SAVING SCOTLAND'S RED SQUIRRELS

RESULTS OF SPRING 2015

SQUIRREL SURVEYS

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ACKNOWLEDGEMENTS

The Saving Scotland's Red Squirrels Team thanks all the people who volunteered their valuable time to carry out these surveys as well as the painstaking work to identify all the hair samples. Thanks also to all those who helped make the feeder-boxes and assemble the survey packs. The surveys would not have been possible without your input. In addition, we greatly appreciate the access to woodlands granted by land managers throughout the Project area.

The Saving Scotland's Red Squirrels Team gratefully acknowledges the collaboration of our signatory partners: Scottish Wildlife Trust (lead partner), Scottish Natural Heritage, Forestry Commission Scotland, RSPB Scotland, Scottish Land & Estates and Red Squirrel Survival Trust, all of which are vital for the Project to be a success.

Saving Scotland's Red Squirrels is also grateful for the funding contributions of:

Aberdeen Greenspace, Aberdeen City Council AWPR Fund, Angus Environment Trust, Biffa Awards, Clark Bradbury Charitable Trust, D'Oyly Carte Foundation, Forestry Commission Scotland, Forest Enterprise Scotland, Gannochy Trust, Garfield Weston Foundation, Hugh Fraser Foundation, Margaret Davis Charitable Trust, Martin Wills Wildlife Maintenance Trust, Mrs MA Lascelles Charitable Trust, J & J R Wilson Charitable Trust, Loch Lomond and the Trossachs National Park Authority, Red Squirrel Survival Trust, RSPB Scotland, Scottish Natural Heritage, Solway Heritage and the many people who have donated online or in response to our red squirrel campaign.

RESULTS OF SPRING 2015 SQUIRREL SURVEYS

1. SUMMARY

This report details the results of monitoring of red and grey squirrels organised by Saving Scotland's Red Squirrels (SSRS) in Spring 2015. The results for the northern half of Scotland were compared to similar surveys undertaken in Spring 2014, 2013, 2012 and 2011, while those in South Scotland were compared to the surveys carried out in Spring 2014 and 2013.

Taking the tetrads in the northern project areas together, the Spring 2015 results for grey squirrels show a highly significant decline in the occurrence of grey squirrels in the tetrads when compared with both Spring 2011 and Spring 2012. When compared with more recent years (Spring 2013 and Spring 2014) there was no significant difference in occupancy of the sample tetrads. This can be interpreted as a decline in grey squirrel distribution which occurred early on in the period surveyed (2011-2013), after which further reductions have been difficult to achieve. The continued trapping pressure has confined their distribution to the reduced coverage, with only very little recovery of their range after the early reductions. With continual recolonisation of the Central Lowlands control zone by grey squirrels from the south, it is expected that the rate of decrease in detected range in this region would level out over time until a balance is reached between a small number of remaining squirrels removed and the number immigrating and reoccupying some of the tetrads each year.

The proportion of tetrads detecting red squirrels in the Spring 2015 surveys for the northern project areas taken together was identical to the proportion in 2014, and showed no significant difference with any of the preceding years 2011 to 2013. Over the whole period between 2011 and 2015 there was a small increase of 7.7% in the number of tetrads in the sample where red squirrels were detected, which, however, was not significant.

The steady trend for red squirrels detected by the surveys suggests a situation in which red squirrels have never been very far away in the locations surveyed during the period from 2011, albeit perhaps initially occurring at very low densities. The pie-charts show us a picture of change from species overlap in many tetrads which then become home to just reds in response to the removal of grey squirrel competition. Over the last two surveys the number of tetrads failing to detect squirrels at all has increased, particularly when compared with 2012 and 2013. This was probably due to the very poor mast crop of Autumn 2012, leading to poor overwinter survival and poor breeding in 2013. In Spring of 2015 the weather was notably cold and wet at the start of the surveys, which may also have reduced detection rates if squirrels were avoiding being out and about.

Grey squirrel survival over the 2014-15 winter was shown by our 2015 trapping to have been significantly up on previous years, following an abundant beech and acorn crop in the autumn of 2014. We could therefore have expected a better showing for grey squirrels in the 2015 surveys than actually occurred: possibly there was still abundant natural food available from the previous year, reducing the attractiveness of the feeder-boxes. Alternatively, the grey squirrel population has not yet begun to recover from the reductions achieved in earlier years.

For South Scotland, the results revealed that the situation for red squirrel distribution has remained similar to that of the previous year with no statistically significant differences in the proportions of red squirrels occupying tetrads. This is good news as red squirrels remain very widespread across the region, with two tetrads in Berwickshire picking up red squirrels for the first time. However, grey squirrels appear to be expanding their range over the period 2013-2015. Although the figures are not yet significant, the mapping shows expansion of the grey squirrel detectable range over a large tract of country from the River Annan westwards to New Galloway. The situation needs to be monitored carefully to determine whether this is part of an ongoing trend of grey squirrel spread or part of a temporary fluctuation in squirrel numbers. The result highlights how important it is that co-ordinated grey squirrel control is sustained for the long term in order to prevent further losses of red squirrels.

2. AIM OF THIS REPORT

Saving Scotland's Red Squirrels (SSRS) is a project to stop the decline of Scotland's core red squirrel populations. North of the Central Belt we aim to prevent the further replacement of red squirrels by grey squirrels by working to progressively reduce the geographic range and abundance of grey squirrels in and around Aberdeen, and by preventing their spread northwards from the Central Lowlands. This is achieved through a co-ordinated network of grey squirrel control at the interface between the red and grey squirrel distributions. In Aberdeenshire grey squirrel control began in 2007, 2010 for the Central Lowlands. South of the Central Belt the aim of the last 7 years has been to try to prevent the spread of squirrelpox (SQPV) northwards into the SQPV-free grey squirrels in the Central Belt. Grey squirrel control has focussed in areas where grey squirrel blood samples have tested SQPV-positive, rather than at trying to reduce the grey squirrel population overall, although reductions have sometimes followed as a by-product of the intensive trapping.

Monitoring in the North East and the Central Lowlands was set up in 2011 to provide evidence on which to assess the effects of grey squirrel control on both red and grey squirrel populations. This document reports the results of the Spring 2015 surveys and compares them to results obtained in 2011, 2012, 2013 and 2014. We provide estimates of the level of change and assess whether the results suggest that our Red Squirrel Protection Network is achieving benefits for red squirrels.

In South Scotland, distribution monitoring was carried out for the first time in Spring 2013, with a view to detecting the relative distributions of red and grey squirrels, and repeated in 2014. The Spring 2015 surveys continue the series of snapshots so that the short-term trends can now be seen.

3. METHODOLOGY

To determine whether red and grey squirrels are present or absent in a particular area, monitoring tetrads (2 x 2km squares) were set up in 2011 for the North East and Central Lowlands, and in Spring 2013 for the Scottish Borders and Dumfries & Galloway. In each tetrad four feeder-boxes were positioned to sample right across the square, each with a sticky

pad to collect hair-samples from visiting animals. Each feeder-box was checked by volunteers a total of three times over a period of six weeks and three hair samples collected from each box. Hairs were identified under a microscope. Each tetrad was then allocated to one of the following four categories: “red squirrels only”, “grey squirrels only”, “both species” or “neither” species.

In Spring 2011 the Project set up 48 tetrads in North East Scotland and the Central Lowlands. We continued to add further tetrads during the following years so that by Spring 2015 there were 136 tetrads set up across these areas, of which 108 were completed. This allows a comparison with four previous Spring surveys at a similar point in the life-cycle of the squirrel populations (sampling adult winter survivors before the young born in the early spring breeding season leave the drey and become available for survey).

In South Scotland 102 tetrads were set up in both Spring 2013 and Spring 2014. In Spring 2015 some additional sites were identified in order to cover the new Priority Areas for Red Squirrels more representatively : of around 115 set up, 102 were surveyed, of which 85 were completed with the full set of 12 hair samples collected. Of the 85 completed in Spring 2015, 66 were completed in Spring 2014 and could therefore be directly compared. For the Spring 2015:Spring 2013 comparison there were 65 tetrads surveyed in both years.

For the analyses we have treated the North East and Central Lowlands samples combined and the South Scotland results separately.

The Spring 2015 surveys

Project Area	Completed tetrads	Incomplete tetrads
North East Scotland	48	1
Central Lowlands	60	10
South Scotland	85	17

The table above shows the number of tetrad surveys initiated in Spring 2015. Of over 240 tetrads set up across project areas, 11 of the tetrads in the north and 17 in the south were incompletely surveyed: in some cases the sticky pads went missing or the volunteer was unable to complete the survey for some reason. Several tetrads were not surveyed at all.

A particular problem that we had in 2015 was that the vast majority of South Scotland samples were returned stuck firmly to the backing paper so that the hair sample could not be properly analysed under the microscope. With so much effort potentially to be wasted, we researched a way of soaking the samples in solvent and carefully removing the backing paper. It was estimated this took the equivalent of 6 full-time working weeks to complete! We are so grateful to the volunteers, Jake and Alistair, for doing the bulk of this, and Project Officers Alexa and Kate for the rest. This issue, together with a lack of South Scotland project staff for much of the summer, delayed the production of this report.

Although some of the incomplete tetrads detected squirrel presence, the incomplete data were unsuitable for inclusion in the analysis. This partial data is, however, included in the maps.

4. RESULTS

The following table sets out the number of tetrads detecting either squirrel species, both species or neither species in each year.

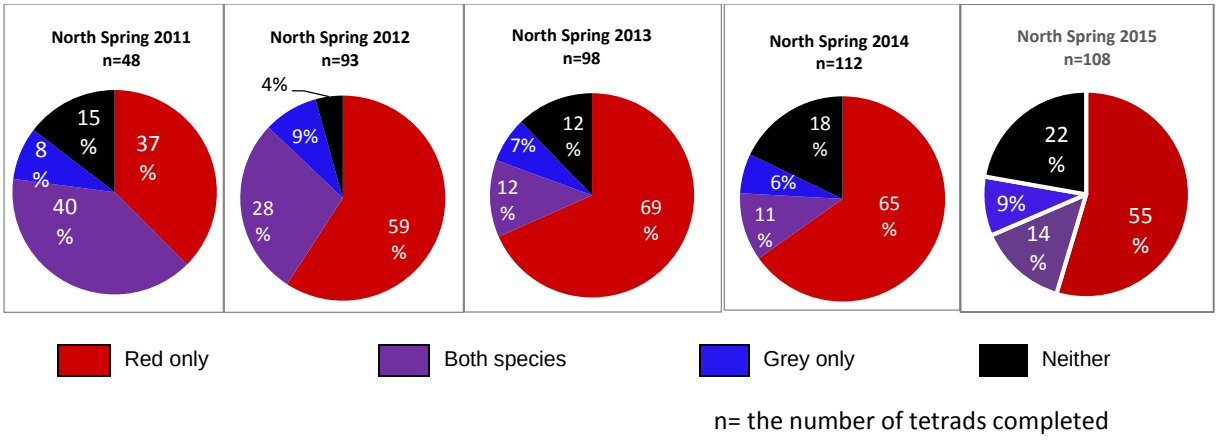
Project Area	Survey season	Red squirrels only	Grey squirrels only	Both Species	Neither species	Total no. of tetrads completed	(Total including incomplete tetrads)
North	Spring 2011	18	4	19	7	48	48
	Spring 2012	55	8	26	4	93	112
	Spring 2013	67	7	12	12	98	120
	Spring 2014	73	7	12	20	112	124
	Spring 2015	59	10	15	24	108	119
South	Spring 2013	41	15	7	25	88	102
	Spring 2014	44	16	8	18	86	99
	Spring 2015	31	18	13	23	85	102

Figures 1 a and b display this information graphically for visual comparison.

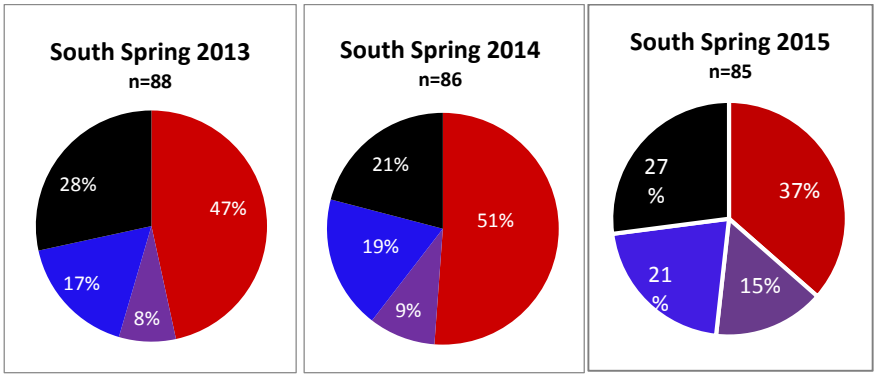
For those people in the northern half of the project who are interested to see the results obtained closer to home, we have split the tables into North East and Central Lowlands. Maps and tables showing the 2015 results for individual tetrads appear at the back of this report.

Figure 1. Proportions of tetrads with both species, either species or none detected.

a. North East Scotland and the Central Lowlands.



b. South Scotland



North East Scotland

Survey season	Red squirrels only	Grey squirrels only	Both Species	Neither species	Pine Martens	Total no. of tetrads
Spring 2011	3	2	7	3	NA	15
Spring 2012	19	5	6	1	2	31
Spring 2013	20	5	2	8	7	35
Spring 2014	26	5	2	13	7	46
Spring 2015	22	5	5	16	6	48

Central Lowlands (Tayside and Argyll & Trossachs)

Survey season	Red squirrels only	Grey squirrels only	Both Species	Neither species	Pine Martens	Total no. of tetrads
Spring 2011	15	2	12	4	NA	33
Spring 2012	36	3	20	3	NA	62
Spring 2013	47	2	10	4	26	63
Spring 2014	47	2	10	7	26	66
Spring 2015	37	5	10	8	26	60

Replacement Index

In order to compare the results of pairs of tetrad surveys we calculated a Replacement Index (RI) using a table showing the changes that occurred in each tetrad between two surveys. This index was devised by Usher *et al*. (1992) who used it to examine the dynamics of two species within 10km grid squares for the whole of Britain from 1973 to 1988. In this report we have adopted this index in order to summarise the complex of changes in the presence/absence of either red squirrels, grey squirrels, both species or neither species in each of the tetrads. For this analysis we could only use tetrads that had been sampled in both years being compared.

For North Scotland we compared survey results first between Spring 2015 and Spring 2014, then Spring 2015 vs. Spring 2013, followed by Spring 2015 vs. Spring 2012 and lastly Spring 2014 vs. Spring 2011. For South Scotland, results were compared between Spring 2015 and Spring 2014, then Spring 2015 vs Spring 2013.

North East and Central Lowlands Combined: Spring 2014-Spring 2015

To compare the 2015 results with those from 2014, we compared 93 tetrads that were sampled in both years and looked at the changes in each tetrad. The following matrix table summarises the results.

Replacement Index Table: North East and Central Lowlands Combined: 2014-2015

		Spring 2015				
		Red	Both	Neither	Grey	*Total*
Spring 2014	Red	50	5	4	0	59
	Both	0	8	0	0	8
	Neither	2	0	16	1	19
	Grey	0	2	1	4	7
	Total	52	15	21	5	93

The table above presents all the possible changes to the tetrads and how many fall into each of four categories: “red squirrels only”, “both red and grey squirrels”, “neither species”, “grey squirrels only”. The rows describe the state of the tetrad in the Spring 2014 survey and the columns the tetrads in the Spring 2015 survey. For example, 2 tetrads had neither species of squirrel in Spring 2014 but only reds in Spring 2015 (Murtle Den in Aberdeen and Moulinearn, south of Pitlochry); and 16 tetrads had neither species in both the 2014 and 2015 surveys. One tetrad gained grey squirrels where in 2014 neither species was detected: (Kilbryde near Doune in Stirlingshire).

The shaded diagonal represents no change. Above the shaded diagonal, the figures represent changes in favour of grey squirrels; below the diagonal they represent changes in favour of red squirrels. We calculated a Replacement Index as follows:

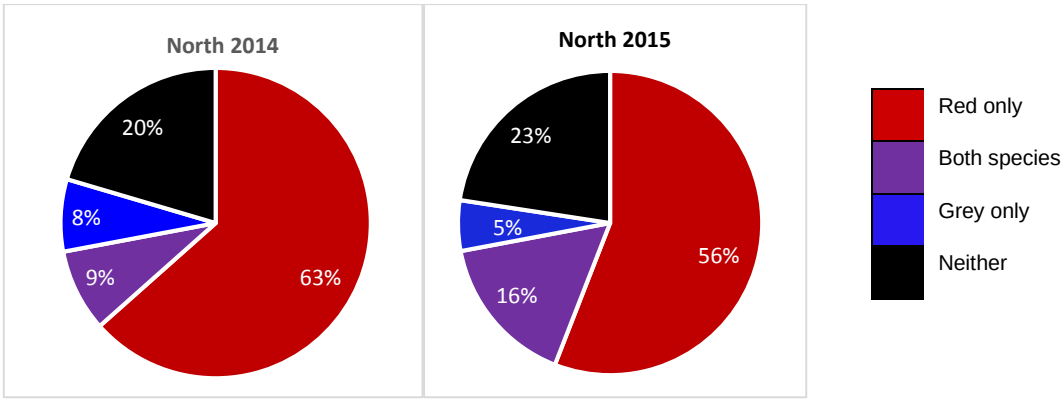
$$\frac{\text{(sum of values above the diagonal) - (sum of values below the diagonal)}}{\text{(the sum of all values in matrix except the “neither-neither” value)}}$$

A negative index represents a change in favour of red squirrels and a positive index represents a change in favour of grey squirrels.

The Replacement Index comparing Spring 2015 with Spring 2014 is calculated to be 0.06. This is an index showing very slight change in favour of grey squirrels.

A visual representation of the results is shown in Figure 2, clearly showing a shift from red-only to both species, although the overall proportion of tetrads with red squirrels remains constant at 72% in both years.

Figure 2. Proportions of the 93 matched tetrads with either species, both species or none detected in North East Scotland and the Central Lowlands, comparing 2015 with 2014



North East and Central Lowlands Combined: Spring 2013-Spring 2014

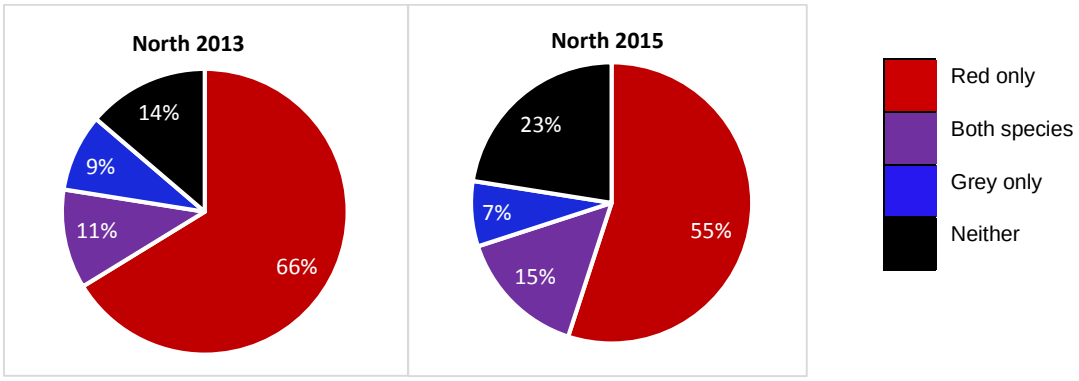
For the comparison between 2013 and 2015, there were 80 tetrads that were surveyed in both years.

Replacement Index Table: North East and Central Lowlands Combined: 2013-2015

		Spring 2015				
		Red	Both	Neither	Grey	*Total*
Spring 2013	Red	40	5	8	0	53
	Both	3	4	1	1	9
	Neither	1	2	8	0	11
	Grey	0	1	1	5	7
	Total	44	12	18	6	80

The greatest number of changes (15) were beneficial to grey squirrels, mostly through a loss of red squirrels from tetrads (9), but also an expansion of greys into 7 tetrads where there has previously been just reds or no squirrels. The Replacement Index for this survey period was calculated as 0.10, representing a change in favour of grey squirrels. (The change in proportions of red and grey squirrels was not statistically significant when tested by a two-sample binomial test.)

Figure 3. Proportions of the 80 matched tetrads with either species, both species or none detected in Aberdeenshire and the Central Lowlands, comparing 2015 with 2013



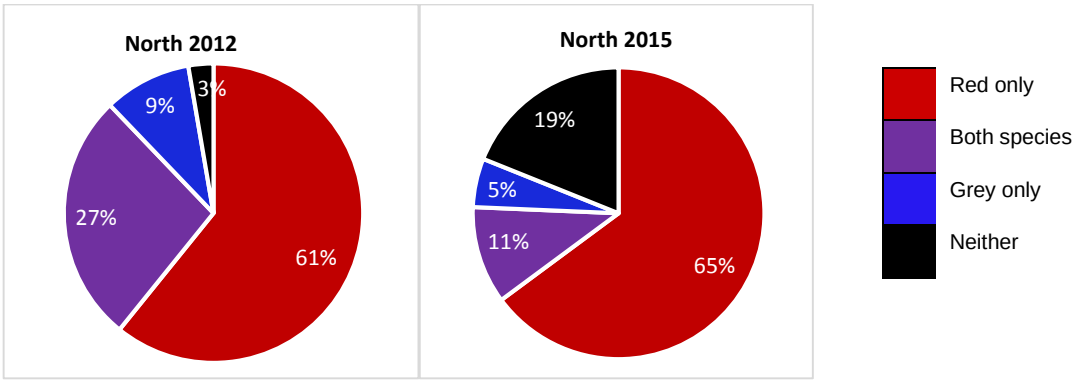
North East and Central Lowlands Combined: Spring 2012-Spring 2015

Replacement Index Table: North East and Central Lowlands Combined: 2012-2015

		Spring 2015				
		Red	Both	Neither	Grey	*Total*
Spring 2012	Red	31	5	9	0	45
	Both	15	2	3	0	20
	Neither	1	0	1	0	2
	Grey	1	1	1	4	7
	Total	48	8	14	4	74

For the comparison between 2012 and 2015, a sample of 74 tetrads were surveyed in both years. The larger numbers of changes (19) were beneficial to red squirrels, although 17 were beneficial to greys. A significant number of tetrads (15) lost grey squirrels to become “red only”. However, 12 tetrads lost reds to become squares where no squirrels were detected in 2015. Five tetrads gained greys to become squares with both species. Two tetrads appear to have gained red squirrels, changing to either “red only” or to “both species”. The Replacement Index for this survey period was calculated as -0.16, which represents a change in favour of red squirrels. (Highly significant decline in proportion of greys by two-sample binomial test.)

Figure 4. Proportions of the 74 matched tetrads with either species, both species or none detected in North East Scotland and the Central Lowlands, comparing 2015 with 2012



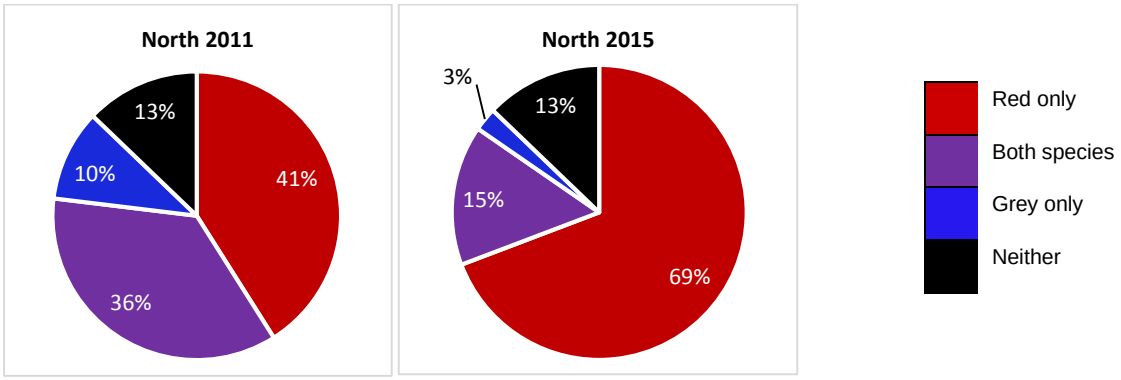
North East and Central Lowlands Combined: Spring 2011-Spring 2015

Replacement Index Table: North East and Central Lowlands Combined: 2011-2015

		Spring 2015				
		Red	Both	Neither	Grey	*Total*
Spring 2011	Red	14	1	1	0	16
	Both	9	2	3	0	14
	Neither	3	1	1	0	5
	Grey	1	2	0	1	4
	Total	27	6	5	1	39

For the comparison between 2011 (our first sampling year) and 2015, a sample of 39 tetrads were surveyed in both years. The larger numbers of changes (16) were beneficial to red squirrels, and only 5 were beneficial to greys. Seven tetrads (15) gained red squirrels to become “red only” or both. The Replacement Index for this survey period was calculated as --0.32, which represents a large change in favour of red squirrels. (Highly significant decline in proportion of greys by two-sample binomial test.)

Figure 5. Proportions of the 39 matched tetrads with either species, both species or none detected in North East Scotland and the Central Lowlands, comparing 2015 with 2011



South Scotland: Spring 2014-Spring 2015

The Spring 2014 and Spring 2015 samples for South Scotland allowed us to compare 66 tetrads that were sampled in both years.

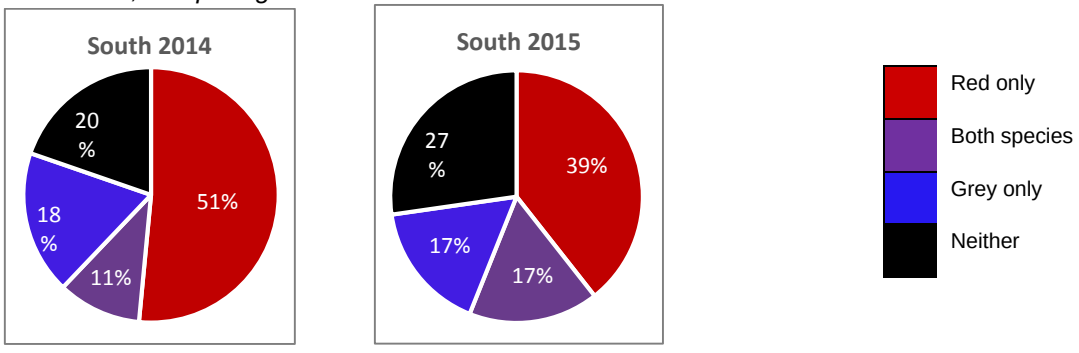
Replacement Index Table: South Scotland: 2014-2015

Spring 2014 \ Spring 2015	Red	Both	Neither	Grey	*Total*
Red	21	5	7	1	34
Both	3	2	0	2	7
Neither	2	1	10	0	13
Grey	0	3	1	8	12
Total	26	11	18	11	66

15 changes were beneficial to grey squirrels and only 7 were in favour of reds. Greys were detected in 5 tetrads that had previously held reds and reds were lost from 7 "red-only" tetrads." 5 tetrads became "red only", but greys were lost from only 1 tetrad. The overall proportion of red squirrels declined, although not statistically significantly. The proportion of grey squirrels increased – again not significantly according to statistical tests carried out (2-sample binomial test).

The Replacement Index for this survey period was calculated as +0.09, representing a small change in favour of grey squirrels.

Figure 5. Proportions of the 66 matched tetrads with either species, both species or none detected in South Scotland, comparing 2015 with 2014



South Scotland: Spring 2013-Spring 2015

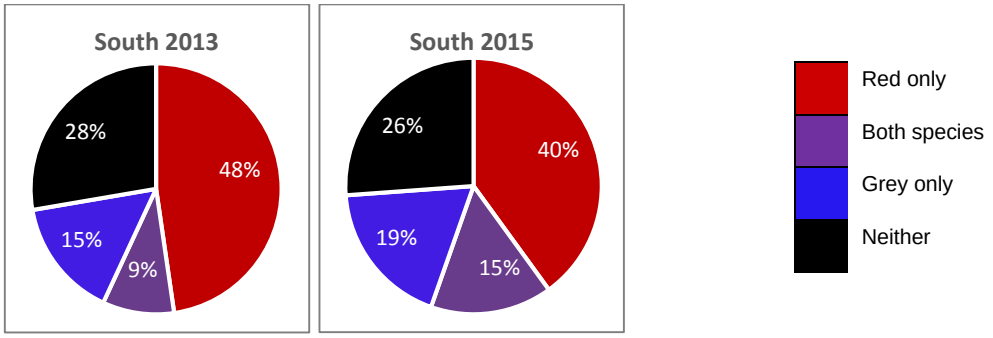
Comparing 65 Spring 2015 surveys with the same tetrads in Spring 2013 results:

Replacement Index Table: South Scotland: 2013-2015

Spring 2013 \ Spring 2015	Red	Both	Neither	Grey	*Total*
Red	21	4	4	2	31
Both	2	2	0	2	6
Neither	2	3	12	1	18
Grey	1	1	1	7	10
Total	26	10	17	12	65

In this case 13 changes favoured grey squirrels and 10 favoured red squirrels. Overall the Replacement Index summarising all changes was calculated to be +0.06, which represents a very small change in favour of grey squirrels. 10 "red only" squares in 2014 either gained grey squirrels or lost red squirrels by 2015. On the other hand 7 squares gained red squirrels and 2 lost greys. (Two sample binomial test found no significant difference between proportions of reds and greys from 2013 to 2015.)

Figure 6. Proportions of the 65 matched tetrads with either species, both species or none detected in South Scotland, comparing 2015 with 2013



5. DISCUSSION

The changes that the North Scotland surveys have detected over the year Spring 2013 to Spring 2015 suggest a picture of slight recovery of grey squirrel range and slight loss of red squirrel range. However, when 2015 is compared with either 2012 or 2013 we see a substantial improvement in the situation for red squirrels, with a definite decline in grey range. Statistical tests looking at the proportions of each species present over the 5 years (Two-Sample Binomial tests not presented here) show no significant change for red squirrels over the period, but a highly significant decline in grey squirrel presence since 2012.

Interestingly, when we examined results for the North East, Tayside and Argyll & Trossachs separately, we saw the same broad trends occurring in each region, with a sharp decline in greys early in the period (2011-2013), levels confined at the reduced range into 2015 or a very slight recovery. The only departure from the overall picture was a noticeable increase for red squirrel occurrence in the North East between 2011 and 2012, followed by relative stability or slight loss of range. The broad agreement between regions is suggestive of a nationwide

seasonal effect, probably through the combined effects of adverse winter conditions and fluctuating food tree crops on the two squirrel species.

In South Scotland the first systematic tetrad survey was conducted in 2013, and repeated in Spring 2014 and 2015. As for the northern half of the project, the data suggested a more or less stable situation for red squirrels overall, with the replacement index for South Scotland showing only small losses of red squirrel coverage between 2014 and 2015. Figure 5 shows a decrease from 62% to 56% of tetrads with red squirrels present. For the sample surveyed twice in 2013 and 2015, there was also a small change in red squirrel range from 57% to 55% (Figure 6). Neither change was statistically significant (two-sample binomial test).

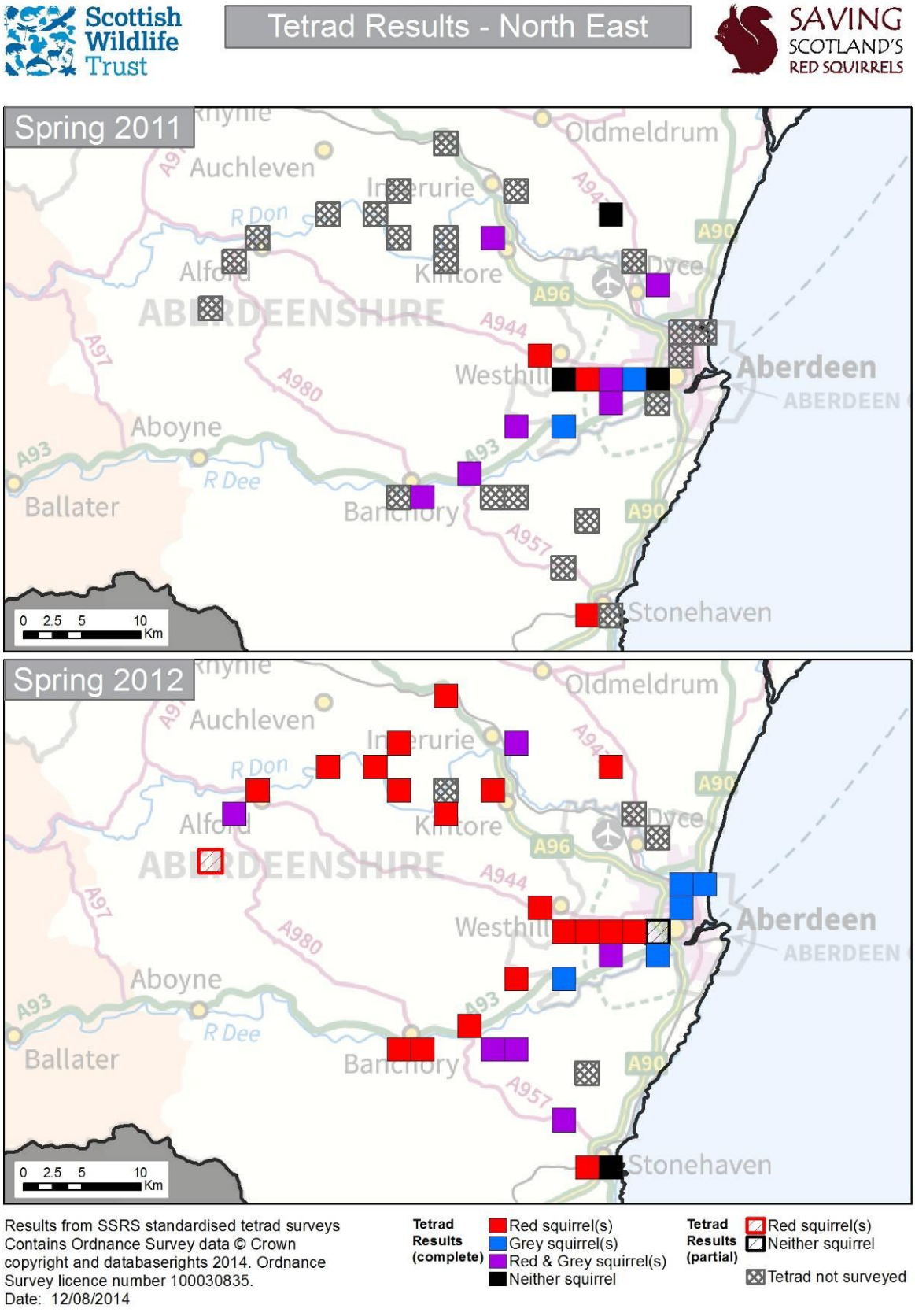
For grey squirrels, Figure 1b (all tetrads surveyed) appears to suggest a visible expansion in their range; however, Figure 5 (same tetrads surveyed both years) suggests a smaller increase from 29% to 34%, mostly due to a change from “red only” to “both species”. From 2013 to 2015 there was a larger shift from 24% to 34% coverage by grey squirrels (Figure 6: same tetrads surveyed in both years). 2015 was a year that also gave us far more new grey squirrel sightings records for many parts of Dumfries and Galloway, and our trapping figures also suggest an increase in grey squirrel numbers. The results displayed in Map 9 for 2015 show a large swathe of country from the Annan valley westwards to Glenkens where grey squirrels have now been detected for the first time in this series of surveys. We know that there have been grey squirrels present in low numbers in these areas for a while, but the previous two surveys did not detect them here, so we can assume that population numbers have increased in these areas to the point that detection has become more likely.

We will be repeating the surveys in Spring 2016. After an exceptional breeding year recorded for grey squirrels in 2015 the surveys are predicted to reveal greater changes in favour of greys than those we picked up in 2015. The many outsize grey squirrels (several in excess of 800g, and a few above 900g, compared with the “normal” adult weight of about 600g) being caught right across Scotland in the winter of 2015-16, suggests that the abundant beech and acorn availability from the previous autumn of 2014 is still conferring an advantage to greys over reds, despite a poor mast crop in autumn 2015.

With each passing year we learn more about squirrel population interactions and the effect on species range – thanks to the systematic data collected over the SSRS project period. This is essential in helping us to assess the effects of grey squirrel control on both red and grey squirrel populations, and to determine just how much effort will be necessary over the years to maintain the red squirrel population at viable size.

Saving Scotland’s Red Squirrels wishes to thank all the volunteers who gave up their time to help us collect this data, and all those landowners who co-operated by allowing us access to their land, without which this research would not be possible.

Figure 6. Maps comparing the results of tetrads for North East Scotland for Spring 2011-2015



Scottish Wildlife Trust

Tetrad Results - North East

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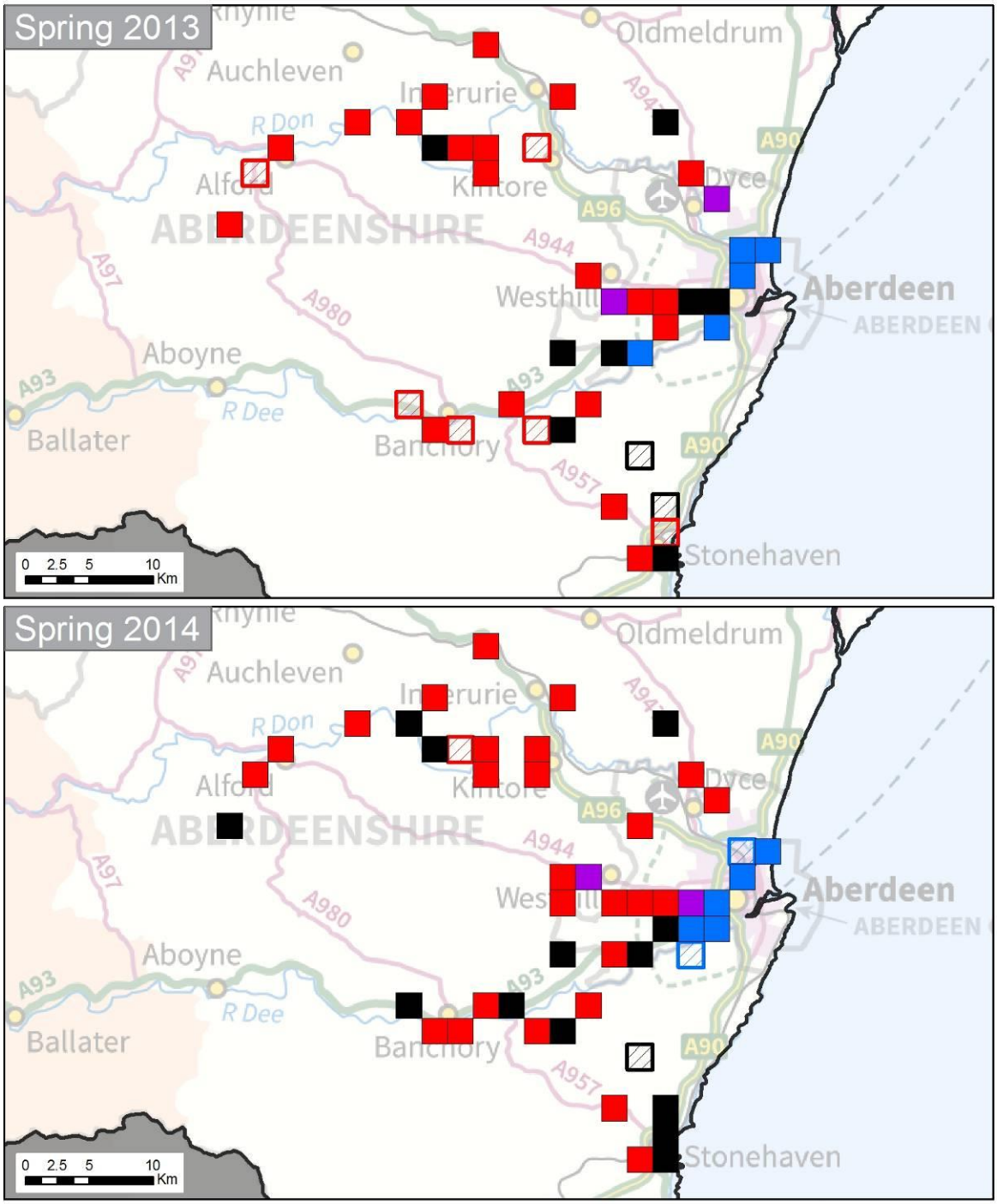


Results from SSRS standardised tetrad surveys
Contains Ordnance Survey data © Crown copyright and databaserights 2014. Ordnance Survey licence number 100030835.
Date: 12/08/2014

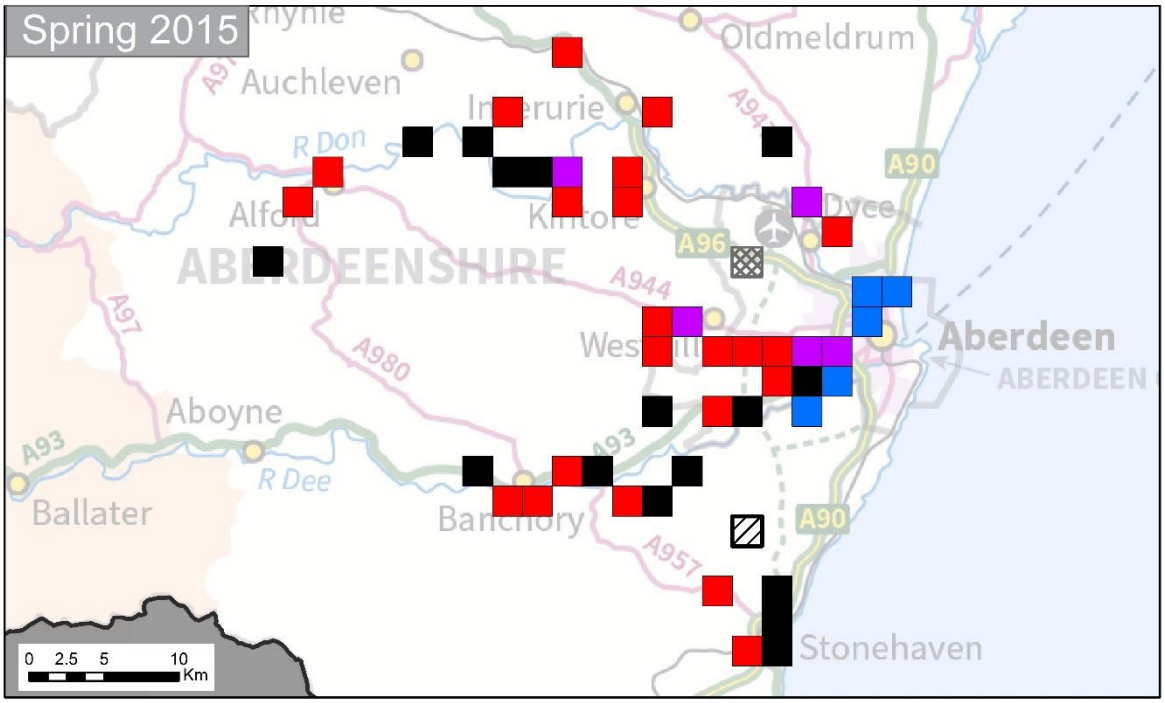
Tetrad Results (complete)
- Red squirrel(s)
- Grey squirrel(s)
- Red & Grey squirrel(s)
- Neither squirrel

Tetrad Results (partial)
- Red squirrel(s)
- Grey squirrel(s)
- Neither squirrel

Scottish Wildlife Trust

Tetrad Results - North East

SAVING SCOTLAND'S RED SQUIRRELS



Results from SSRS standardised tetrad surveys
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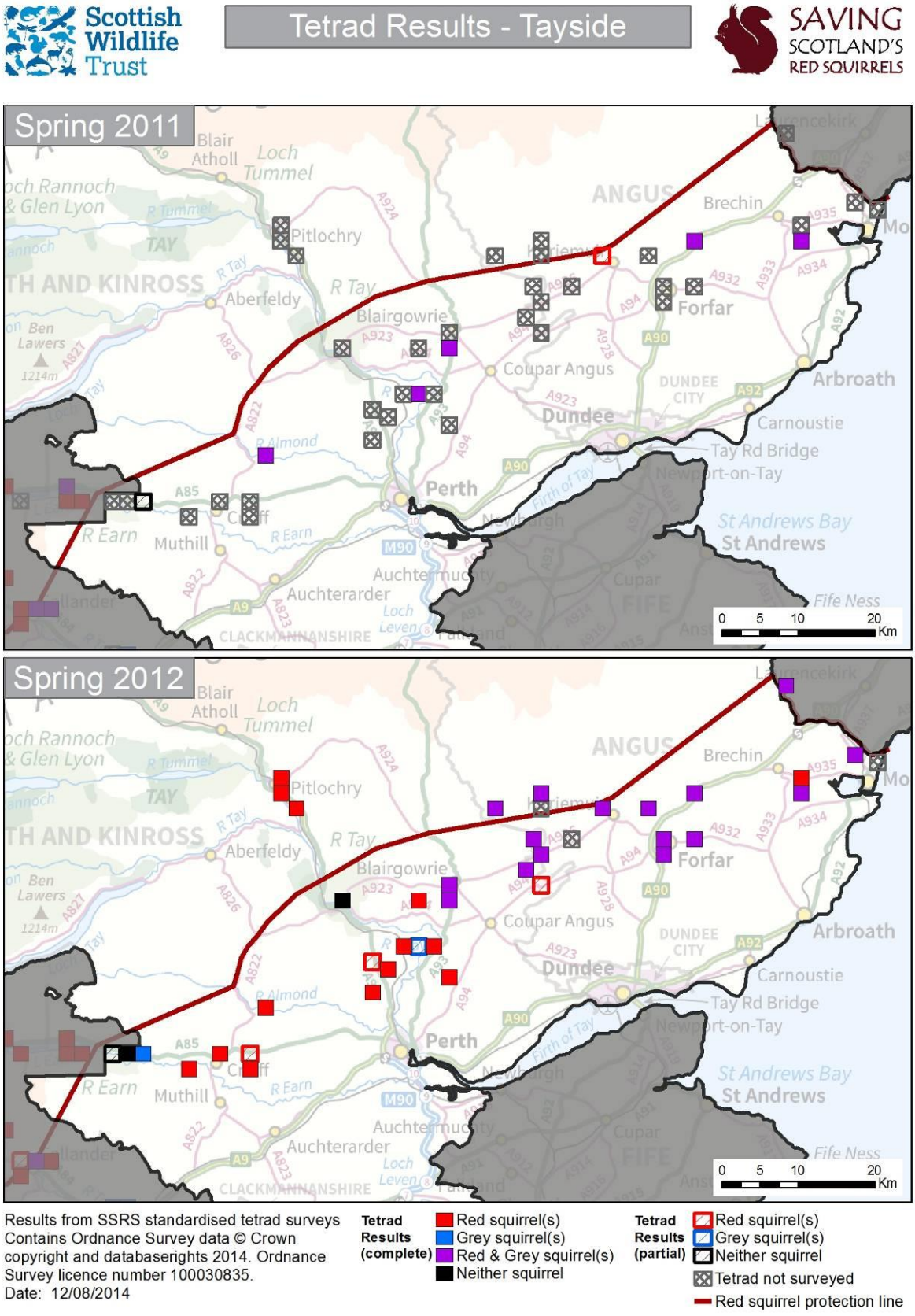
Date: 05/02/2016

Tetrad Results

- Red squirrel(s)
- Grey squirrel(s)
- Red_Grey squirrel(s)
- Neither squirrel
- Red squirrel(s) - Tetrad partially completed
- Neither squirrel - Tetrad partially completed
- Tetrad not surveyed

Figure 7. Maps comparing the results of tetrads for Tayside for Spring 2011-2015



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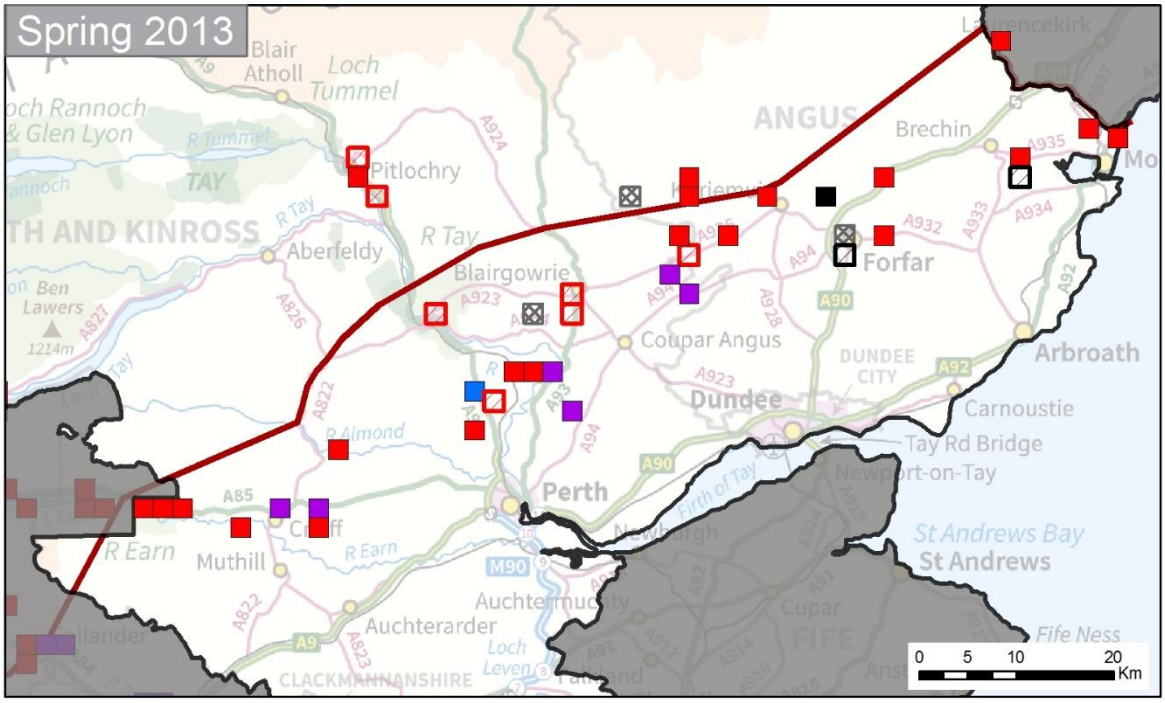
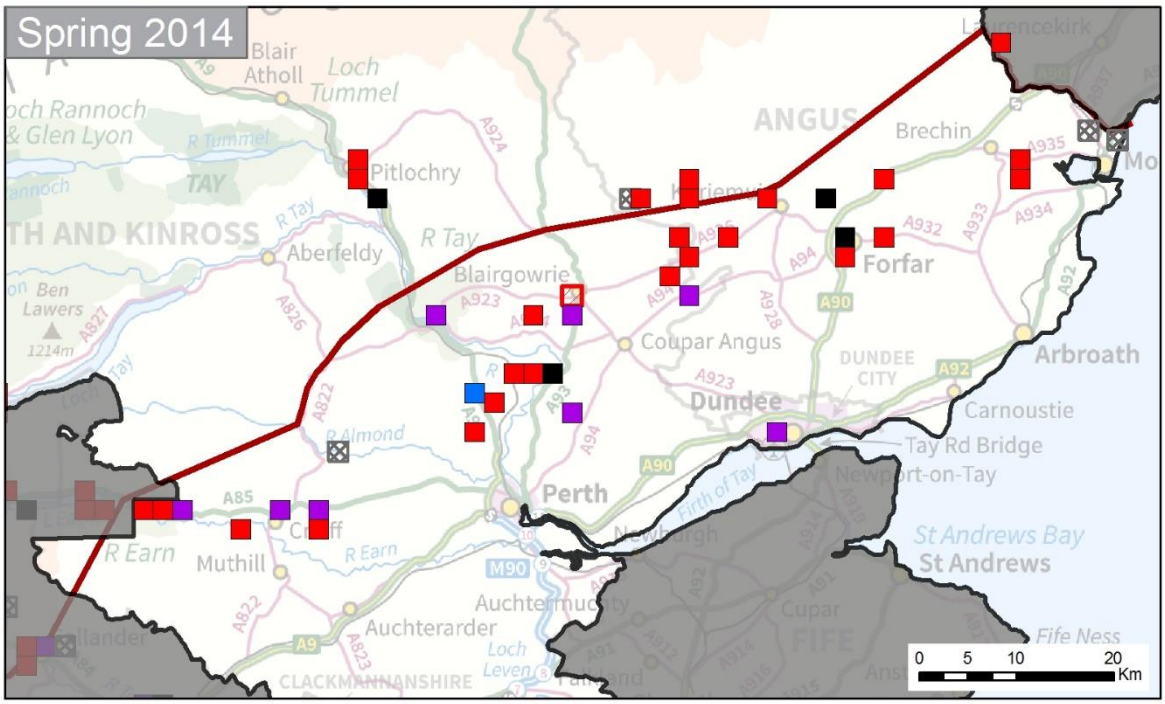
Tetrad Results - Tayside

SAVING SCOTLAND'S RED SQUIRRELS





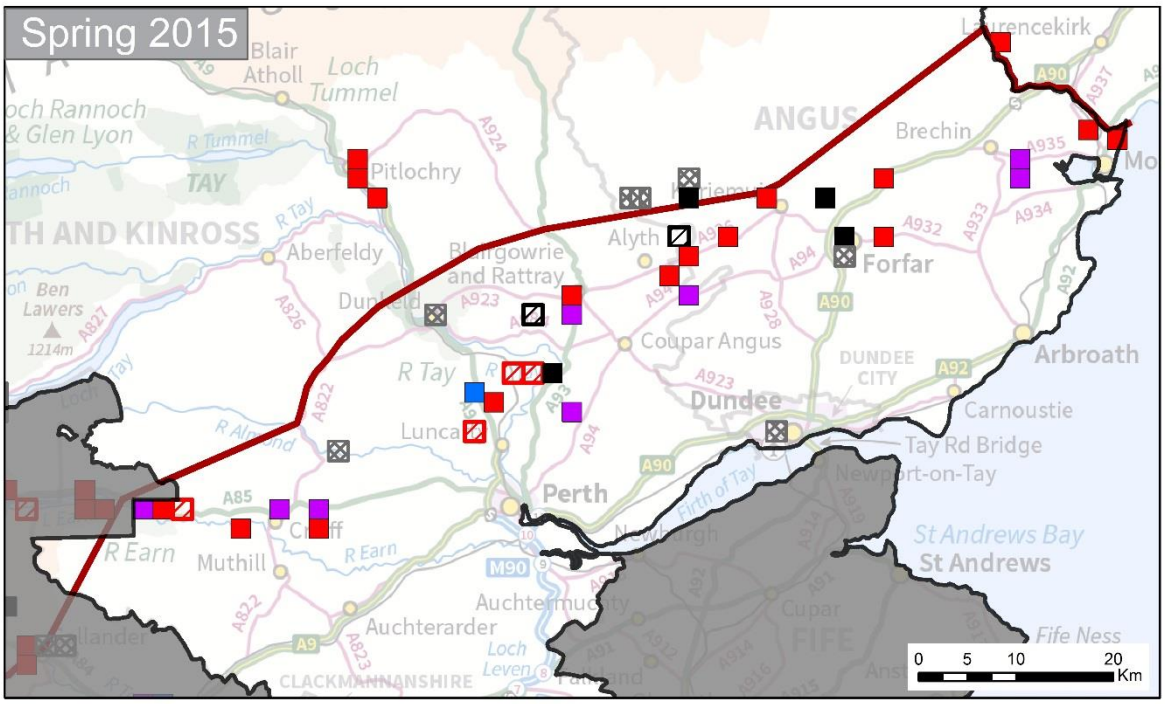
Results from SSRS standardised tetrad surveys

Date: 29/09/2014

Tetrad Results (complete)
- Red squirrel(s)
- Grey squirrel(s)
- Red & Grey squirrel(s)
- Neither squirrel

Tetrad Results (partial)
- Red squirrel(s)
- Neither squirrel
- Tetrad not surveyed
- Red squirrel protection line

Tetrad Results - Tayside



Results from SSRS standardised tetrad surveys
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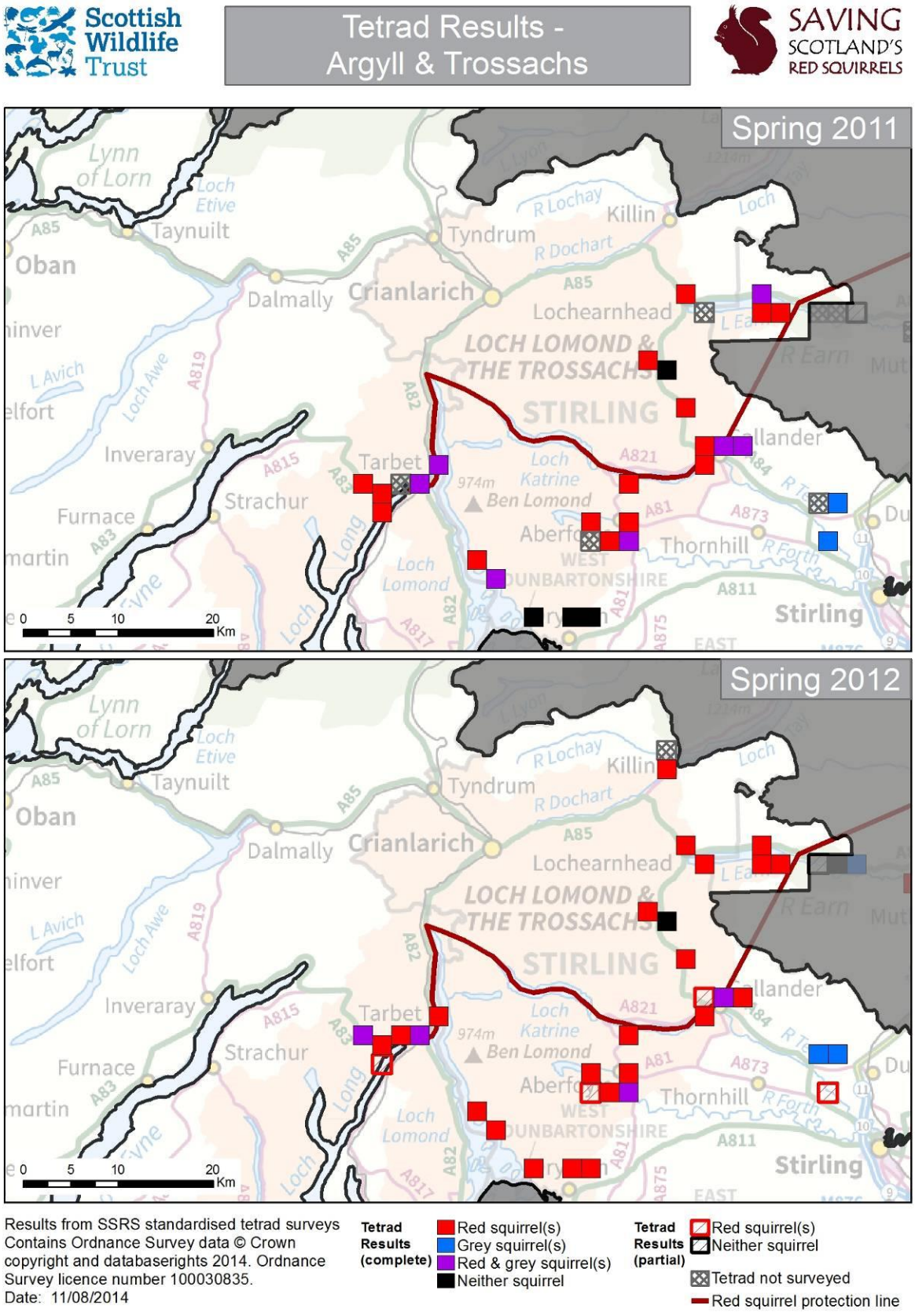
Date: 05/02/2016

Tetrad Results

- Red squirrel(s)
- Grey squirrel(s)
- Red_Grey squirrel(s)
- Neither squirrel
- Red squirrel(s) - Tetrad partially completed
- Neither squirrel - Tetrad partially completed
- Tetrad not surveyed
- Red squirrel protection line

Figure 8. Maps comparing the results of tetrads for Argyll & Trossachs for Spring 2011-2015



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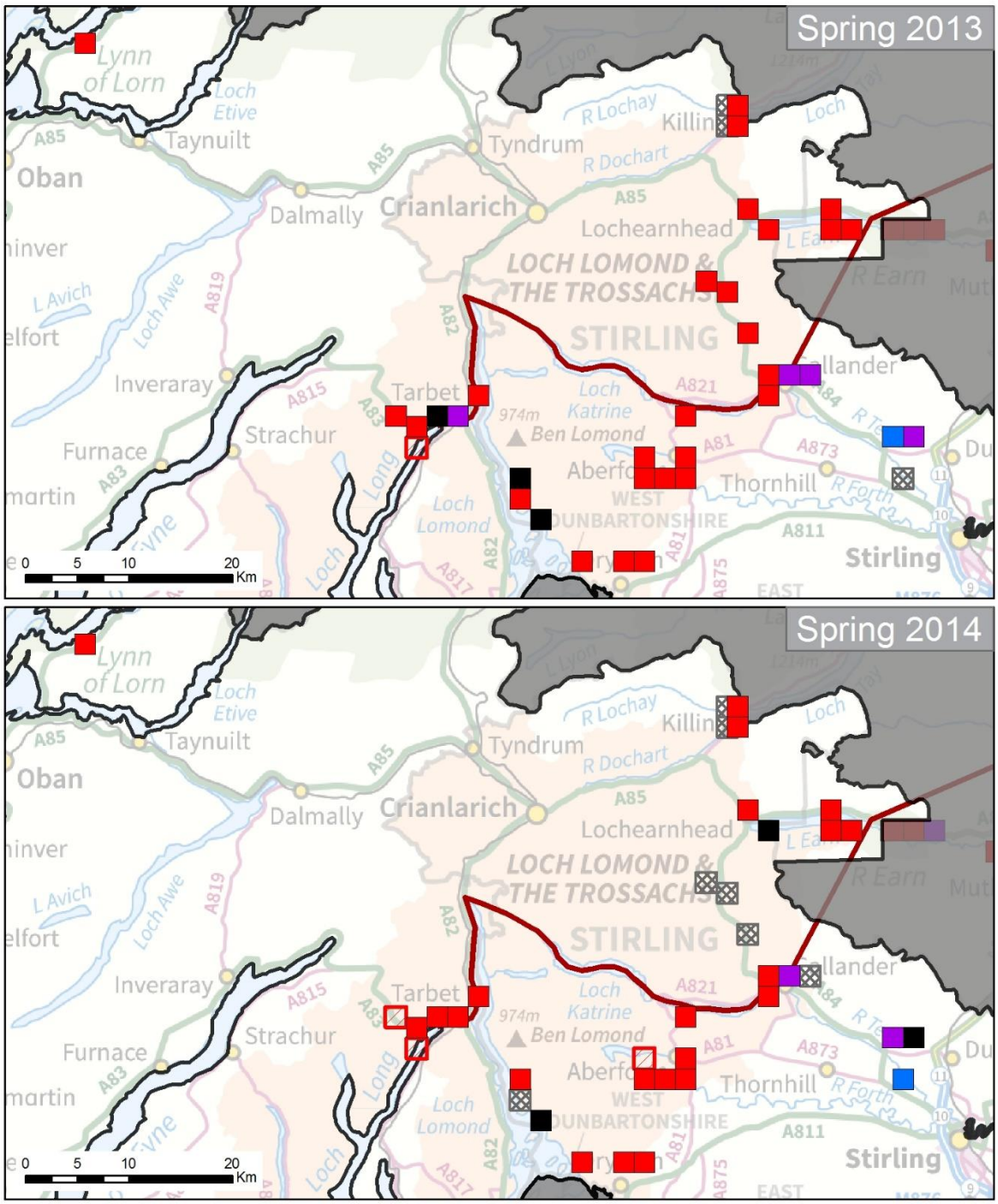
Tetrad Results - Argyll & Trossachs

SAVING SCOTLAND'S RED SQUIRRELS



Results from SSRS standardised tetrad surveys
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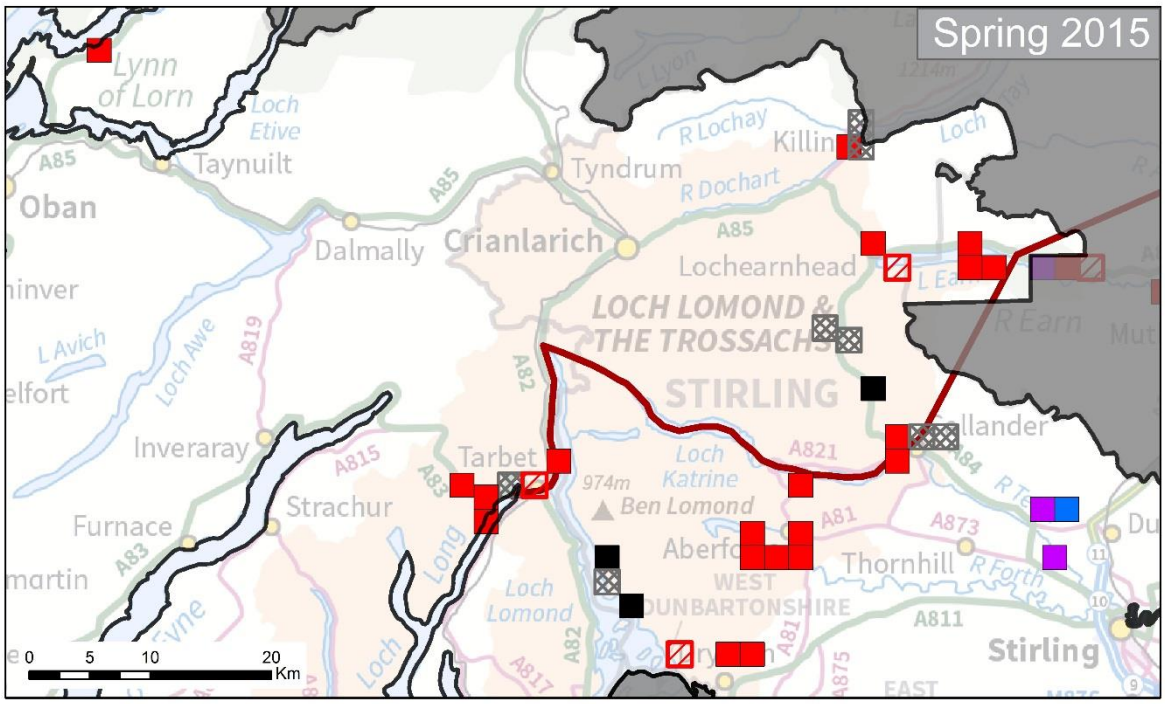
Date: 29/09/2014

Tetrad Results (complete)
- Red squirrel(s)
- Grey squirrel(s)
- Red & Grey squirrel(s)
- Neither squirrel

Tetrad Results (partial)
- Red squirrel(s)
- Tetrad not surveyed

Red squirrel protection line

Tetrad Results - Argyll & Trossachs



Results from SSRS standardised tetrad surveys
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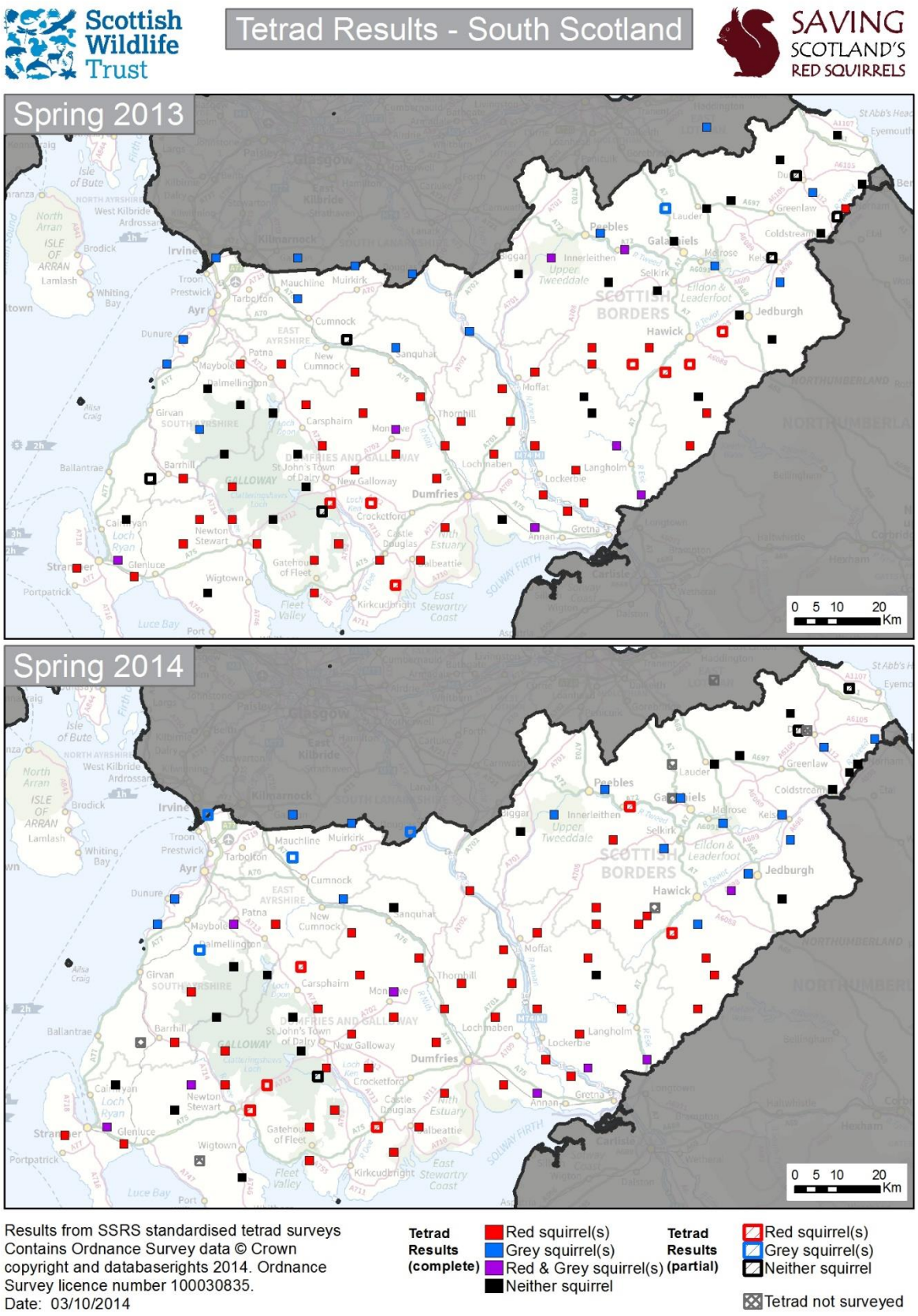
Date: 05/02/2016

Tetrad Results

- Red squirrel(s)
- Grey squirrel(s)
- Red_Grey squirrel(s)
- Neither squirrel
- Red squirrel(s) - Tetrad partially completed
- Tetrad not surveyed
- Red squirrel protection line

Figure 9. Maps comparing the results of tetrads for South Scotland for Spring 2013-2015



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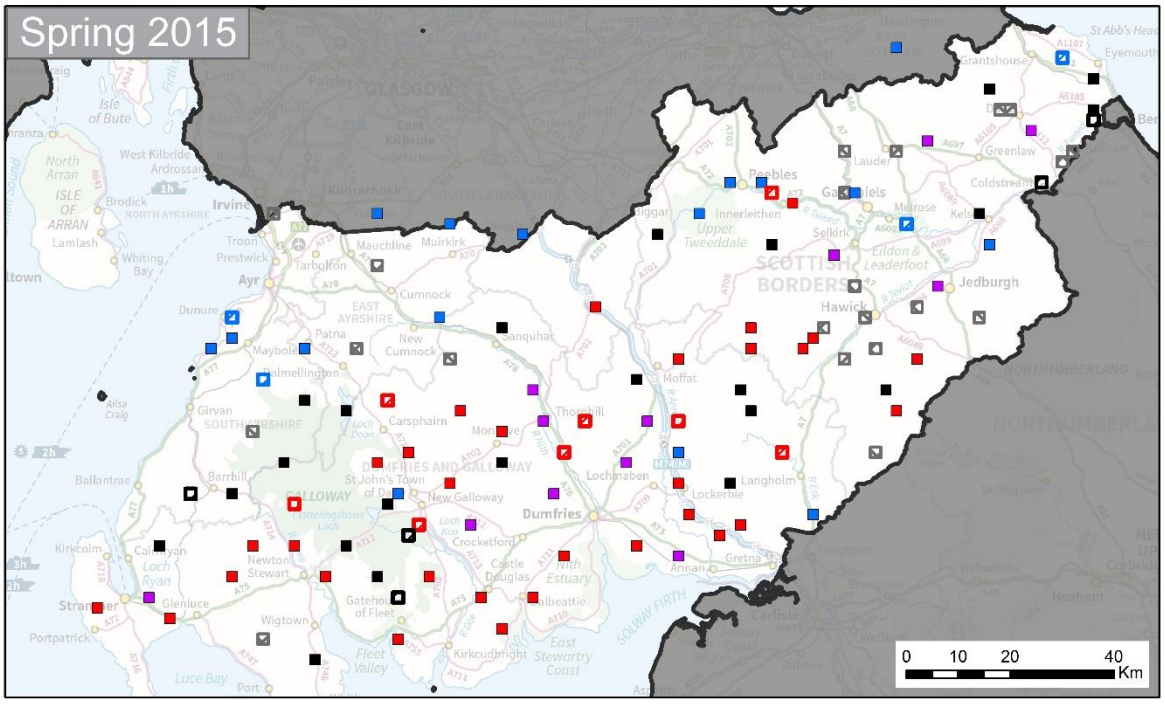
Tetrad Results - South Scotland

SAVING SCOTLAND'S RED SQUIRRELS



Results from SSRS standardised tetrad surveys
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Date: 04/03/2016

- Red squirrel(s)
- Grey squirrel(s)
- Red_Grey squirrel(s)
- Neither squirrel
- Red squirrel(s) - Tetrad partially completed
- Grey squirrel(s) - Tetrad partially completed
- Neither squirrel - Tetrad partially completed
- Tetrad not surveyed

Tetrad Results 2015

North East		Argyll & Trossachs		Tayside	
Tetrad	**Species**	**Tetrad**	**Species**	**Tetrad**	**Species**
NJ5210	Neither	NM9440	Red only	NN7222	Both species
NJ5414	Red only	NN2404	Red only	NN7422	Red only
NJ5616	Red only	NN2601	Red only	NN7622	*Red only
NJ6218	Neither	NN2603	Red only	NN8220	Red only
NJ6618	Neither	NN3004	*Red only	NN8622	Both species
NJ6816	Neither	NN3206	Red only	NN9020	Red only
NJ6820	Red only	NN4800	Red only	NN9022	Both species
NJ7016	Neither	NN5200	Red only	NN9456	Red only
NJ7214	Red only	NN5204	Red only	NN9458	Red only
NJ7216	Both species	NN5632	Red only	NN9654	Red only
NJ7224	Red only	NN5812	Neither	NO0630	*Red only
NJ7614	Red only	NN5824	Red only	NO0634	Grey only
NJ7616	Red only	NN6006	Red only	NO0833	Red only
NJ7800	Neither	NN6008	Red only	NO1036	*Red only
NJ7804	Red only	NN6022	*Red only	NO1236	*Red only
NJ7806	Red only	NN6622	Red only	NO1242	*Neither
NJ7820	Red only	NN6624	Red only	NO1436	Neither
NJ8006	Both species	NN6822	Red only	NO1632	Both species
NJ8200	Red only	NN7202	Both species	NO1642	Both species
NJ8204	Red only	NN7402	Grey only	NO1644	Red only
NJ8400	Neither	NN7690	Grey only	NO2646	Red only
NJ8404	Red only	NS3698	Neither	NO2750	*Neither
NJ8602	Red only	NS3894	Neither	NO2844	Both species
NJ8604	Red only	NS4290	*Red only	NO2848	Red only
NJ8618	Neither	NS4690	Red only	NO2854	Neither
NJ8800	Grey only	NS4890	Red only	NO3250	Red only
NJ8802	Neither	NS4898	Red only	NO3654	Red only
NJ8804	Both species	NS5098	Red only	NO4254	Neither
NJ8814	Both species	NS5280	Grey only	NO4450	Neither
NJ9002	Grey only	NS5298	Red only	NO4850	Red only
NJ9004	Both species	NS7398	Both species	NO4856	Red only
NJ9012	Red only	NS8286	Grey only	NO6070	Red only
NJ9206	Grey only			NO6256	Both species
NJ9208	Grey only			NO6258	Both species
NJ9408	Grey only			NO6961	Red only
NO6696	Neither			NO7260	Red only
NO6894	Red only			NO4462	*Red only
NO7094	Red only			NO6204	Neither
NO7296	Red only				
NO7496	Neither				
NO7694	Red only				
NO7894	Neither				
NO8096	Neither				
NO8288	Red only				
NO8484	Red only				
NO8492	*Neither				
NO8684	Neither				
NO8686	Neither				
NO8688	Neither				

* Tetrad only completed partially so not included in analysis

SOUTH SCOTLAND					
Tetrad	**Species**	**Tetrad**	**Species**	**Tetrad**	**Species**
NS2208	Grey only	NT6048	Both	NX7854	Red only
NS2610	Grey only	NT6220	Both	NX7886	Neither
NS2614	*Grey only	NT7034	Neither	NX7892	Red only
NS3202	*Grey only	NT7228	Grey only	NT8050	Both
NS3335	Grey only	NT7258	Neither	NT8240	*Neither
NS4008	Grey only	NT7854	Both	NT8664	*Grey only
NS5206	Neither	NX1270	Neither	NT9252	*Neither
NS5426	Grey only	NX1456	Red only	NT9254	Neither
NS5434	Grey only	NX1880	*Neither	NT9260	Neither
NS6614	Grey only	NX2664	Red only	NX0058	Red only
NS6832	Grey only	NX2680	Neither	NX1060	Both
NS7812	Neither	NX3070	Red only	NX8460	Red only
NS8230	Grey only	NX3686	Neither	NX8694	Both
NS8400	Both	NX3870	Red only	NX8880	Both
NS9616	Red only	NX3878	*Red only	NX9068	Red only
NT0402	Neither	NX4098	Neither	NX9088	*Red only
NT0830	Neither	NX4248	Neither	NX9494	*Red only
NT1206	Red only	NX4464	Red only	NY0286	Both
NT1634	Grey only	NX4870	Neither	NY0470	Red only
NT2240	Grey only	NX4896	Neither	NY0694	Both
NT2400	Neither	NX5464	Neither	NY1268	Both
NT2608	Red only	NX5486	Red only	NY1282	Red only
NT2612	Red only	NX5678	Neither	NY1288	Grey only
NT2840	Grey only	NX5698	*Red only	NY1294	*Red only
NT3028	Neither	NX5852	Red only	NY1476	Red only
NT3038	*Red only	NX5860	*Neither	NY2072	Red only
NT3436	Red only	NX5880	Grey only	NY2282	Neither
NT3608	Red only	NX6072	*Neither	NY2474	Red only
NT3810	Red only	NX6088	Red only	NY2696	Neither
NT4226	Both	NX6274	*Red only	NY3288	*Red only
NT4638	Grey only	NX6464	Red only	NY3876	Grey only
NT5200	Neither	NX6882	Red only	NY5496	Red only
NT5466	Grey only	NX7096	Red only		
NT5632	*Grey only	NX7274	Both		
NT5806	Red only	NX7460	Red only		

* Tetrad only completed partially so not included in analysis