

Report 1 of 3 for RSPB, SNH, FCS and GWCT

Black grouse conservation review

Monitoring in Scotland

Robert Hawkes and Amy Corrigan
(2013)

For further information on this report please contact:

Chris Bailey (Advisory manager, RSPB Scotland)
2 Lochside View, Edinburgh Park, Edinburgh, EH12 9DH
Telephone No: 0131 317 4130
Email: chris.bailey@rspb.org.uk

This report should be quoted as: Hawkes, R.W., & Corrigan, A. (2013) Black grouse conservation review: Monitoring in Scotland. *RSPB report to Forestry Commission Scotland, the Game and Wildlife Conservation Trust and Scottish Natural Heritage.*

This report, or any part of it, should not be reproduced without the permission of RSPB. This permission will not be withheld unreasonably. The views expressed by the author of this report should not be taken as the views and policies of the Royal Society for the Protection of Birds, Scottish Natural Heritage, Forestry Commission Scotland and the Game and Wildlife Conservation trust. This report is from a partnership project with partners: Forestry Commission Scotland, the Game and Wildlife Conservation Trust, the Royal Society for the Protection of Birds and Scottish Natural Heritage.



Executive summary

Context: Undertaken by a variety of different stakeholders many black grouse monitoring programmes are underway across Scotland. In this paper, we evaluate the extent of this monitoring and make recommendations to how this could be co-ordinated to form a national monitoring scheme.

Approach: The report identifies, across Scotland, the extent and survey methodology of black grouse lek monitoring between 2000-11. Based upon these details, programmes were defined under three categories: a) annual static (yearly surveys over a consistent area), b) annual variable (yearly surveys over a variable area) and c) irregular/ one off surveys. To assess the extent of monitoring, the total area covered by each survey was compared to the 1988-1991 Breeding Bird Atlas (BBA) range (Gibbons *et al.* 1993). National surveys were excluded as these are already well reported. Potential resource for future monitoring is also appraised.

Results: Between 2000-11 an estimated 50% of the 1988-1991 BBA range has been monitored. The extent of monitoring differs throughout Scotland, with substantial variations in survey frequency (annual repeats to one off counts) and coverage (static or variable area monitoring between years). Several programmes regularly report localised trends. Others have the potential to attain this information by standardising the location of core survey areas between years. Beyond 2012, some monitoring and advice programmes are expected to finish or decline in extent, due to funding constraints.

Conclusions: The current extent of monitoring across Scotland is good; however, localised surveys are not coordinated nationally. Several data holders have reservations about information sharing whilst others lack the staffing capacity to collate the group's records. To help develop a national monitoring scheme, partners of the Scottish black grouse Biodiversity Action Plan (SBAP) steering group will need to liaise with survey coordinators and support monitoring within core black grouse areas.

Glossary

- ABBGRP: Argyll and Bute Black Grouse Recovery project
- BBA: Breeding Bird Atlas
- BCTP: Bird Conservation Targeting Project
- CSBGCSG: Central Scotland Black Grouse and Capercaillie Study Group
- DSBGSG: Deeside Black Grouse Study Group
- EIA: Environmental Impact Assessment
- FCS: Forestry Commission Scotland
- GWCT: Game and Wildlife Conservation Trust
- JMT: John Muir Trust
- NBN: National Biodiversity Network
- NFE: National Forest Estate
- NTS: National Trust Scotland
- PBGSG: Perthshire Black Grouse Study Group
- RSPB: Royal Society for the Protection of Birds
- SBAP: Scottish Biodiversity Action Plan
- SBGSG: Speyside Black Grouse Study Group
- SNH: Scottish Natural Heritage
- SUP: Southern Uplands Partnership
- TMP: Trial Management Project
- UKBAP: UK Biodiversity Plan

Contents

1) Introduction	5
2) Methods.....	7
2.1 Identifying monitoring extent	7
2.2 Identifying the approach to monitoring.....	7
2.3 Identifying the resource requirements, data holding and longevity of monitoring.....	8
3) Results.....	9
3.1 Monitoring extent	9
3.2 Monitoring within North East Scotland	12
3.3 Monitoring within North Scotland	15
3.4 Monitoring within South West Scotland.....	18
3.5 Monitoring within South East Scotland	23
3.6 Monitoring longevity.....	26
4) Discussion	28
4.1 Extent of monitoring	28
4.2 Monitoring approach and inferring trends	28
4.3 Monitoring longevity.....	29
4.4 Communicating monitoring	30
5) Conclusions	32
6) Recommendations.....	33
7) Acknowledgements	36
8) References	37

1) Introduction

The UK black grouse population (*Tetrao tetrix*) was estimated at 5078 displaying males (95% CL 3920–6156) during 2005 (Sim *et al.* 2008), representing a 22% decline from the 1995/96 estimate of 6506 (95% CL 5000-8100) (Hancock *et al.* 1999). In Scotland, numbers fell significantly by 29%, with a significant drop in South West (49%) and South East (69%) Scotland. Non-significant declines have also been recorded in North (16%) and North East Scotland (9%). Given these trends, black grouse are red listed as a species of high conservation concern (Gregory *et al.* 2002), listed on Annex 2B of the EU Birds Directive (2009/147/EC), are a UK Biodiversity Action Plan (UKBAP) species and a priority under the Species Action Framework (SNH 2007). Maintaining a population of 3250 males across 230 10km² grid squares by 2030 is a conservation priority of the Scottish black grouse Biodiversity Action Plan (SBAP) steering group (Biodiversity Action Reporting System 2006). To help meet these targets an up to date understanding of the status and distribution of the population is required.

Monitoring lekking males in spring can provide information on the numbers and distribution of black grouse. Over multiple years, monitoring can be used to infer trends. Within Scotland, black grouse are monitored through both a national survey repeated every 10-12 years and a number of localised programmes.

One of our best accounts of lek distribution is through the Bird Conservation Targeting Project (BCTP), a partnership initiative between the BTO, Natural England, the RSPB, and SNH. The BCTP utilises all lek records held by the RSPB and BTO, this includes data from; most localised monitoring programmes, the National Biodiversity Network, other RSPB datasets (from their internal mapping database, Merlin), biological record centres, and BTO datasets (including preliminary data from the 2007-2011 Bird Atlas). Data held by the BCTP is validated by local record centres and regional RSPB black grouse practitioners for accuracy. It is of note, however, that in some areas data is probably missing (through a complete absence of monitoring or missing surveys from the BCTP dataset).

Initiatives like the BCTP provide a good understanding of black grouse distributions, however, the current extent of black grouse monitoring in Scotland remains unknown. Moreover, the information collected by these programmes remains unreported at a national level. If a new national monitoring scheme is to be developed, a better understanding of existing efforts and survey gaps is required.

Objectives

1. To assess the extent of black grouse monitoring between 2000-11.
2. To identify how programmes differ in their survey approach.
3. To identify the resources available and the likely continuation of monitoring.
4. To assess the level of information sharing and highlight opportunities for improvement.
5. To scope the potential for filling survey gaps and developing a national monitoring scheme.

2) Methods

This report focuses on black grouse lek monitoring in spring, between late March and mid May, the peak period for detecting displaying males (Baines 1996). Across a defined area the observer will initially search all suitable habitat to identify the location of leks. The number of displaying males at each lek are recorded one hour either side of dawn over two subsequent visits. A detailed description of this methodology is provided by Gilbert *et al.* 1998.

2.1 Identifying monitoring extent

All monitoring carried out between 2000 and 2011 was identified. Survey leads from the following organisations: the Royal Society for the Protection of Birds (RSPB); Forestry Commission Scotland (FCS); John Muir Trust (JMT); the Southern Uplands Partnership (SUP); and the Game and Wildlife Conservation Trust (GWCT) were contacted. National surveys were excluded since these are already well reported (i.e. Hancock *et al.* 1999, Sim *et al.* 2008).

To quantify monitoring extent, lead contacts were asked to define the boundaries of their monitoring. This information was then digitized using ArcGIS (ESRI 2011) and split into the four Scottish regions (North, North East, South West, and South East) used within the last national survey (Sim *et al.* 2008). Using the 1988-1991 Breeding Bird Atlas (Gibbons *et al.* 1993) range as a basis for comparison, this report estimates the proportion of black grouse range monitored on a national and regional level.

2.2 Identifying the approach to monitoring

The type of monitoring varies between local surveys in relation to: monitoring frequency (annual or irregular), survey area (static or varied between years), and sampling intensity (known lek counts or full area searches). Based upon this information all surveys were grouped into one of the following categories:

- **Annual - static surveys:** Multiple year programmes over a consistent survey area.
- **Annual - variable surveys:** Multiple year programmes over a variable survey area.
- **Irregular/ one off surveys:** Irregular or single year surveys.

2.3 Identifying the resource requirements, data holding and longevity of monitoring

Project coordinators were approached to identify how monitoring is resourced, communicated and whether they anticipated it continuing in the future. Table 1 outlines the details identified for each monitoring programme.

Table 1: Details identified for each monitoring programme

Programme details	
Organisational/ group lead	The lead organisation or group that oversees the programme and holds the data.
Data holding	Where monitoring data is currently held.
Resource requirements:	The staffing, funding and voluntary needs.
Likely future	Whether the programme is expected to continue or finish.

3) Results

3.1 Monitoring extent

Survey extent in relation to black grouse range

Approximately 50% of the Scottish 1988-1991 Breeding Bird Atlas (BBA) black grouse range has been monitored between 2000-11 (Figure 1, Table 2). In total, monitoring within South East Scotland covered the greatest portion of the BBA range (55%), followed by the South West (51%), North East (51%) and North (48%). Considering only annual surveys, coverage has been greatest in South East Scotland (55%), followed by the South West (46%), North East (38%), and North (34%). Interpretation of these figures requires caution; many programmes only monitor a proportion of their study area within any one year whilst black grouse range has possibly altered since the atlas was published. Therefore, these figures may be an overestimate or underestimate of monitoring extent within different regions.

Table 2: Extent of black grouse monitoring within four Scottish regions in relation to the 1988-1991 BBA range

Region	Range		
	Black grouse range (1991 Breeding Bird Atlas) (km ²)	Monitoring coverage (2000- 11) (km ²)	Annual monitoring coverage (2011) (km ²)
North	8944	4312 (48%)	3077 (34%)
North East	7798	3967 (51%)	2967 (38%)
South West	12947	6539 (51%)	5942 (46%)
South East	3717	2037 (55%)	2037 (55%)
Total	33406	16855 (50%)	14023 (42%)

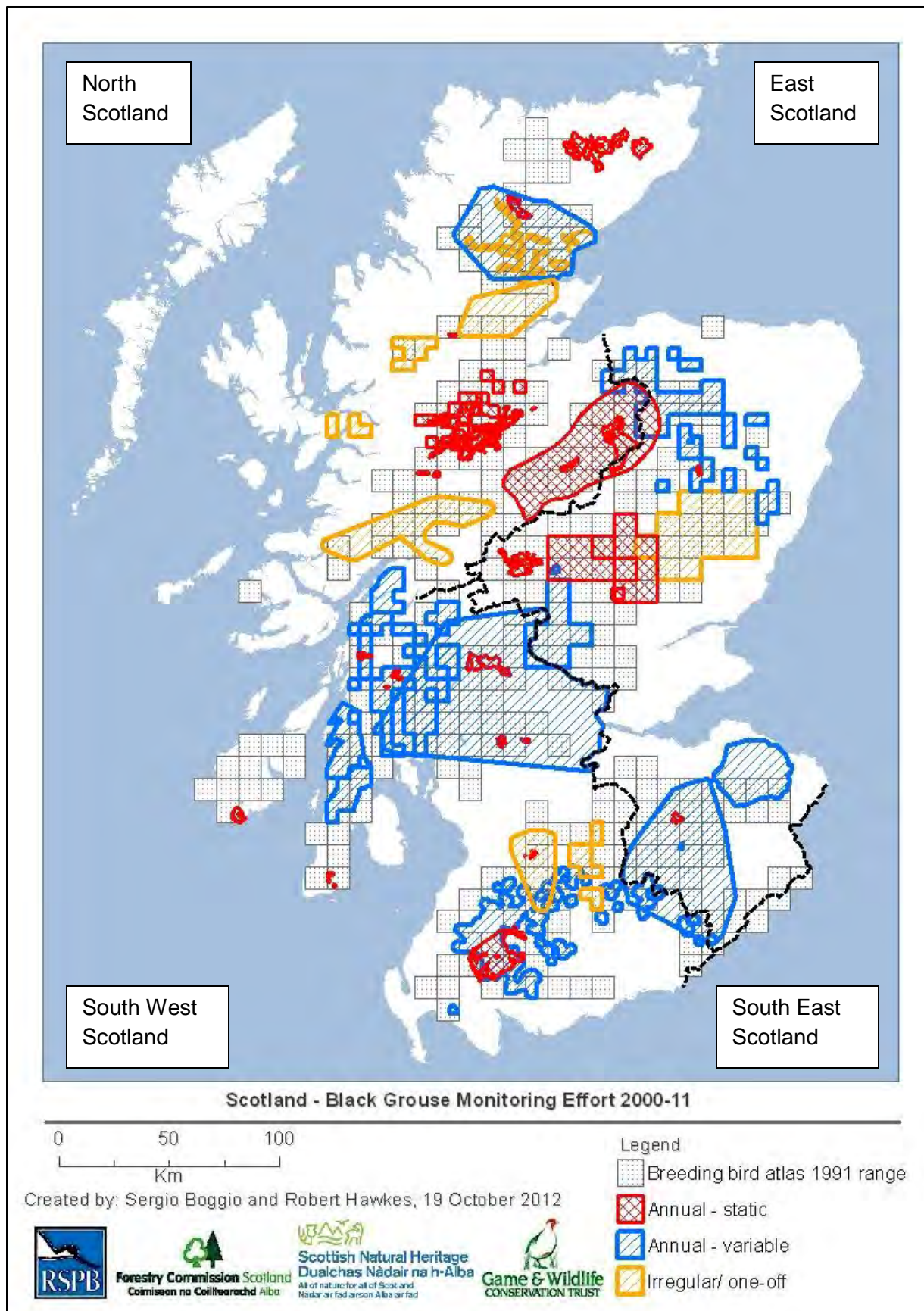


Figure 1: Coverage of black grouse monitoring between 2000-11 in relation to the 1988-1991 BBA range

3.2 Monitoring within North East Scotland

North East Scotland contains two annual programmes each which monitor a static area; the Perthshire Black Grouse Study Group (PBGSG) and the Forest of Clunie project (Figure 2, Table 3). Running since 1990 and reaching full survey coverage a few years later the PSBGSG relies upon voluntary support. The Forest of Clunie Project and the Operation Country Watch Scheme are coordinated by a field officer and have been running since 2002 and 2004, respectively. The Angus Glens survey has only run once (2007). The Deeside Black Grouse Study Group (DSBGSG) and the Strathdon group monitor a number of estates each year, relying upon the support of local landowners, volunteers and gamekeepers. Where programmes overlap the results from one survey will often feed into another. Aside from a few squares in southern Tayside and western Grampian there appears to be no major gaps in survey coverage. GWCT are attempting to establish a new group within Southern Perthshire to survey some unmonitored areas (The Earn/Tay/Almond (ETA) Group). Monitoring has also occurred on RSPB reserves and National Forest Estate sites (appendix) throughout and beyond the region.

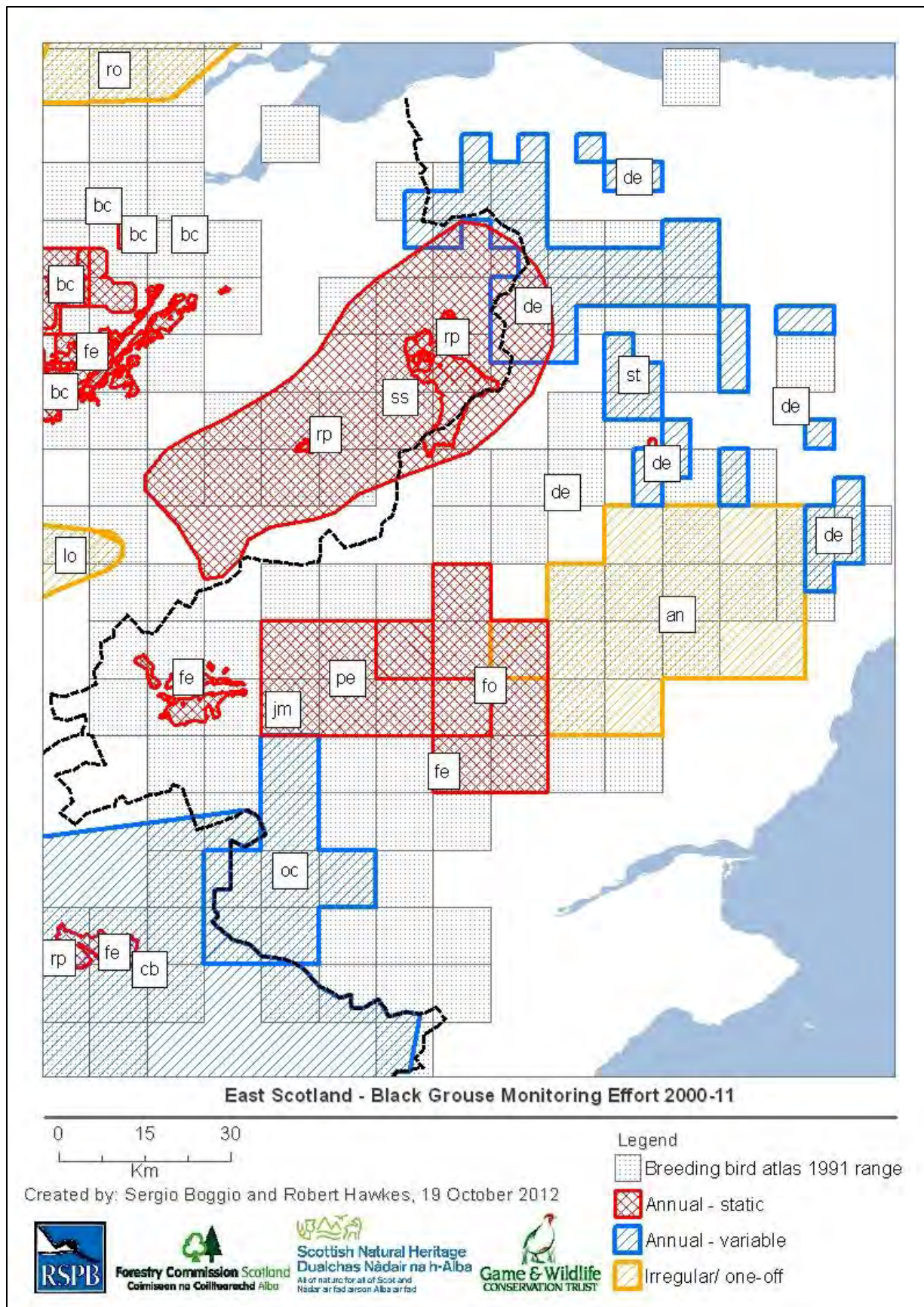


Figure 2: Black grouse monitoring within East Scotland between 2000-11. an = Angus glen survey, de = Deeside black grouse study group, fe = NFE monitoring, fo = Forest of Clunie project, jm = John Muir trust monitoring, pe = Perthshire black grouse study group, oc = Operation Countrywatch survey, st = Strathdon black grouse study group, rp = RSPB reserve monitoring

Table 3: Black grouse monitoring programmes within East Scotland.

Survey/ group	Category	Lek search	Code	Lead organisation	Duration	Resource use	Likely future	Data holding
Perthshire Black Grouse Study Group	Annual static	Yes	pe	Independent	1990 - present	1 RSPB staff member (coordination and data analysis), around 20 volunteers (2011). Group relies heavily on the time and effort of a few key people	Continue	PBGSG, NBN and on Merlin
Angus Glens Survey	Irregular/ one off	Yes	an	RSPB	2007	RSPB staff and contracted surveys	Uncertain	RSPB, Merlin
Operation Countrywatch Survey	Annual variable	Yes	oc	RSPB	2004 – present	One paid project officer - the Operation Country watch field officer, and volunteers from the Tayside raptor study group and the PBGSG	Continue	RSPB, Merlin
Forest of Clunie Project	Annual static	Yes	fo	RSPB (SNH funded)	2002 – present	One paid project officer – Forest of Clunie field officer	Continue	NBN, RSPB, Merlin
Deeside Black Grouse Study group	Annual variable	Yes	de	NTS	2009 - present	Group relies heavily on voluntary support and the participation on local estates	Continue	NTS
Strathdon	Annual variable	Yes	st	GWCT	2010 – present	Group relies heavily on voluntary support and the participation on local estates	Uncertain	GWCT

3.3 Monitoring within North Scotland

Established in 1988 and surveying a consistent core since 2001, the Speyside Black Grouse Study Group (SBGSG) is the largest programme within the region (Figure 3, Table 4). Commitment from both volunteers and staff (primarily from GWCT, RSPB and FCS) have enabled this programme to continue. Through the Trial Management Project (TMP) and the Beaully survey, 26 * 5km² grid squares (some of which overlap) have been monitored since 2007 across the Beaully catchment. Within Sutherland monitoring has occurred annually since 2002 and between 2006-10 through the Sutherland and Golspie survey.

The remainder of monitoring within the Highlands has been undertaken through one off/irregular programmes commissioned by the RSPB (Lochaber (2002, 2008), Wester Ross & Skye (2009), and Ross-shire (2011)). These efforts have relied upon RSPB staff time and contract surveyors. Monitoring at Rosehall Windfarm was funded the by energy provider E.ON. Gaps in coverage exist between these programmes, particularly south of Ross-shire and north of the Beaully catchment.

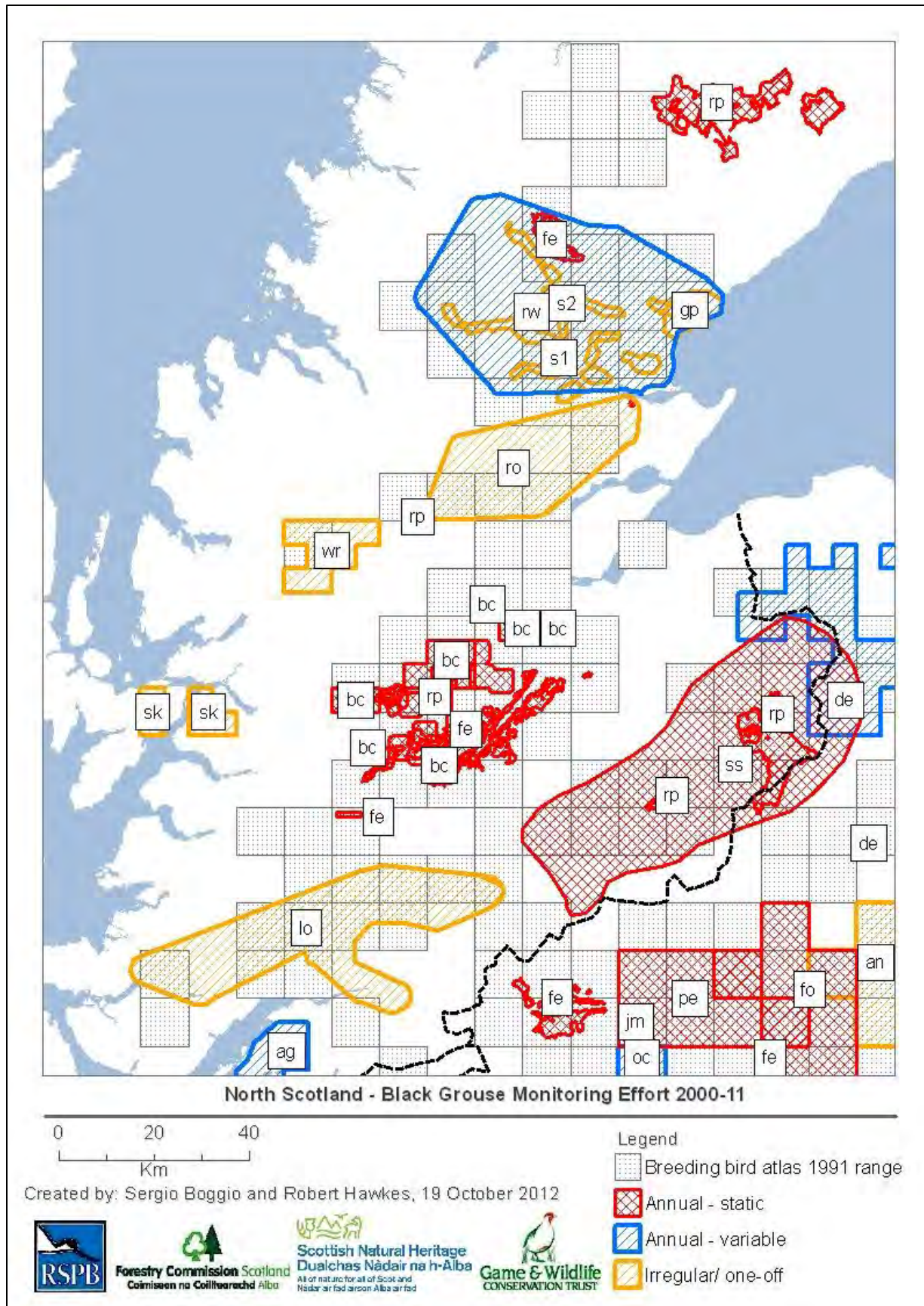


Figure 3: Black grouse monitoring within North Scotland between 2000-11. bc = Beaulieu survey and Trial Management project, fe = NFE monitoring, lo = Lochaber, gp = Golspie, ro = Ross-shire, rp = RSPB reserve monitoring, rw = Rosehall windfarm, s1 = Sutherland 202, s2 Sutherland >2007, sk = Skye, ss = Speyside black grouse study group, wr = Wester Ross

Table 4: Black grouse monitoring programmes within North Scotland.

Survey/ group	Category	Lek search	Code	Lead organisation	Duration	Resource use	Likely future	Data holding
Speyside Black Grouse Study Group	Annual static	Yes	ss	RSPB and GWCT	1988 – present	GWCT, RSPB and FCS staff time and volunteers to carry out surveys and analysis	Continue	Held by the study group
Sutherland 2002	Irregular / one off	Yes	s1	RSPB	2002	Unknown	One off	RSPB
Sutherland 2007>	Annual variable	Yes	s2	RSPB	2007 – present	RSPB staff time	Continue	RSPB
Ross-shire 2011	Irregular / one off	Yes	ro	RSPB	2011	RSPB staff time	Potential for more	RSPB, Merlin
Lochaber 2002, 2008	Irregular / one off	Yes	lo	RSPB	2002, 2008	The work was carried out by three surveyors	Potential for more	RSPB, Merlin
Skye and Wester Ross 2009	Irregular / one off	Yes	sk & wr	RSPB	2009	RSPB staff time and contract surveyors	Potential for more	RSPB, Merlin, NBN
Beaully Survey and Trial Management Project	Annual static	Yes	bc	RSPB and FCS	2007 – present	RSPB and FCS staff time and contract surveyors	None	RSPB, Merlin
Golspie 2006-2010	Irregular / one off	Yes	gp	RSPB	2006-2010	RSPB staff time and contract surveyors	None	RSPB, Merlin
Rosehall windfarm 2004, 2005 & 2009	Irregular / one off	No	rw	E.ON UK	2004,05 & 09	Unknown	None	E.ON

3.4 Monitoring within South West Scotland

Established in 2002 and monitoring a consistent set of leks since 2007, the Argyll and Bute Black Grouse Recovery Project (ABBGRP) has monitored Argyll and Loch Lomond & The Trossachs (Figures 4-6, Table 5). Across as many known leks as possible, parts of Dumfries and Galloway have been monitored since 1980 by RSPB staff and volunteers (including the Galloway forest TMP site). The Central Scotland Black Grouse and Capercaillie Study Group (CSBGCSG) captures a large proportion of the Central Scotland range, with some leks monitored annually. Monitoring through CSBGCSG has declined in response to recent range contractions. Parts of East Ayrshire and Southern Lanarkshire were monitored once in 2007 and 2011, respectively. Localised gaps in survey coverage are evident within the Argyll peninsula, southern Clyde valley and western Dumfries and Galloway (few birds are believed to be present on Islay).

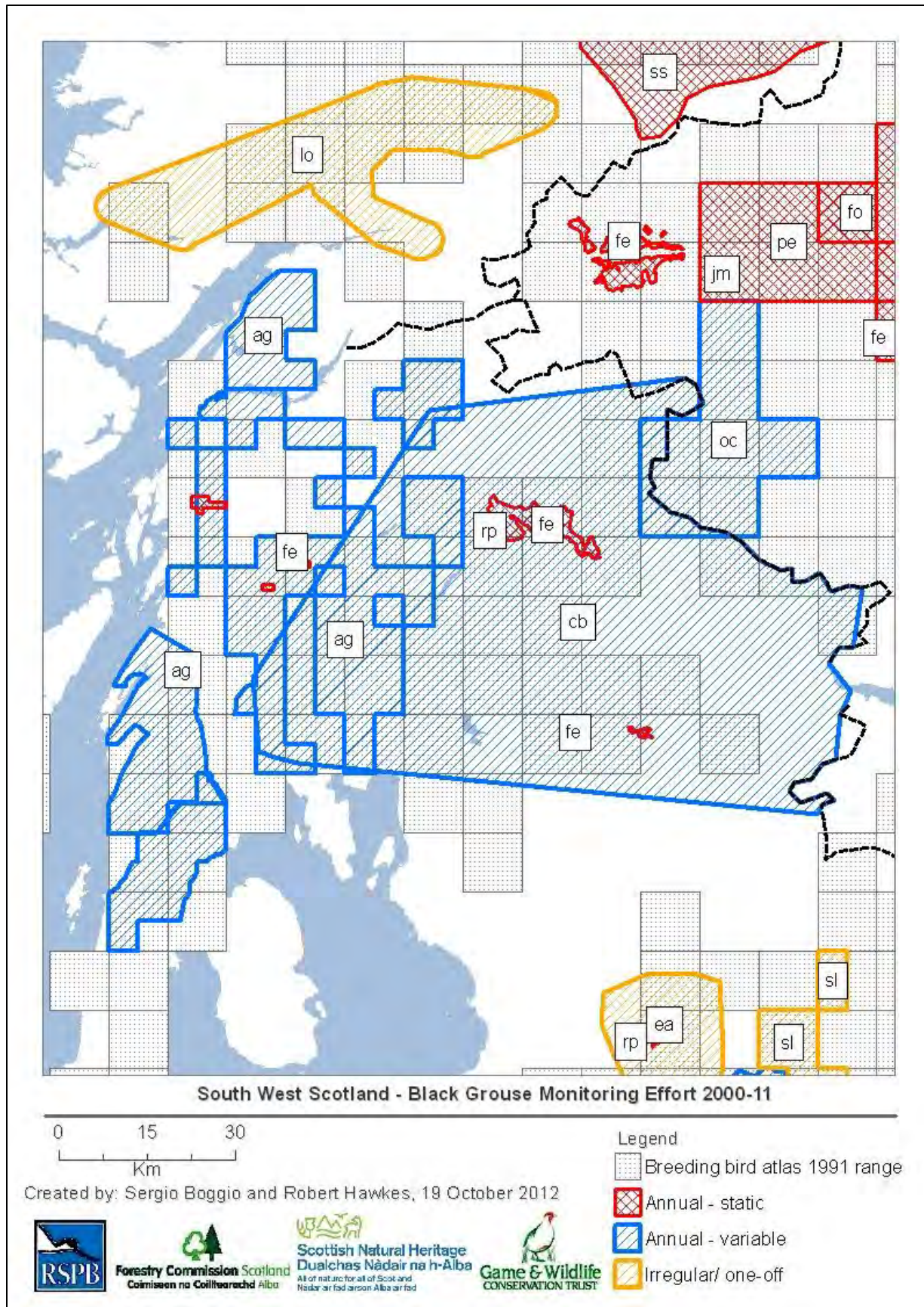


Figure 4: Black grouse monitoring within South West Scotland between 2000-11. ag = Argyll and Bute Black Grouse Recovery Project, cb = Central Scotland Black Grouse and Capercaillie study group, ea = East Ayrshire, fe = NFE monitoring, rp, RSPB reserve monitoring, sl = South Lanarkshire

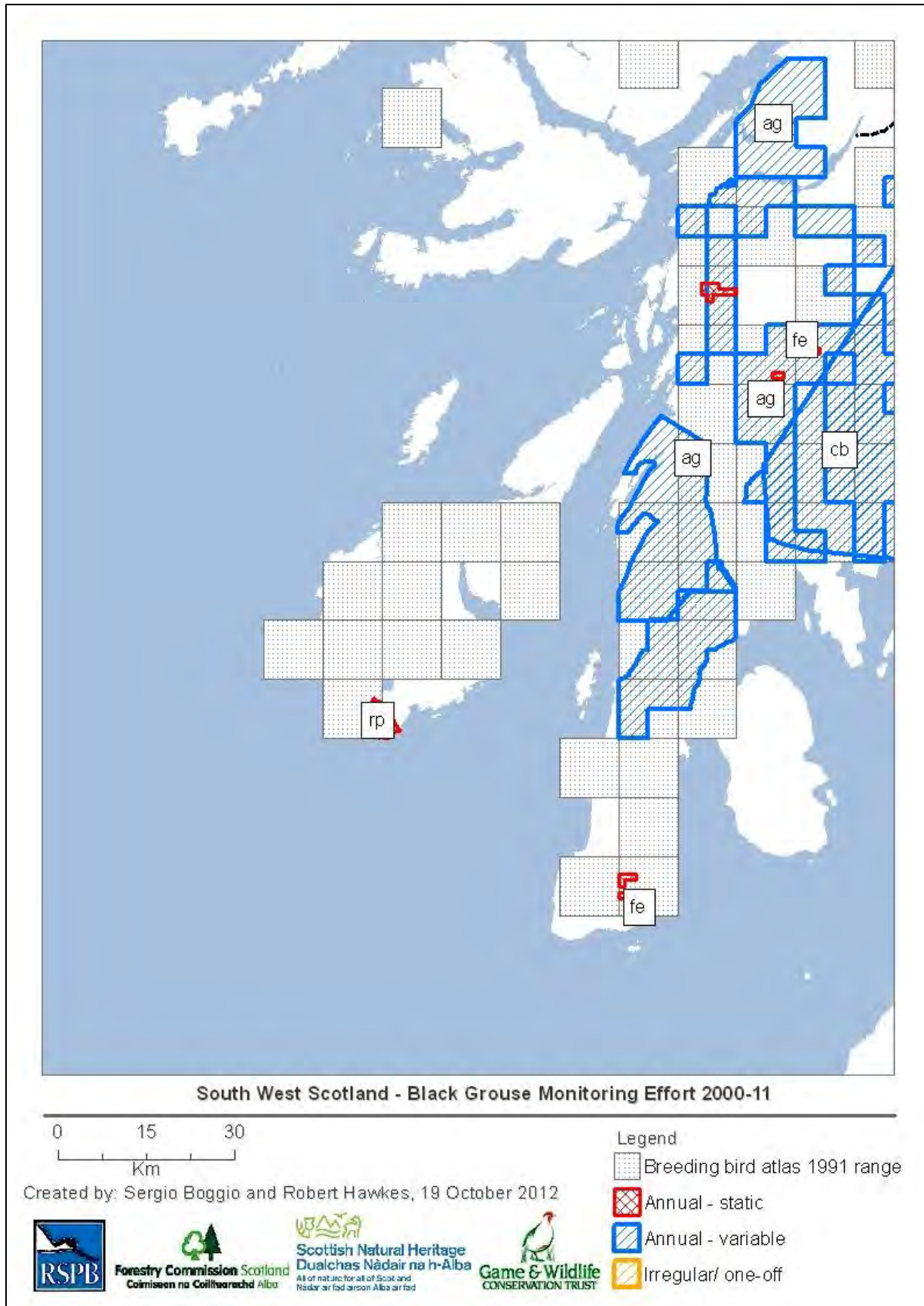


Figure 5: Black grouse monitoring within South West Scotland between 2000-11. ag = Argyll and Bute Black Grouse Recovery Project, cb = Central Scotland Black Grouse and Capercaillie study group, dg = Dumfries and Galloway, fe = NFE monitoring, rp = RSPB reserve monitoring,

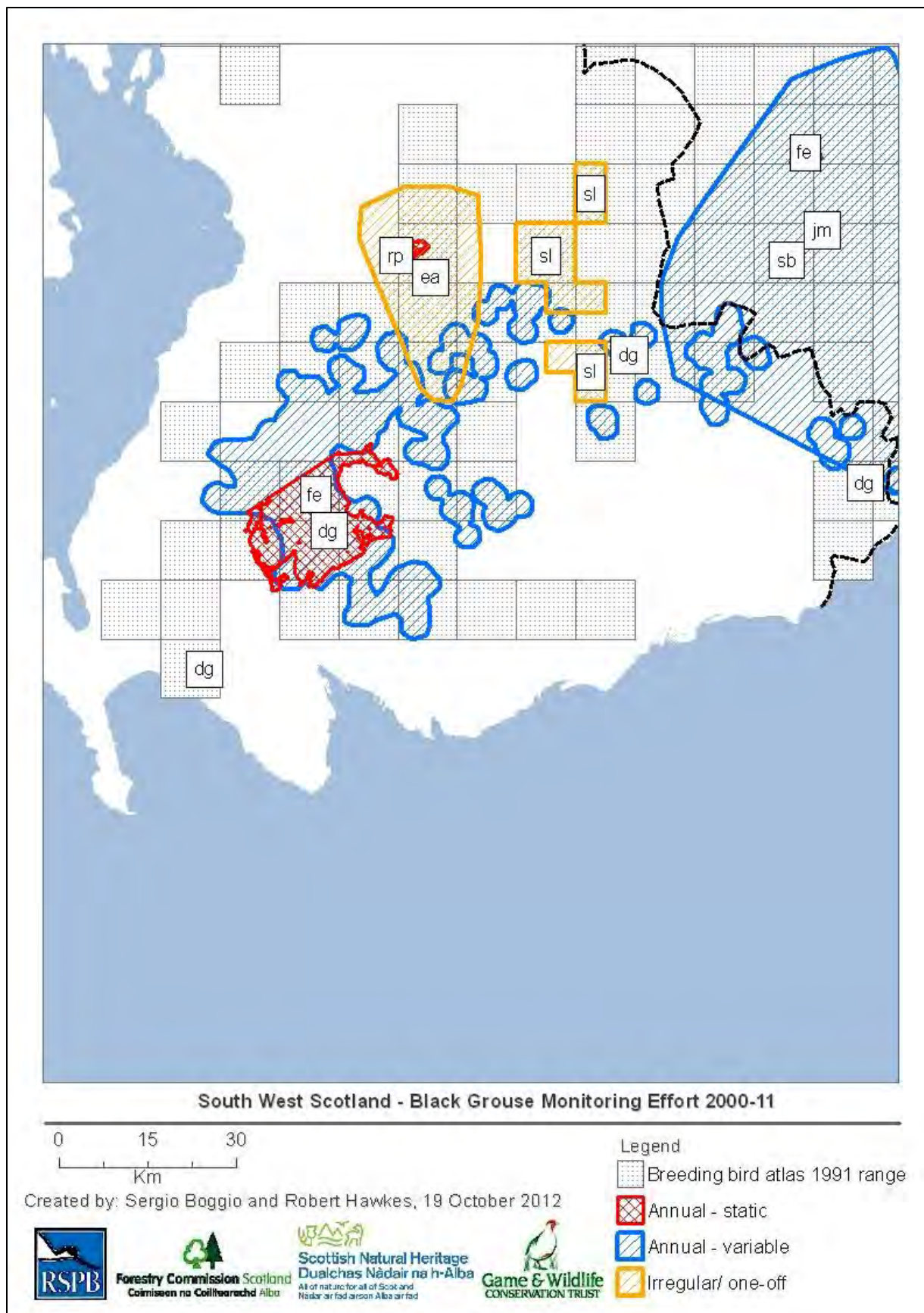


Figure 6: Black grouse monitoring within South West Scotland between 2000-11. dg = Dumfries and Galloway, ea = East Ayrshire, fe = NFE monitoring, rp, RSPB reserve monitoring, sl = South Lanarkshire

Table 5: Black grouse monitoring programmes within South West Scotland.

Survey/ group	Category	Lek search	Code	Lead organisation	Duration	Resource use	Likely future	Data holding
Central Scotland Black Grouse and Capercaillie Study Group	Annual variable	Yes	cb	Independent Group (survey co-ordinator is a volunteer)	1998 – present	Requires the time and coordination of an RSPB staff member in addition to voluntary support	Uncertain	SUP
Argyll and Bute Black Grouse Recovery Project	Annual variable	Yes	ag	RSPB, SNH, FCS	2002 – present	One paid project officer who does surveys and coordinates volunteers. Some years contract surveyors have also been employed: 2x 2008, 1x 2009 and 2.5 x 2010	One off	RSPB, Merlin, NBN
Dumfries and Galloway	Annual variable	Yes	dg	RSPB	1980 – present	Requires the time and coordination of the RSPB staff plus volunteers (typically 10 per year) effort. In some years paid contract surveyors have been used. Forest Districts are counted by FCS staff	Uncertain	SUP
East Ayrshire 2007	Irregular/ one off	Yes	ea	RSPB (SNH funded)	2007	Contract surveyors	None	Merlin
South Lanarkshire	Irregular/ one off	Yes	sl	RSPB	2011			

3.5 Monitoring within South East Scotland

Consistent annual monitoring has only occurred within the Borders since 2010 through the Southern Uplands Black Grouse Survey (SUBGS) (Figure 7 and Table 6). Prior to SUBGS irregular monitoring was undertaken across a similar area by RSPB and SUP staff, and volunteers (the Lothian and Borders survey and Southern Uplands Partnership Survey). GWCT have monitored the Lammermuir hills since 2010 through a project officer and the support of local gamekeepers. Monitoring on the NFE and John Muir Trust properties provides an additional source of information. Gaps in survey coverage are present within parts of southern Forth and southeast Borders.

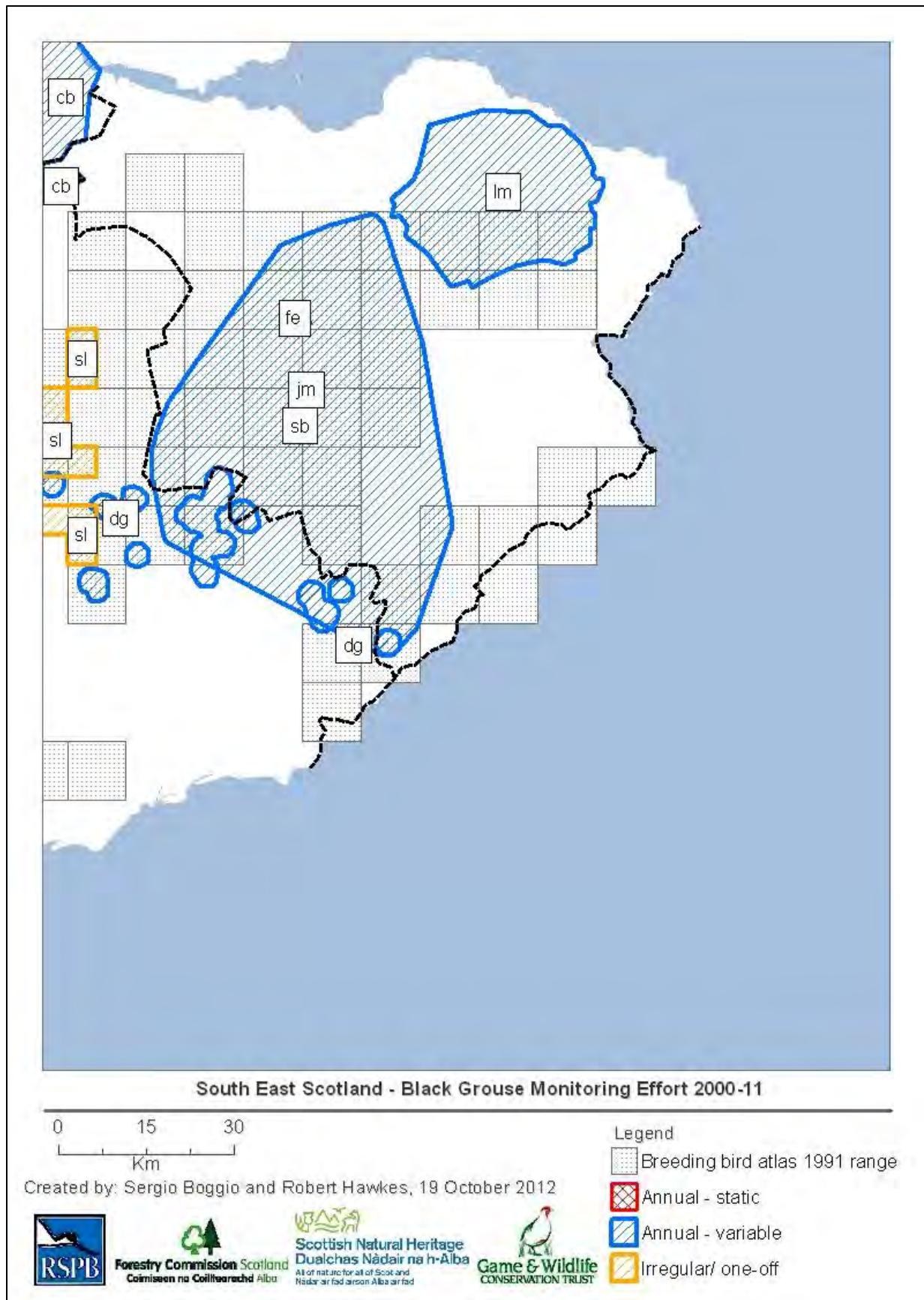


Figure 7: Black grouse monitoring within South East Scotland between 2000-11. dg = Dumfries and Galloway, fe = NFE monitoring, jm = John Muirs Trust monitoring, rp, RSPB reserve monitoring, sb = Southern Uplands Black Grouse Survey, sl = South Lanarkshire

Table 6: Black grouse monitoring programmes within South East Scotland.

Survey/ group	Category	Lek search	Code	Lead organisation	Duration	Resource use	Likely future	Data holding
Southern Uplands Partnership Surveys	Irregular/ one off	Yes		SUP	2006, 2007	Unknown	Uncertain	SUP
RSPB Lothian and Borders	Irregular/ one off	Yes		RSPB	2008	Unknown	One off	RSPB, Merlin, NBN
Southern Uplands Black Grouse Survey	Annual variable	Yes	sb	SUP	2010 – present	Employed project officer, 5 volunteers and a contract surveyor. 1 induction day and then close liaison with volunteers	Uncertain	SUP
John Muir Trust Species Counts	Annual variable	No	jm	John Muir Trust	2011 – present	Staff time	Continue	JMT
Lammermuirs monitoring	Annual variable	Yes	lm	GWCT	2010 – present	Staff time and the voluntary support of estate owners	Continue	GWCT

3.6 Monitoring longevity

RSPB reserve and NFE monitoring is expected to remain ongoing across existing sites (appendix) (Figure 8). However, the future of localised monitoring programmes varies across the country:

- **East Scotland:** All annual programmes and study groups are expected to remain ongoing. Future repeats of the Angus Glens survey have not been scheduled.
- **North Scotland:** The Speyside Black Grouse Study Group and Beaully survey are anticipated to continue. RSPB coordinators of the Sutherland programme are expected to reduce their survey effort beyond 2012. Future one off/ irregular repeat surveys are not currently planned.
- **South West Scotland:** The Central Scotland Black Grouse and Capercaillie Study Group and the Dumfries and Galloway survey are expected to continue with a similar level of effort in the future. Monitoring within Argyll may face significant cutbacks. It is unknown whether the one off east Ayrshire and south Lanarkshire surveys will be repeated.
- **South East Scotland:** GWCT monitoring within the Lammermuirs is expect to remain ongoing, alongside localised counts on JMT properties. It is unknown whether the Southern Uplands Black Grouse Survey will continue beyond 2012.

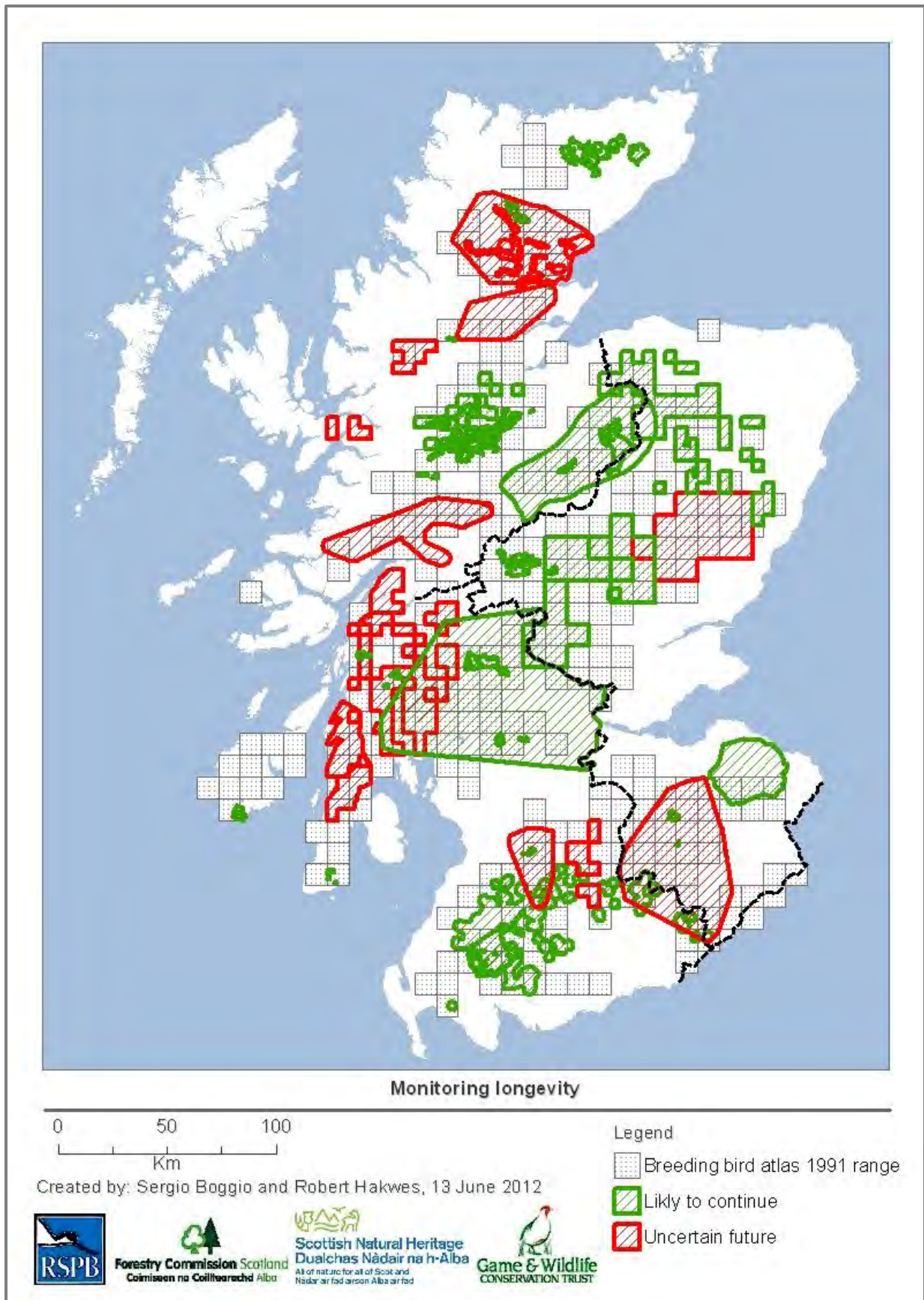


Figure 8: Likely longevity of future black grouse monitoring

4) Discussion

4.1 Extent of monitoring

Between 2000-11, 50% of the Scottish black grouse 1988-91 Breeding Bird Atlas range (Gibbons *et al.* 1993) has been monitored, with annually re-occurring surveys covering 42% of this range. Monitoring extent has been similar between the four Scottish regions, with the South East (55%) and the North (48%) receiving the most and least, respectively. Although gaps in coverage exist, many of the core black grouse populations are routinely monitored (e.g. Perthshire, Deeside, Speyside, the Beaully catchment, central Scotland, Galloway forest park, and the Southern Uplands). Interpretation of these figures, however, requires caution. The Scottish black grouse range will have changed since the last Breeding Bird Atlas; therefore, any interpretation of monitoring extent within this report is a best guess attempt. Moreover, because some programmes only cover part of their survey area each year, monitoring extent is probably an overestimate within those regions containing a lot of ‘annual-variable’ surveys. It is beyond the scope of this report to estimate or infer what proportion of the Scottish population (i.e. % of birds) has been regularly or routinely monitored through these surveys.

Practitioners consulted during this report often cited the availability of both volunteers and paid counters to be the main barriers to achieving a sufficient level of monitoring. In particular, recruiting volunteers and ensuring that surveyors utilise standardise methods (e.g. full lek searches) can be difficult. The capacity to maintain current monitoring levels, whilst addressing survey gaps, will probably depend upon the availability of volunteers, group coordinators and willing estate owners.

4.2 Monitoring approach and inferring trends

Between 2000-11, nine programmes were monitored on an annual basis over a variable survey area. Six programmes were monitored over a static area and six via irregular/ one off

programmes. Many annual variable area programmes also monitored a core area between years. The chosen methodology is often determined by the objectives of the group, the coordinator or the resources available. Study groups or organisations attempting to build a long-term picture of a local population generally monitor annually over a consistent area. Within areas where monitoring is less frequent, practitioners typically commission irregular/ one off surveys due to insufficient financial or volunteer resource to support annual surveys. Regular monitoring can provide an up to date understanding of lek distributions and population change.

Assuming a consistent area is monitored between years, both irregular and annual surveys are capable of inferring population trends. However, to account for dispersal, the programme in question must incorporate full leks searches over a defined area to ensure an adequate level of accuracy. Several programmes identified by this report monitor a consistent area and readily publicise trends. Other programmes could potentially attain this information over a proportion of their study area. A complete understanding of black grouse trends across the entire Scottish range is not a necessity as a limited number of annual surveys across the country could provide a broad indication of main regional trends.

Beyond the national survey, trends are not reported at a national level. By collating and summarising the findings gathered from local programmes this information could be attained. An understanding of long term trends would be a useful output of any national monitoring initiative. This would provide an up to date indicator of population health, a means for assessing the influence of anthropogenic changes (e.g. land use shifts, climate change) and an evidence base for focusing management within areas of conservation concern.

4.3 Monitoring longevity

The future of some monitoring programmes is uncertain. Within East Scotland, most surveys and study groups are anticipated to continue. The SBGSG and the Beaully survey within North

Scotland will remain ongoing; however, future monitoring within Sutherland, Lochaber, Ross-shire, Wester Ross and Skye are not being considered at the moment. Within the South West, most study groups are expected to remain ongoing, but in several cases this will be at a reduced extent. Monitoring across the Lammermuir hills in South East Scotland is ongoing; however, the main initiative within this area (the Southern Uplands Black Grouse Survey) finished in 2012. RSPB reserves and 15 sites on the NFE are expected to continue monitoring. The next national survey is scheduled for 2017.

A lot of surveys require financial aid to cover the costs of staff and vehicle hire, alongside sufficient voluntary support. The presence of a black grouse project officer has benefited many programmes by providing additional staffing capacity and a medium for coordinating volunteers. The availability of these resources can have a direct impact upon monitoring; as such, well-established programmes are generally run by a group of committed volunteers (e.g. PBGSG). One off surveys or recently established programmes are typically reliant upon stakeholder support (e.g. RSPB, FCS) and/ or contract staff. For example, the cost of commissioning a 20 x 5km² survey is estimated at £4,800 (RSPB internal budgets).

Long term monitoring can provide detailed information (including trends) and attract dedicated teams of volunteers. Where possible, existing programmes should be encouraged to undertake regular monitoring. Ideally, a number of 'priority' surveys/ groups should be supported within core populations, with any additional resources directed towards poorly monitored areas.

4.4 Communicating monitoring

Within organisations data sharing is generally good and often held within specialised biodiversity databases (e.g. the RSPB's internal mapping database, Merlin). Between organisations communication and collaboration varies. Some surveys are not uploaded onto the National Biodiversity Network (NBN) (including RSPB funded programmes) and are therefore unavailable to conservation practitioners whilst others only publish broad messages

(e.g. trends and absolute number) in a newsletter, the circulation of which varies. A number of concerns about data sharing exist. Many groups identified data collation as a time consuming task, whilst others were reluctant to share data publicly.

Although most programmes collect lek data at a ≤ 100 m resolution this information is publicised at different scales. Many programmes upload their lek records onto NBN where information is publically available at a 10km resolution. Records held by BCTP are presented at a 4km resolution, but only for internal RSPB use. Conversely, regional breeding bird atlases available for public consumption, illustrate black grouse records to the tetrad level (2km^2) (e.g. Elkins *et al.* 2003, Francis and Cook 2011, Murray *et al.* 1998) whilst many study groups (e.g. SSBGSG) publicise lek records at a 100 m resolution within their newsletters. Practitioners dealing with black grouse management plans (e.g. case officers, land agents) require a good understanding of bird distributions. A lack of high-resolution lek data (≤ 2 km) has been cited as a major limitation to their work.

A sufficient level of data sharing amongst individual surveys and study groups (at least summary findings, e.g. number of males) is a prerequisite for any national monitoring initiative. The chosen data resolution of a national survey will represent a trade off between accuracy and information restrictions. Ideally, individual lek records should be uploaded onto NBN for public consumption at a 10 km resolution. To help inform management, black grouse distributions should be available at a 2 km resolution for internal use by SBAP partners.

5) Conclusions

Currently one of the main mechanisms for assessing the population status of black grouse is the national survey. This is, however, only repeated every 10-12 years. Due to logistical constraints and financial costs (over £56,000 in Scotland), a more frequent national survey is unlikely. One solution would be to improve the national co-ordination of annual monitoring data provided by local surveys.

Between 2000-11 black grouse monitoring covered approximately 50% of the 1991 Breeding Bird Atlas range. Although gaps in annual coverage exist, particularly within parts of South West and North Scotland, core areas are seemingly monitored on a regular basis. Many programmes readily report localised trends across a consistently monitored area whilst others could attain this information through minor alterations to their methodology. Currently the findings of these programmes are largely reported in isolation of one another. Coordinating these results through a national monitoring scheme would provide a tool for collating survey data and assisting future decisions on resource targeting.

There are several potential barriers facing the development of a national monitoring initiative. Some programmes have data sharing reservations, and in particular, the publicising of individual lek records. Moreover, the future of some programmes, particularly within the Borders, Argyll and the Highlands, are uncertain. Without the full support and co-operation of existing monitoring efforts, any attempt to coordinate this information at a national level would be hindered. To help create and sustain such a scheme these issues need to be resolved.

6) Recommendations

This section outlines a number of recommendations to the black grouse SBAP steering group

6.1 Supporting existing monitoring and addressing gaps

Issue

A significant proportion of the Scottish population is currently monitored; however, several surveys are at risk of finishing or declining whilst notable gaps in survey coverage exist.

Potential solution

1. Support existing programmes where required. Where annual monitoring is not possible, less frequent monitoring should be encouraged alongside established programmes.
2. Encourage the continued development of voluntary monitoring through study groups.
3. As a lower priority, encourage monitoring within gaps.

6.2 Identifying population trends

Issue

Information on black grouse trends are often publicised locally; however, beyond the national survey, this information is not summarised nationally.

Potential solution

1. All programmes should be encouraged to carry out full lek searches.
2. Annual monitoring should be encouraged where possible.
3. Trends should be reported from multiple programmes across the country, providing regional indicators of population change. In some cases, SBAP partners will need to liaise with local groups to develop their methodology. The following programmes could represent suitable candidates:
 - NFE and RSPB reserve monitoring.

- East Scotland: PBGSG, DSBGSG, Strathdon, Operation country watch, Forest of Clunie.
- North Scotland: SBGSG, Beaully survey.
- South West Scotland: CSBGSG, Argyll and Stirling survey, Dumfries and Galloway survey.
- South East Scotland: Southern Uplands Black Grouse Survey, Lammermuirs.

6.3 Data communication and information sharing

Issue

Several localised programmes do not fully communicate findings and do not share lek records. This information would be needed if regional and national population summaries are to be produced. Providing information on individual leks would assist with the prioritisation of conservation management.

Potential solution

1. SBAP partners should encourage individual programmes to share findings with any national monitoring initiative.
2. Any information held by a national survey must only be used with the agreement of the owner of the data. Use of this data must acknowledge the source.
3. Where possible, lek information should be uploaded onto NBN at a resolution ideal for both black grouse practitioner and public consumption. Practitioners may require lek data at a finer resolution to help inform their conservation work.

6.4 Coordinating a national monitoring programme

Issue

The findings of localised monitoring schemes are not coordinated nationally.

Potential solution

1. SBAP partners could support a specialist role to liaise with individual study groups on an annual basis.
2. The coordinator of the national programme should report their findings to the SBAP group and the monitoring groups on an annual basis (e.g. numbers and trends).
3. Major findings would be uploaded onto the SBAP website.

7) Acknowledgements

We would like to thank the numerous monitoring groups, estates and volunteers involved with this project for providing information on their monitoring. The constructive inputs of Chris Bailey, Sue Haysom, Gordon Patterson, Phil Warren, the black grouse SBAP steering group, and various RSPB practitioners on earlier drafts are also highly appreciated.

8) References

Baines, D. (1996) Seasonal variation in lek attendance and lekking behaviour by male Black Grouse *Tetrao tetrix*. *Ibis*, 138, pp 177-180.

Biodiversity Action Reporting System. (2006) Targets and outcomes, National and local targets, *Tetrao tetrix* (Black grouse). Accessed at: http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals.asp?X=%7B16909245-B7D0-4FAD-9B6954B49A80B3D0%7D&C=1&flipLang=&txtLogout=, Accessed on: 12/04/2012.

Elkins, N., Reid, J.B., Robertson, D.G., and Smout, A-m. (2003) The Fife Bird Atlas, Woodlands Studios, Dunfermline.

ESRI. (2011) ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute.

Francis, I., Cook, M. (2011) The Breeding Birds of North-East Scotland, Scottish Ornithologists Club, Aberdeen.

Gibbons, D.W., Reid, J.B., Chapman, R.A. (1993) The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991, T & AP Poyser, London.

Gilbert, G., Gibbons, D.W. and Evans, A. (1998) Bird Monitoring Methods: a Manual of Techniques for Key UK Species. Sandy, UK: RSPB.

Gregory, R.D., Wilkinson, N.I., Noble, D.G., Robinson, J.A., Brown, A.F., Hughes, J., Procter, D.A., Gibbons, D.W. & Galbraith, C.A. (2002) The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002–2007. *British Birds*, 95, pp 410–450.

Hancock, M., Baines, D., Gibbons, D., Etheridge, B. and Shepherd, M. (1999) Status of male black grouse *Tetrao tetrix* in Britain in 1995-96. *Bird Study*, 46, pp 1-15.

Murray, R., Holling, M., Dott, H., Vandome, P. (1998) The Breeding Bird Atlas of South-East Scotland, Scottish Ornithologists Club, Edinburgh.

Sim, I.M.W., Eaton, M.A., Setchfield, R.P., Warren, P.K., & Lindley, P. (2008) Abundance of male Black Grouse *Tetrao tetrix* in Britain in 2005, and change since 1995-96. *Bird Study*, 55, pp 304-313.

SNH. (2007) A Five Year Species Action Framework: Making a difference for Scotland's Species. Accessed at: <http://www.snh.org.uk/pdfs/species/Species%20Action%20Framework.pdf>, Accessed on: 2/11/2011.

Appendix

List of sites, approximate area and the resource requirements of monitoring on the National Forest Estate

Count location	Approximate Area	Staff resource 2011*
Dalchork	2000 ha North Dalchork 2000 ha Dalnessie	22 days
Glenmoriston/Affric Trial Management Project (TMP) area	Circa 15000ha FES (Circa 20000ha private)	Counts on FES land funded from FESHO Environment budget (c. £7.5k per year)
Glenmore	1000ha (10x 1km squares)	6 days
Glen Affric	2000ha	11 days
Rannoch Barracks	4500ha FES +2000ha private	4 days
South Rannoch	1800ha FES +1300ha private	4 days
Angus Glens	1500ha FES +1100ha Private	4 days
Glen Garry	1000ha	6 days
Dalbuie	600ha max (Six 1x1km squares)	4 days
Eredine & Brenchoille	1000ha (Ten 1x1km squares)	6 days
Loch Katrine	4000ha	21 days
Cochno Hill and Gavinburn	1300ha	3 days
Campsie Glen	800ha	3 days
Glentress	1500ha	8 days