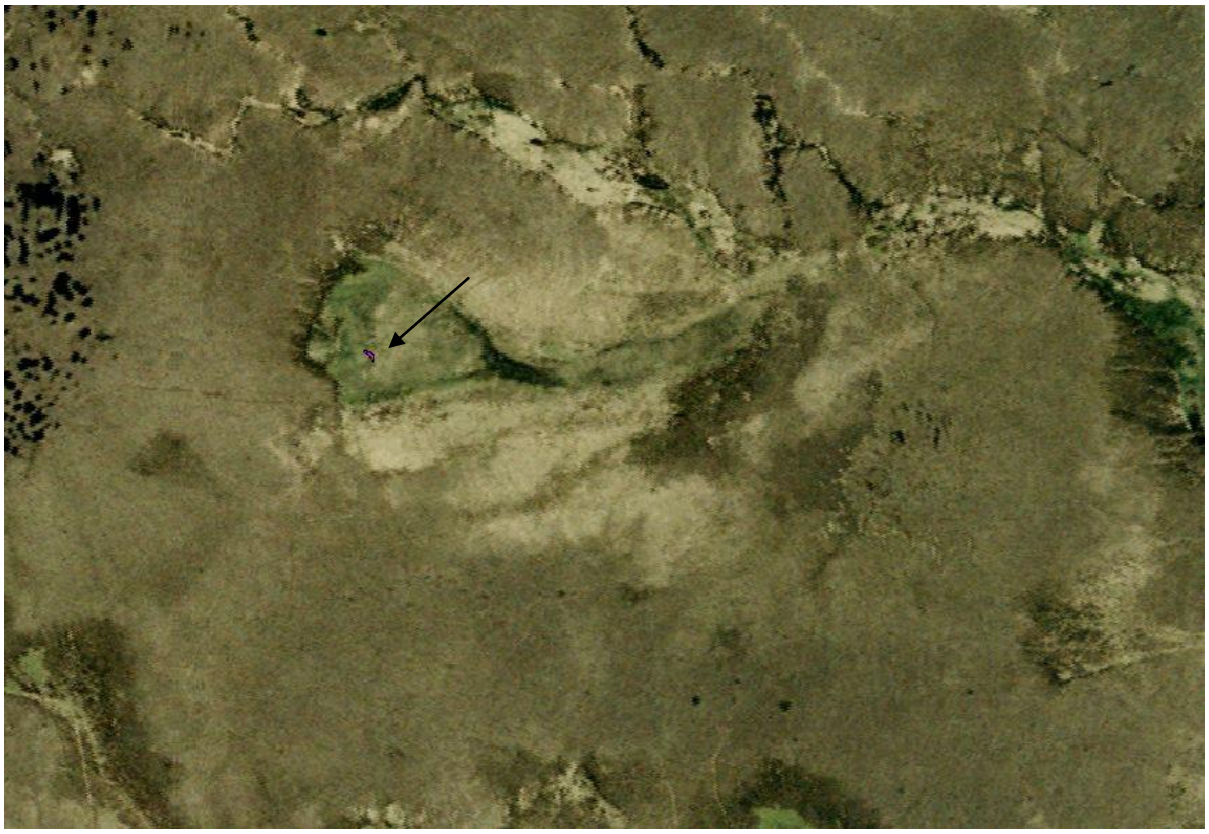
Arial photograph of the *S. hirculus* population at Largan Mor B



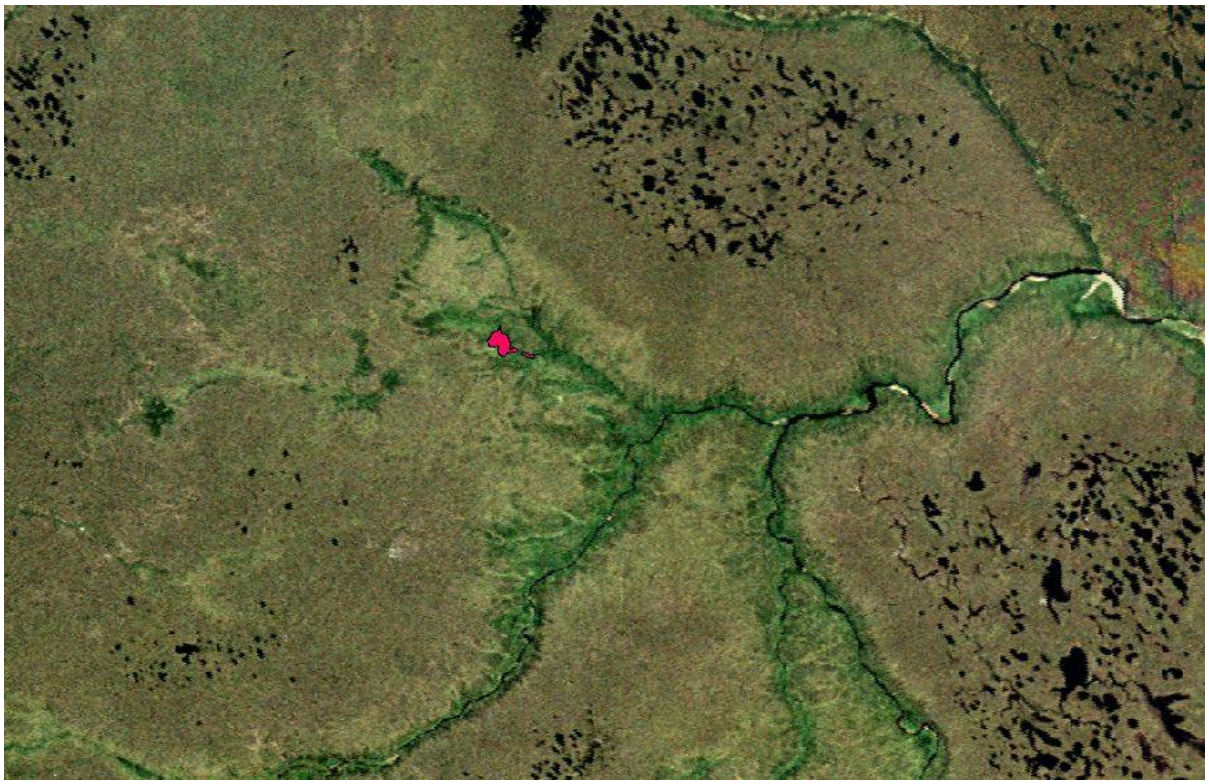
Arial photograph of the *S. hirculus* populations at Sheean A, B, C and D.



Arial photograph of the *S. hirculus* population at Sheskin B



Arial photograph of the *S. hirculus* population at Sheskin A



Arial photograph of the *S. hirculus* population at Uggool.