What happened to the built environment in one year? Atlas of change in Scotland 2016 to 2017.

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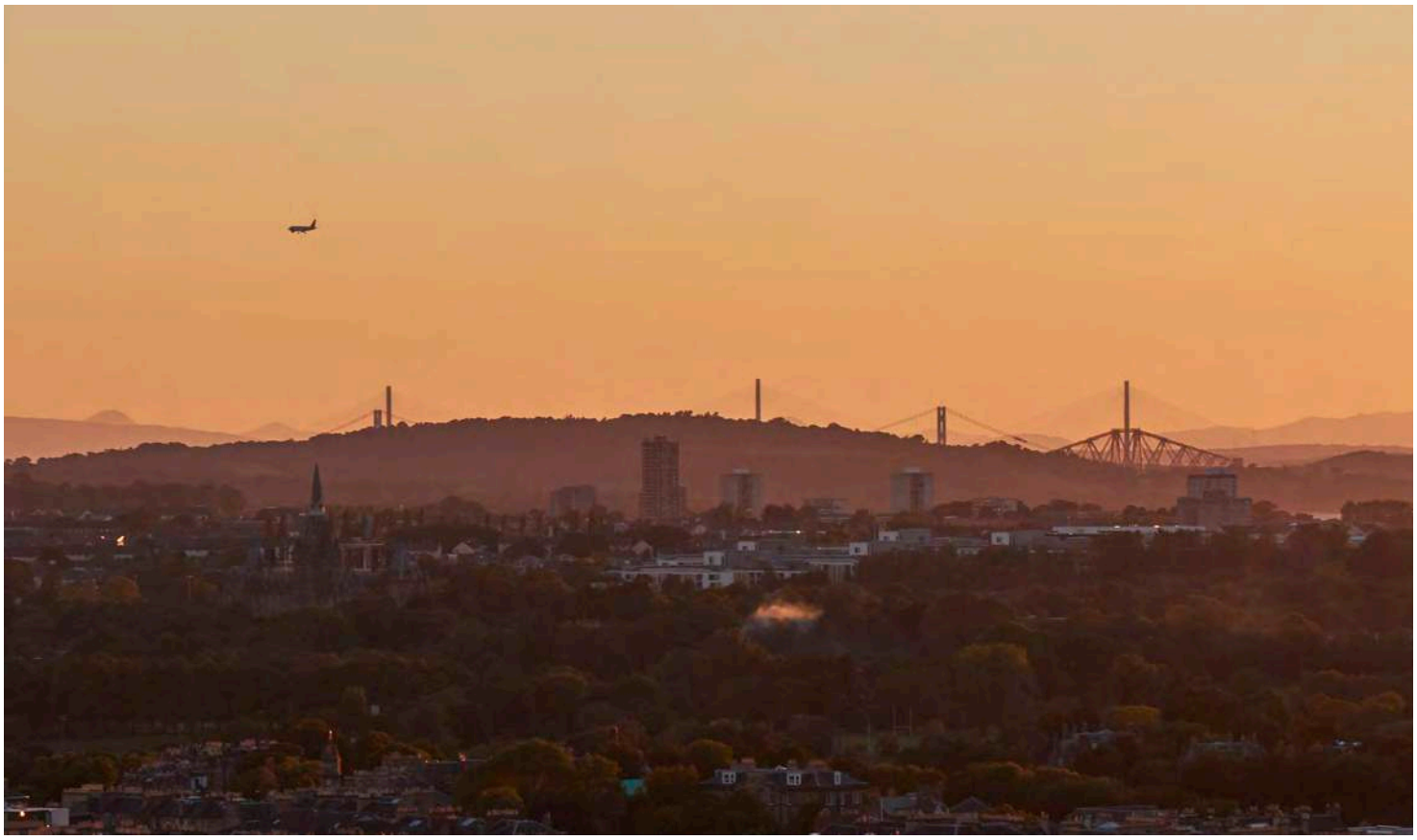

MRC/CSO Social and Public Health Sciences Unit

MRC Medical Research Council

CHIEF SCIENTIST OFFICE

University of Glasgow

What happened to the built environment in one year? Atlas of change in Scotland 2016 to 2017.

***Laura Macdonald, Rich Mitchell**

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Clackmannanshire

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Background

The UK has some of the best longitudinal data about people's lives and their health in the world (UK Data Service, 2018) and these have proved incredibly useful in understanding health, how health inequalities have developed over time, and how change in people's individual circumstances can affect their chances of good health. However, in order to understand the role of neighbourhood environment in protecting or harming health, we also need longitudinal data on environment which we could join to these data on individuals. Some environmental characteristics, such as air pollution, are quite well captured over time but there is a particular gap in data about the built environment, facilities and infrastructure. The data displayed in this atlas are a product of a project which focused on retrospectively creating longitudinal measures of neighbourhood built and social environment, for very large numbers of towns, cities and settlements. To undertake this task, we obtained Ordnance Survey map data from Digimap, a web mapping and online data delivery service developed by the EDINA national data centre (Digimap, 2018). These maps are regularly updated, so can provide a picture of how our built environment changes year to year, by comparing one year's map to the previous year's. We have identified changes in very large numbers of towns and cities, over a relatively short period of time (1 year), and hope to look at change over longer periods (5 to 10 years). We will then join this information on environmental change to data about health and health behaviour, asking questions about the extent to which they have been affected.

Project aims: To develop a robust methodology to quantify change in built environment and selected features (i.e. buildings, roads and woodland) between two time points (October 2016 to October 2017) using Ordnance Survey data, and to describe built environment change across Scotland and by Council Area.

Methods

Ordnance Survey Data

Ordnance Survey Open Map Local (OML) data was downloaded from EDINA Digimap for Scotland for October 2016 and October 2017. OML is a detailed street-level open data vector mapping product including buildings, roads, woodland, etc. (see figure 1). Council Area (CA) boundaries were downloaded from the Small Area Statistics PACkage (SASPAC, 2018). Background maps included in figures were obtained from Ordnance Survey (OS Open Background (Ordnance Survey, 2018)).

Creation of Scotland grid

ArcMap version 10.3 was used to create a fishnet grid for the whole of Scotland containing 500m by 500m grid cells (see figure 1).

Figure 1. Open Map Local data over-laid with fishnet grid.

Calculating change in features over time

For 2016 and for 2017, building centroids, road sections, and woodland sections, were spatially joined to grid cells. For each cell, a count of buildings, the sum of length of road sections, and the sum of area of woodland, were calculated. Building, road and woodland change was calculated for each cell between the two time points and categorised as loss, gain or no change.

Summarising change

The proportion of cells gaining or losing buildings, roads or woodland was calculated for Scotland as a whole and for each CA individually. For calculating proportions of cells losing or gaining buildings, the denominator used was the number of cells with buildings in 2016 and/or 2017 (alternatively to all cells in Scotland). For proportions of cells losing or gaining roads, the denominator used was the number of cells with roads in 2016 and/or 2017, and likewise for calculating proportions of cells losing or gaining woodland, the denominator was the number of cells with woodland in 2016 and/or 2017. We recognise that this is one particular way to express change and other ways may be equally valid.

Results

Change across Scotland

Table 1 shows the proportions of cells with gain, loss or no change in buildings, roads and woodlands across Scotland as a whole. Buildings and roads showed similar proportions of cells with some change (around 12%), while for woodland around 20% of cells showed change. Proportions of cells showing gain in features were higher than those losing them, for all three features.

Table 1. Percentage (number) of cells with loss/gain/no change in buildings, roads and woodland within Scotland (2016 to 2017)

Cells with:	% (N)	% (N)	% (N)
	Buildings	**Roads**	**Woodland**
Gain	7.6 (6158)	6.8 (9117)	11.3 (18974)
Loss	4.0 (3195)	5.4 (7313)	8.9 (14880)
No change	88.4 (71491)	87.8 (118051)	79.8 (133799)
Total	100.0 (80844)	100.0 (134481)	100.0 (167563)

If including all cells across Scotland as the denominator (n=314833), proportions appear much smaller; 2% of cells show building gain and 1% show building loss, 2.9% show road gain and 2.3% road loss, while 6.0% show woodland gain and 4.7% loss (table not shown).

Table 2 shows more detail for loss and gain of features. For the majority of cells, changes in buildings, roads and woodland, were generally small. Around 94% of cells (with buildings in 2016 and/or 2017) gained fewer than 10 buildings, and 99% lost fewer than 10 buildings. Less than 7% gained 10 or more buildings, while 1% lost 10 or more. 98% of cells gained less than 1000m of roads and around 90% lost less than 1000m. Over half of cells gained, and

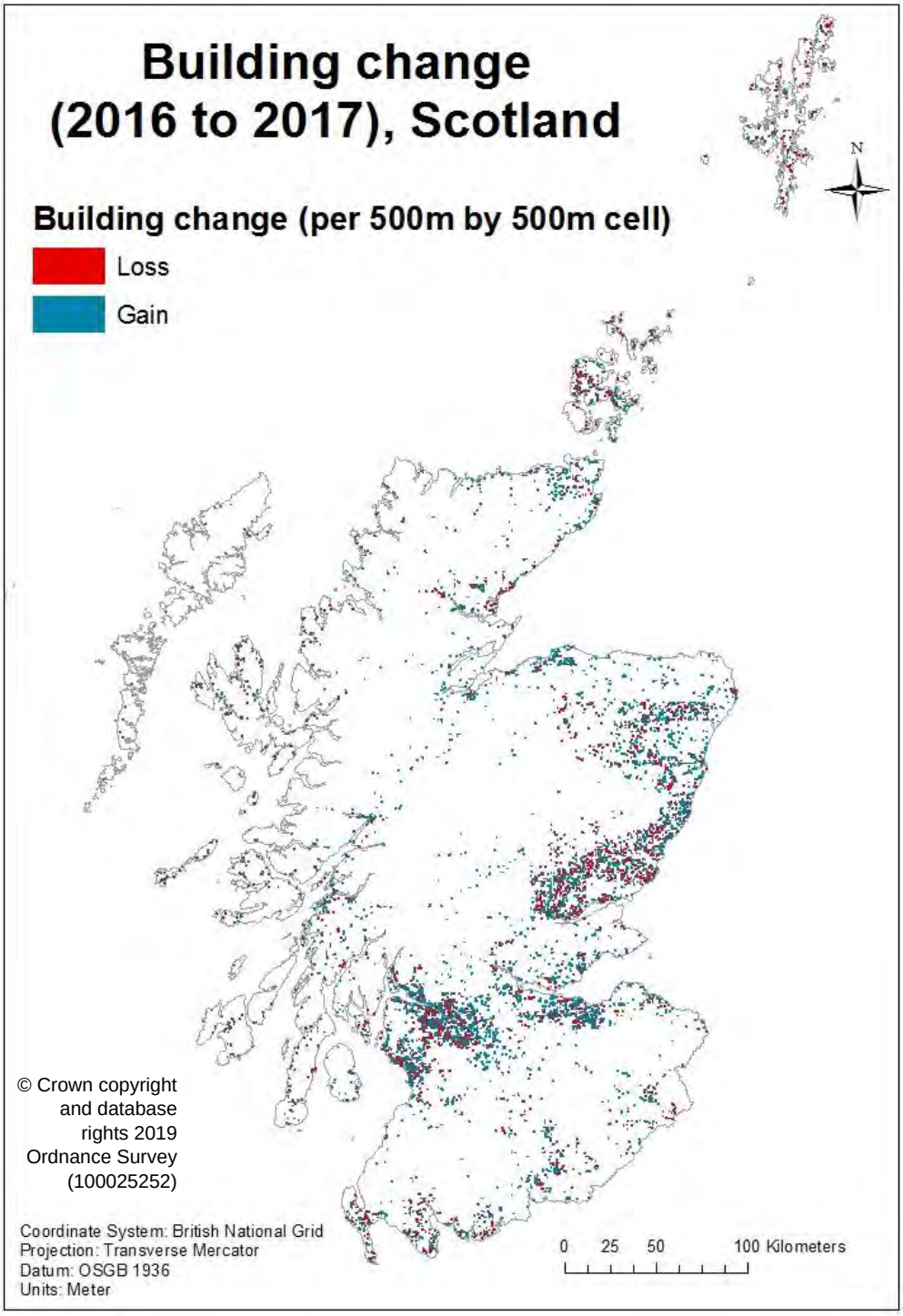
70% of cells lost, fewer than 1000m² of woodland, while 44% of cells gained, and around under a third lost, >1000m² of woodland.

Table 2. Percentage (number) of cells with gain/loss of buildings, roads and woodland in Scotland (2016 to 2017)

		% (N) Gain	% (N) Loss
Building	**1 to 4**	86.9 (5352)	96.5 (3082)
(numbers)	**5 to 9**	6.7 (411)	2.6 (82)
	10+	6.5 (395)	1.0 (31)
	Total	100.0 (6158)	100.0 (3195)
Road	**<100m**	46.1 (4202)	51.2 (3747)
(metres)	**100 to 999m**	52.5 (4788)	47.9 (3503)
	>1000m	1.4 (127)	0.9 (63)
	Total	100.0 (9917)	100.0 (7313)
Woodland	**<100m²**	32.6 (6194)	42.8 (6374)
(square metres)	**100 to 999m²**	23.6 (4473)	27.7 (4117)
	>1000m²	43.8 (8307)	29.5 (4389)
	Total	100.0 (18974)	100.0 (14880)

Figures 2, 3 and 4 show cell loss and gain of buildings, roads and woodland (respectively). Figures 2 displays cells experiencing loss or gain of buildings over the two time points; the majority of change occurred in built up areas within the central belt and down the east coast of Scotland, however change can also be seen within more rural areas including the Scottish Islands. Figure 3 shows cells which experienced loss or gain of roads; there appears to be number of cells experiencing road gain in the central belt and road loss to the north of Scotland. Within figure 4 it can be seen that woodland gain is more common than woodland loss, with extensive areas of gain down the east coast and west of the central belt.

Figure 2.


Building change
(2016 to 2017), Scotland
N
Building change (per 500m by 500m cell)
Loss
Gain
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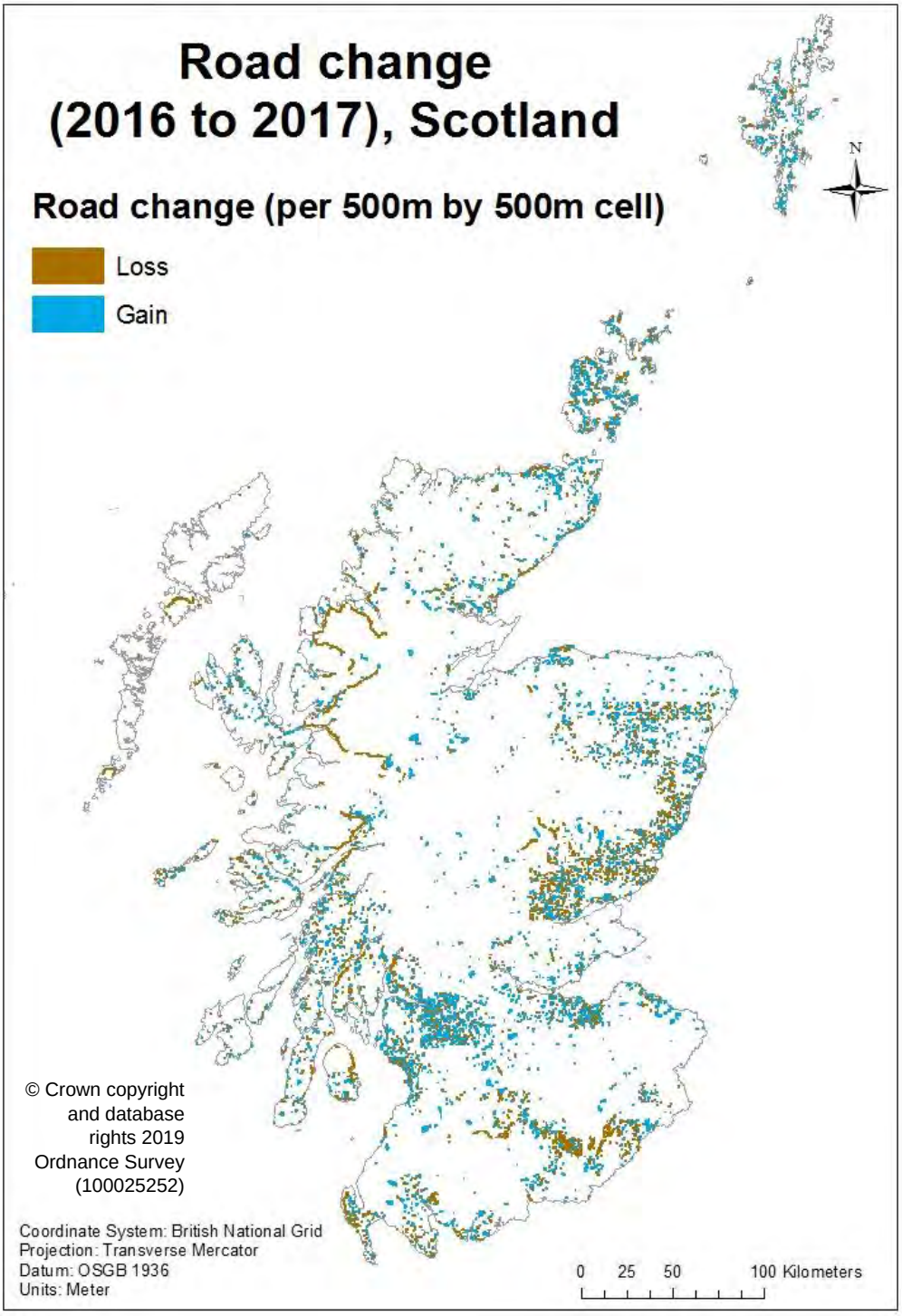
Ordnance Survey
(100025252)
Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter
0 25 50 100 Kilometers

Figure 3.


Road change
(2016 to 2017), Scotland
Road change (per 500m by 500m cell)
Loss
Gain
N
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Ordnance Survey
(100025252)
Coordinate System: British National Grid
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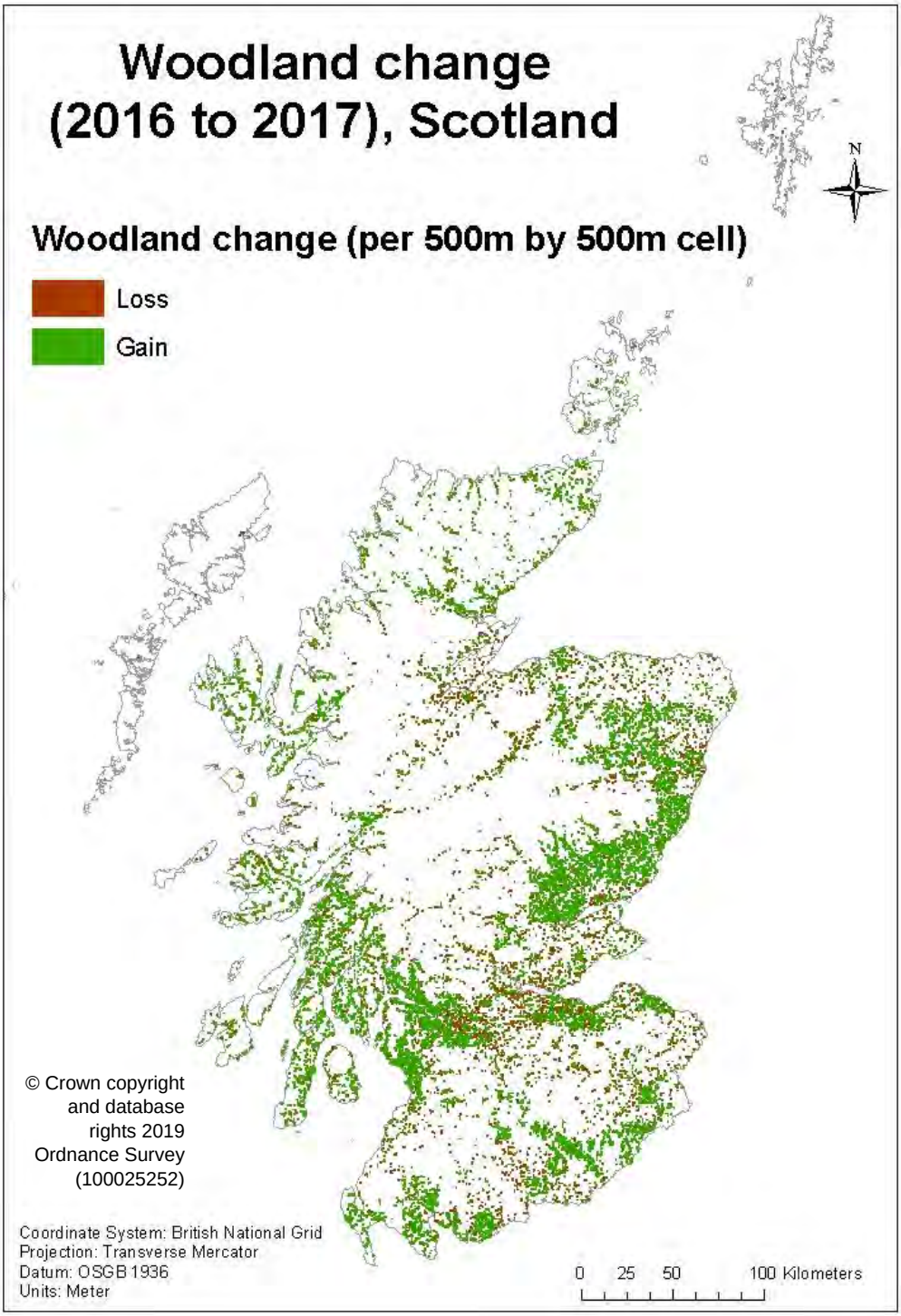
Units: Meter
0 25 50 100 Kilometers

Figure 4.


Woodland change
(2016 to 2017), Scotland
N
Woodland change (per 500m by 500m cell)
Loss
Gain
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Ordnance Survey
(100025252)
Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter
0 25 50 100 Kilometers

Change across Council Areas

Table 3 shows the percentage of cells with building gain and loss, road gain and loss, woodland gain and loss for each of the 32 Council Areas (CA) in Scotland. See appendix (pages 19 to 240) for associated figures. Size of CAs vary with some covering large geographical areas; larger CAs have been divided up over a number of figures. The zoom tool can be used to focus in on areas of interest (e.g. zoom to 200%+).

Table 3. Percentage of cells with gain/loss of buildings, roads and woodland by Council Area (2016 to 2017)

Council Area	Building		Road		Woodland	
	gain	loss	gain	loss	gain	loss
Aberdeen City	8.5	2.0	11.5	3.5	18.8	15.6
Aberdeenshire	6.4	2.7	5.6	4.4	12.8	9.9
Angus	10.5	8.2	8.4	10	29.1	13.5
Argyll and Bute	10.9	6.4	9.2	8.2	16.1	15.5
City of Edinburgh	17.1	6.8	16.2	7.1	25.3	26.6
Clackmannanshire	4.9	1.2	2.6	2.1	8.4	7.2
Dumfries and Galloway	5.0	3.0	4.7	6.5	11.1	6.1
Dundee City	12.6	7.4	17.9	12.1	23.6	20.0
East Ayrshire	4.6	2.7	4.0	1.2	5.2	4.4
East Dunbartonshire	17.3	8.9	17.4	4.8	19.1	19.1
East Lothian	6.9	2.7	6.2	3.7	14.6	9.2
East Renfrewshire	18.8	13.4	25.7	7.6	27.6	18.5
Falkirk	6.2	2.0	5.1	1.0	8.5	9.8
Fife	5.3	1.7	2.9	1.3	7.3	7.3
Glasgow City	12.2	8.3	13.5	5.8	22.0	24.3
Highland	7.6	3.5	6.4	5.7	7.5	6.8
Inverclyde	18.2	7.8	16.7	8.8	27.7	23.7
Midlothian	14.0	6.3	11.1	7.9	17.6	16.2
Moray	5.5	2.1	4.8	3.0	8.8	8.5
Na h-Eileanan an Iar	1.9	0.2	0.5	3.3	0.6	1.0
North Ayrshire	20.9	7.8	16.7	12.4	29.1	17.7
North Lanarkshire	8.1	2.3	7.9	1.8	9.9	13.0
Orkney Islands	9.9	2.3	24.8	15.7	35.7	14.7
Perth and Kinross	8.3	5.1	5.7	6.7	13.4	7.3
Renfrewshire	30.0	15.4	22.4	10.8	36.1	23.1
Scottish Borders	2.3	0.9	2.9	3.1	6.8	5.9
Shetland Islands	8.8	13.3	16.1	7.4	17.7	8.9

South Ayrshire	5.8	2.4	4.3	2.1	5.7	4.4
South Lanarkshire	8.4	2.5	7.5	3.7	8.6	8.8
Stirling	3.5	0.9	2.2	0.8	3.4	4.2
West Dunbartonshire	37.0	8.5	28.7	9.7	33.9	18.2
West Lothian	6.9	3.1	6.0	2.1	11.5	12.4

Building gain and loss

In terms of building gain Na h-Eileanan an Iar and the Scottish Borders showed the lowest change (1.9% and 2.3% respectively of all cells with buildings in 2016/2017). For 22 of the CAs building gain was shown within 10% or less of cells, while three CAS showed proportions of 20% or more (i.e. North Ayrshire (20.9%), Renfrewshire (30%), and West Dunbartonshire (37%). For building loss, 29 CAs showed under 10% of cells with loss between time points. Less than 1% of cells in Na h-Eileanan an Iar, Stirling and the Scottish borders showed loss. Renfrewshire showed the greatest proportion of loss (i.e. around 15% of cells) followed by the Shetlands and East Renfrewshire (13.3% and 13.4% respectively).

Road gain and loss

Na h-Eileanan an Iar exhibited the lowest road gain (0.5% of all cells with roads in 2016/2017). 19 of the CAs showed road gain in less than 10% of their cells. Around a quarter of cells within the Orkney Islands, and East Renfrewshire displayed some level of road gain, while nearly 30% of cells in West Dunbartonshire did so. Road loss ranged from 0.8% of cells in Stirling to 15.7% of cells in the Orkney Islands. The majority of CAs showed up to 10% of cells with road loss, while Dundee City and North Ayrshire showed around 12%.

Woodland gain and loss

Na h-Eileanan an Iar showed the lowest woodland gain; 0.6% of cells with woodland. Renfrewshire and the Orkney Islands showed the highest woodland gain at around 35% while six other CAs ranged from a quarter to a third of cells exhibiting gain (i.e. Edinburgh (25.3%), East Renfrewshire (27.6%), Inverclyde (27.7%), Angus (29.1%), North Ayrshire (29.1%) and West Dunbartonshire (33.9%)). Only 1% of cells in Na h-Eileanan an Iar showed woodland loss. Half of the CAs showed under 10% of cells losing woodland. Renfrewshire, Inverclyde, and Glasgow showed almost a quarter of cells with loss while 26.6% of cells in Edinburgh showed woodland loss.

Examples of built environment change on the ground

Figures 5a, 5b and 5c show examples of change in buildings, roads and woodland using Google Earth Images (Google Earth Pro, 2019) within areas of Aberdeen City, South Lanarkshire and Glasgow City. The changes shown in these images are extensive, showing modification in all three built environment features in specific areas; the majority of changes across Scotland will be smaller-scale.

Figure 5. Change in buildings, roads and woodland (Google Earth, 2019)

within Aberdeen City

2016

2017

within South Lanarkshire

2016

2017

within Glasgow City

2016

2017

Discussion

We have created a novel and robust methodology to quantify change in built environment features (i.e. buildings, roads and woodland) between two time points (October 2016 to October 2017) using Ordnance Survey data, and have described small area built environment change across Scotland and across each Council Area. Existing available data includes static maps over time only where change is not quantified (Centre for Ecology & Hydrology, 2015), or research around small site-specific change only (Foley et al., 2018), while this atlas goes further by including a dataset on change over time across a whole country. The method can be applied to quantify change over different/longer time points, or change in additional features of the built or natural environment (where data available).

There appeared to be a number of changes in built environment features within grid cells across Scotland, over a relatively short period of time; however for the majority of cells, the scale of these changes tended to be small.

A number of questions arose while considering how "best" to measure and quantify built environment change:-

- What geographical level matters (e.g. how small/large should cells be)?
- What level/threshold of change matters to neighbourhoods/residents?
- Which types of change are positive or negative (e.g. can neighbourhood change improve or worsen aspects of residents' lives)?
- Is the change real on the ground?

In particular, the final question is one to consider as a potential caveat of the method. In this document we report on what appears to be physical changes within a year but we cannot decipher from the information provided whether modifications are:

a.) physically real on the ground or,

b.) are data artifacts (i.e. errors) or,

c.) are due to changes in feature coding/classifications (without physical change).

Google earth imagery was used to provide examples of on the ground change (as shown on page 15) but it is beyond the scope of this project to validate all modifications by viewing imagery for each and every change. The interpretation of these changes must be further explored.

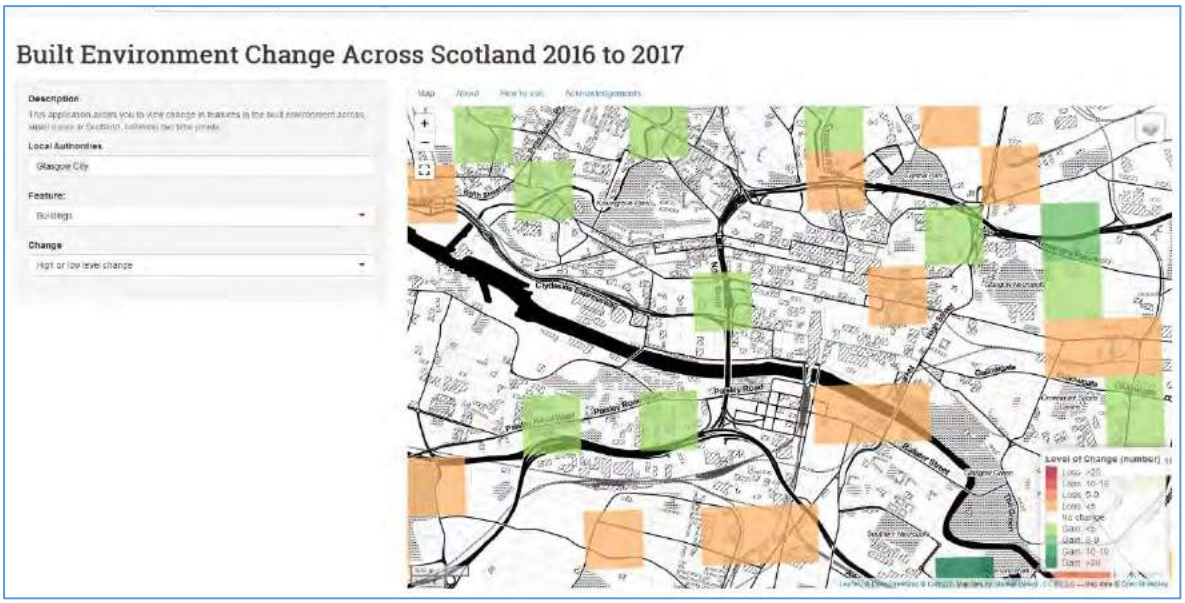
Future work should include studying the potential relevance of such changes to the lives and health of residents within these areas.

Within future work we aim to (subject to the availability of data):-

- Include additional built environment features,
- Look at change over a longer period of time/number of time points,
- Explore associations between change and a number of health-related outcomes.

The Built Environment Change App - An accompanying interactive mapping tool (see figure 6) is available on the CRESH website which allows change in buildings, roads and woodland across small areas in Scotland to be viewed; to access the interactive app visit:- https://creshmap.com/shiny/builtenvironmentchange/.

Figure 6. Built Environment Change App



Acknowledgements

We wish to express our gratitude towards EDINA Digimap and Ordnance Survey for supplying data used within this atlas project, and to Dr Mark Cherrie (CRESH, University of Edinburgh) for his assistance with the interactive mapping tool

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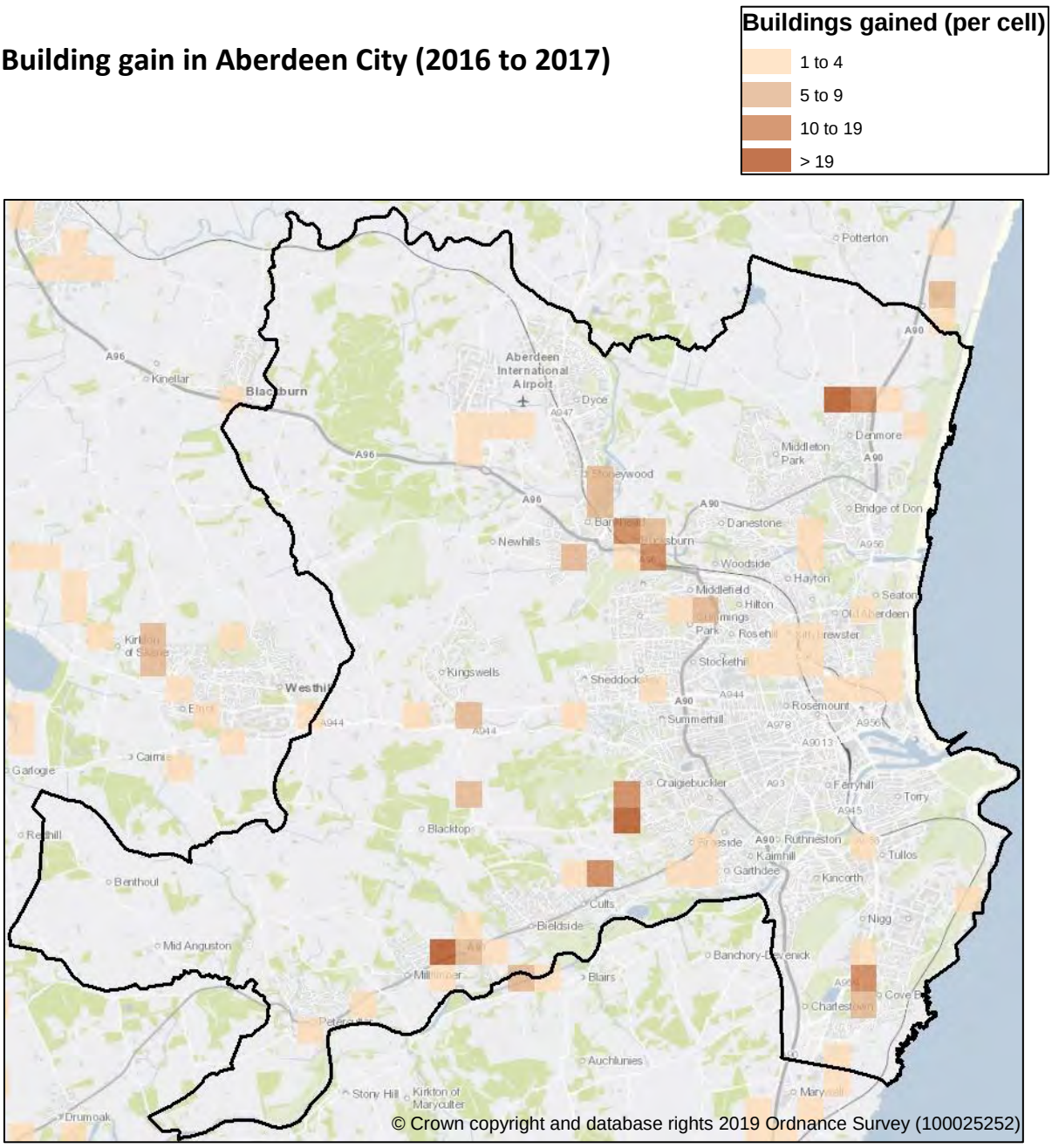
Appendix.

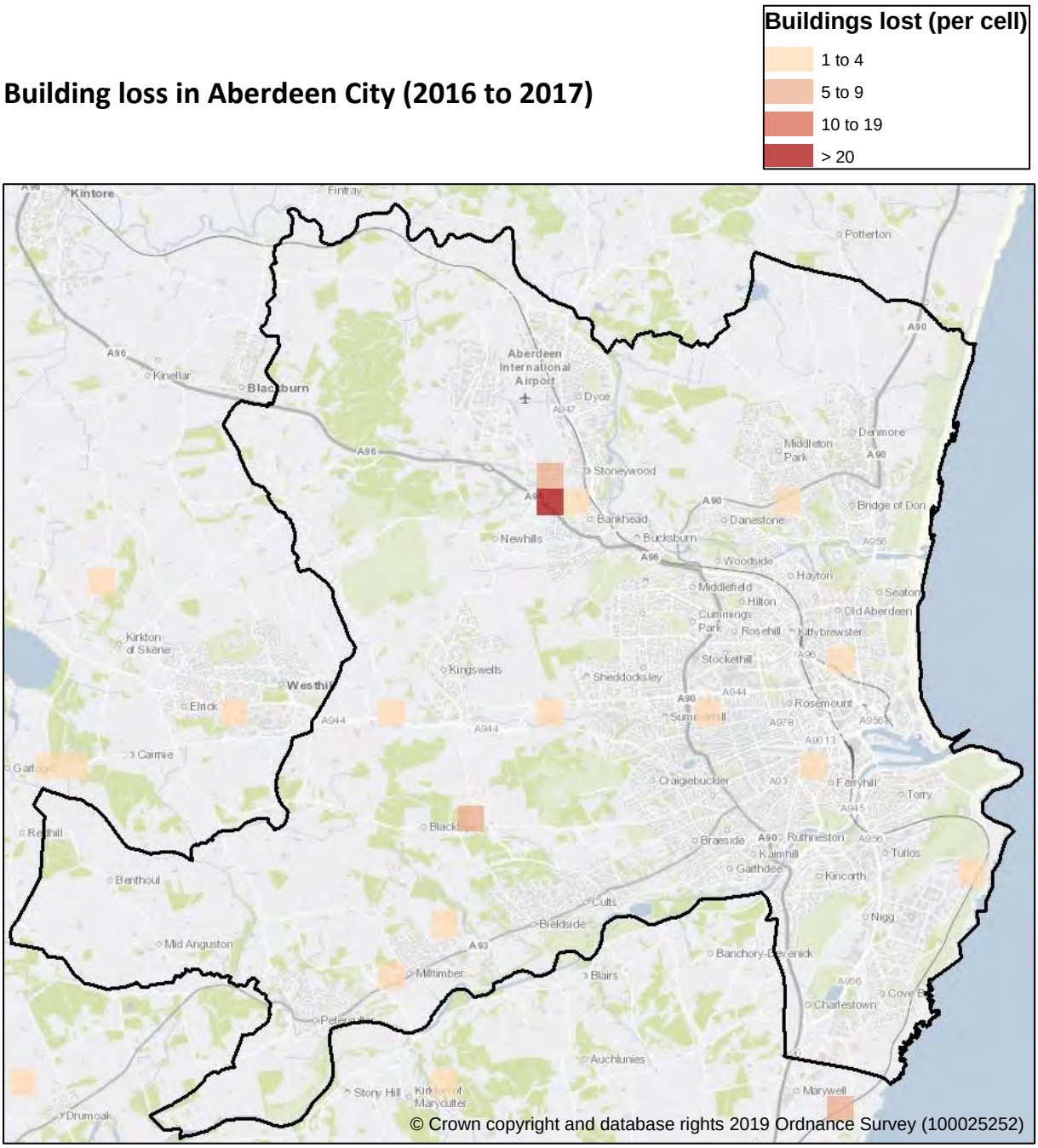
Building gain in Aberdeen City (2016 to 2017)



Of 639 cells that contained buildings within 2016 and/or 2017:-

- **8.5% (n=54) gained buildings, of which:-**
  - **36 gained 1 to 4 buildings**
  - **9 gained 5 to 9 buildings**
  - **6 gained 10 to 19 buildings**
  - **3 gained >19 buildings**

Building loss in Aberdeen City (2016 to 2017)



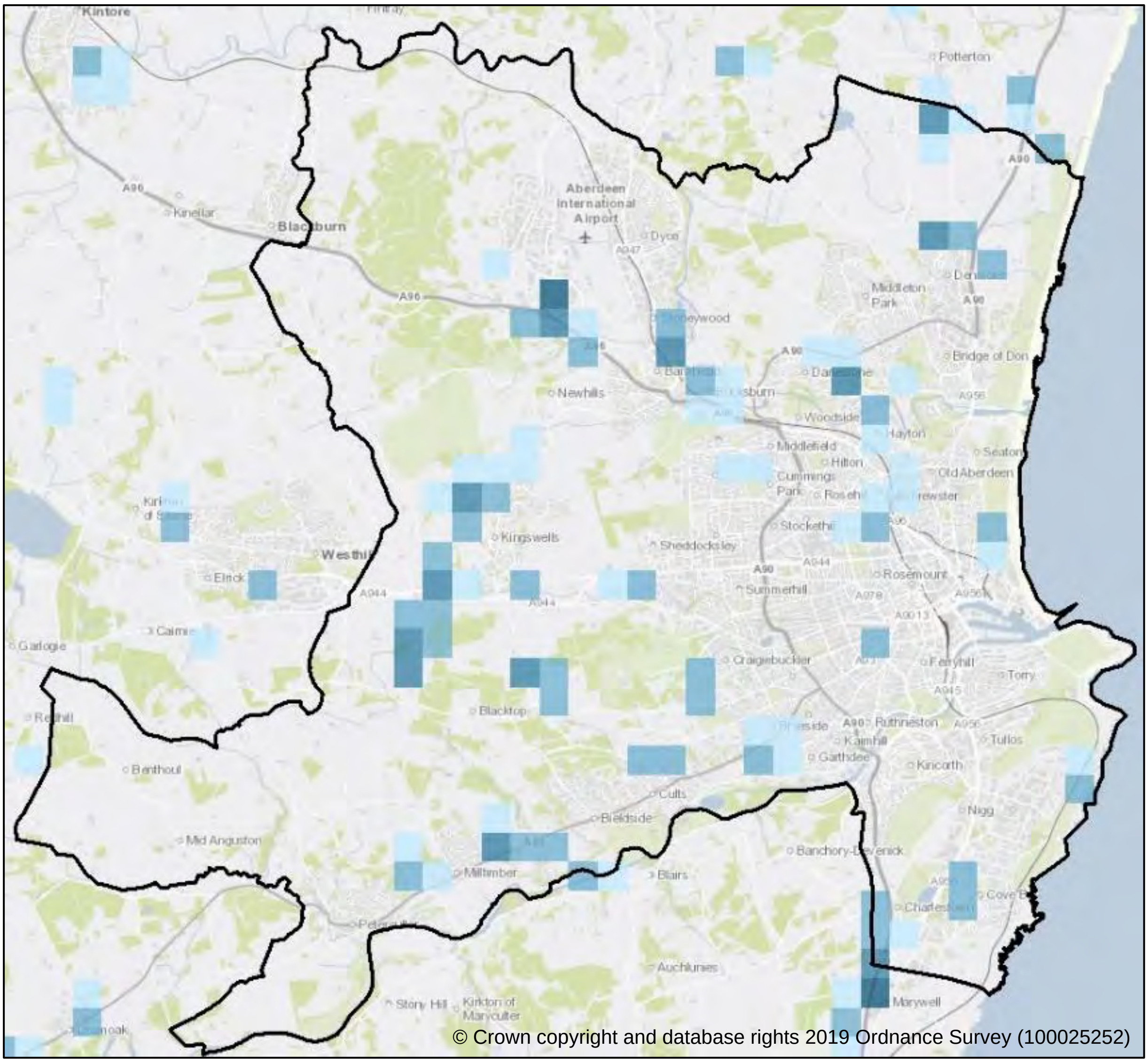
Of 639 cells that contained buildings within 2016 and/or 2017:-

- **2.0% (n=13) lost buildings, of which:-**
  - **10 lost 1 to 4 buildings**
  - **2 lost 5 to 9 buildings**
  - **1 lost >19 buildings**

Road gain in Aberdeen City (2016 to 2017)

Roads gained (per cell)

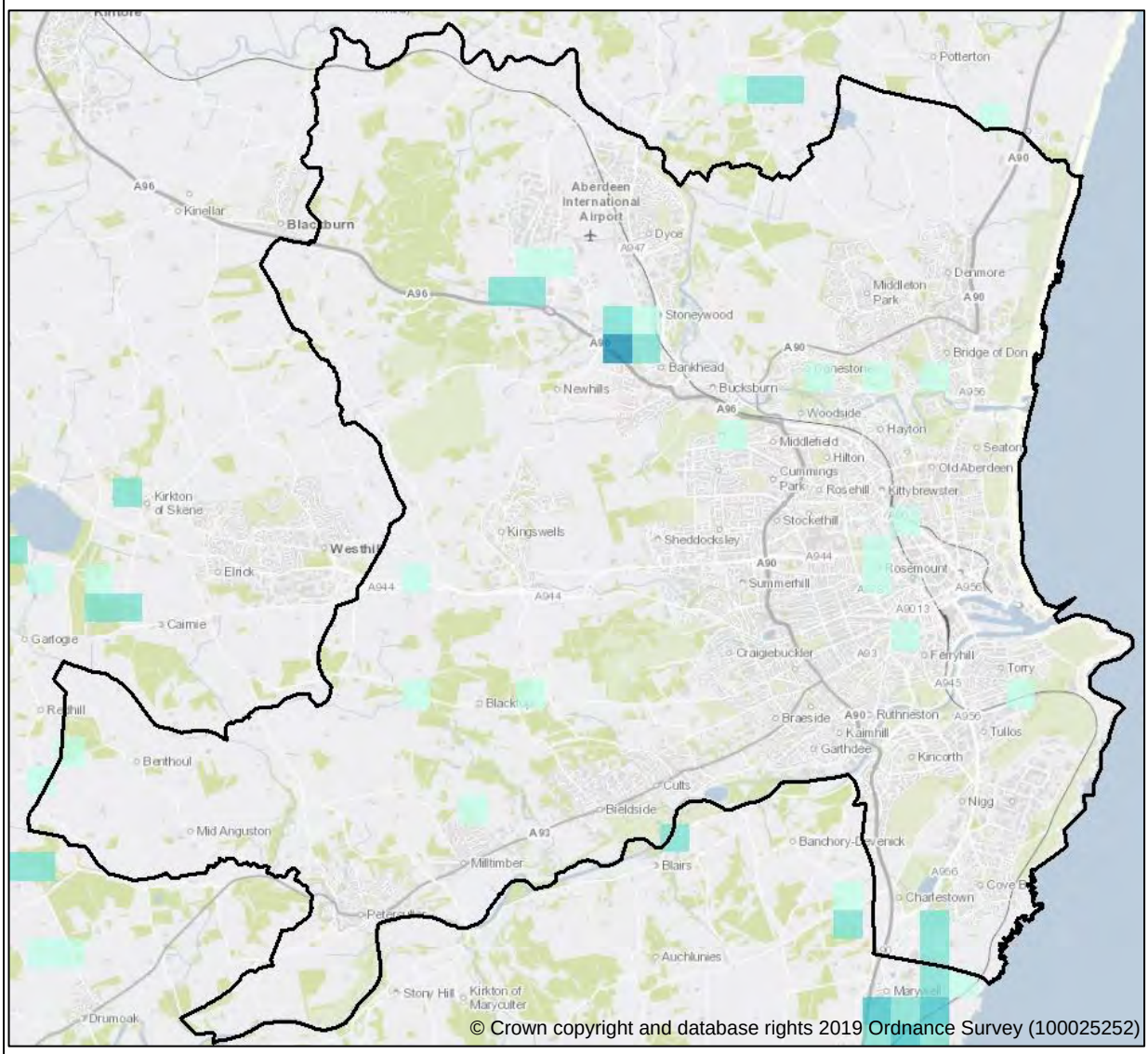
- <100m
- 100 to 499m
- 500 to 999m
- >1000m



Of 686 cells that contained roads within 2016 and/or 2017:-

- **11.5% (n=79) gained roads, of which:-**
  - **33 gained 1 to 100m**
  - **33 gained 100 to 499m**
  - **12 gained 500 to 999m**
  - **1 gained 1000m+**

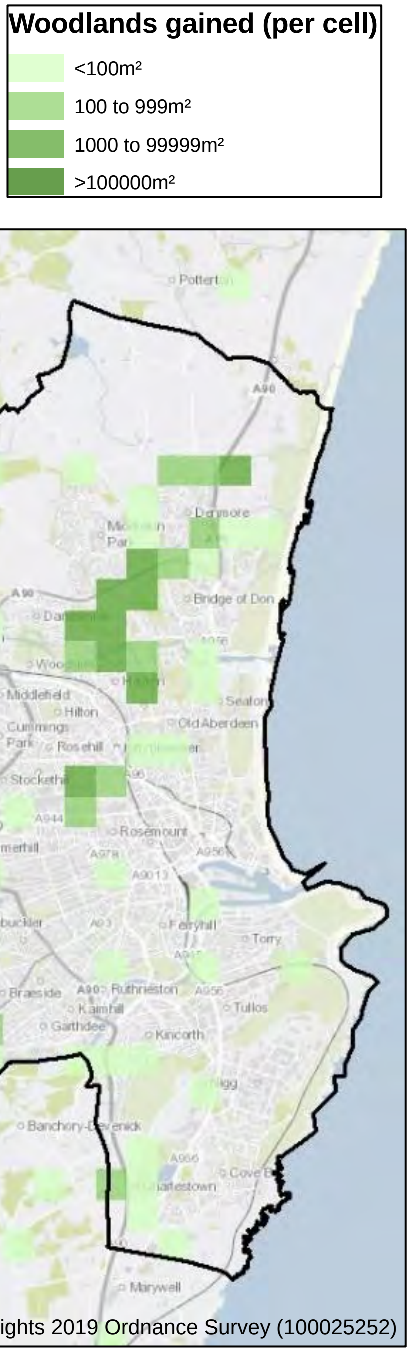
Road loss in Aberdeen City (2016 to 2017)



Of 686 cells that contained roads within 2016 and/or 2017:-

- **3.5% (n=24) lost roads, of which:-**
  - **17 lost 1 to 100m**
  - **6 lost 100 to 499m**
  - **0 lost 500 to 999m**
  - **1 lost 1000m+**

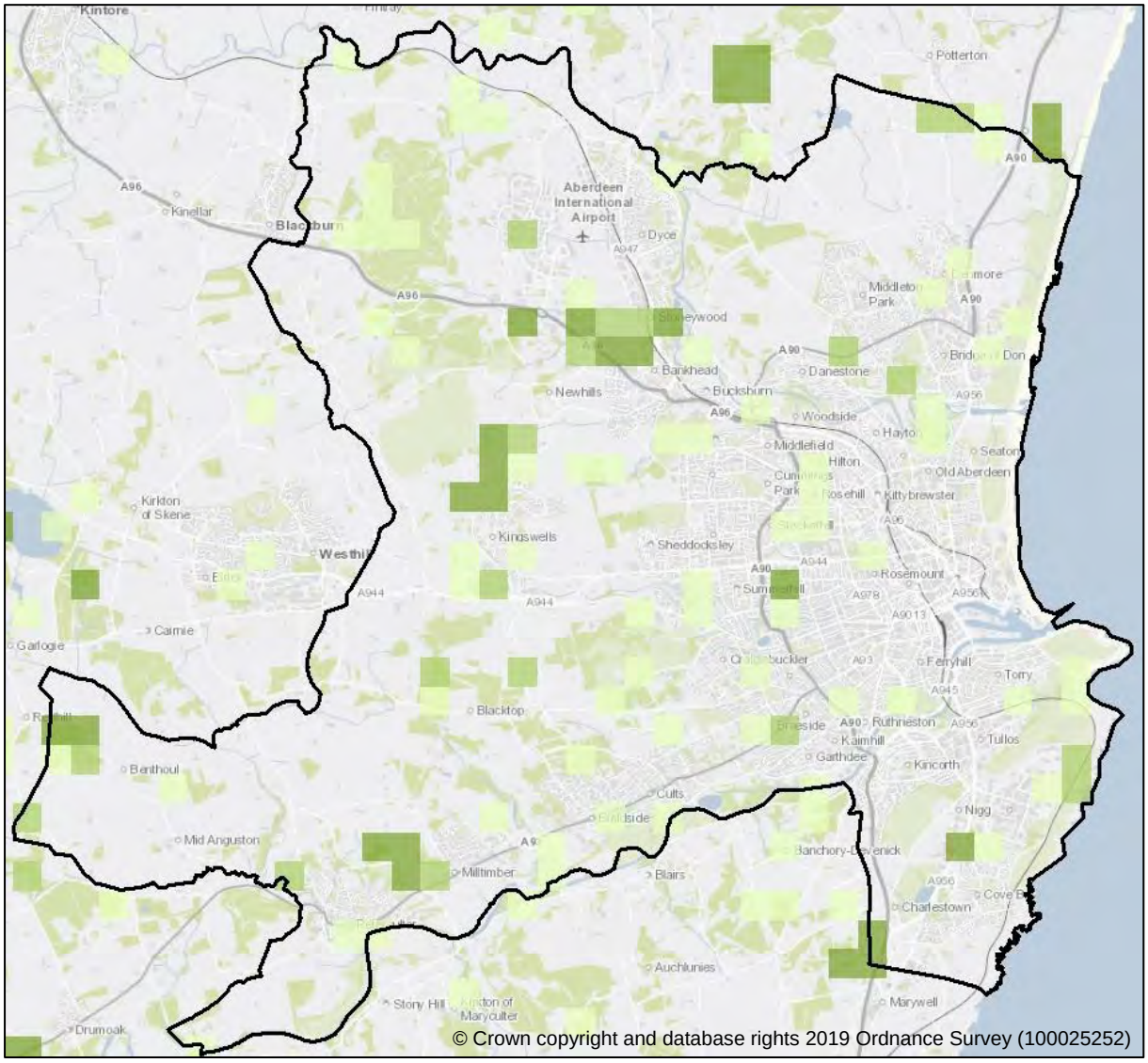
Woodland gain in Aberdeen City (2016 to 2017)



Of 627 cells that contained woodland within 2016 and/or 2017:-

- **18.8% (n=118) gained woodland, of which:-**
    - **78 gained <100m²**
    - **19 gained 100 to 999m²**
    - **21 gained 1000m²+**

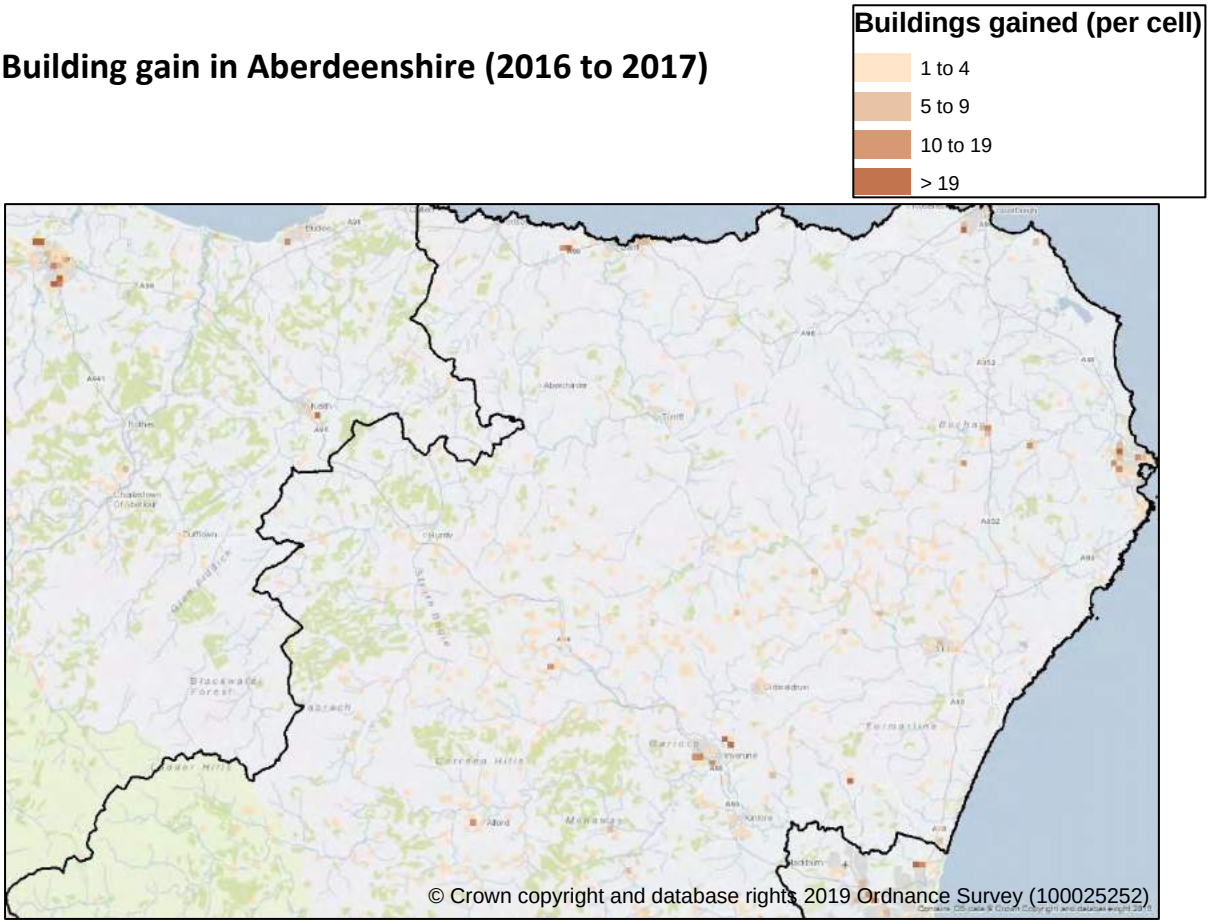
Woodland loss in Aberdeen City (2016 to 2017)



Of 627 cells that contained woodland within 2016 and/or 2017:-

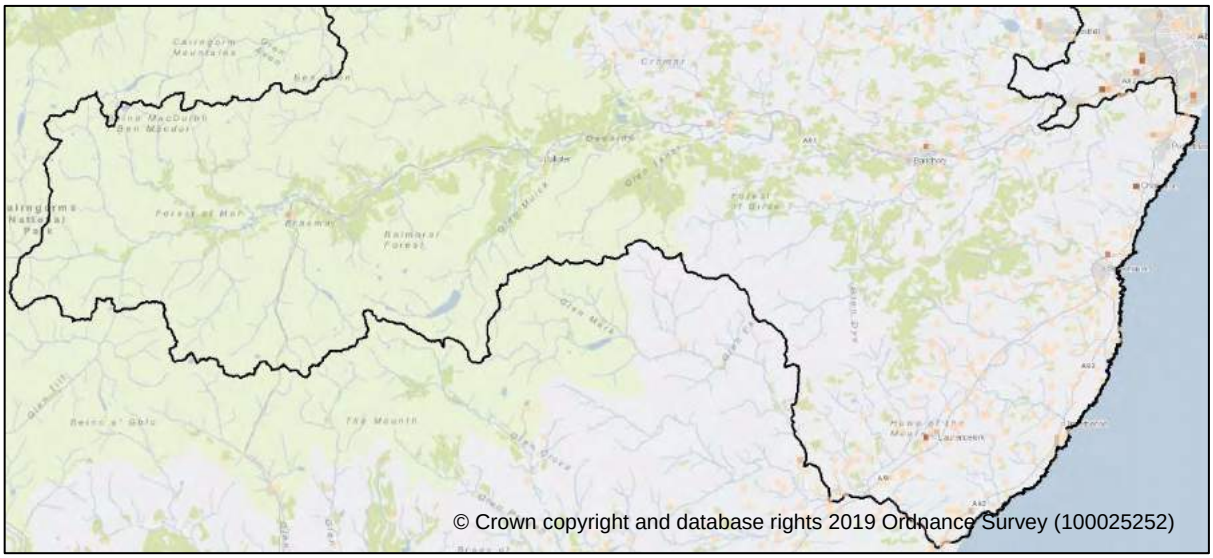
- **15.6% (n=98) lost woodland, of which:-**
  - **61 lost <100m²**
  - **19 lost 100 to 999m²**
  - **18 lost 1000m²+**

Building gain in Aberdeenshire (2016 to 2017)

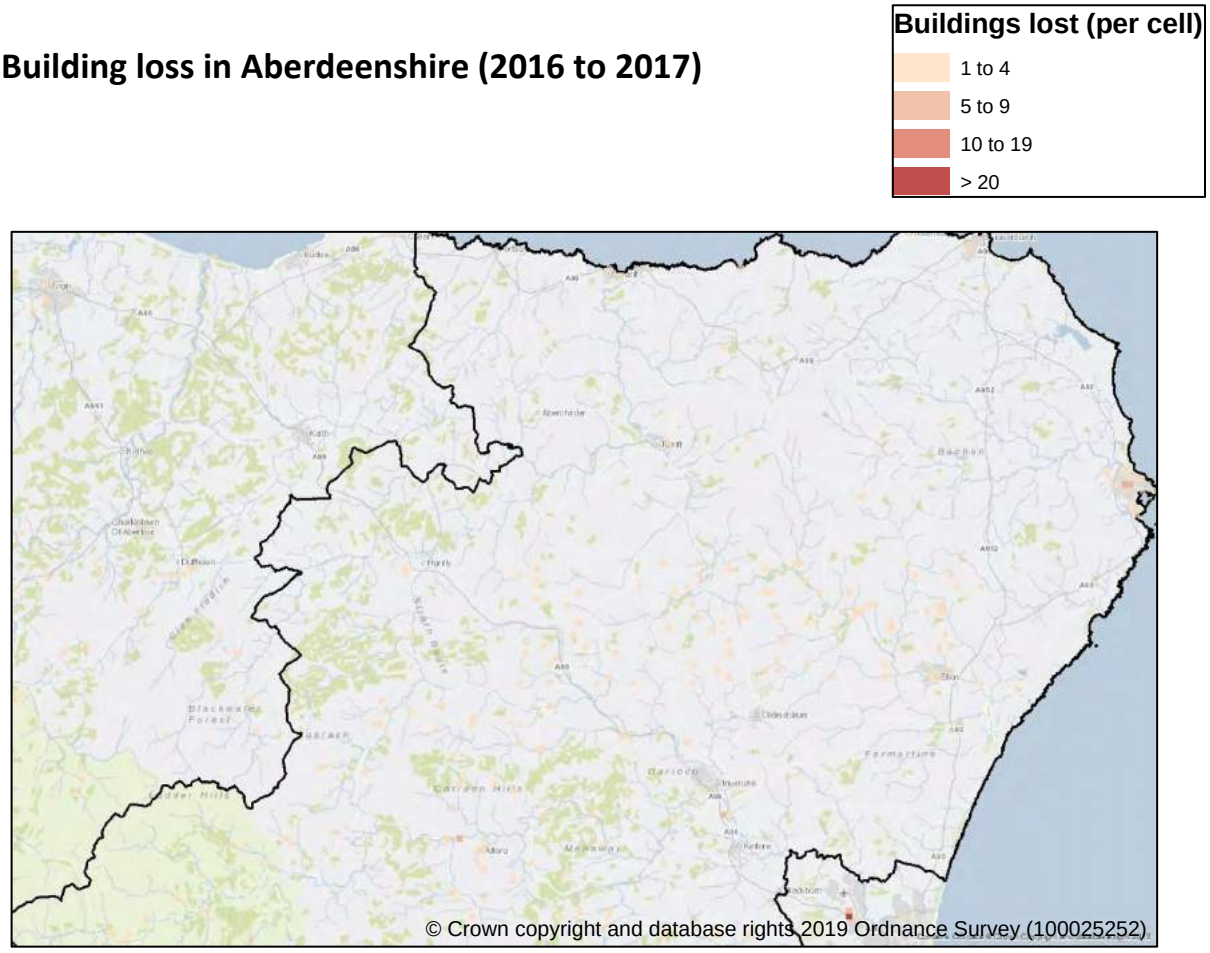


Of 11647 cells that contained buildings within 2016 and/or 2017:-

- **6.4% (n=740) gained buildings, of which:-**
  - **688 gained 1 to 4 buildings**
  - **30 gained 5 to 9 buildings**
  - **14 gained 10 to 19 buildings**
  - **8 gained >19 buildings**

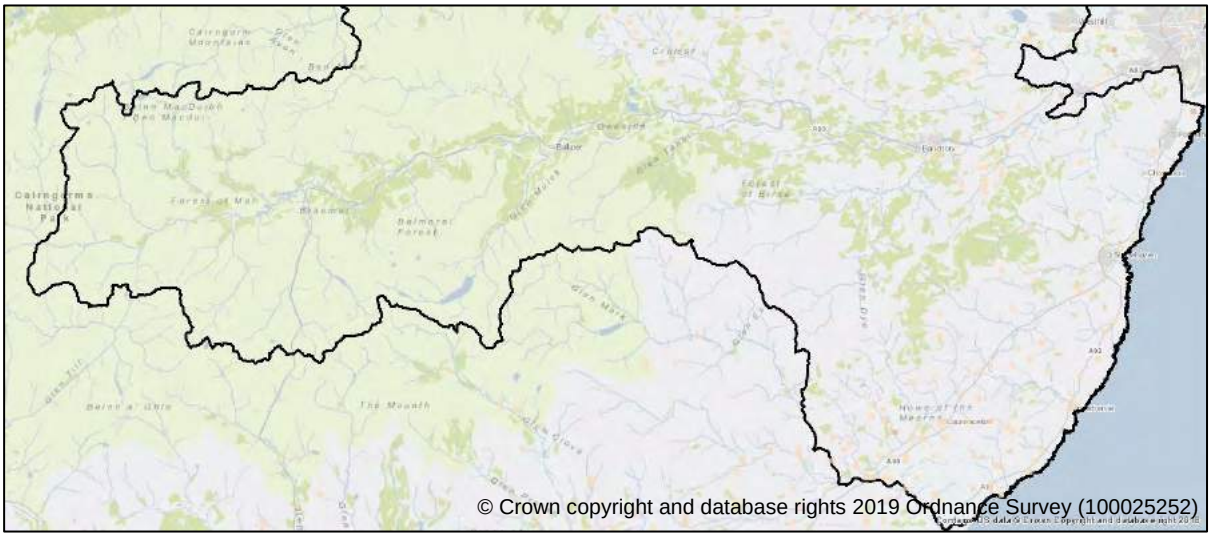


Building loss in Aberdeenshire (2016 to 2017)

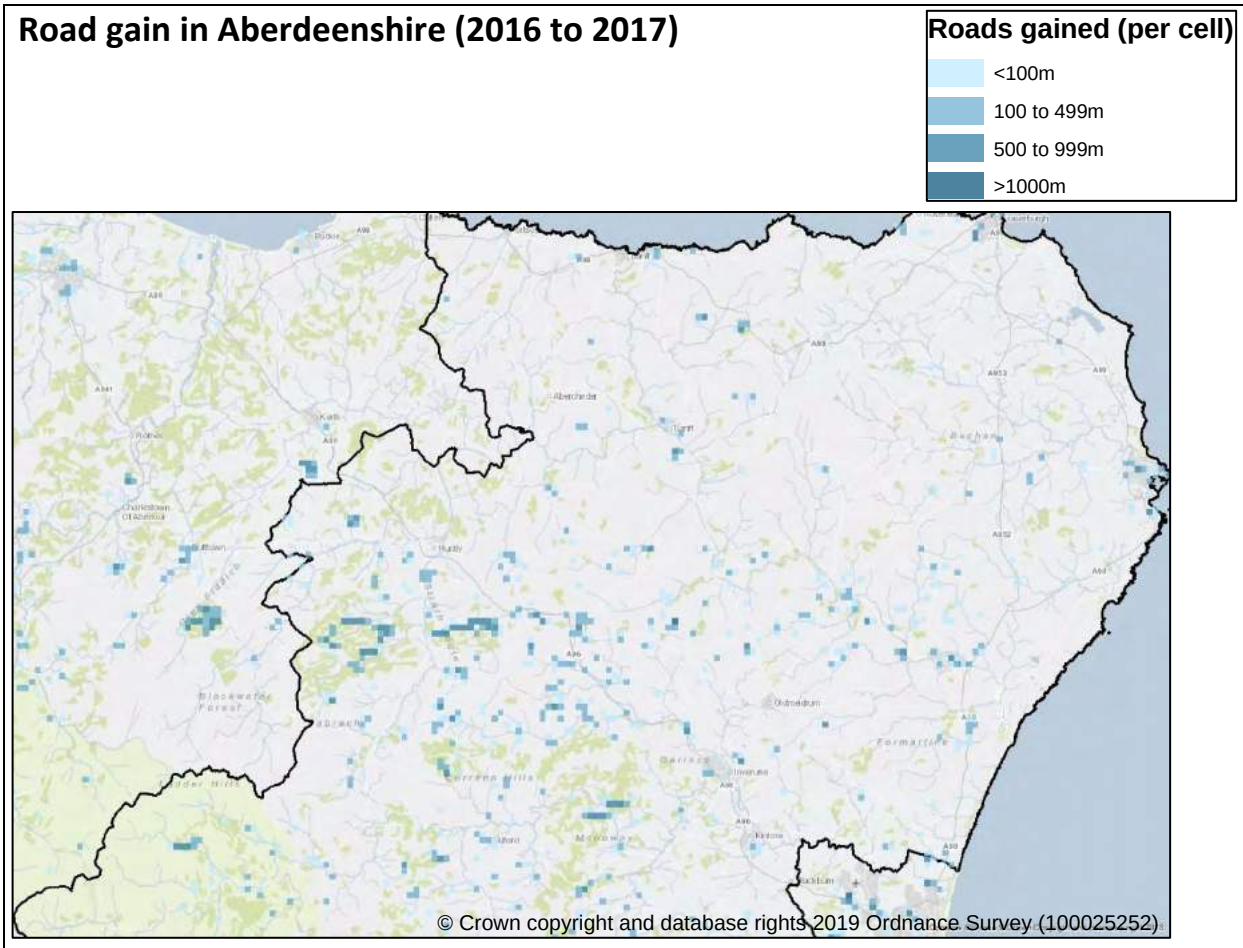


Of 11647 cells that contained buildings within 2016 and/or 2017:-

- **2.7% (n=311) lost buildings, of which:-**
  - **305 lost 1 to 4 buildings**
  - **6 lost 5 to 9 buildings**

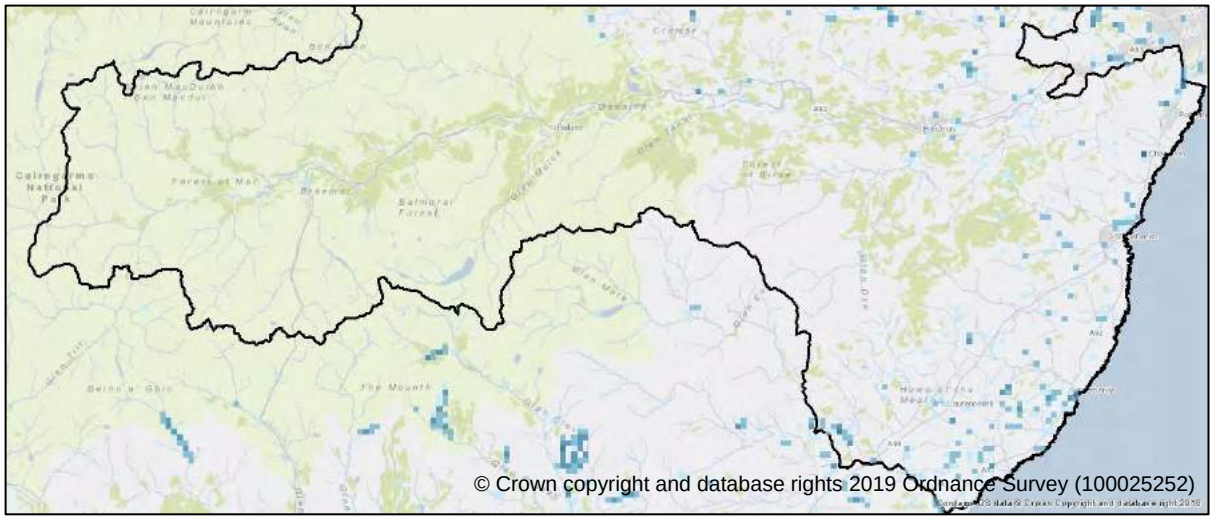


Road gain in Aberdeenshire (2016 to 2017)

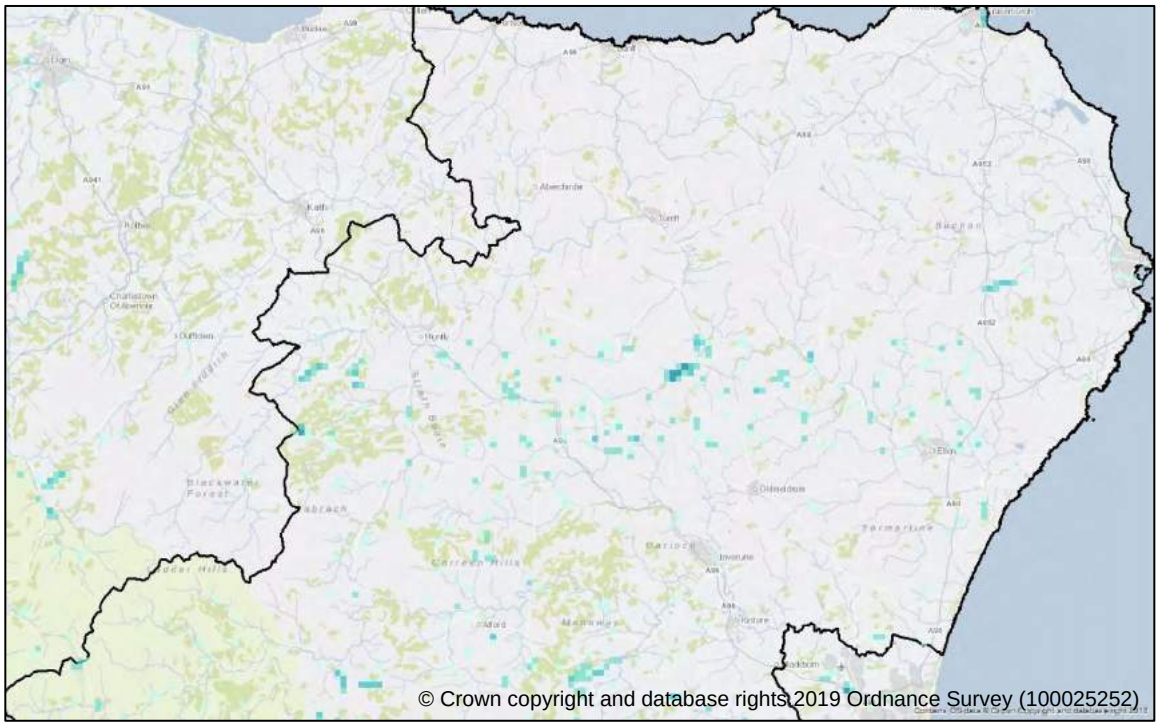


Of 15453 cells that contained roads within 2016 and/or 2017:-

- **5.6% (n=864) gained roads, of which:-**
  - **420 gained 1 to 100m**
  - **355 gained 100 to 499m**
  - **84 gained 500 to 999m**
  - **5 gained 1000m+**

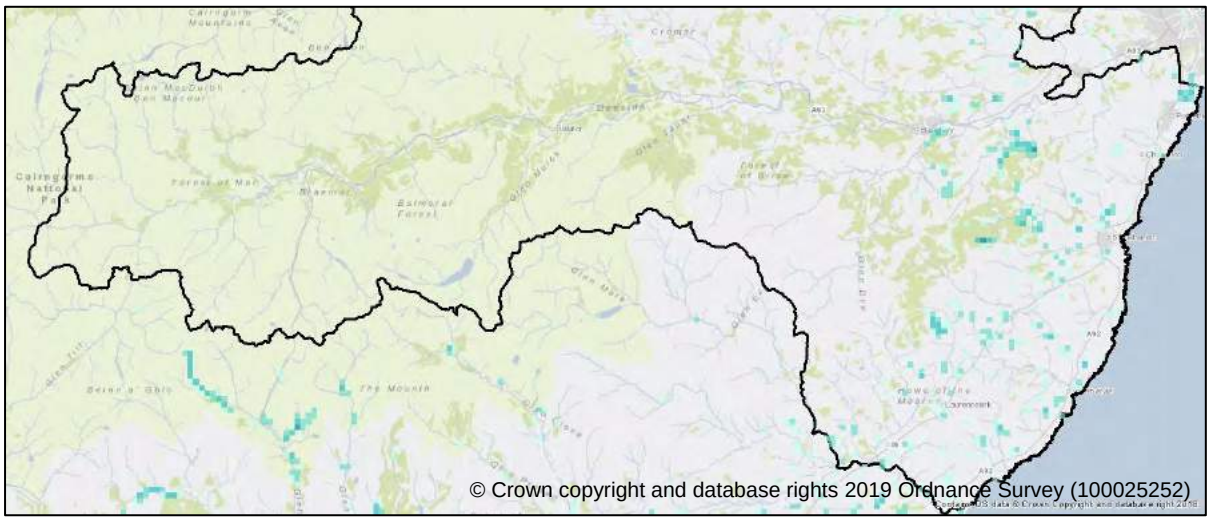


Road loss in Aberdeenshire (2016 to 2017)

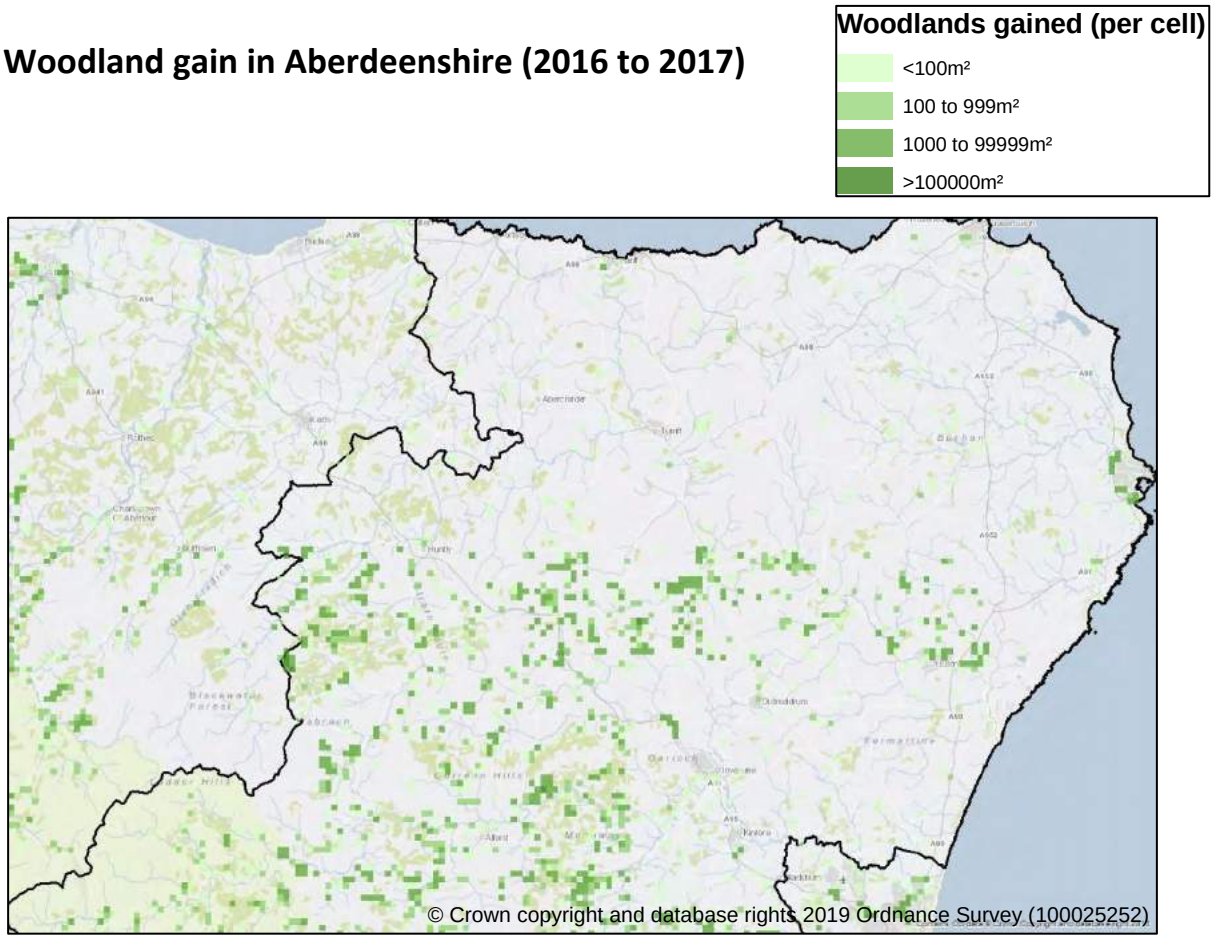


Of 15453 cells that contained roads within 2016 and/or 2017:-

- **4.4% (n=684) lost roads, of which:-**
  - **361 lost 1 to 100m**
  - **256 lost 100 to 499m**
  - **60 lost 500 to 999m**
  - **7 lost 1000m+**

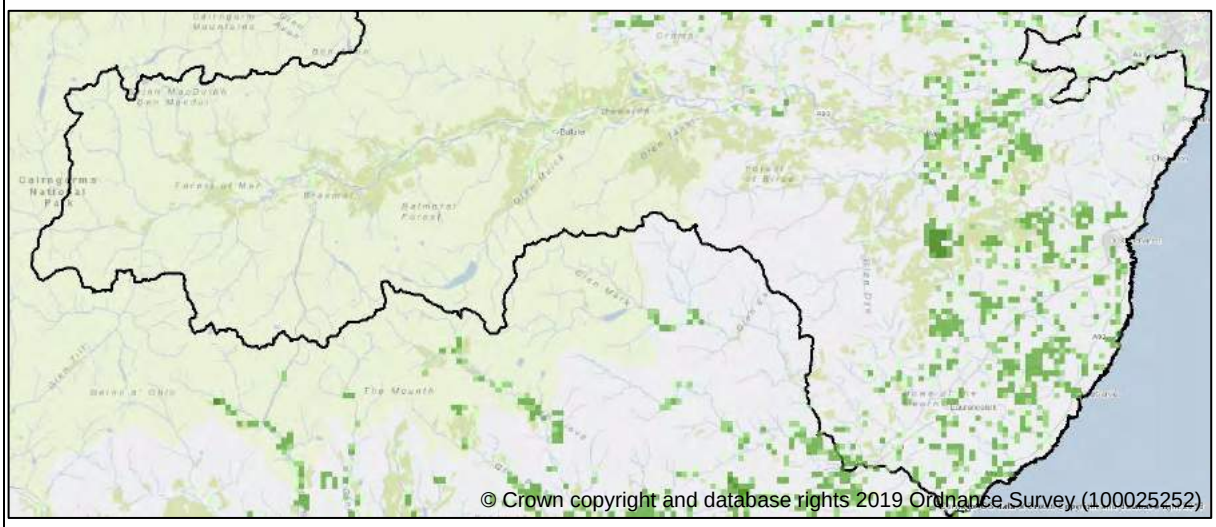


Woodland gain in Aberdeenshire (2016 to 2017)

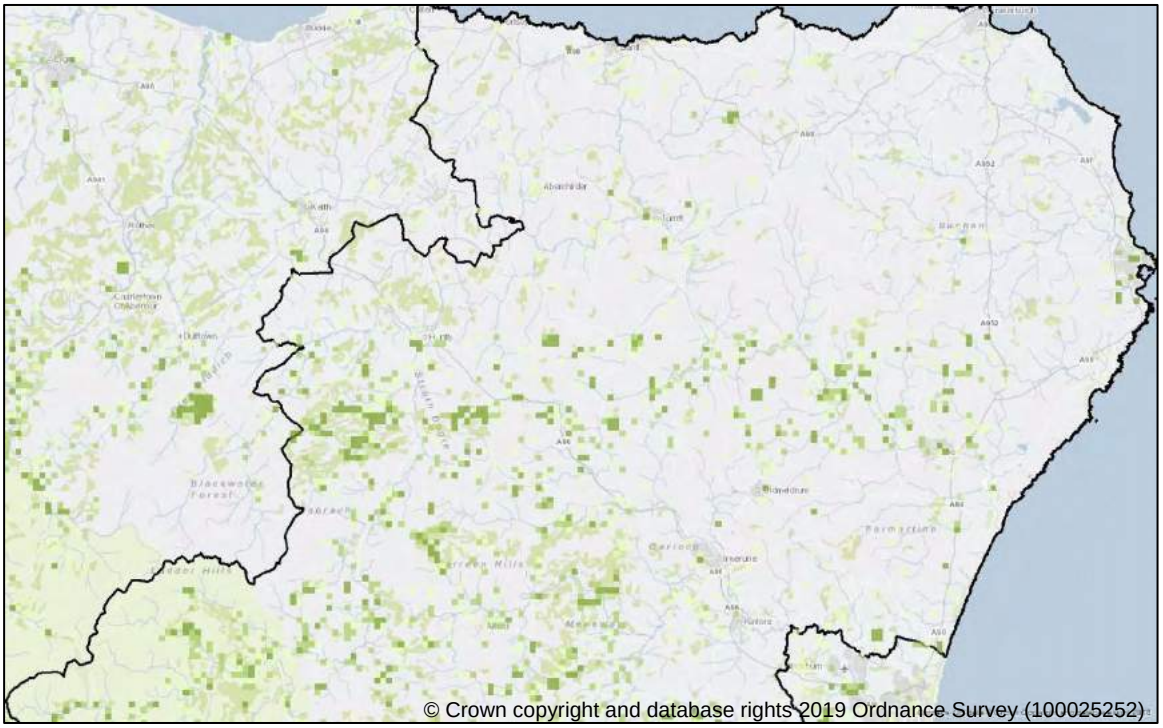


Of 16499 cells that contained woodland within 2016 and/or 2017:-

- **12.8% (n=2117) gained woodland, of which:-**
  - **707 gained <100m²**
  - **534 gained 100 to 999m²**
  - **876 gained 1000m²+**

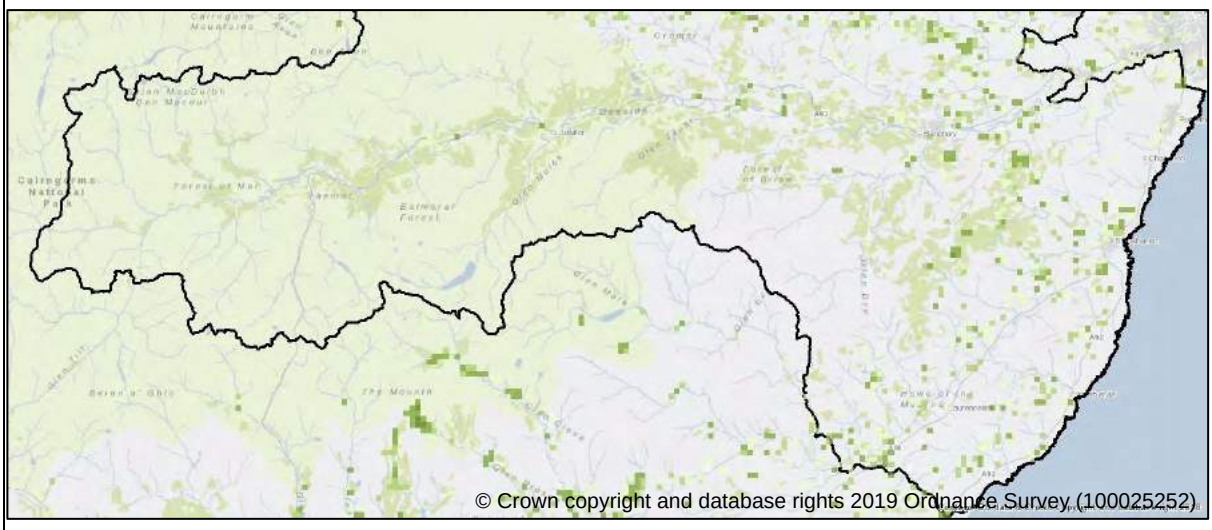


Woodland loss in Aberdeenshire (2016 to 2017)

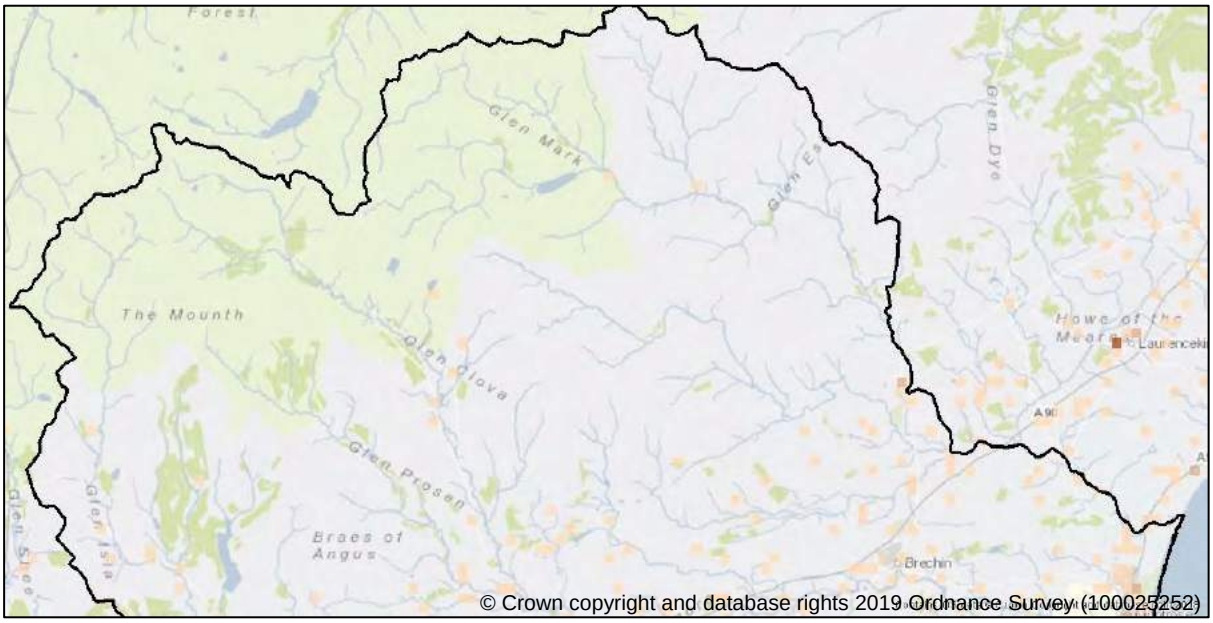


Of 16499 cells that contained woodland within 2016 and/or 2017:-

- **9.9% (n=1637) lost woodland, of which:-**
  - **691 lost <100m²**
  - **518 lost 100 to 999m²**
  - **428 lost 1000m²+**

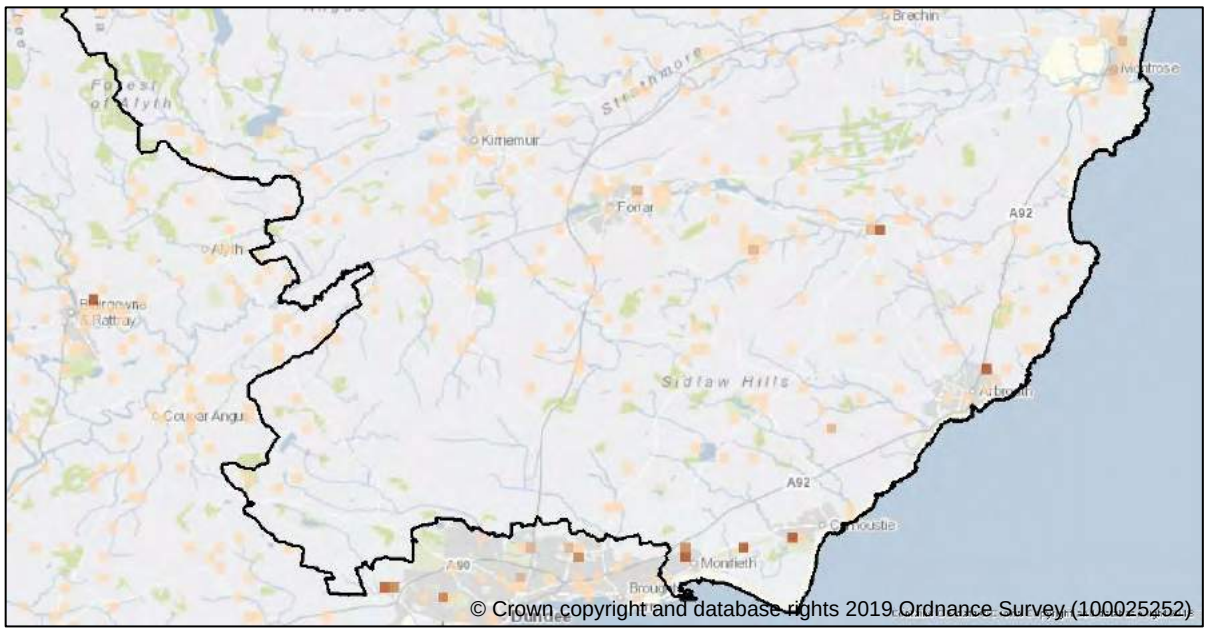


Building gain in Angus (2016 to 2017)

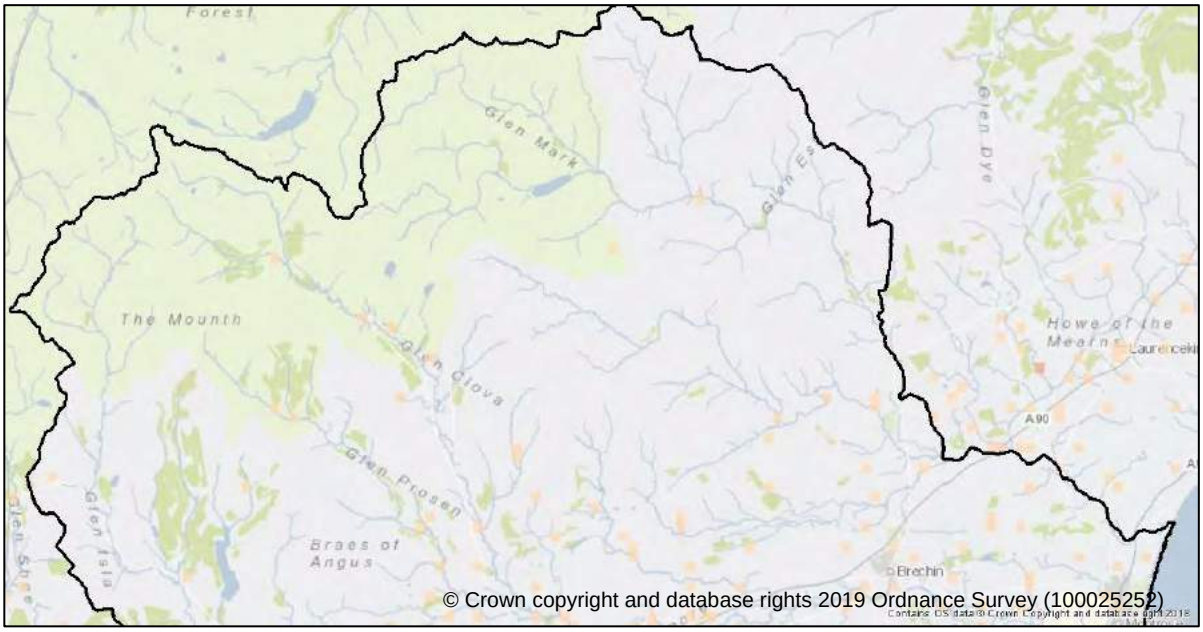


Of 3148 cells that contained buildings within 2016 and/or 2017:-

- **10.5% (n=332) gained buildings, of which:-**
  - **319 gained 1 to 4 buildings**
  - **7 gained 5 to 9 buildings**
  - **1 gained 10 to 19 buildings**
  - **5 gained >19 buildings**

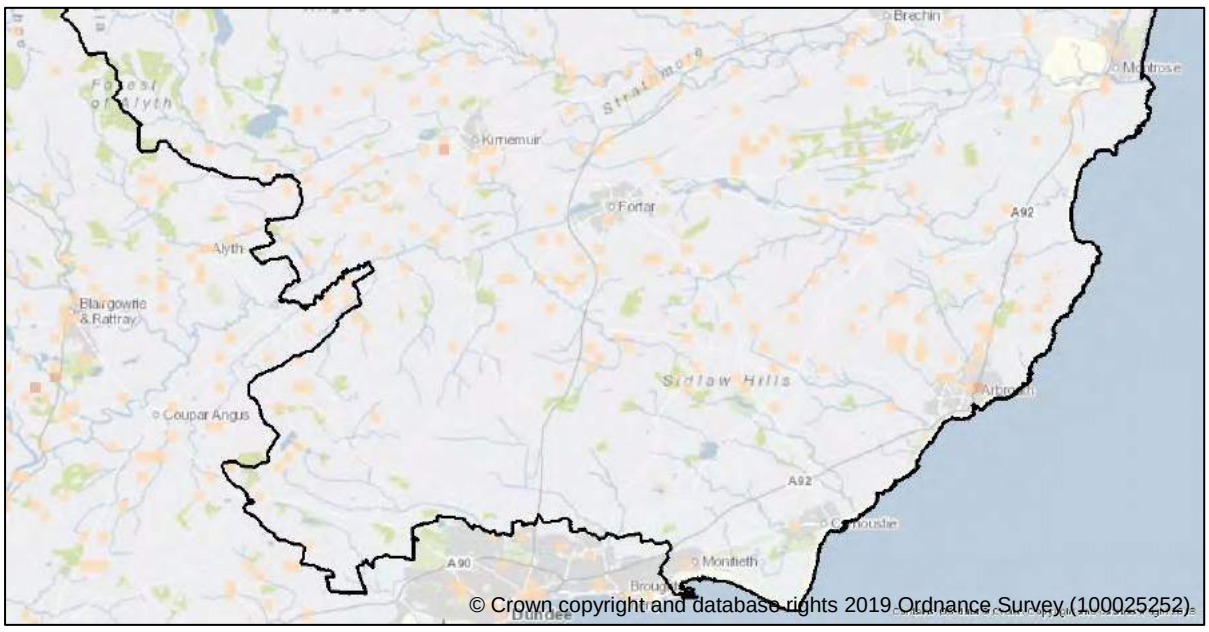


Building loss in Angus (2016 to 2017)

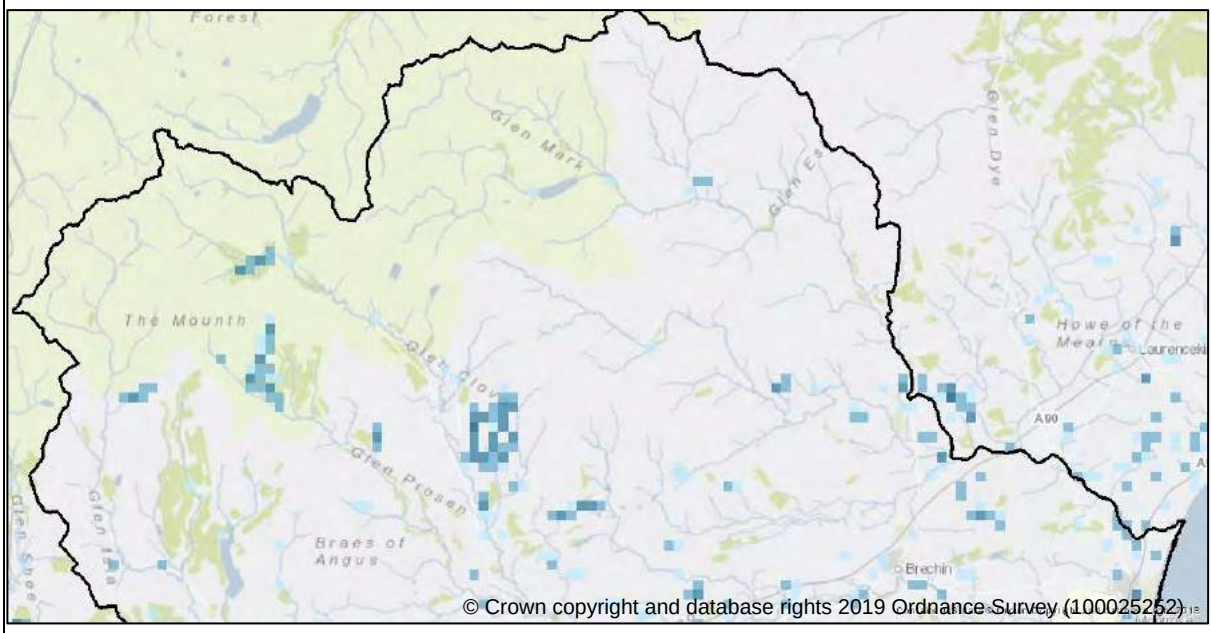


Of 3148 cells that contained buildings within 2016 and/or 2017:-

- **8.2% (n=258) lost buildings, of which:-**
  - **256 lost 1 to 4 buildings**
  - **2 lost 5 to 9 buildings**

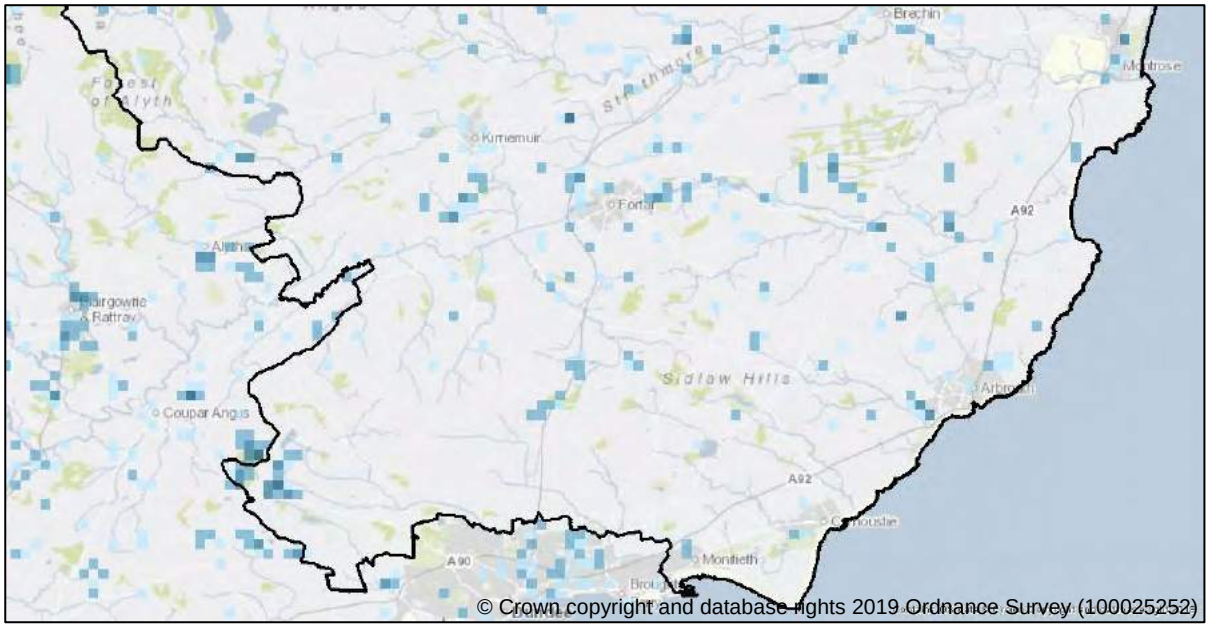


Road gain in Angus (2016 to 2017)

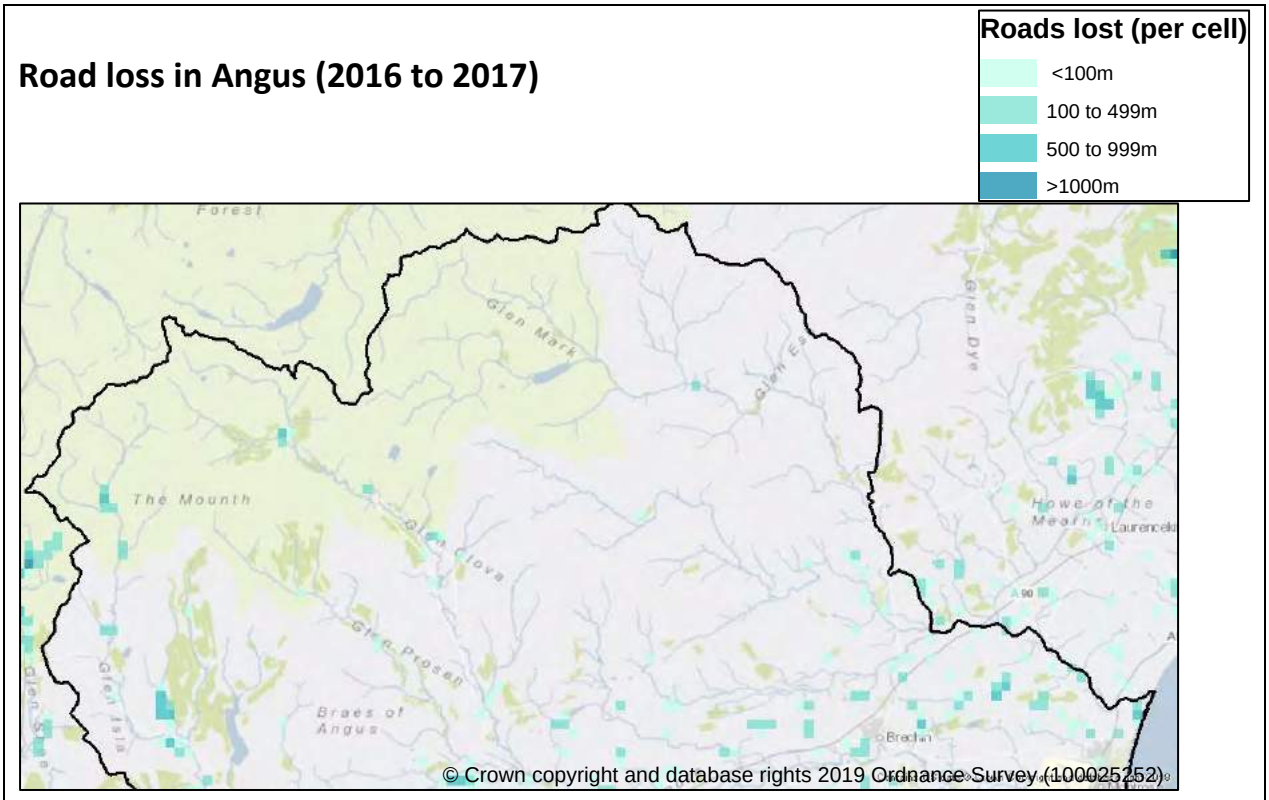


Of 4586 cells that contained roads within 2016 and/or 2017:-

- **8.4% (n=385) gained roads, of which:-**
  - **169 gained 1 to 100m**
  - **162 gained 100 to 499m**
  - **51 gained 500 to 999m**
  - **3 gained 1000m+**

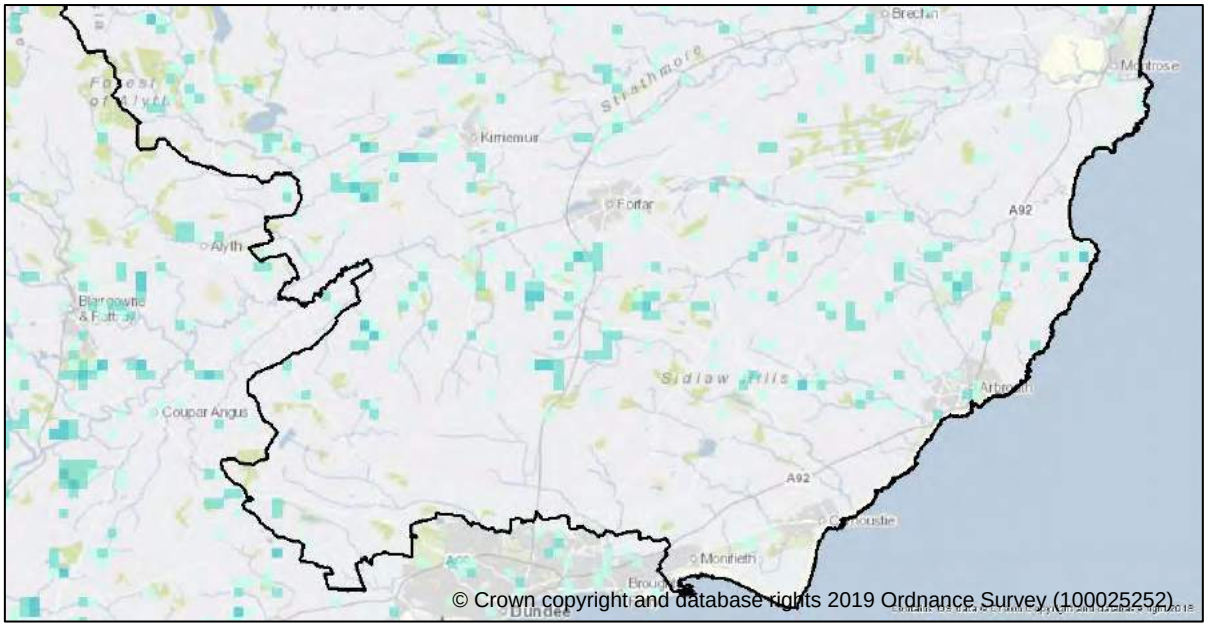


Road loss in Angus (2016 to 2017)

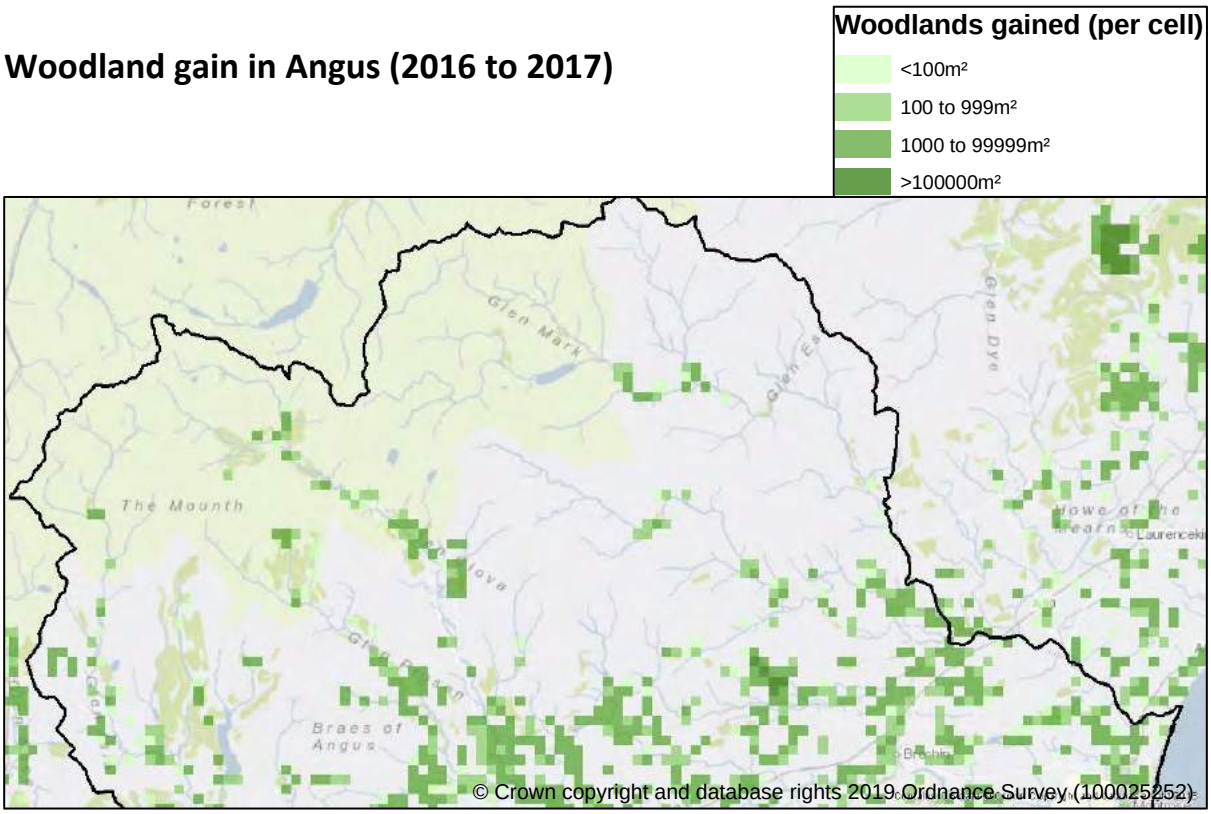


Of 4586 cells that contained roads within 2016 and/or 2017:-

- **10.0% (n=458) lost roads, of which:-**
  - **256 lost 1 to 100m**
  - **173 lost 100 to 499m**
  - **29 lost 500 to 999m**

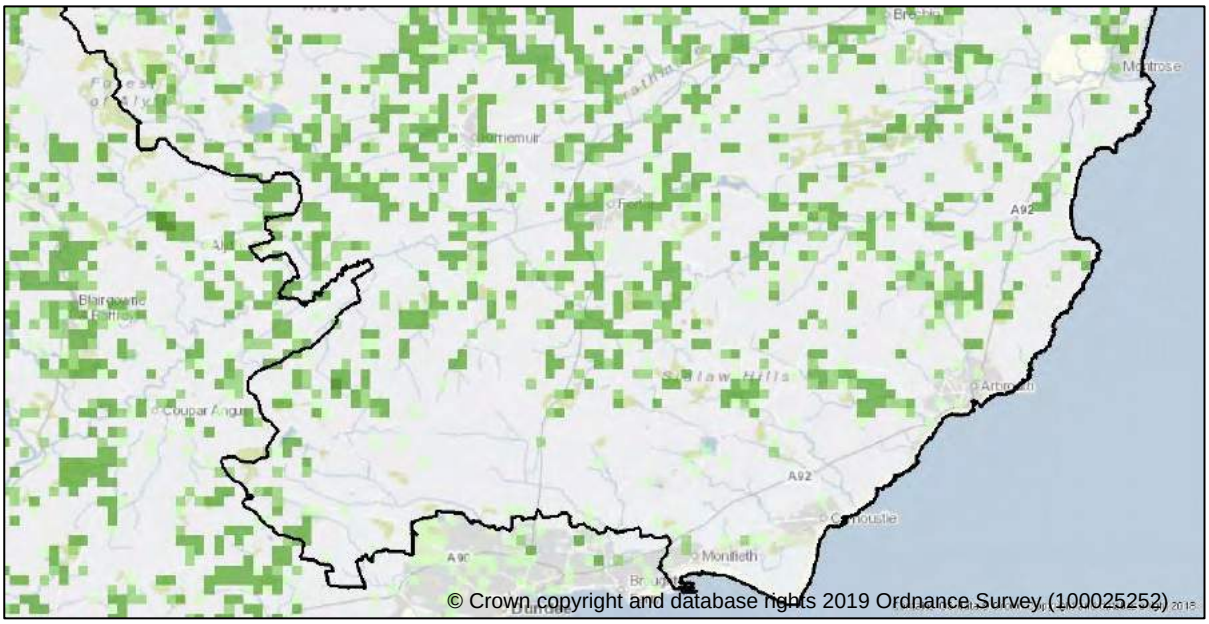


Woodland gain in Angus (2016 to 2017)

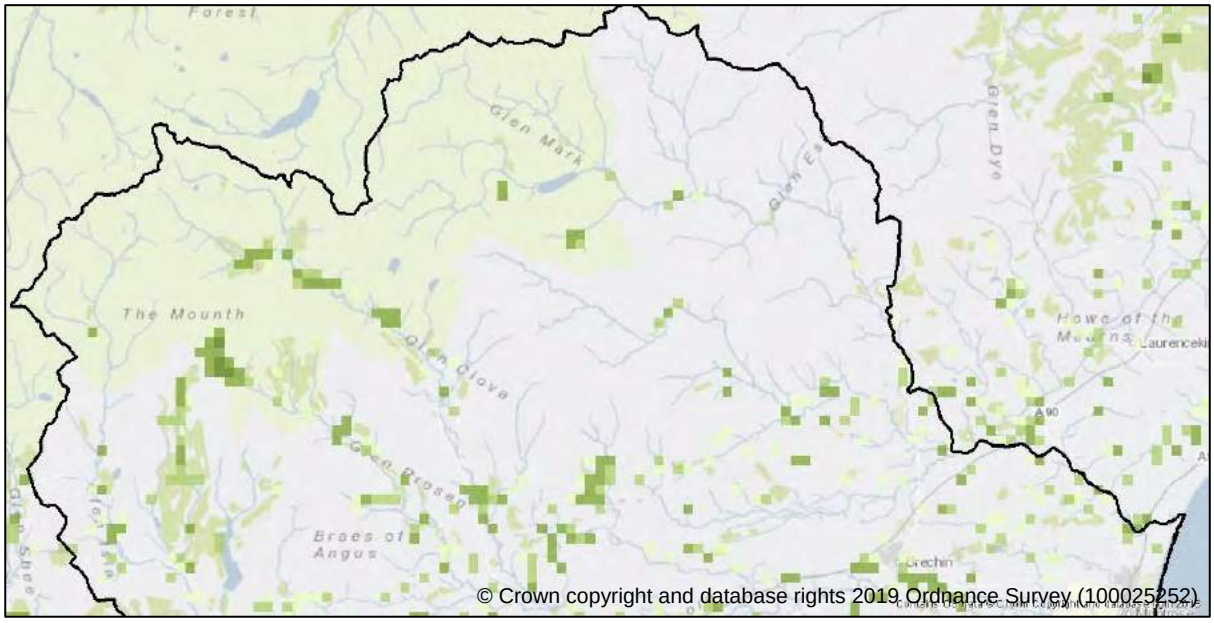


Of 5031 cells that contained woodland within 2016 and/or 2017:-

- **29.1% (n=1462) gained woodland, of which:-**
  - **213 gained <100m²**
  - **375 gained 100 to 999m²**
  - **874 gained 1000m²+**

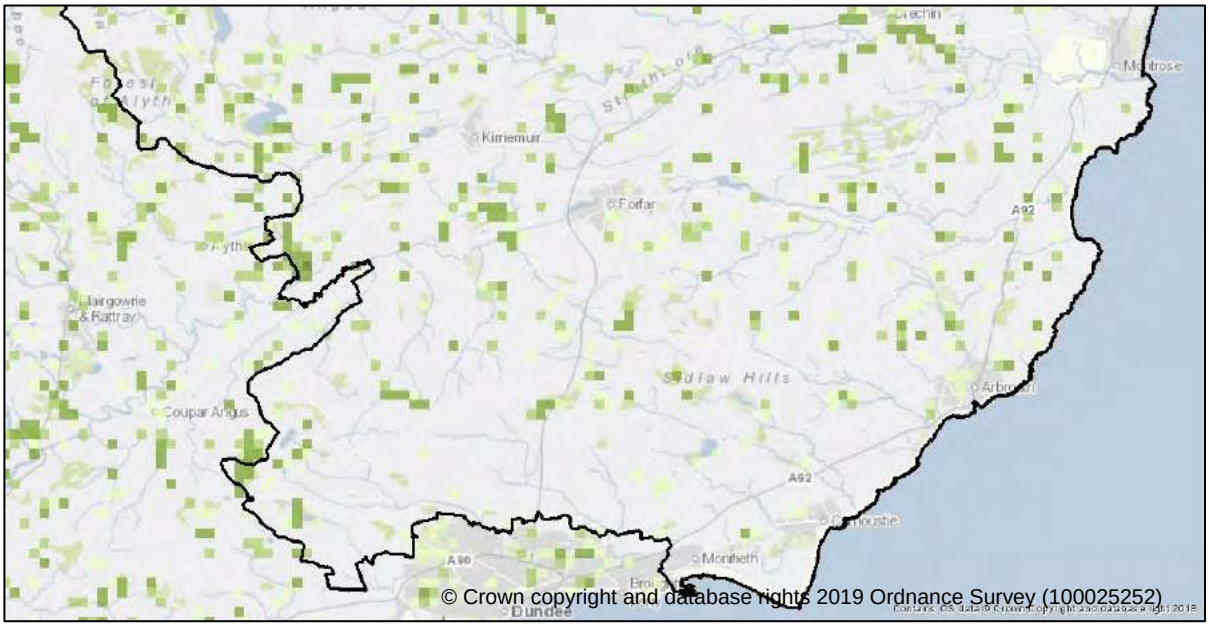


Woodland loss in Angus (2016 to 2017)

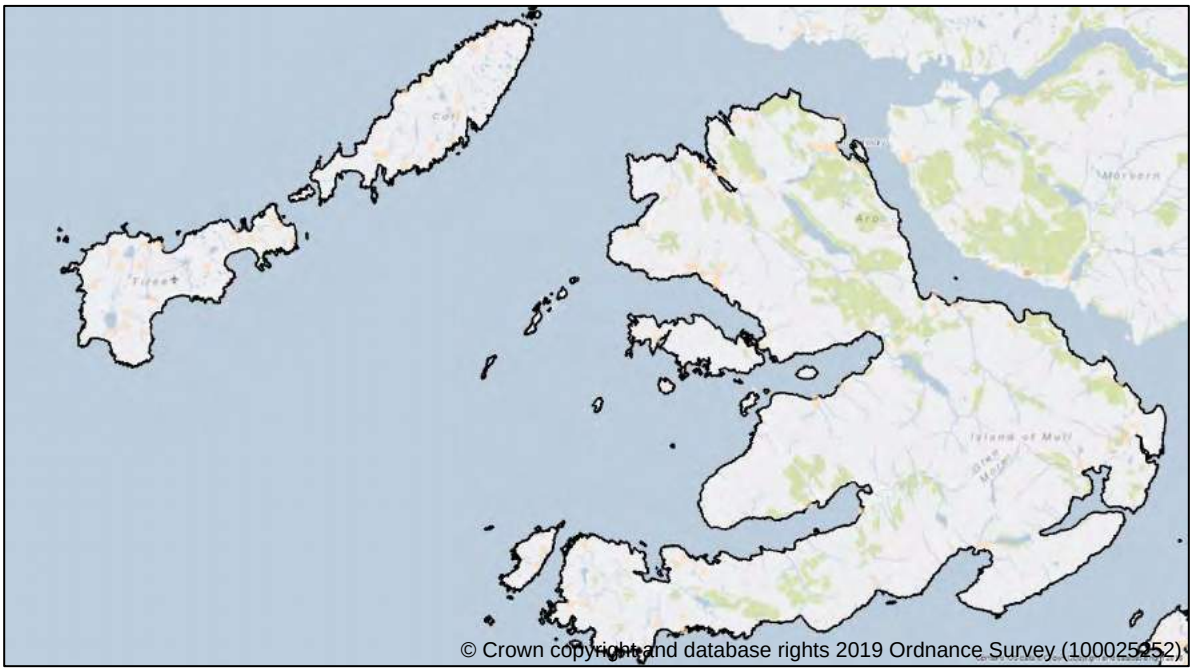


Of 5031 cells that contained woodland within 2016 and/or 2017:-

- **13.5% (n=679) lost woodland, of which:-**
  - **230 lost <100m²**
  - **188 lost 100 to 999m²**
  - **261 lost 1000m²+**

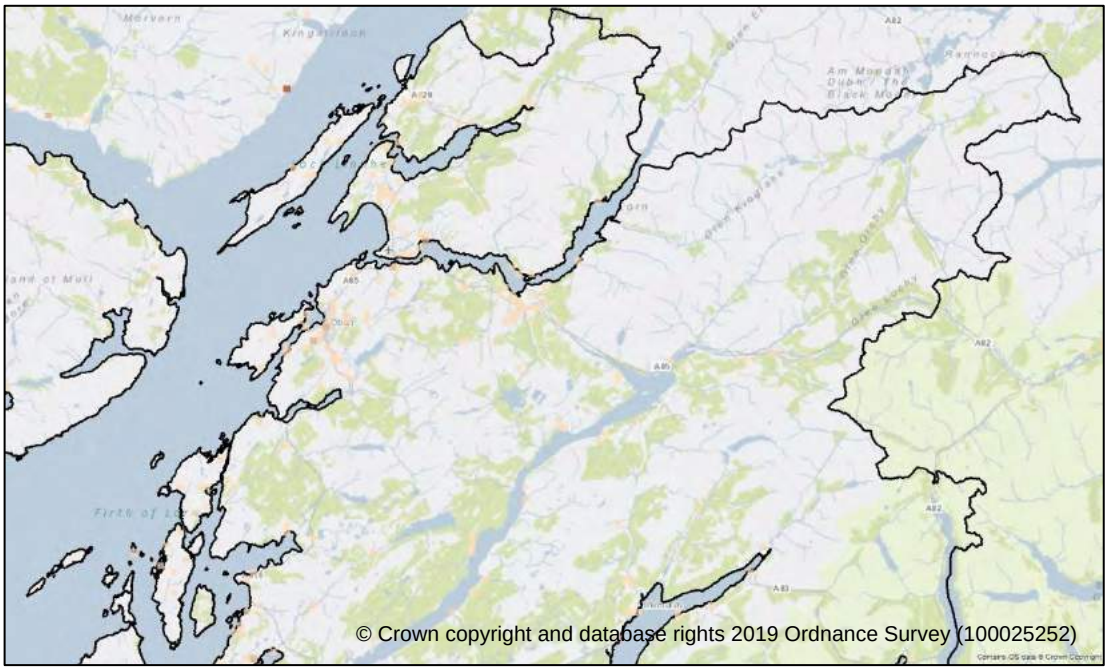


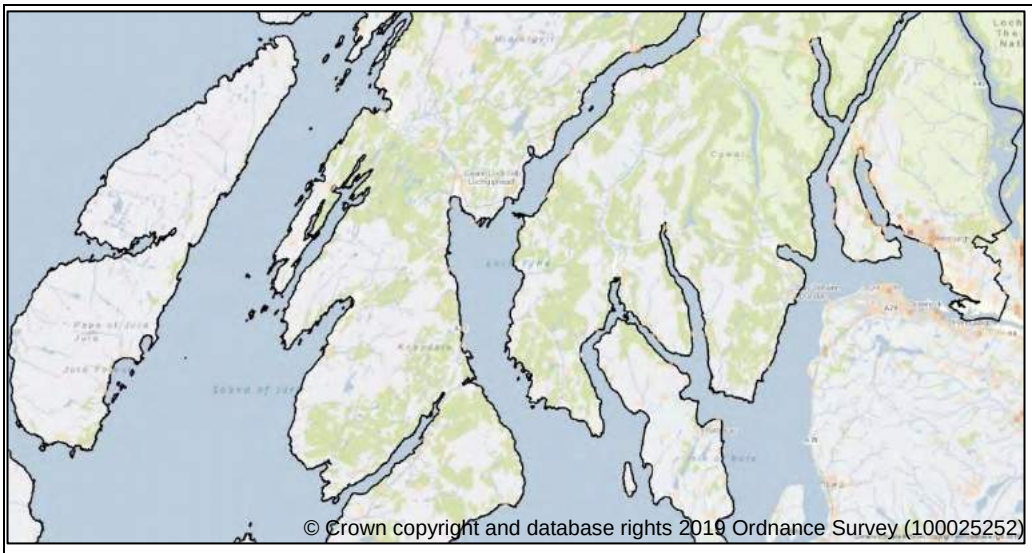
Building gain in Argyll and Bute (2016 to 2017)



Of 4595 cells that contained buildings within 2016 and/or 2017:-

- **10.9% (n=503) gained buildings, of which:-**
  - **488 gained 1 to 4 buildings**
  - **14 gained 5 to 9 buildings**
  - **1 gained 10 to 19 buildings**

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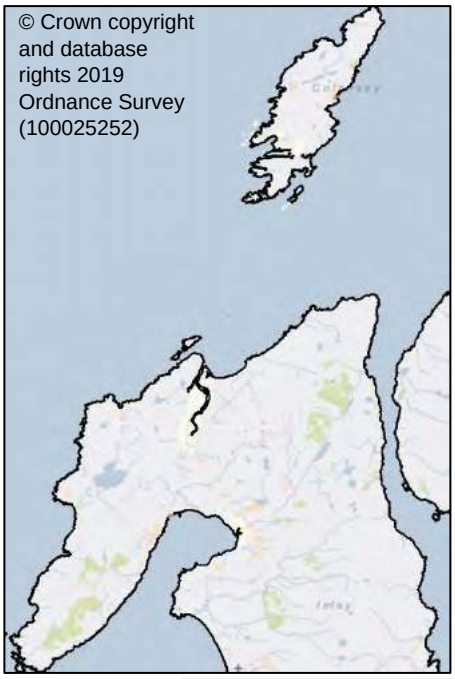
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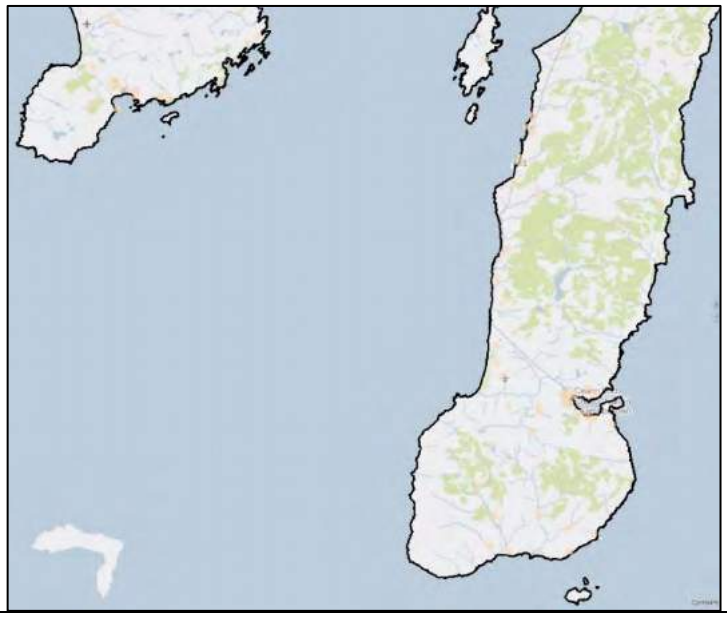
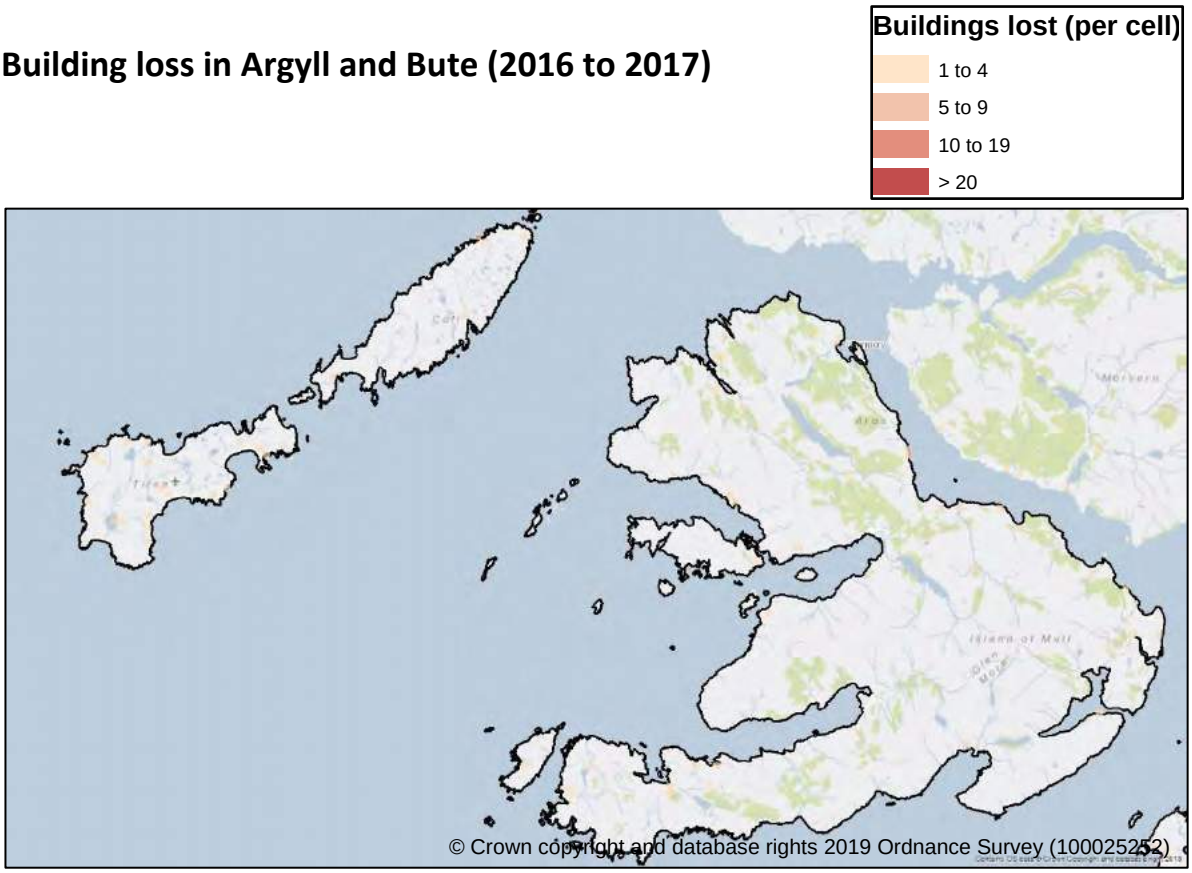
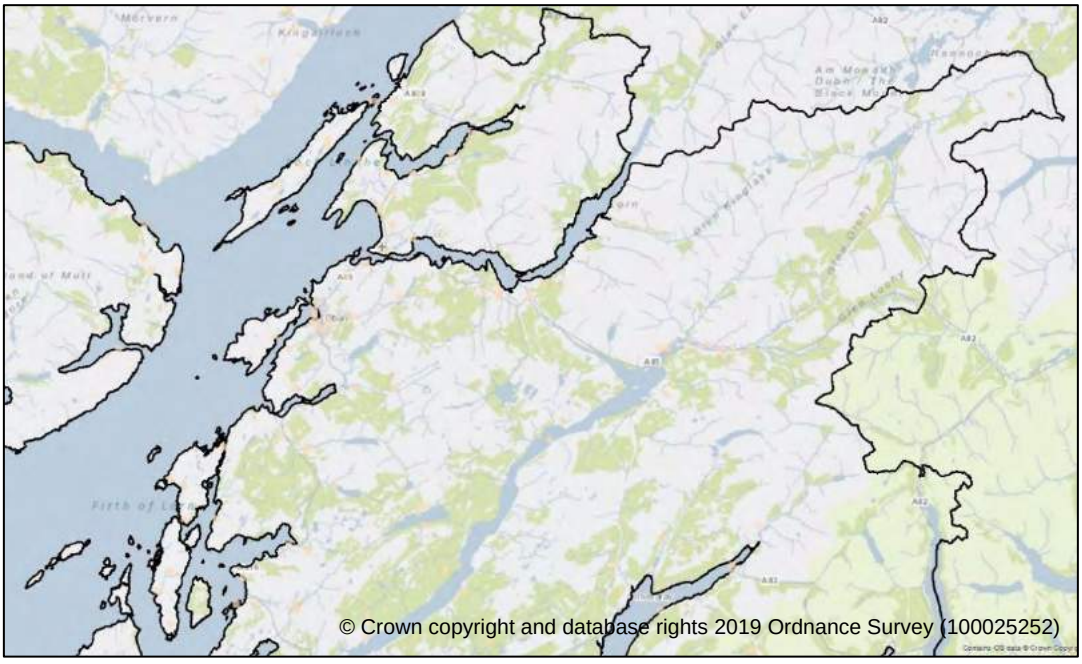


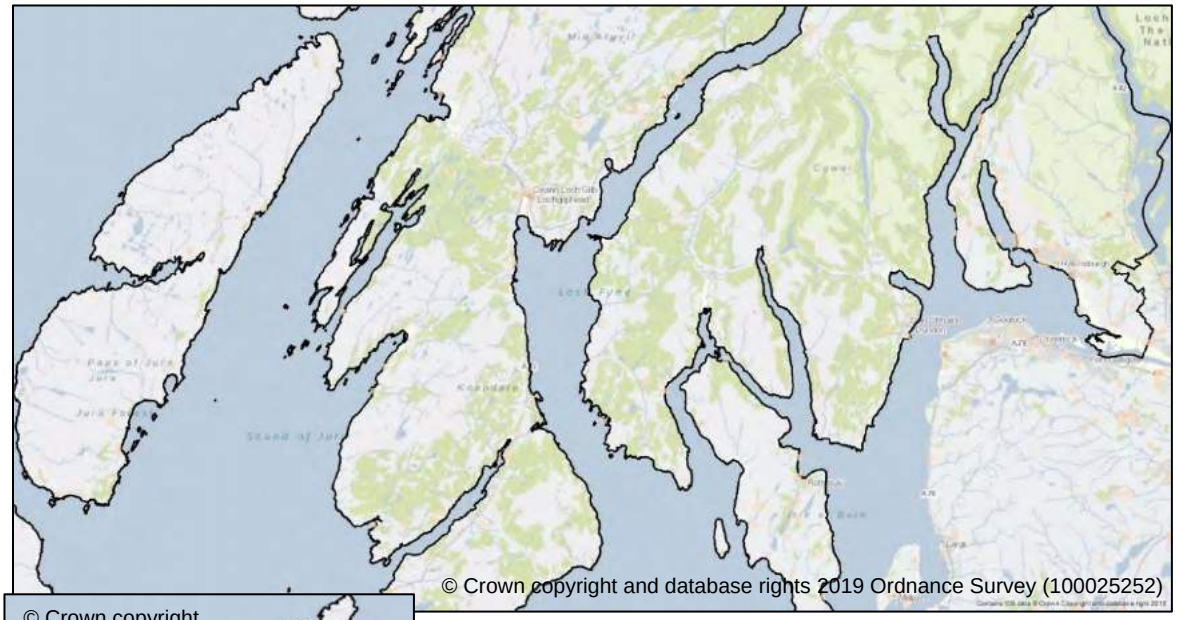
Building loss in Argyll and Bute (2016 to 2017)



Of 4595 cells that contained buildings within 2016 and/or 2017:-

- **6.4% (n=294) lost buildings, of which**
  - **290 lost 1 to 4 buildings**
  - **4 lost 5 to 9 buildings**

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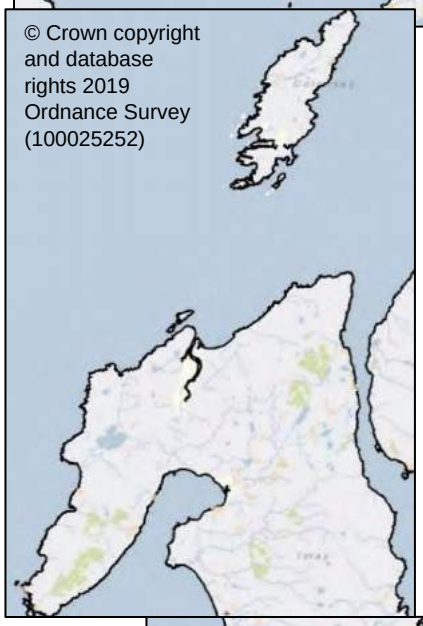
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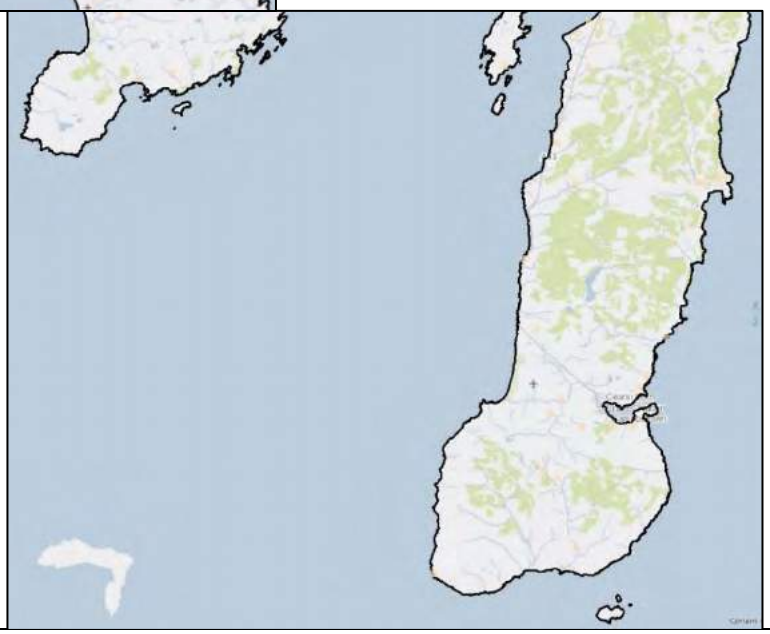
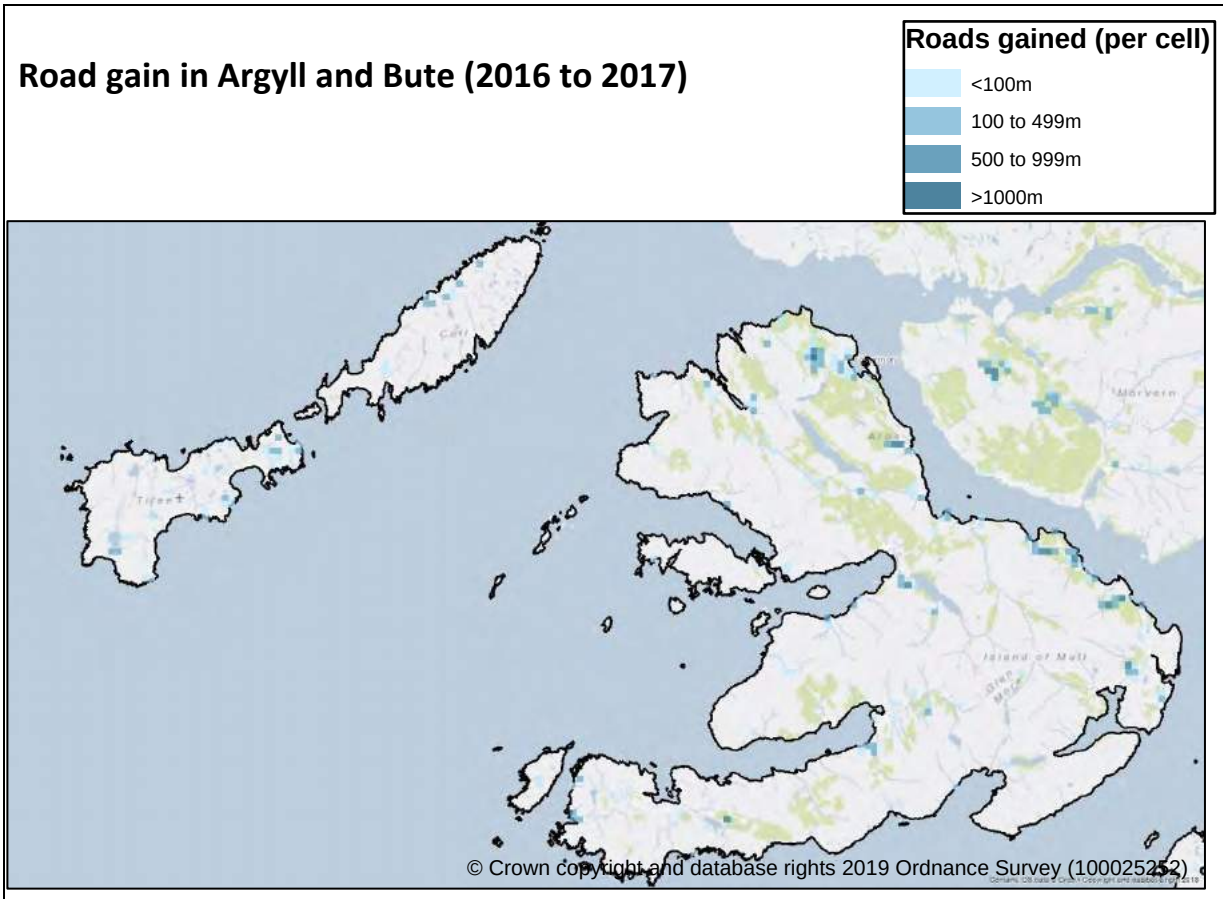
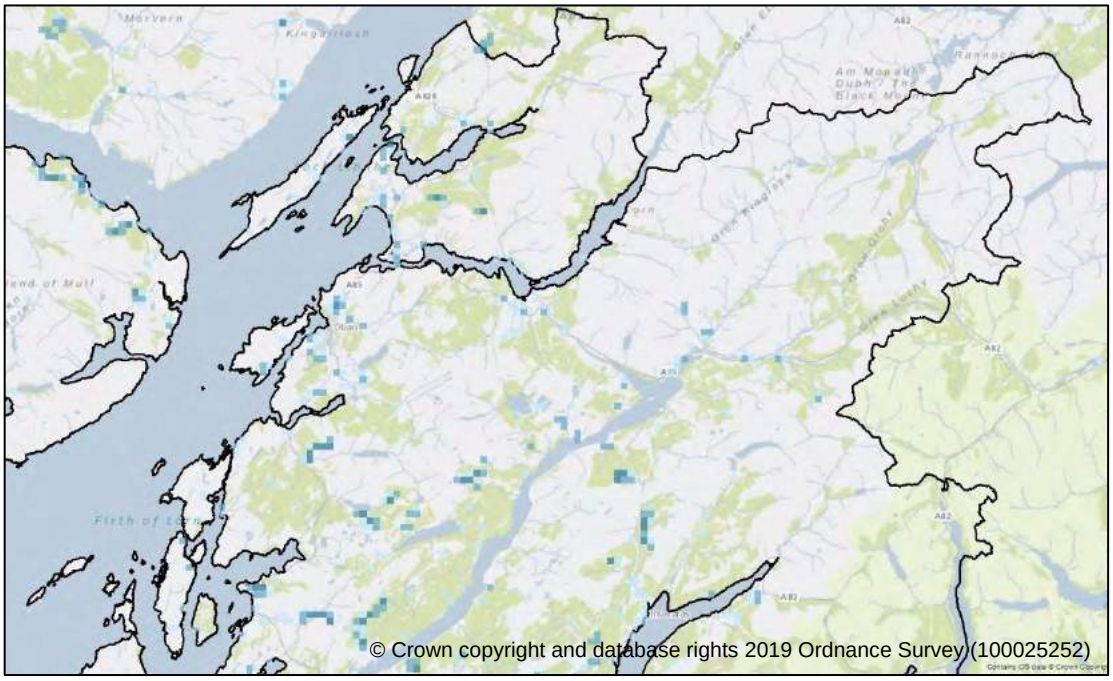


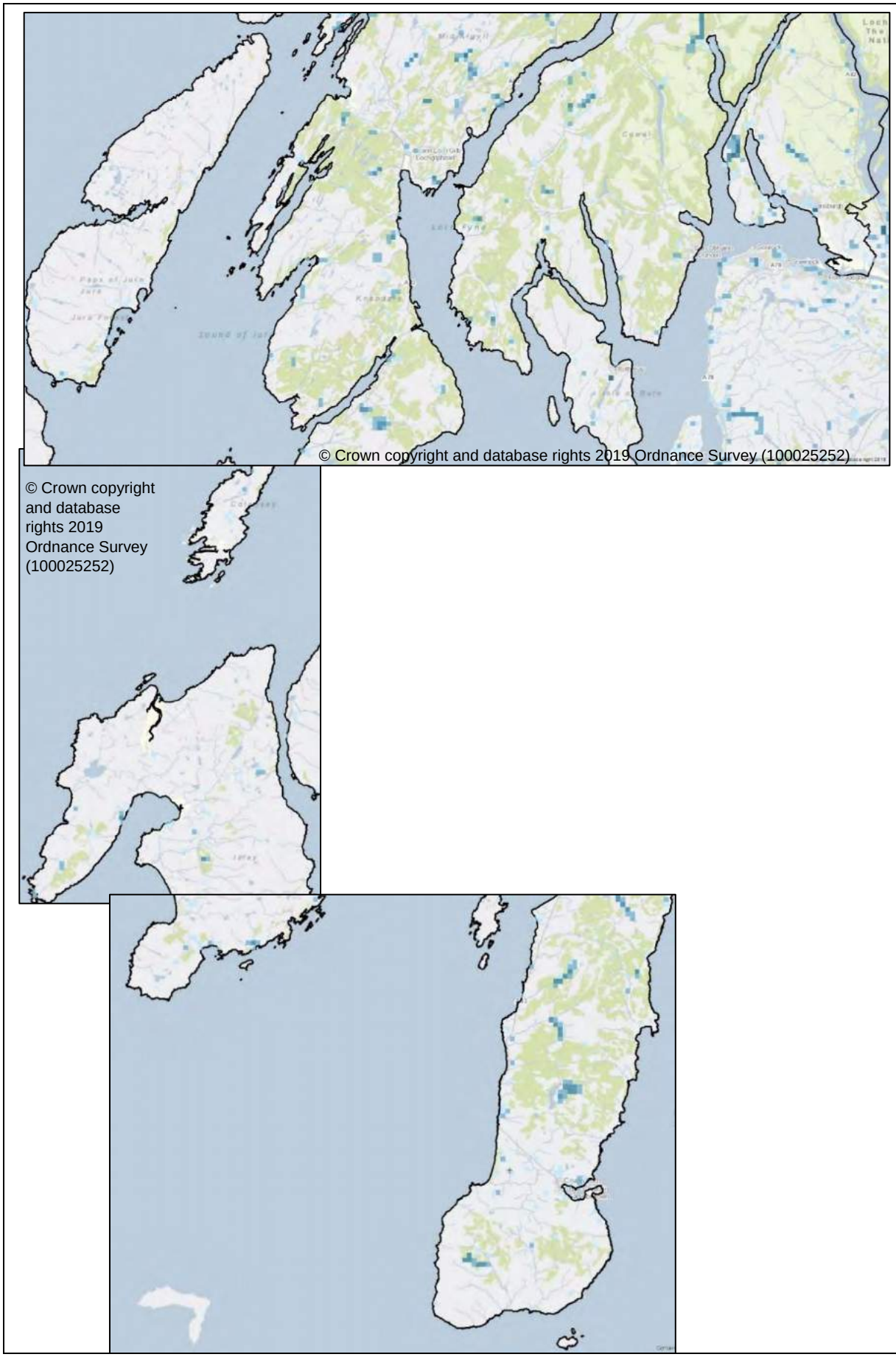
Road gain in Argyll and Bute (2016 to 2017)



Of 10751 cells that contained roads within 2016 and/or 2017:-

- **9.2% (n=986) gained roads/road sections, of which:-**
  - **521 gained 1 to 100m**
  - **340 gained 100 to 499m**
  - **118 gained 500 to 999m**
  - **7 gained 1000m+**

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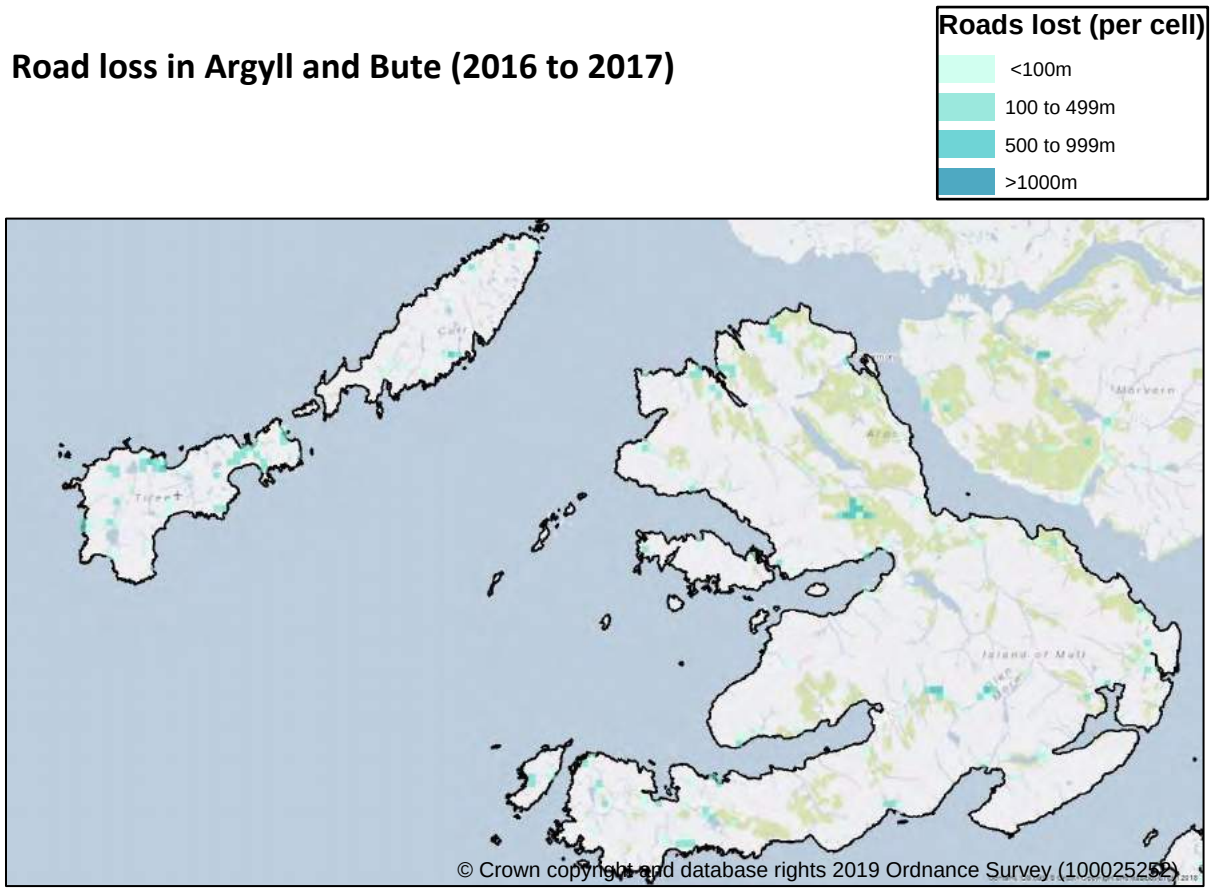
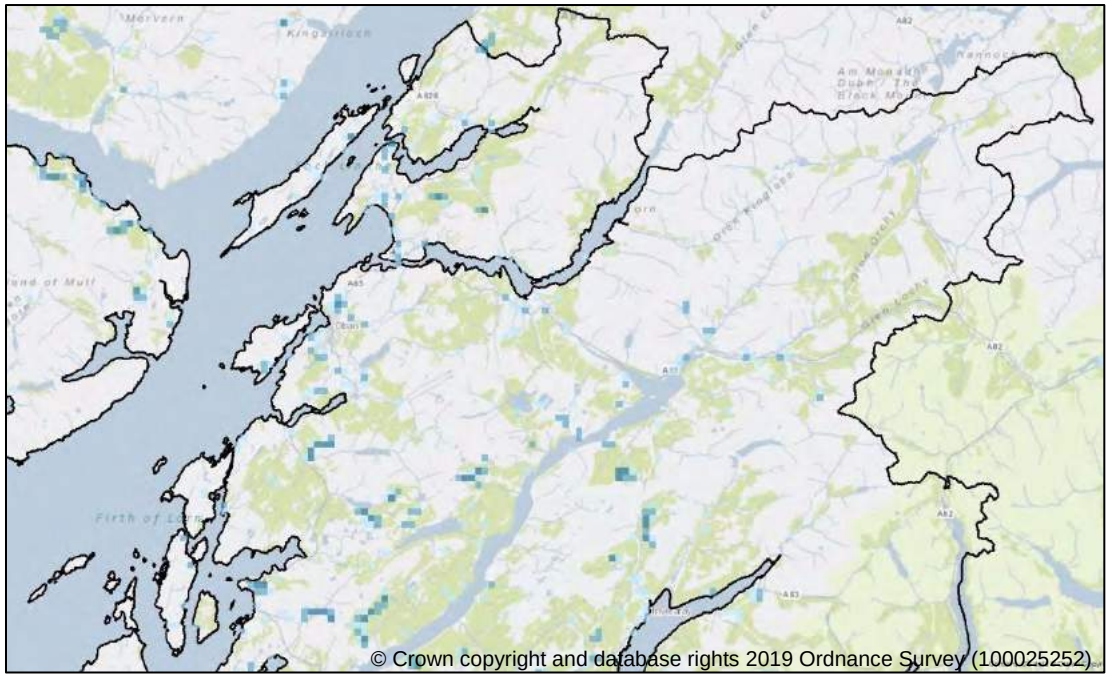
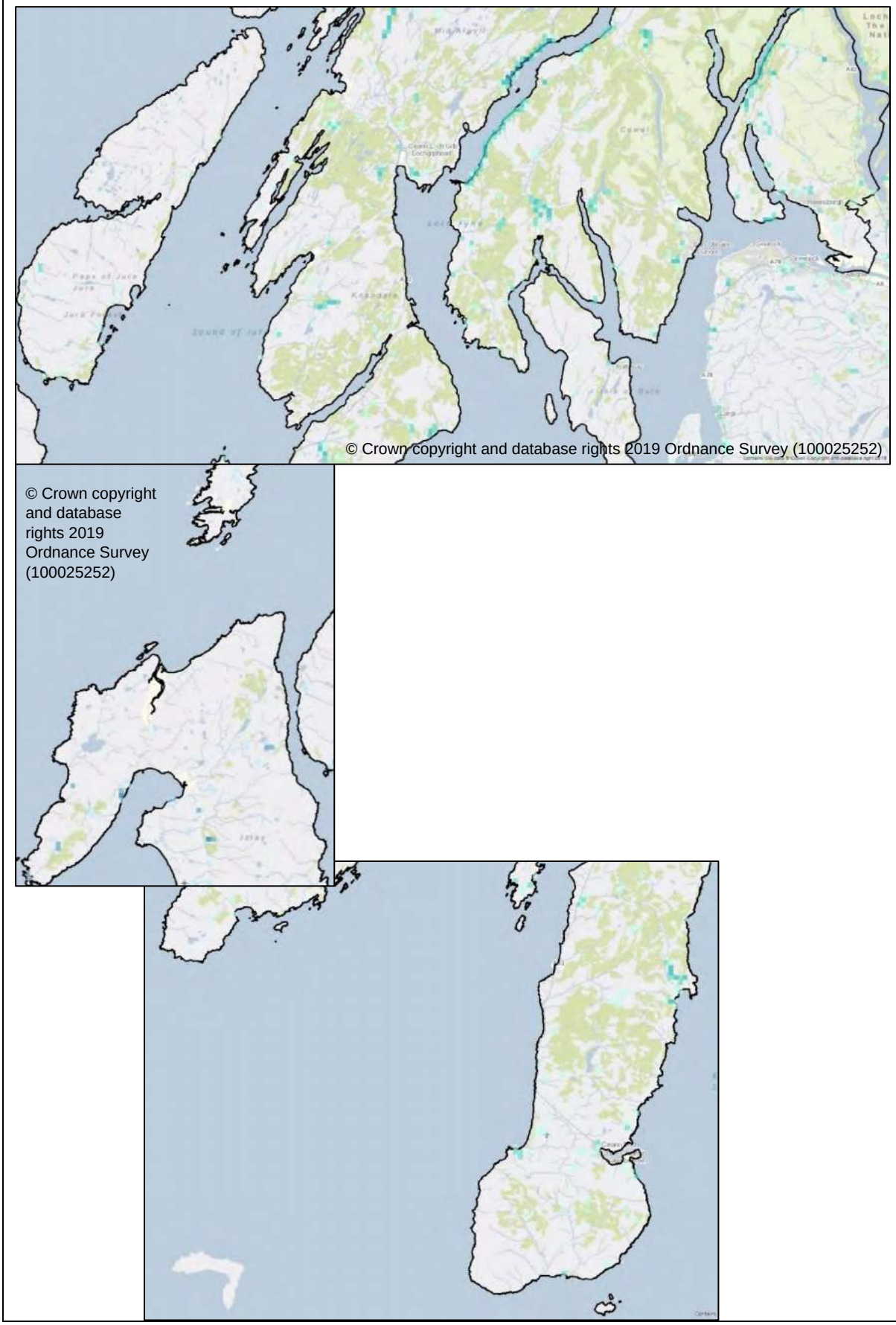
Road loss in Argyll and Bute (2016 to 2017)



Of 10751 cells that contained roads within 2016 and/or 2017:-

- **8.2% (n=884) lost roads, of which:-**
  - **554 lost 1 to 100m**
  - **239 lost 100 to 499m**
  - **87 lost 500 to 999m**
  - **4 lost 1000m+**

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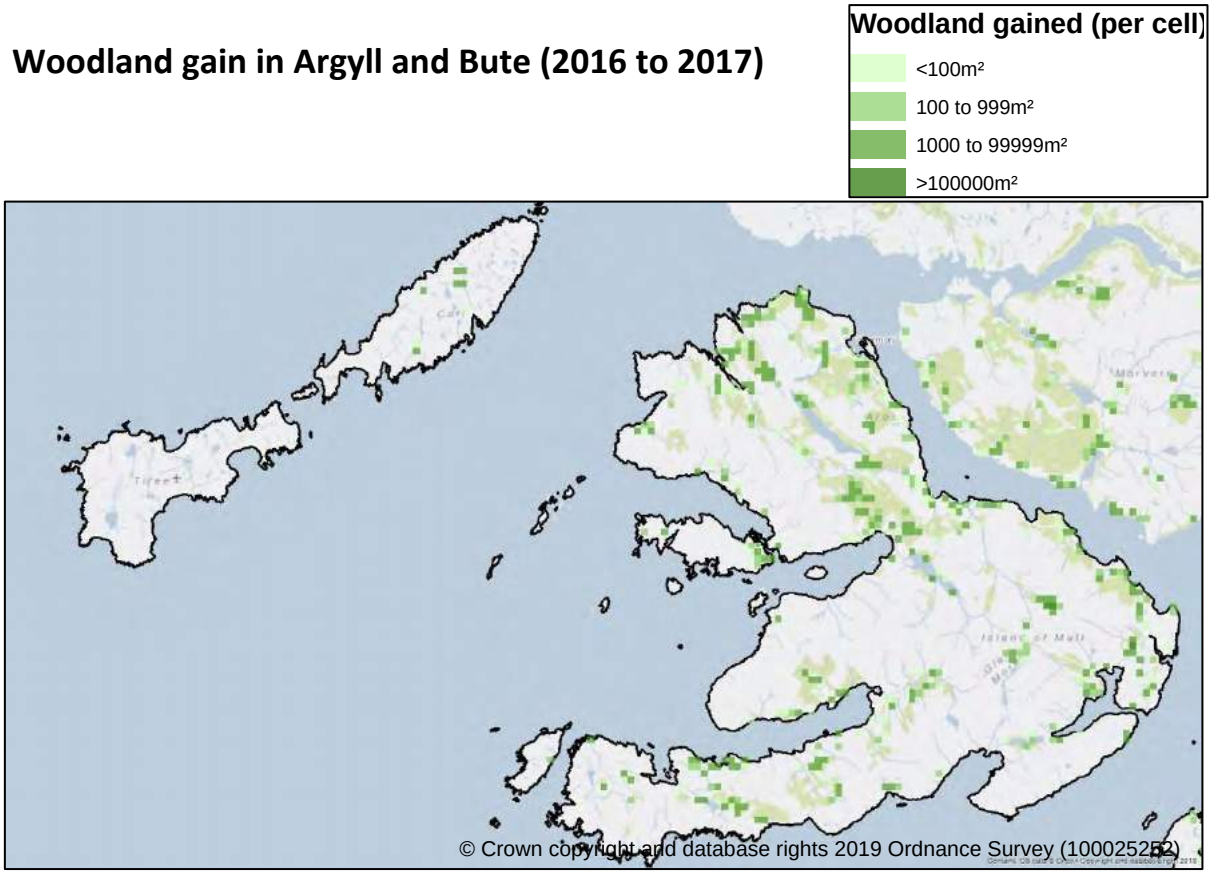
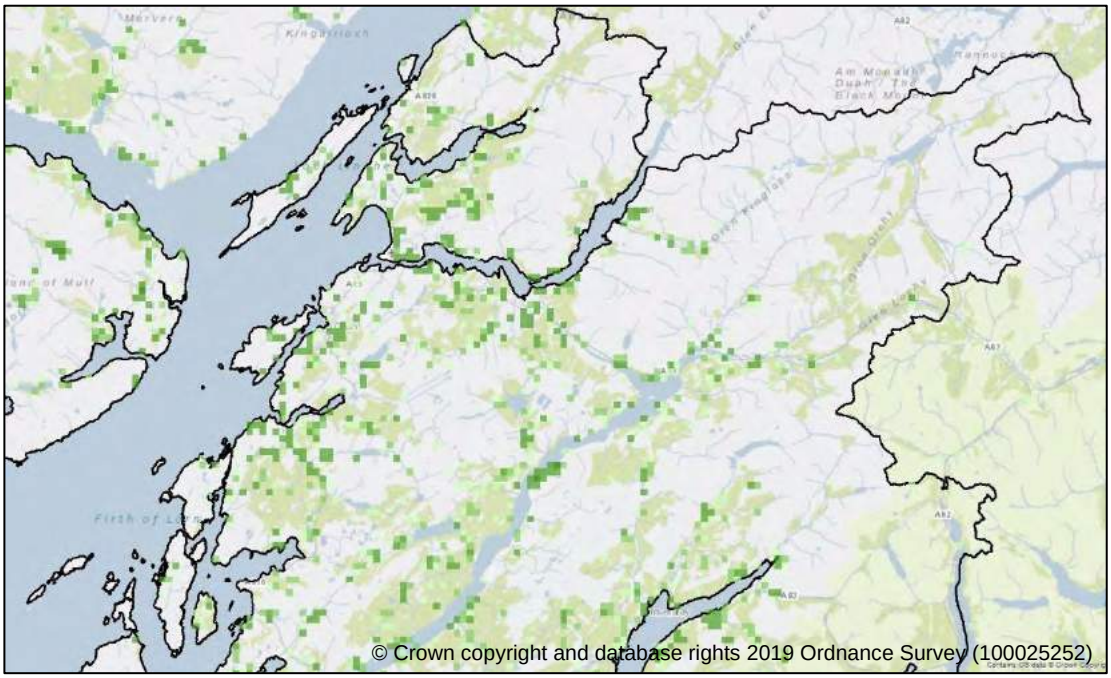
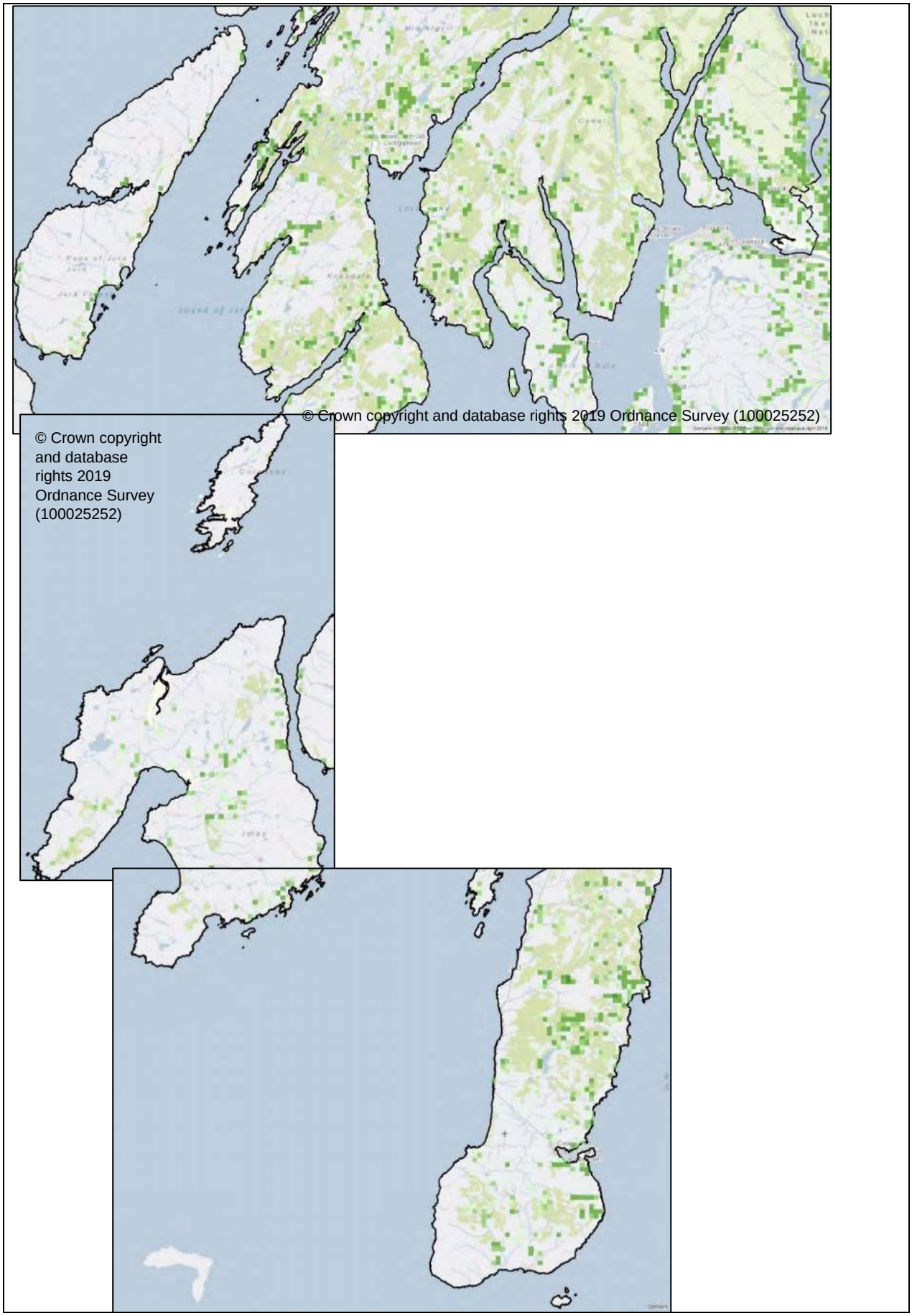
Woodland gain in Argyll and Bute (2016 to 2017)



Of 17117 cells that contained woodland within 2016 and/or 2017:-

- **16.1% (n=2756) gained woodland, of which:-**
  - **738 gained <100m²**
  - **799 gained 100 to 999m²**
  - **1219 gained 1000m²+**

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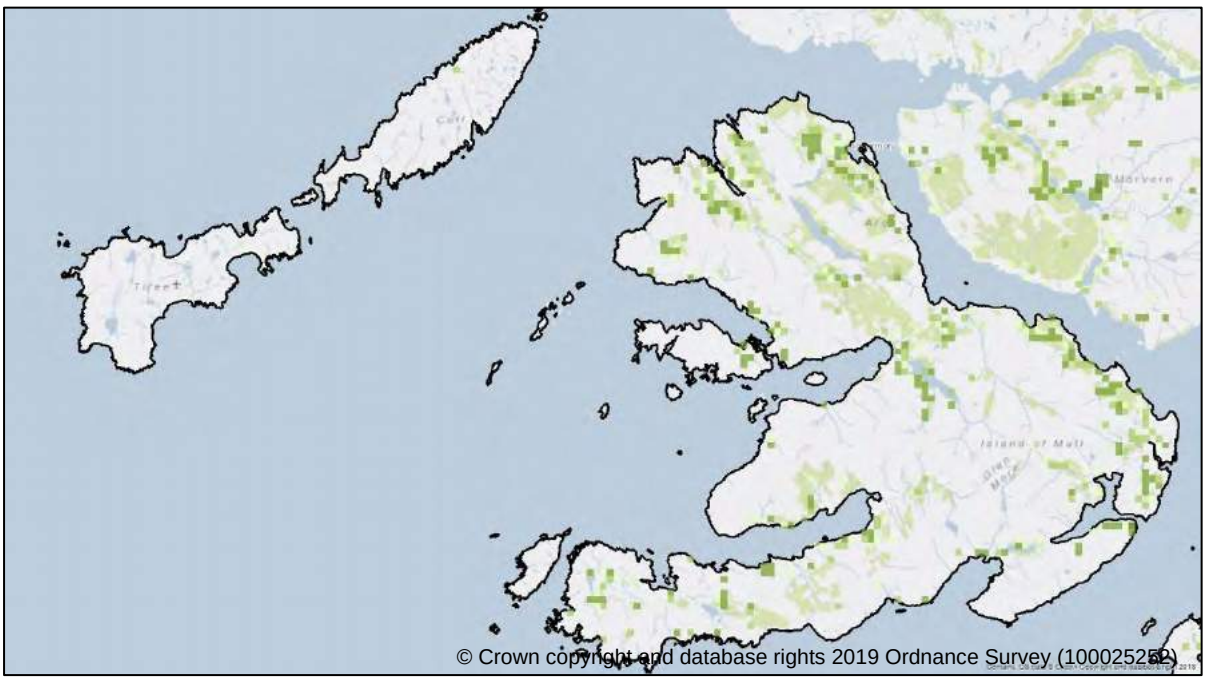
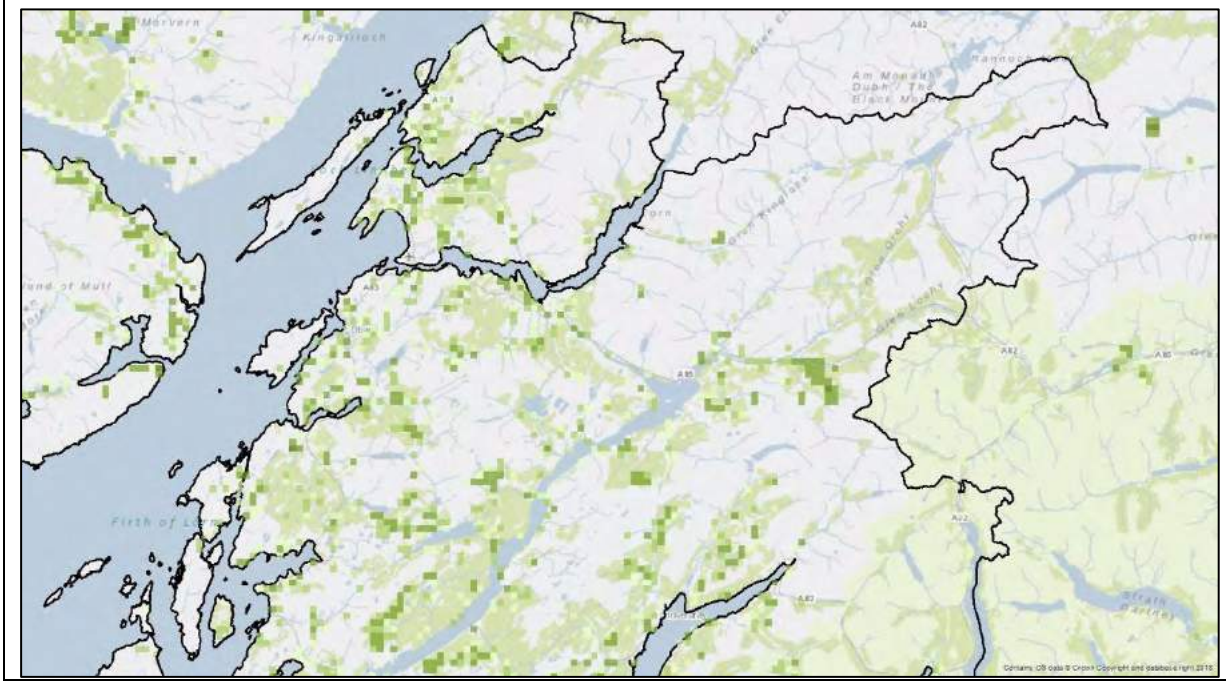
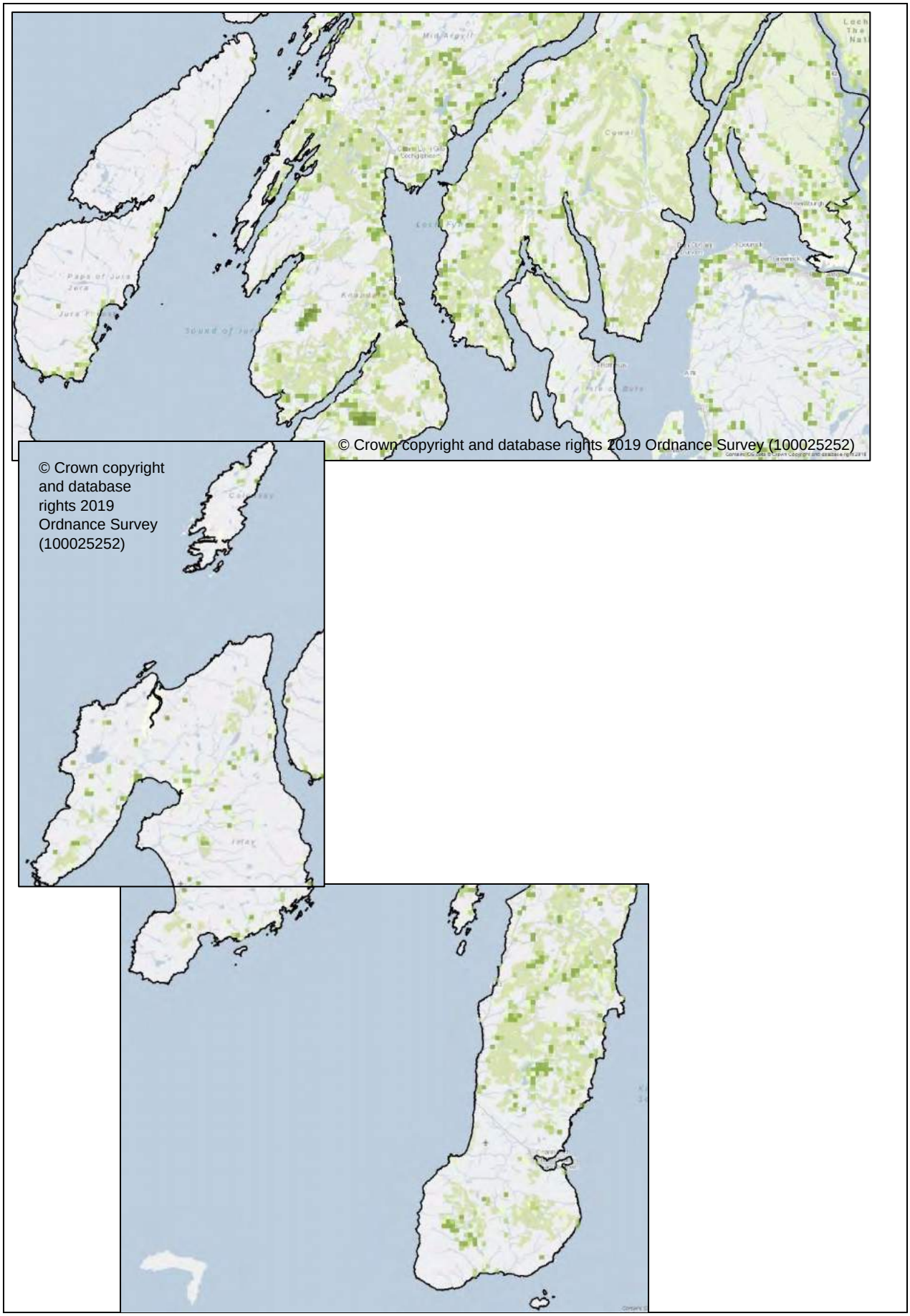
Woodland loss in Argyll and Bute (2016 to 2017)



Of 17117 cells that contained woodland within 2016 and/or 2017:-

- **15.5% (n=2654) lost woodland, of which**
  - **785 lost <100m²**
  - **993 lost 100 to 999m²**
  - **876 lost 1000m²+**

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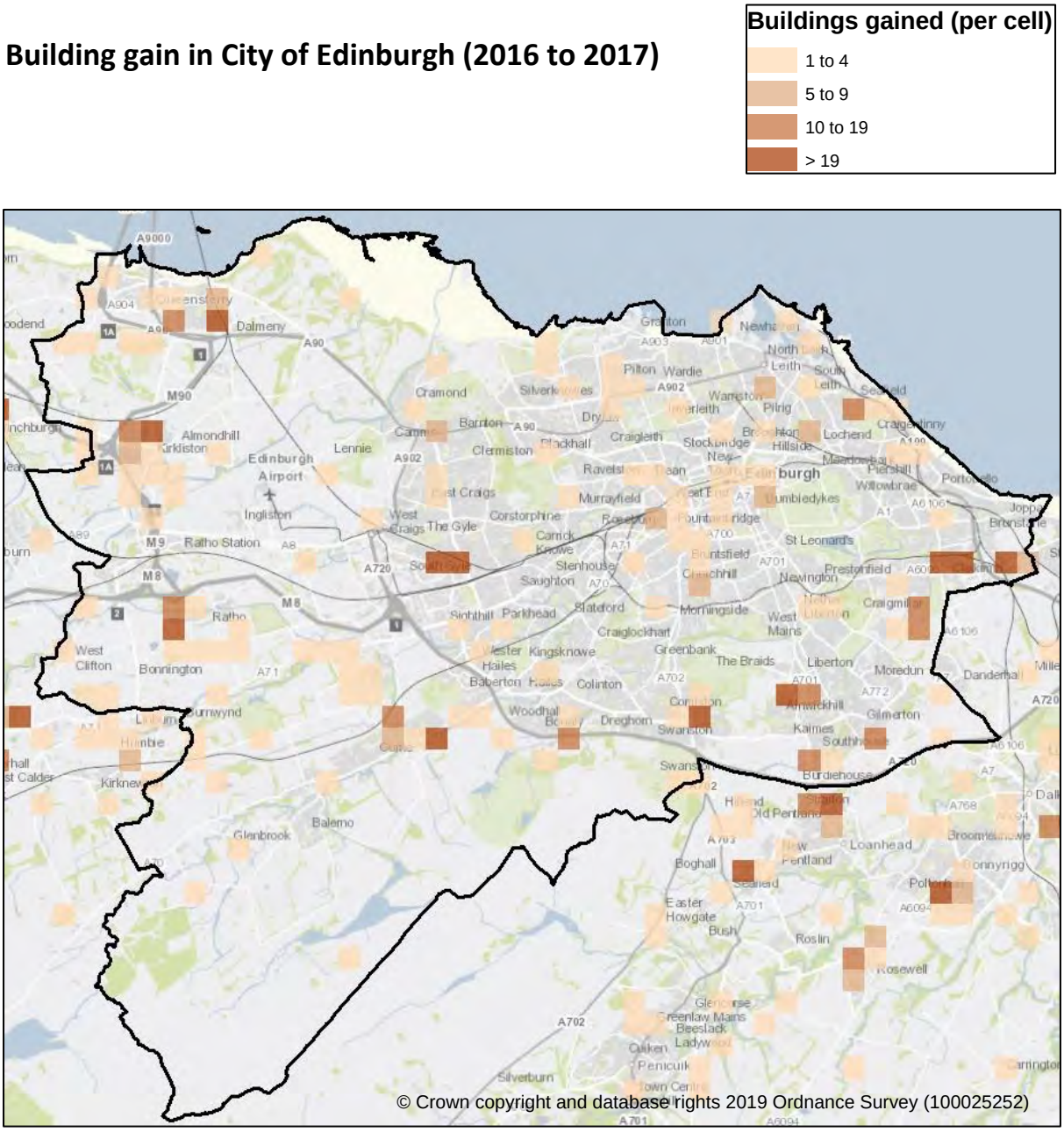
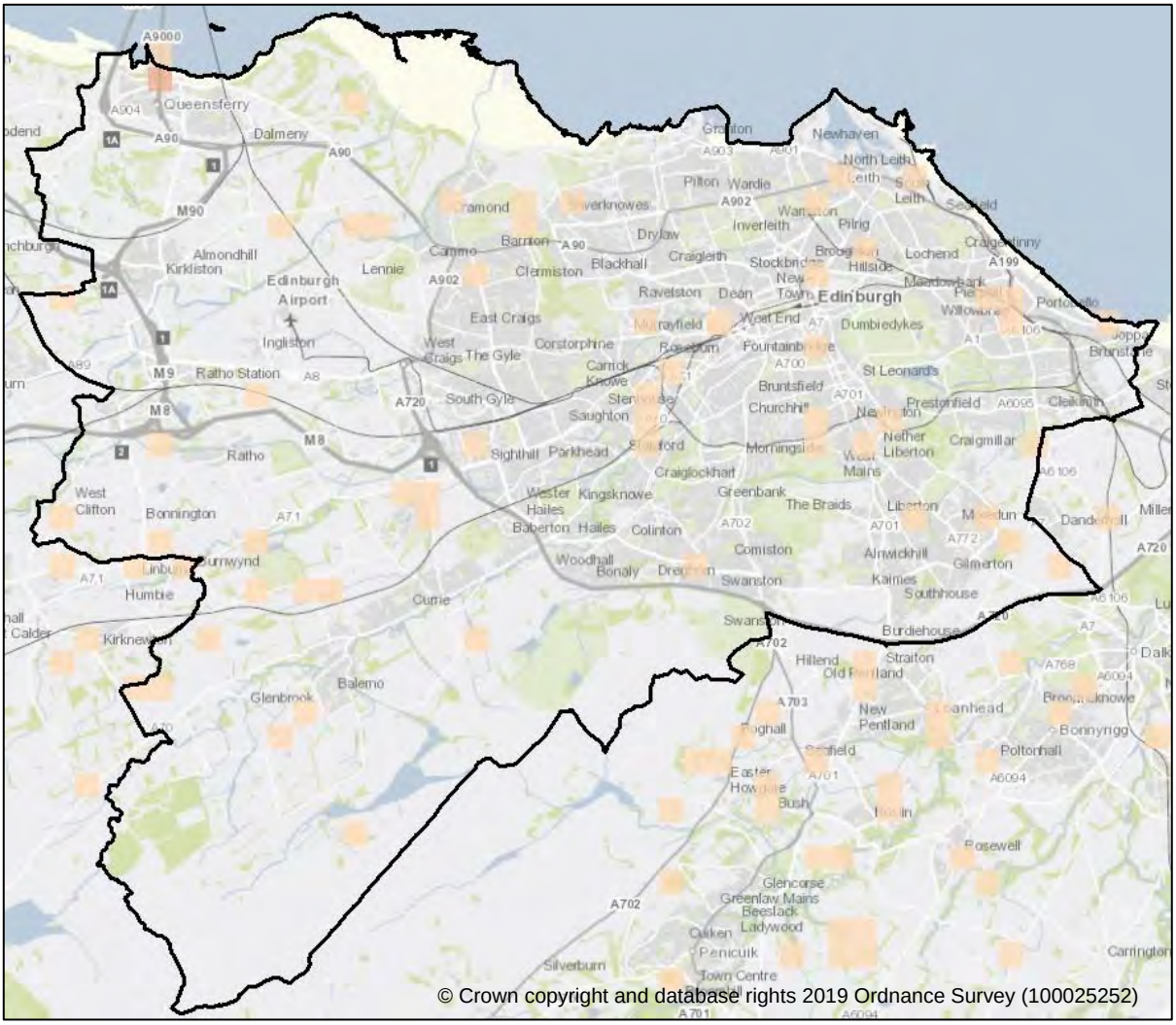
Building gain in City of Edinburgh (2016 to 2017)



Of 826 cells that contained buildings within 2016 and/or 2017:-

- **17.1% (n=141) gained buildings, of which:-**
  - **109 gained 1 to 4 buildings**
  - **10 gained 5 to 9 buildings**
  - **11 gained 10 to 19 buildings**
  - **11 gained >19 buildings**

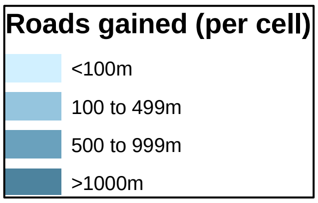
Building loss in City of Edinburgh (2016 to 2017)

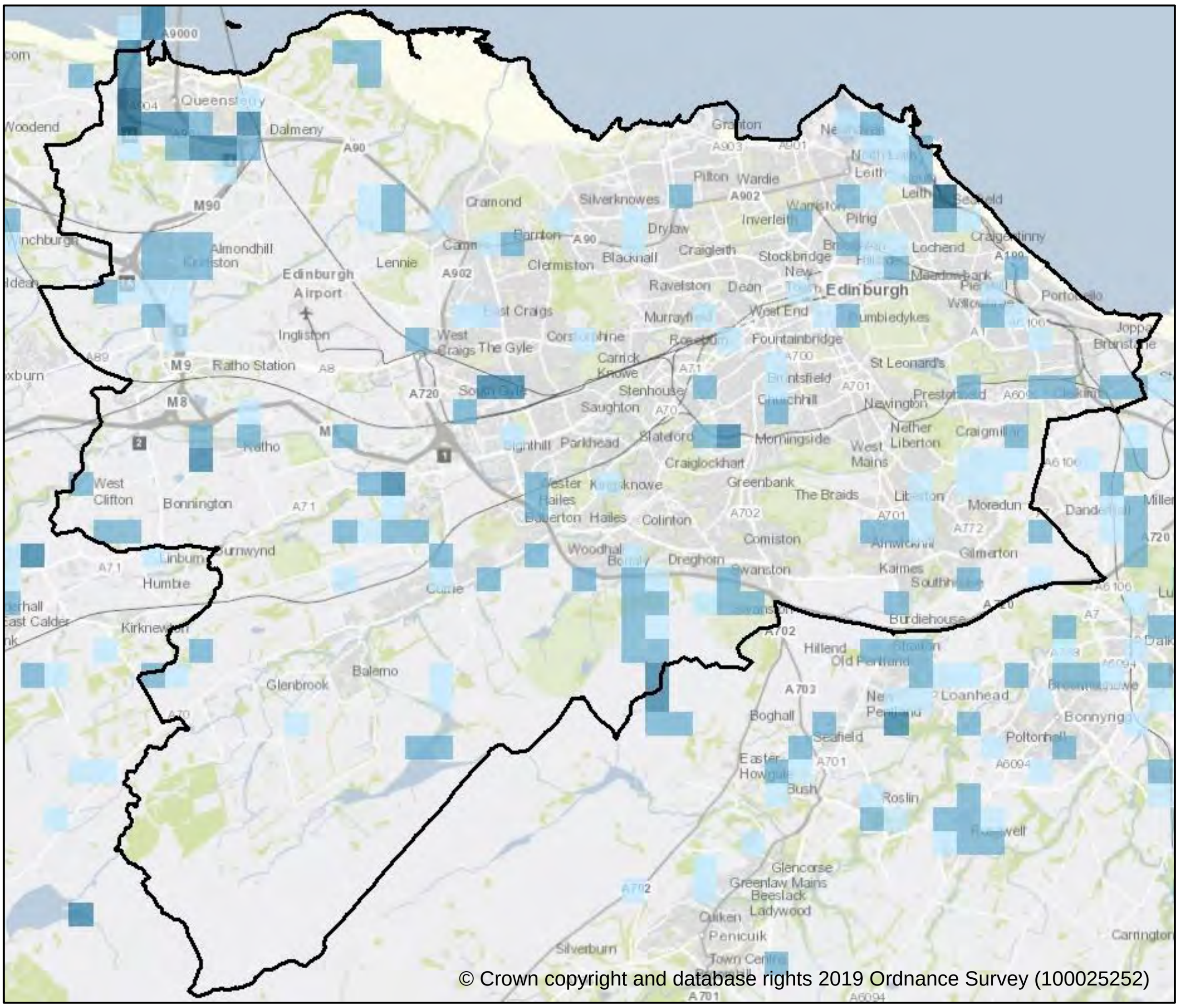


Of 826 cells that contained buildings within 2016 and/or 2017:-

- **6.8% (n=56) lost buildings, of which:-**
  - **55 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

Road gain in City of Edinburgh (2016 to 2017)

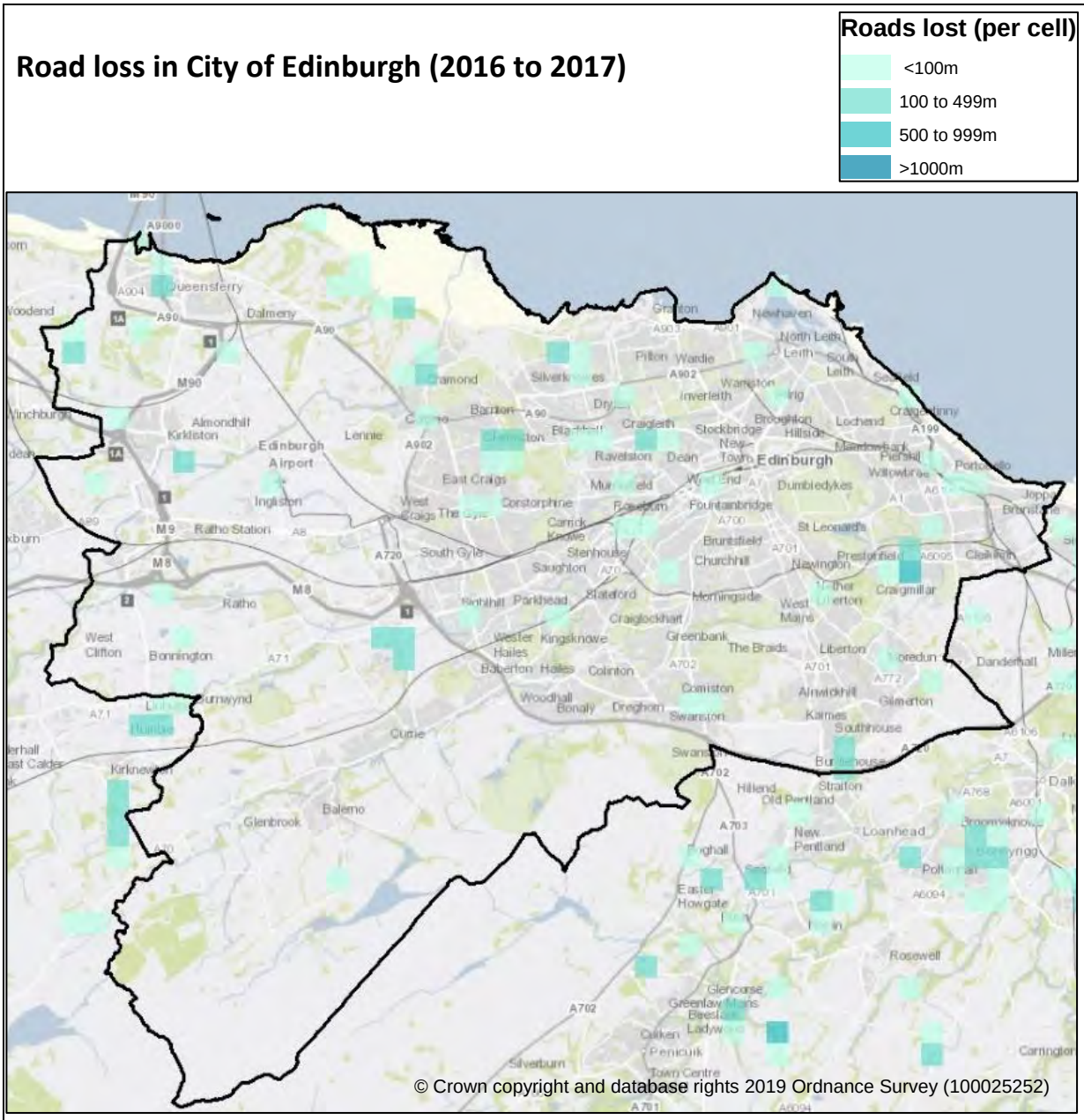




Of 932 cells that contained roads within 2016 and/or 2017:-

- **16.2% (n=151) gained roads, of which:-**
  - **61 gained 1 to 100m**
  - **74 gained 100 to 499m**
  - **13 gained 500 to 999m**
  - **3 gained 1000m+**

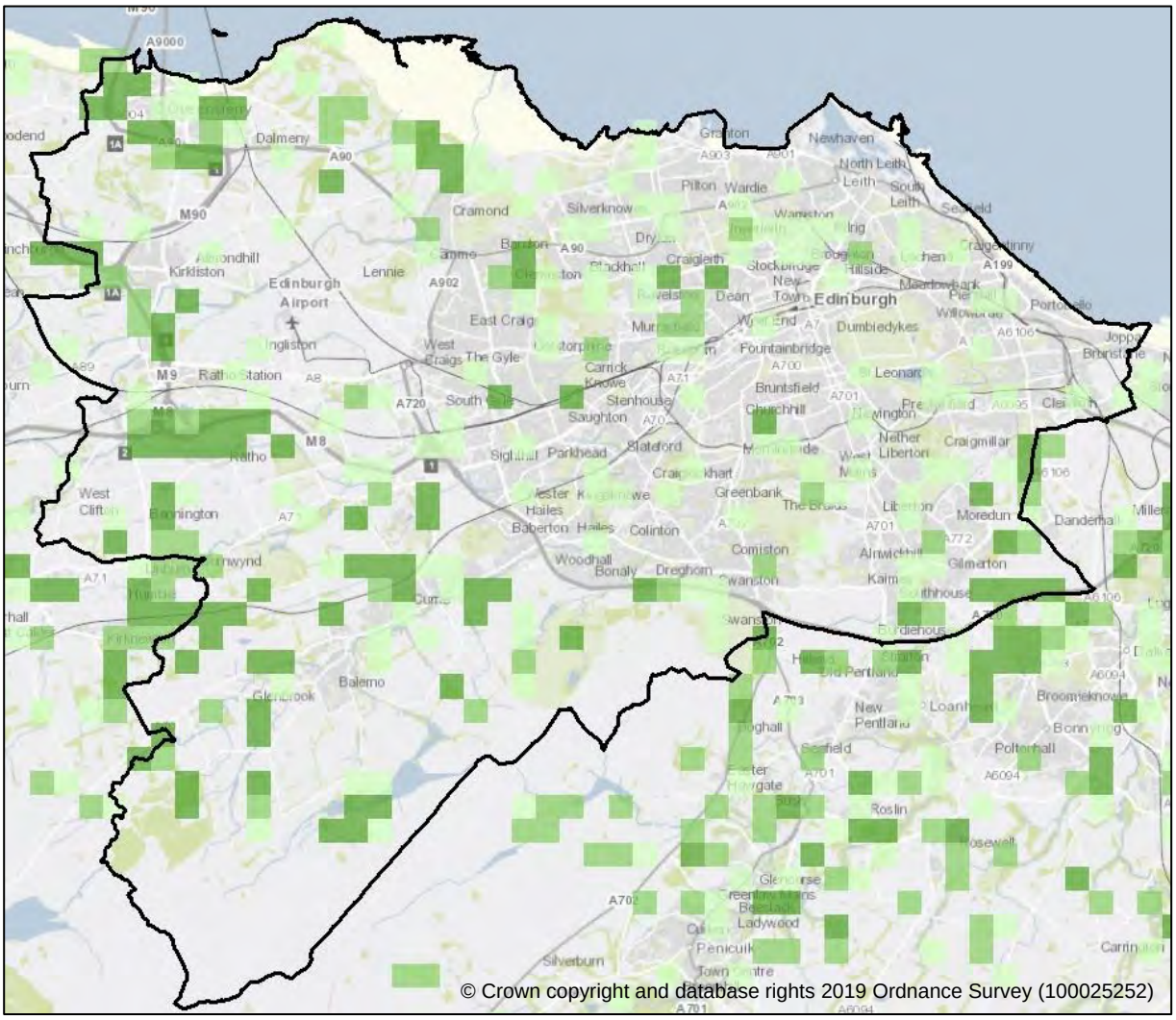
Road loss in City of Edinburgh (2016 to 2017)



Of 932 cells that contained roads within 2016 and/or 2017:-

- **7.1% (n=66) lost roads, of which:-**
  - **50 lost 1 to 100m**
  - **15 lost 100 to 499m**
  - **1 lost 500 to 999m**

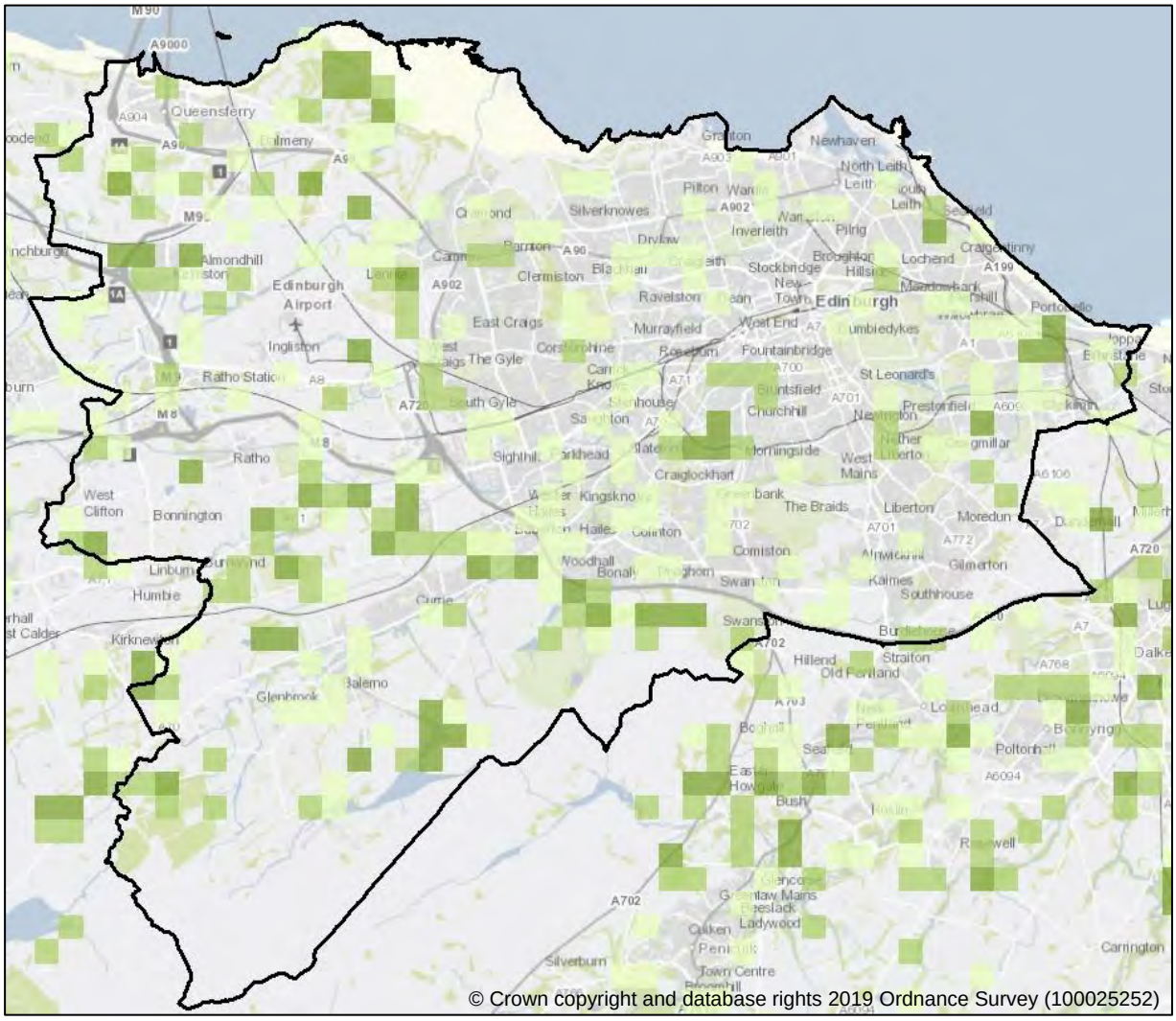
Woodland gain in City of Edinburgh (2016 to 2017)



Of 952 cells that contained woodland within 2016 and/or 2017:-

- **25.3% (n=241) gained woodland, of which:-**
  - **125 gained <100m²**
  - **38 gained 100 to 999m²**
  - **78 gained 1000m²+**

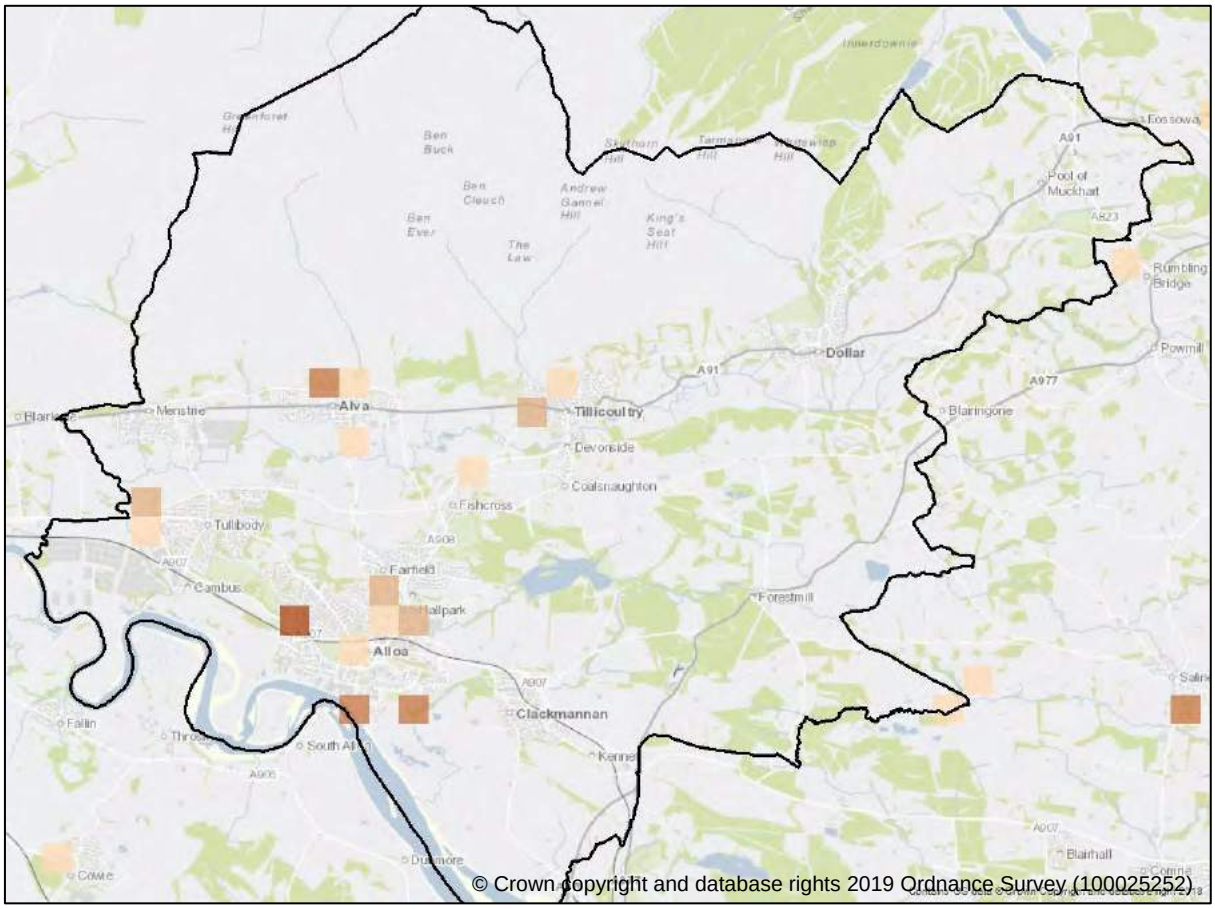
Woodland loss in City of Edinburgh (2016 to 2017)



Of 952 cells that contained woodland within 2016 and/or 2017:-

- **26.6% (n=253) lost woodland, of which:-**
  - **139 lost <100m²**
  - **68 lost 100 to 999m²**
  - **46 lost 1000m²+**

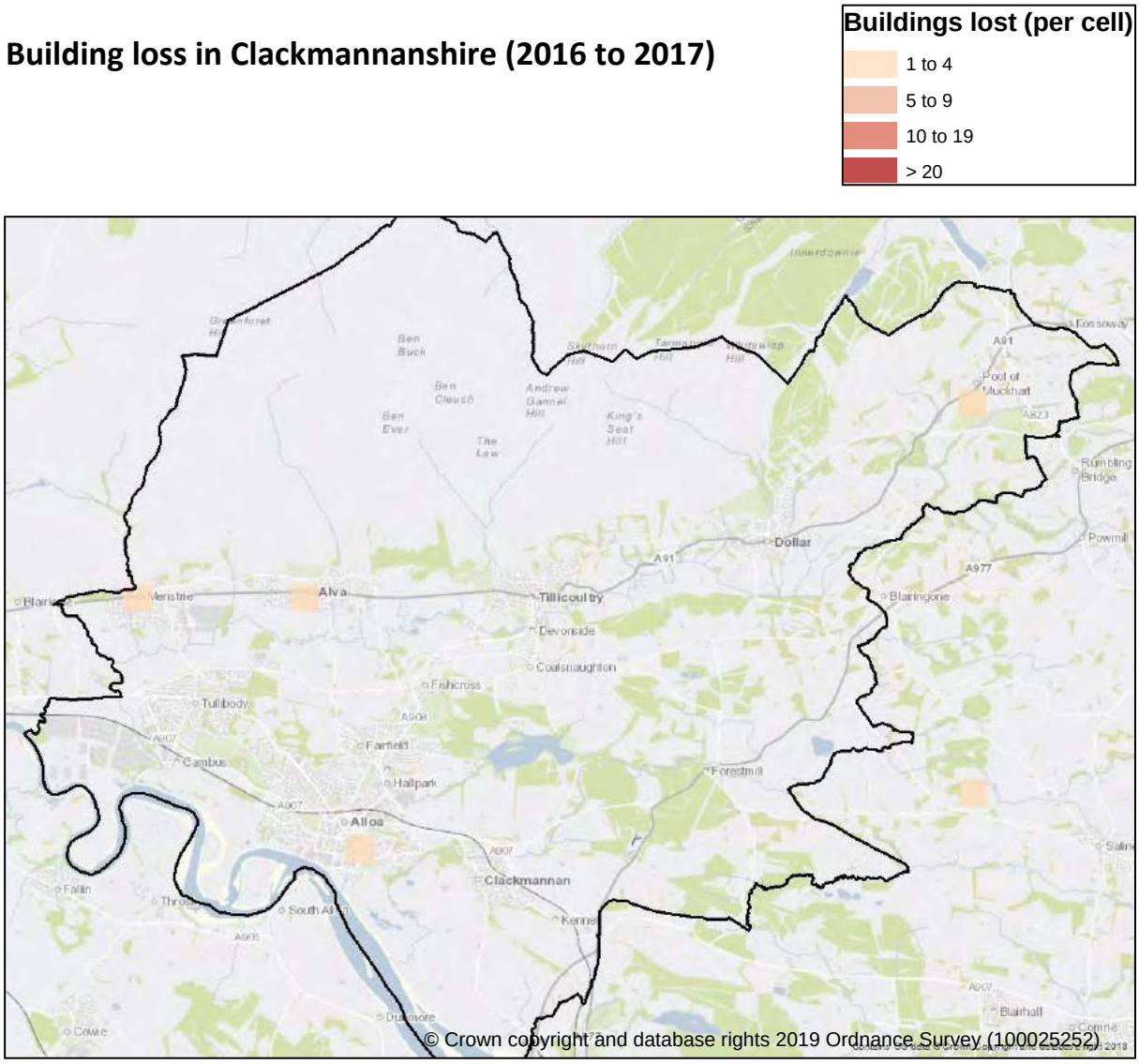
Building gain in Clackmannanshire (2016 to 2017)



Of 327 cells that contained buildings within 2016 and/or 2017:-

- **4.9% (n=16) gained buildings, of which:-**
  - **8 gained 1 to 4 buildings**
  - **4 gained 5 to 9 buildings**
  - **3 gained 10 to 19 buildings**
  - **1 gained >19 buildings**

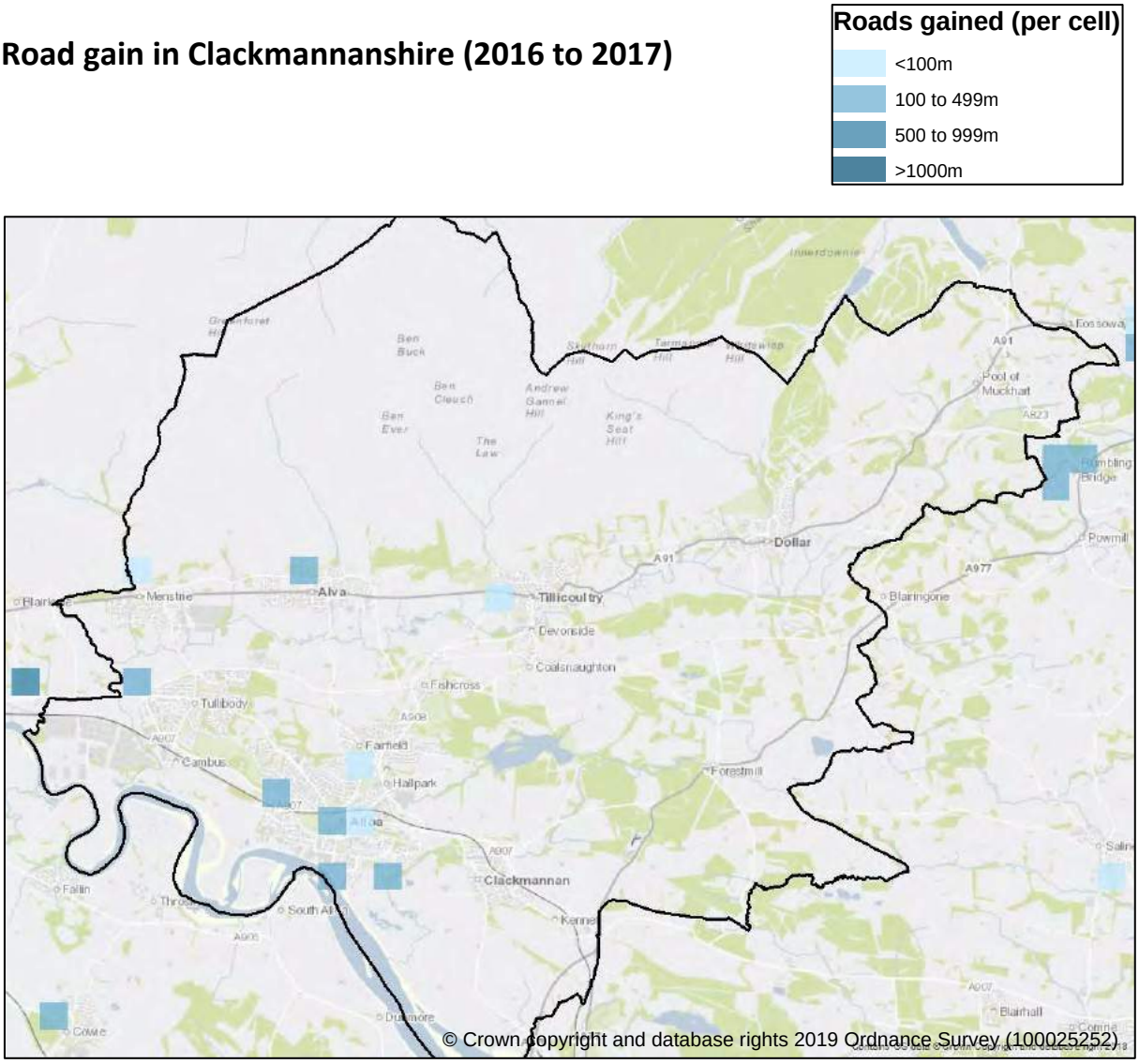
Building loss in Clackmannanshire (2016 to 2017)



Of 327 cells that contained buildings within 2016 and/or 2017:-

- **1.2% (n=4) lost buildings, of which:-**
  - **4 lost 1 to 4 buildings**

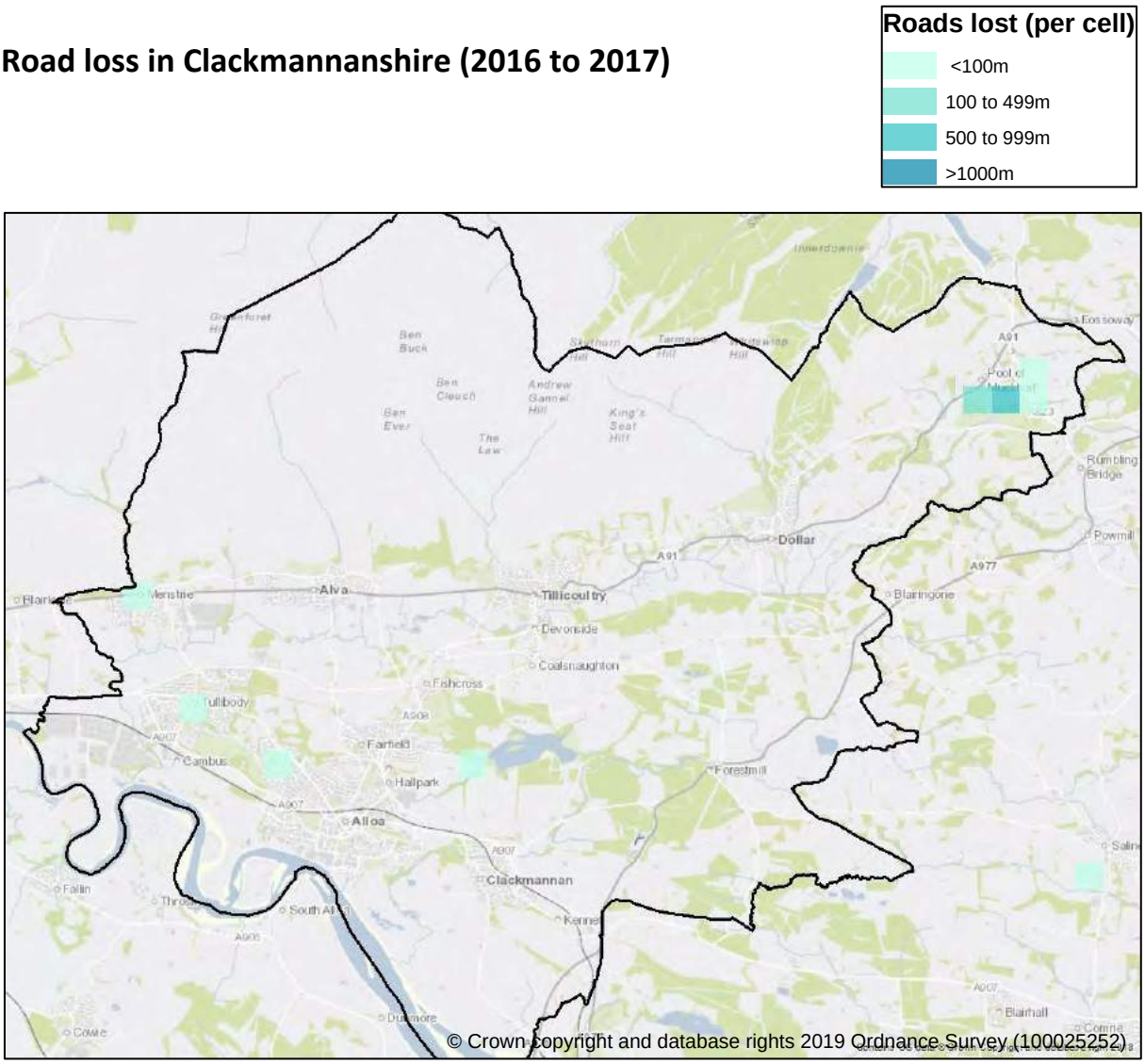
Road gain in Clackmannanshire (2016 to 2017)



Of 385 cells that contained roads within 2016 and/or 2017:-

- **2.6% (n=10) gained roads, of which:-**
  - **4 gained 1 to 100m**
  - **6 gained 100 to 499m**

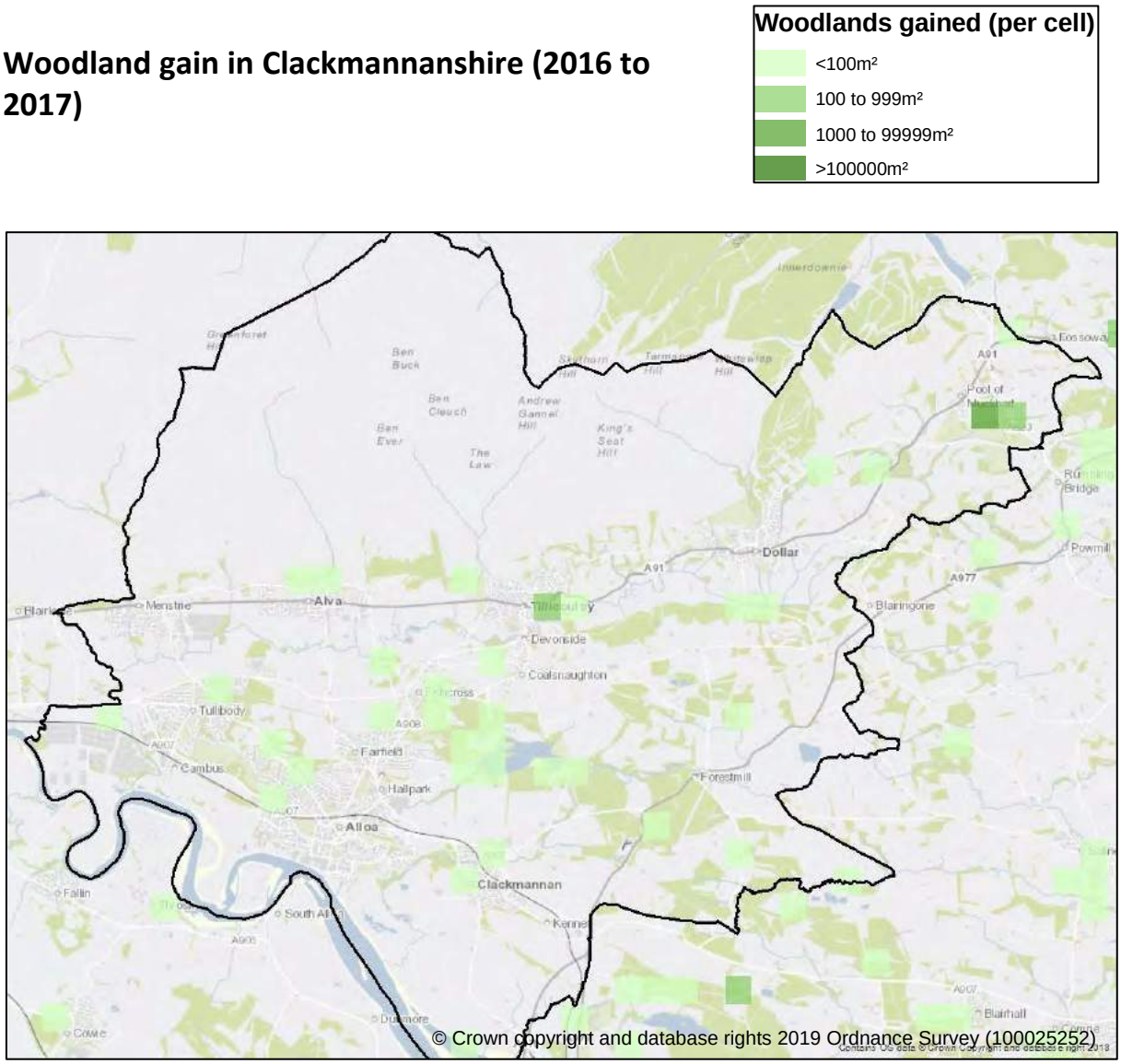
Road loss in Clackmannanshire (2016 to 2017)



Of 385 cells that contained roads within 2016 and/or 2017:-

- **2.1% (n=8) lost roads, of which:-**
  - **6 lost 1 to 100m**
  - **1 lost 100 to 499m**
  - **1 lost 500 to 999m**

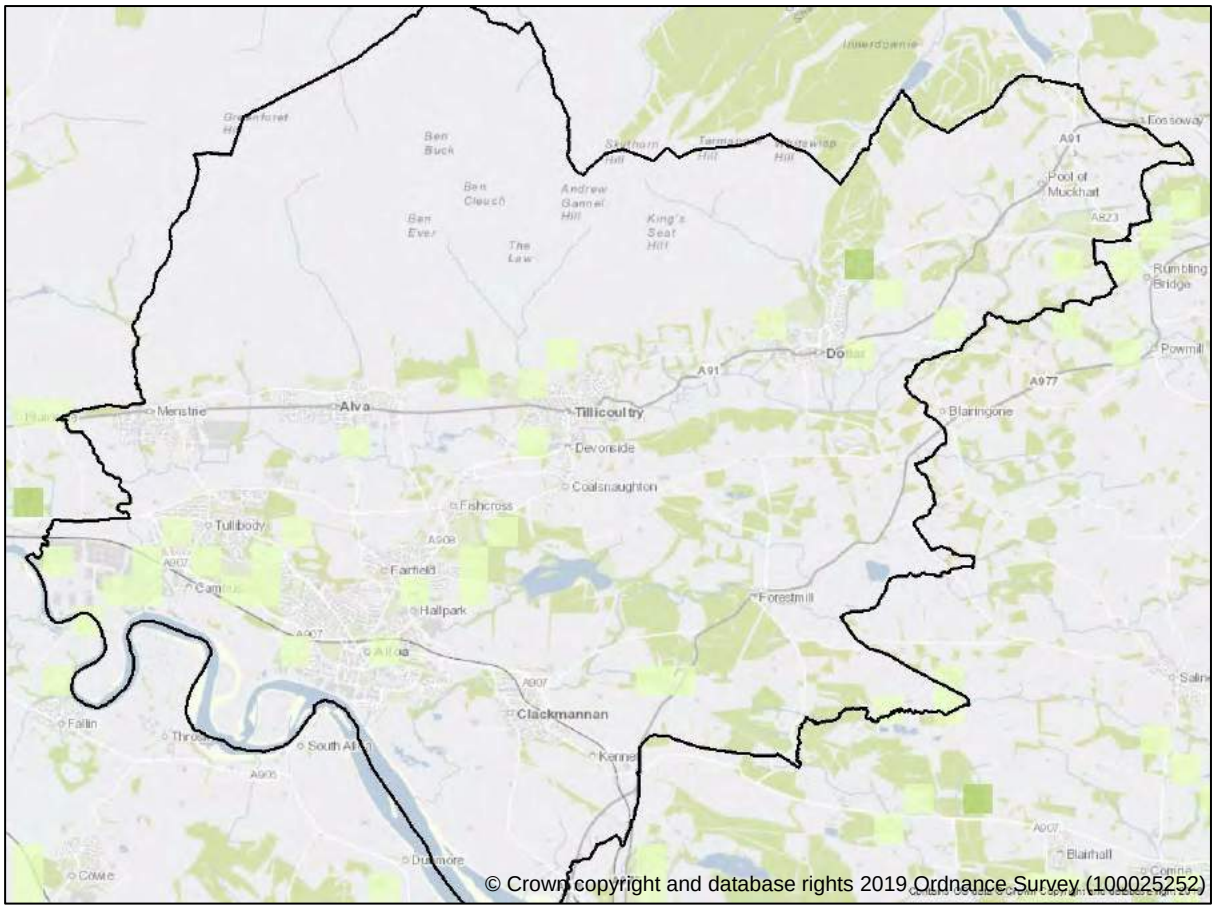
Woodland gain in Clackmannanshire (2016 to 2017)



Of 431 cells that contained woodland within 2016 and/or 2017:-

- **8.4% (n=36) gained woodland, of which:-**
  - **33 gained <100m²**
  - **2 gained 100 to 999m²**
  - **1 gained 1000m²+**

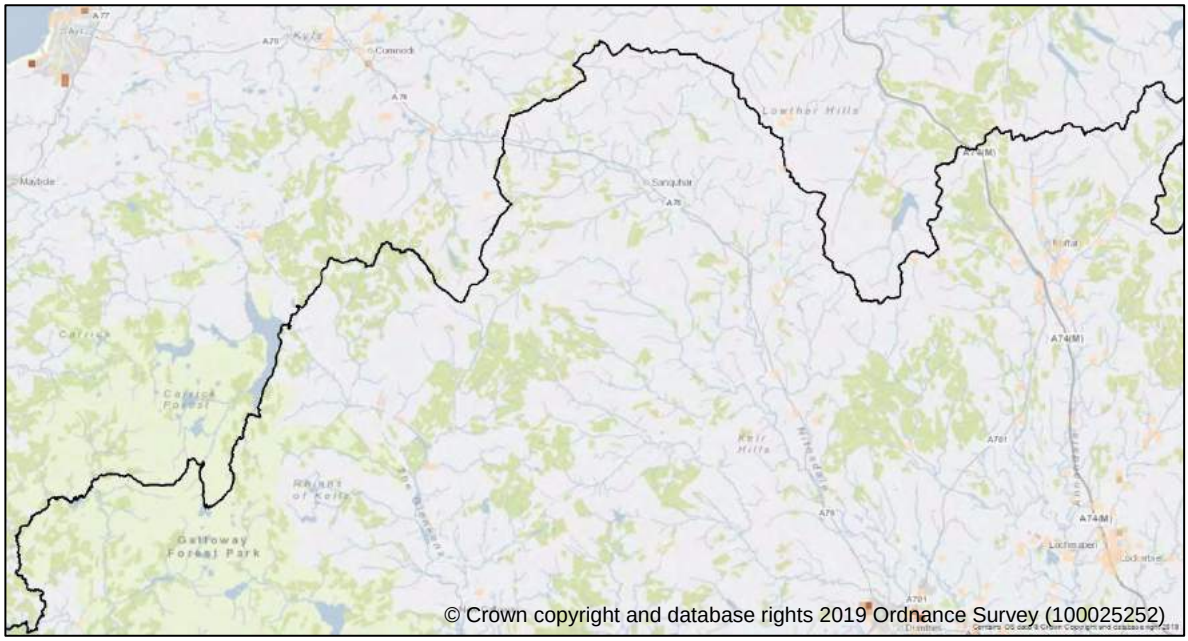
Woodland loss in Clackmannanshire (2016 to 2017)



Of 431 cells that contained woodland within 2016 and/or 2017:-

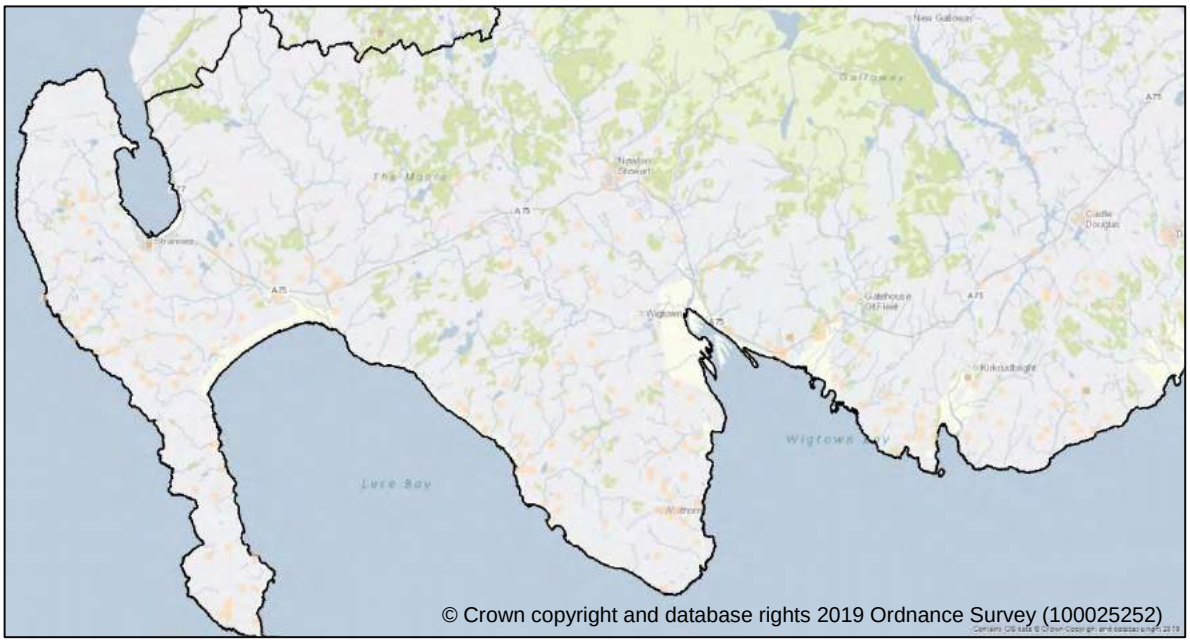
- **7.2% (n=31) lost woodland, of which:-**
  - **30 lost <100m²**
  - **1 lost 100 to 999m²**

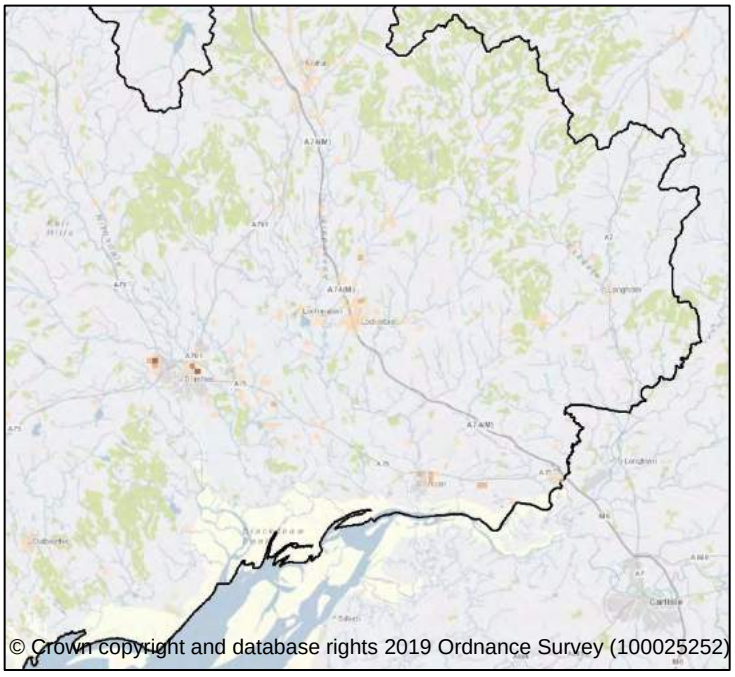
Building gain in Dumfries and Galloway (2016 to 2017)



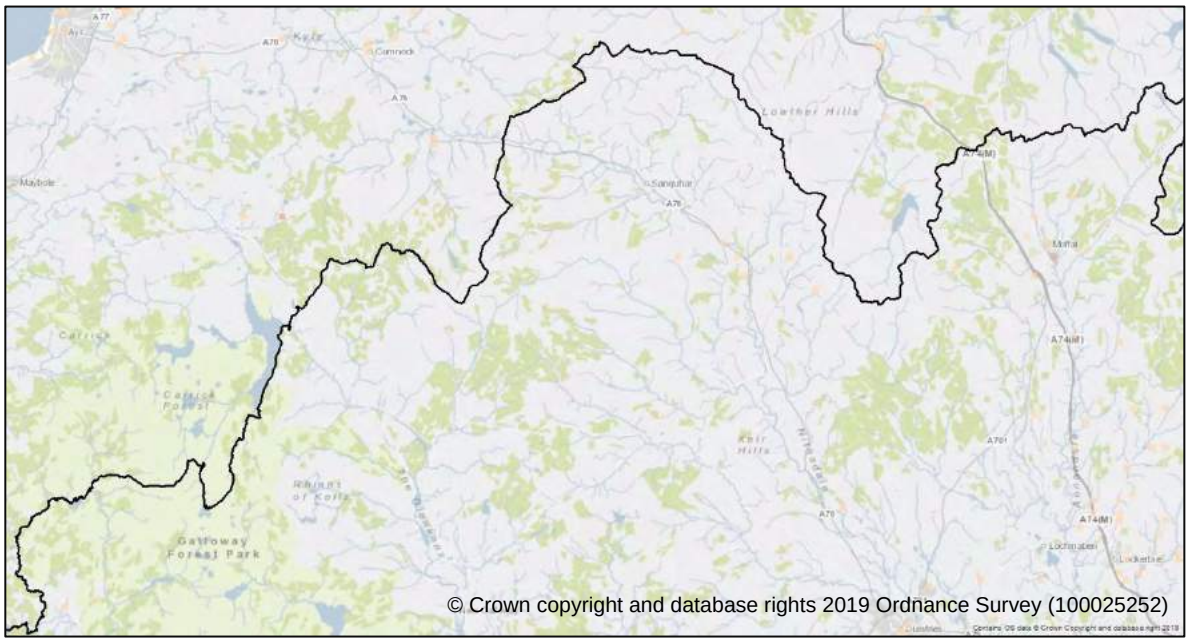
Of 7803 cells that contained buildings within 2016 and/or 2017:-

- **5.0% (n=391) gained buildings, of which:-**
  - **374 gained 1 to 4 buildings**
  - **14 gained 5 to 9 buildings**
  - **1 gained 10 to 19 buildings**
  - **2 gained >19 buildings**



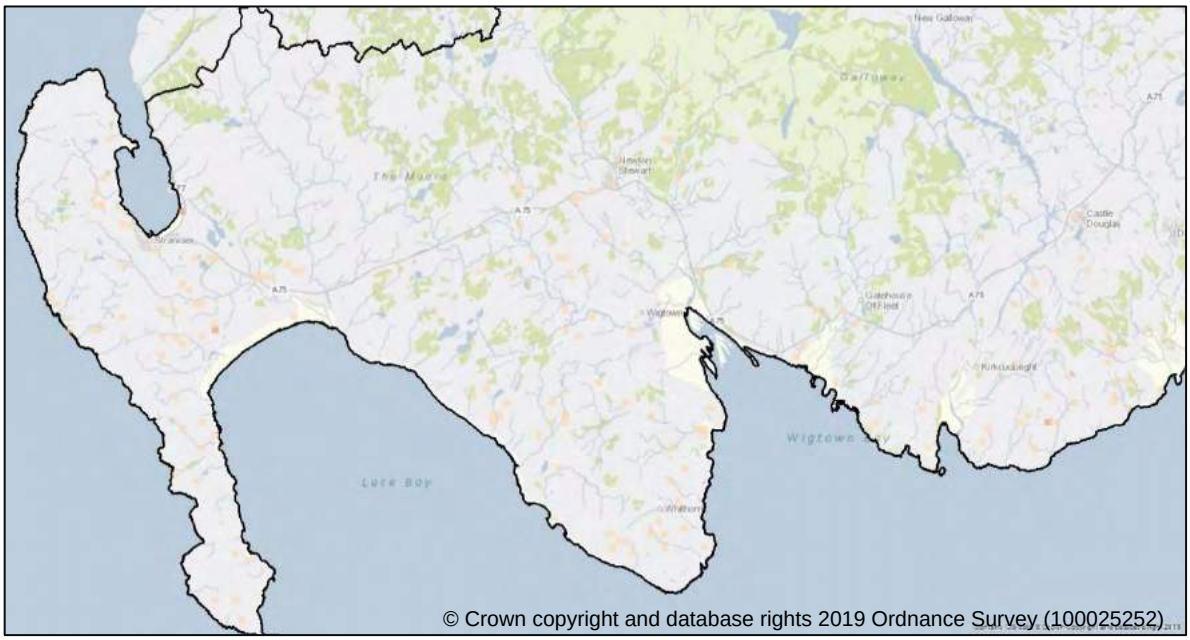


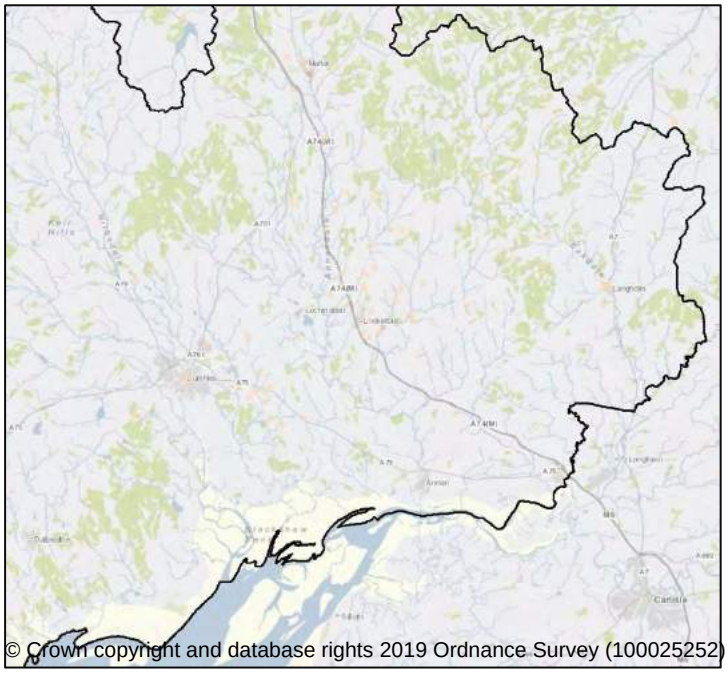
Building loss in Dumfries and Galloway (2016 to 2017)



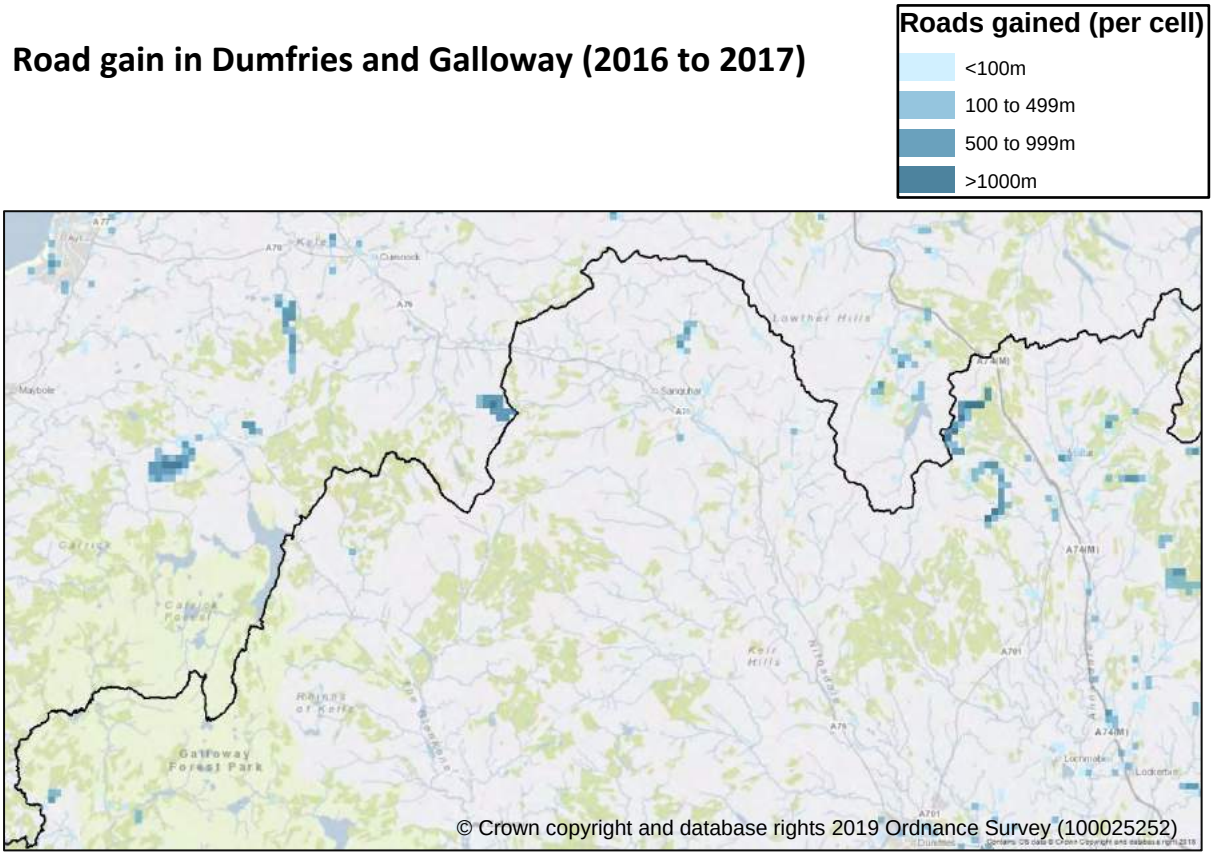
Of 7803 cells that contained buildings within 2016 and/or 2017:-

- **3.0% (n=235) lost buildings, of which**
  - **231 lost 1 to 4 buildings**
  - **4 lost 5 to 9 buildings**



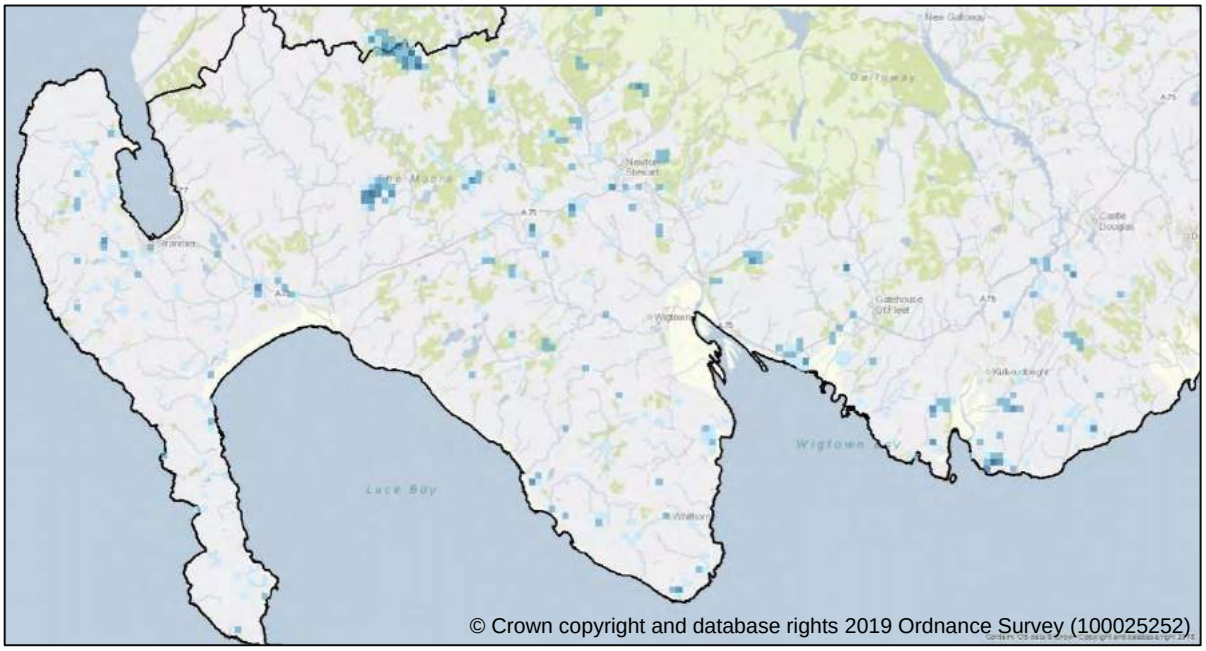


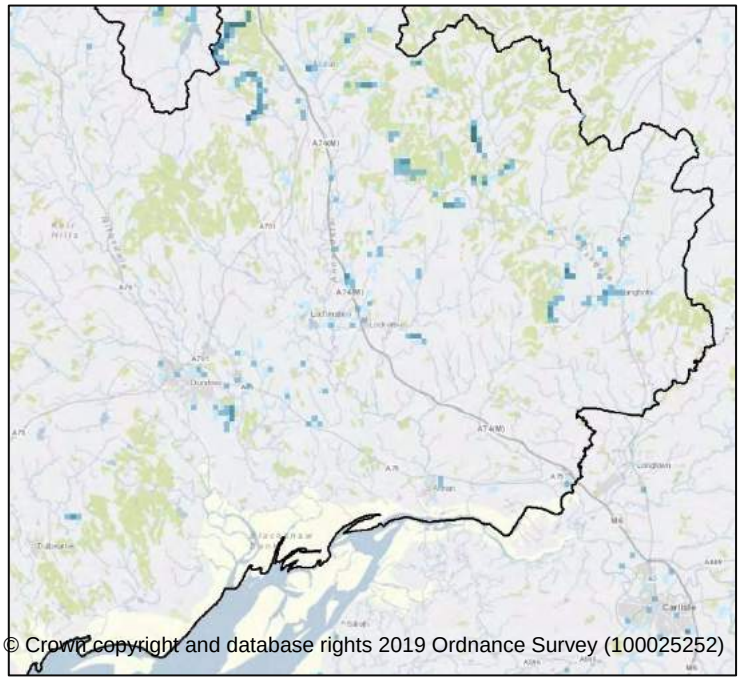
Road gain in Dumfries and Galloway (2016 to 2017)



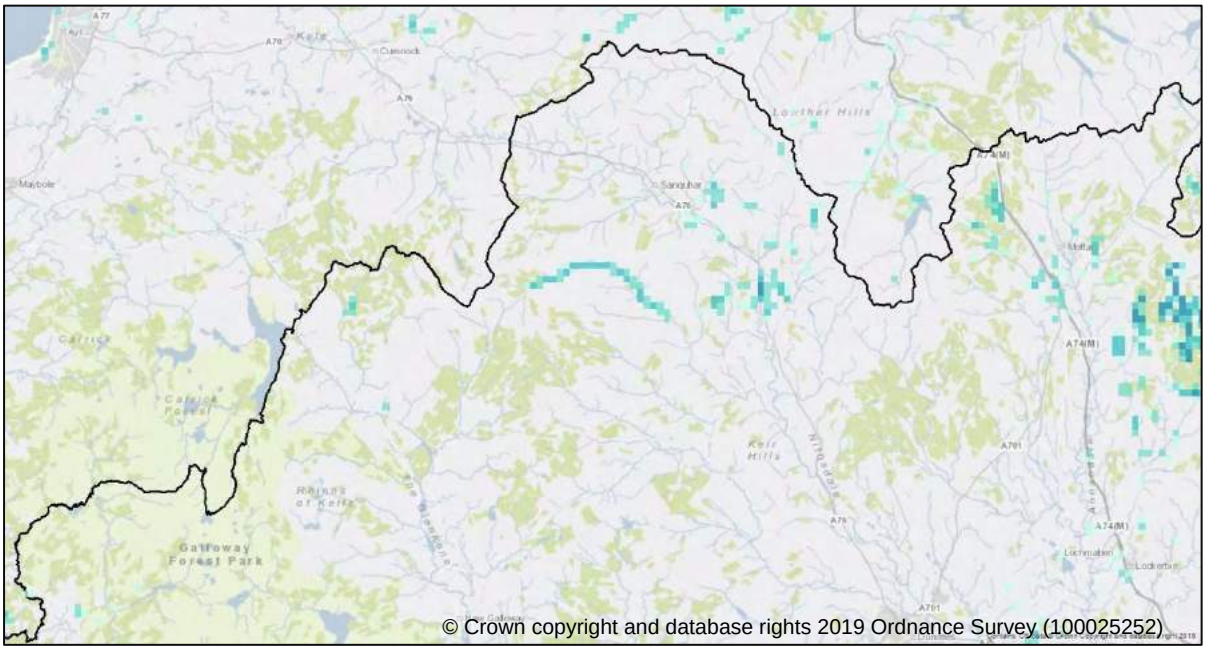
Of 14737 cells that contained roads within 2016 and/or 2017:-

- **4.7% (n=696) gained roads/road sections, of which:-**
  - **329 gained 1 to 100m**
  - **275 gained 100 to 499m**
  - **76 gained 500 to 999m**
  - **16 gained 1000m+**


Luce Bay
Wigtown Bay
© Crown copyright and database rights 2019 Ordnance Survey (100025252)

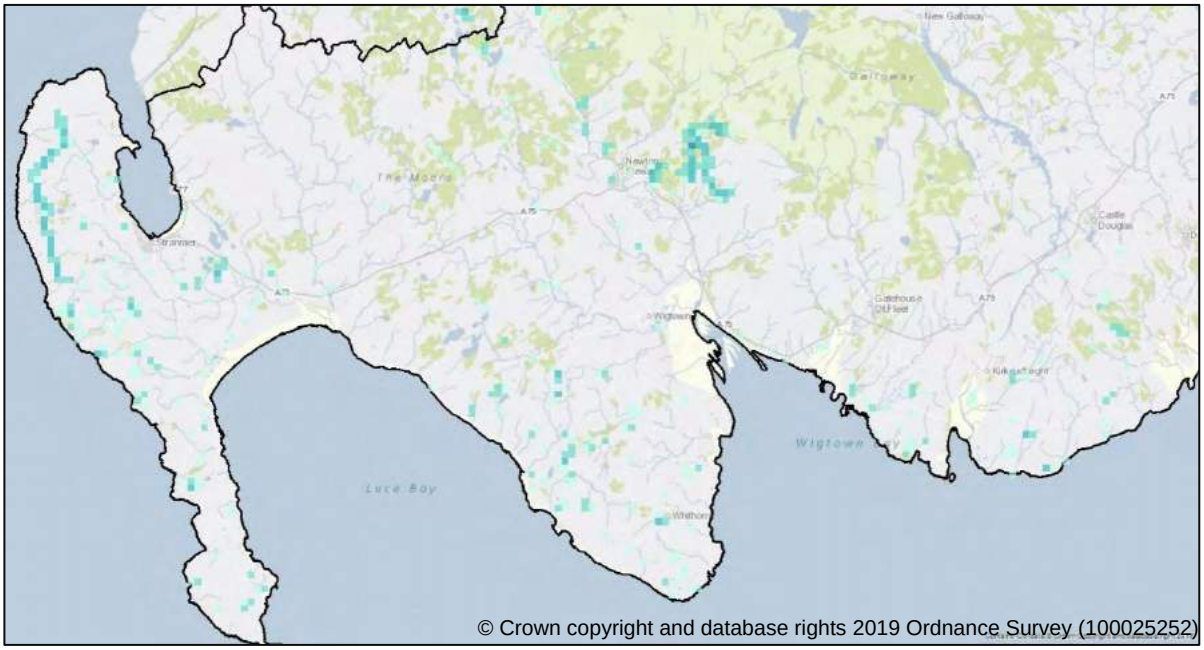

© Crown copyright and database rights 2019 Ordnance Survey (100025252)

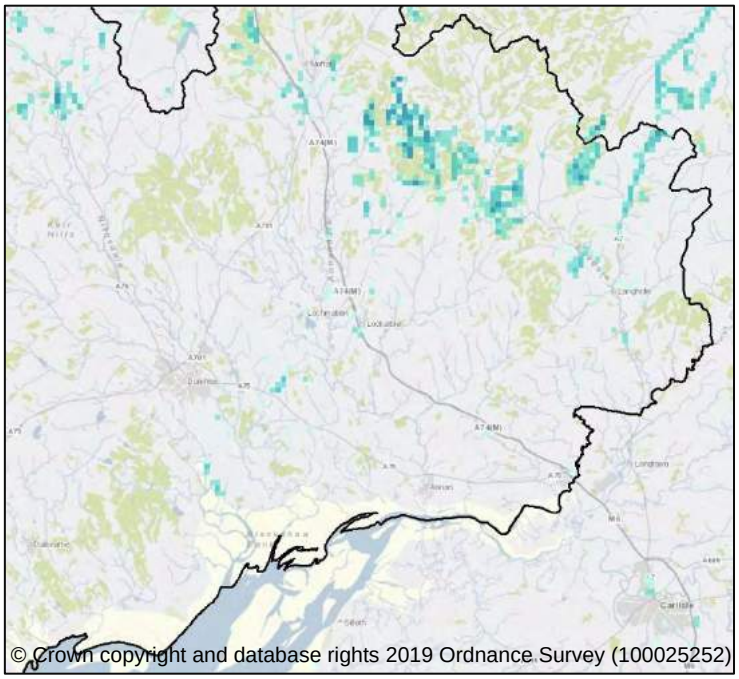
Road loss in Dumfries and Galloway (2016 to 2017)



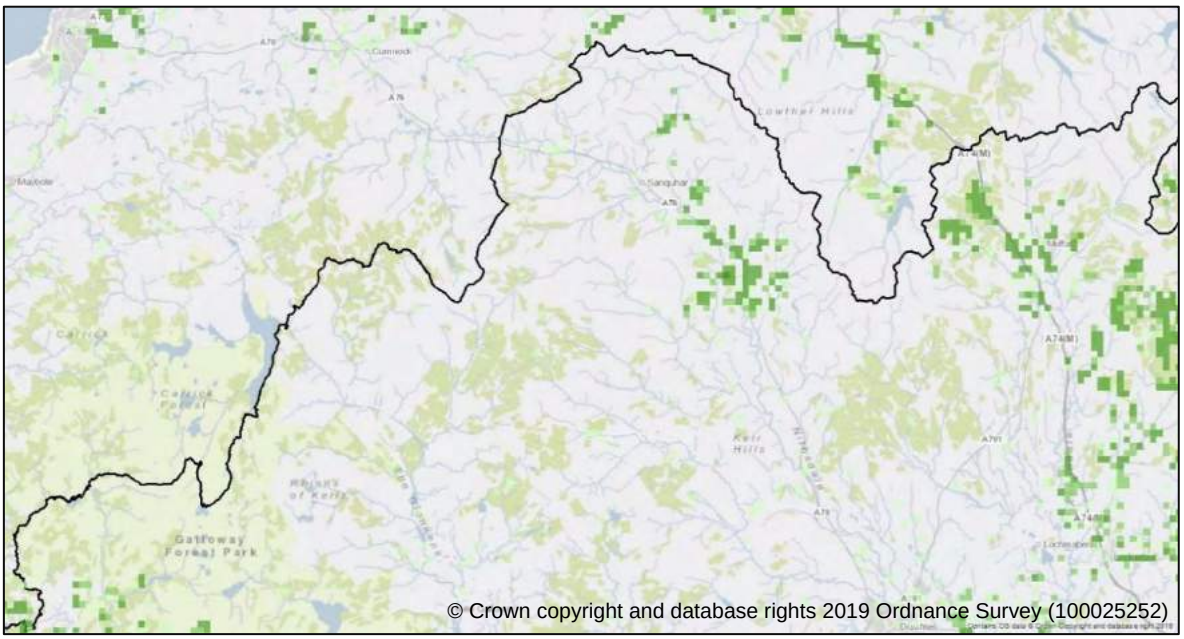
Of 14737 cells that contained roads within 2016 and/or 2017:-

- **6.5% (n=951) lost roads, of which:-**
  - **349 lost 1 to 100m**
  - **371 lost 100 to 499m**
  - **195 lost 500 to 999m**
  - **36 lost 1000m+**



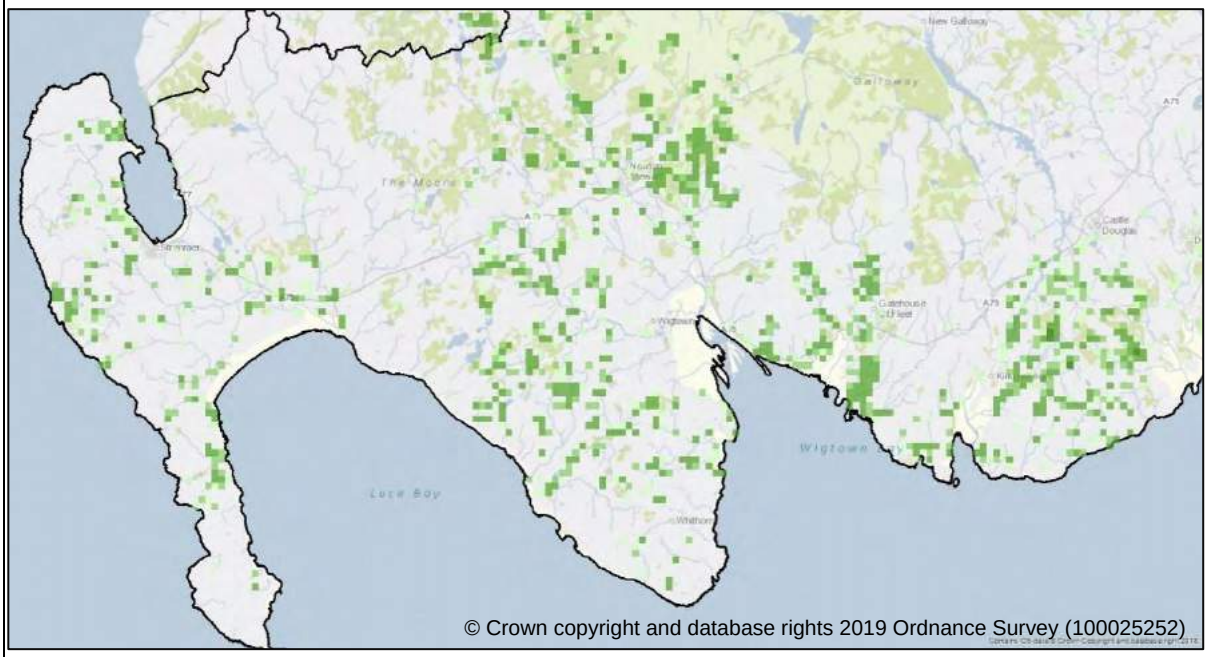


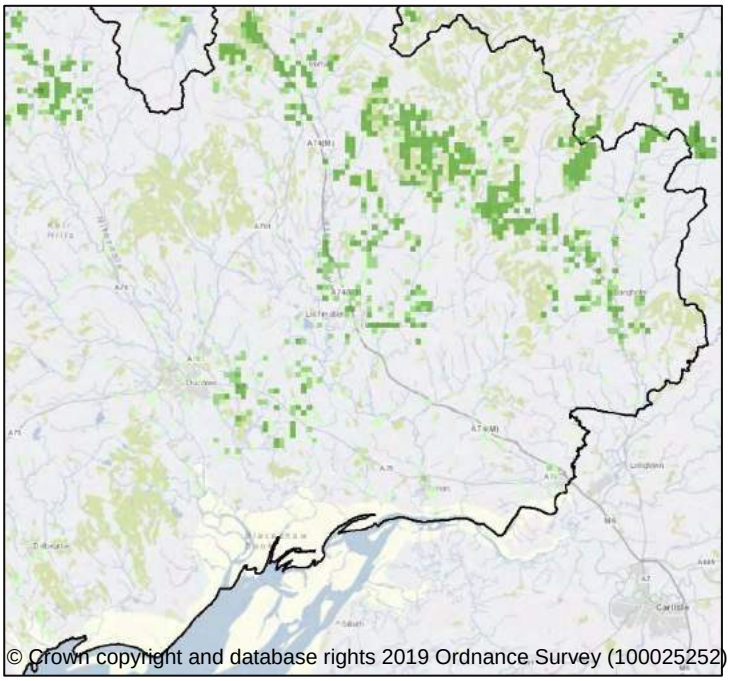
Woodland gain in Dumfries and Galloway (2016 to 2017)



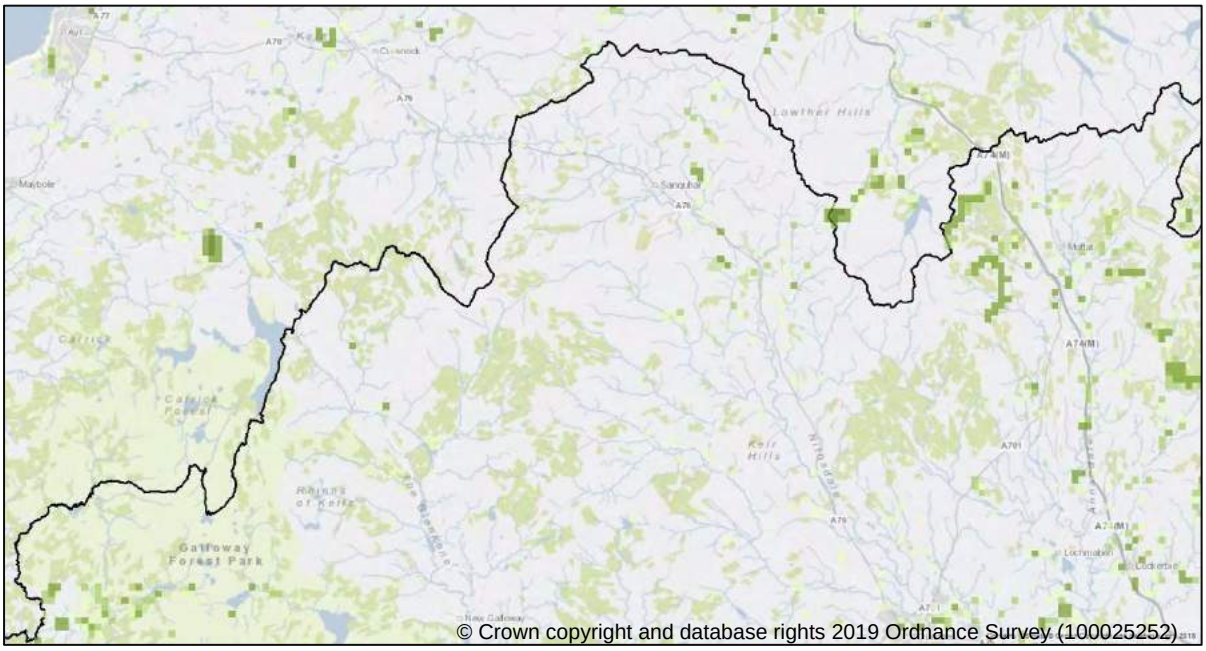
Of 19220 cells that contained woodland within 2016 and/or 2017:-

- **11.1% (n=2130) gained woodland, of which:-**
  - **580 gained <100m²**
  - **557 gained 100 to 999m²**
  - **993 gained 1000m²+**


Luce Bay
Wigtown
© Crown copyright and database rights 2019 Ordnance Survey (100025252)

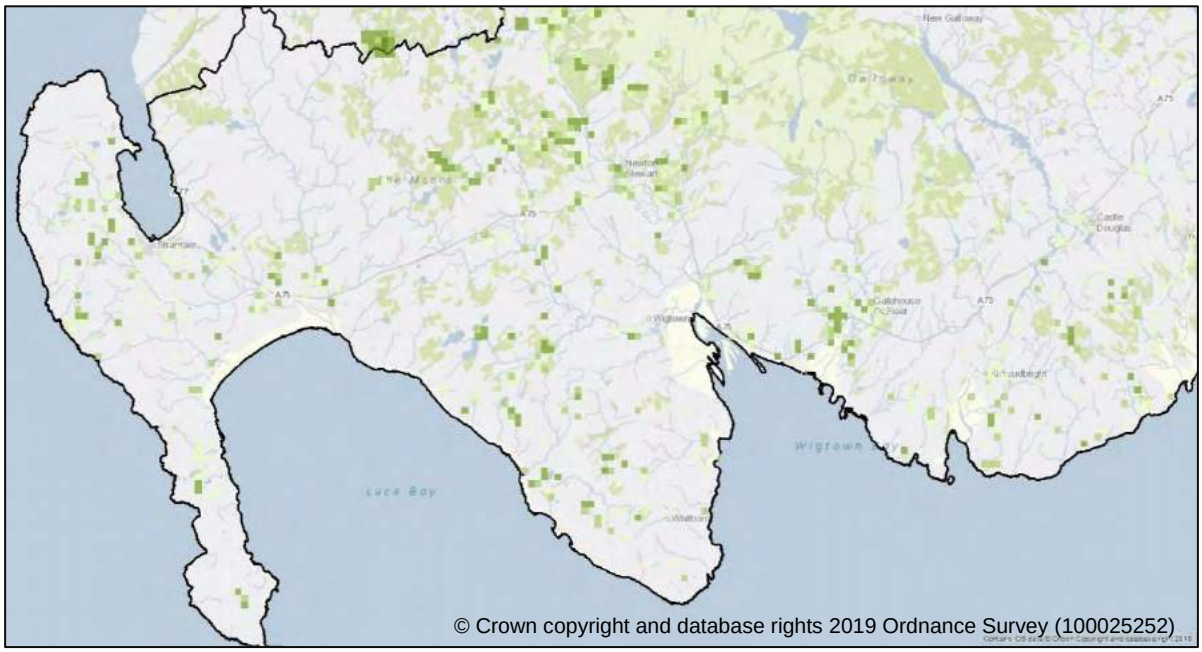

© Crown copyright and database rights 2019 Ordnance Survey (100025252)

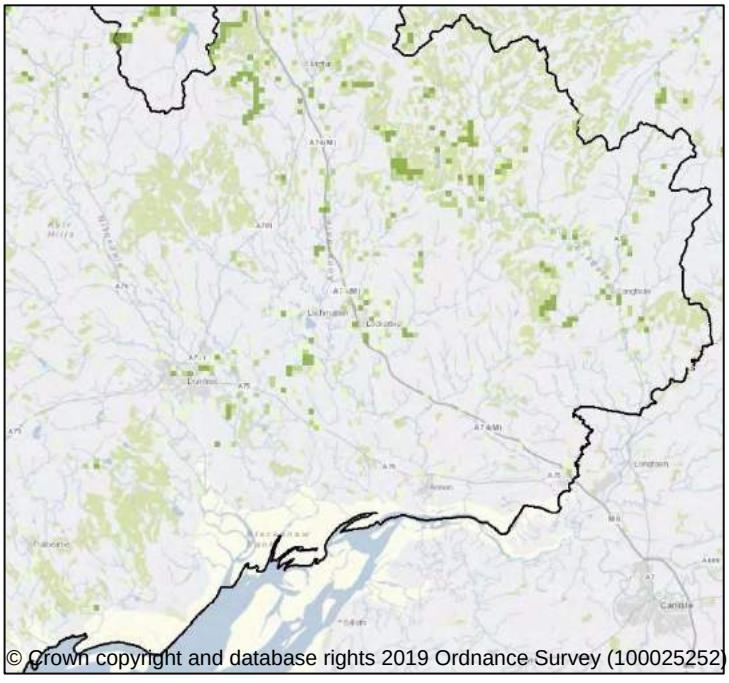
Woodland loss in Dumfries and Galloway (2016 to 2017)



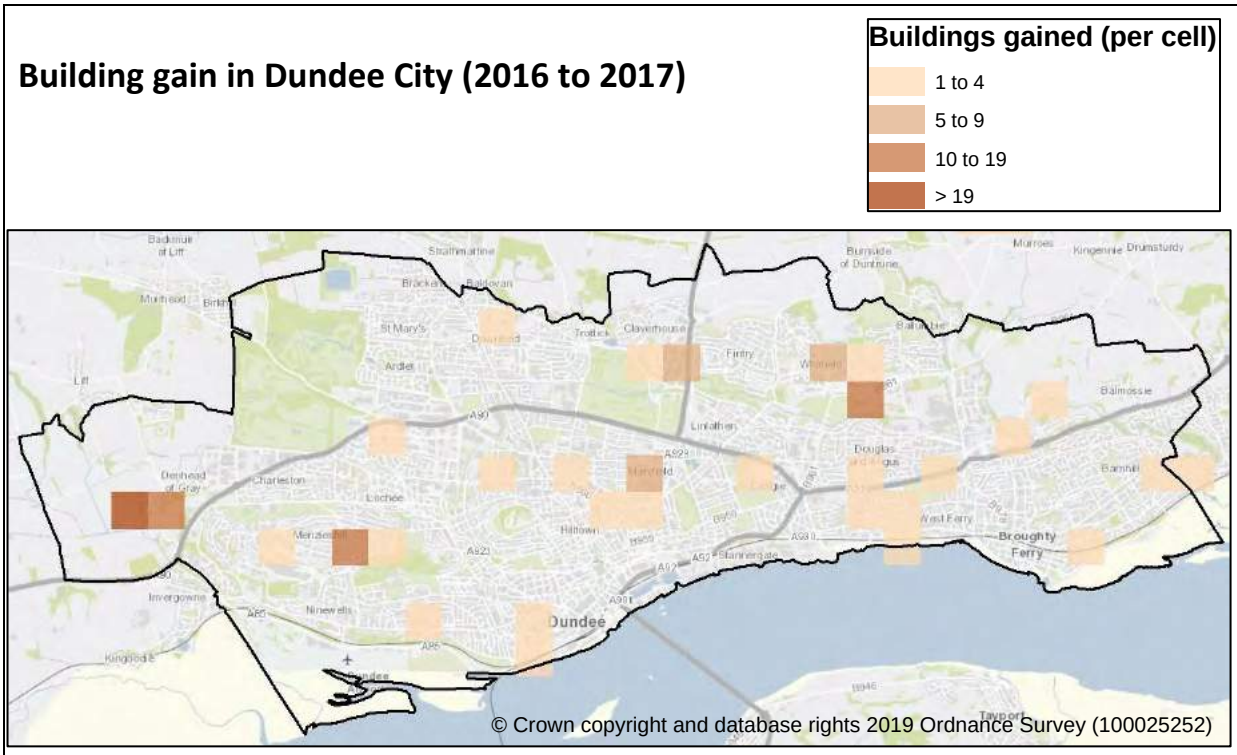
Of 19220 cells that contained woodland within 2016 and/or 2017:-

- **6.1% (n=1182) lost woodland, of which:-**
  - **539 lost <100m²**
  - **316 lost 100 to 999m**
  - **327 lost 1000m²+**





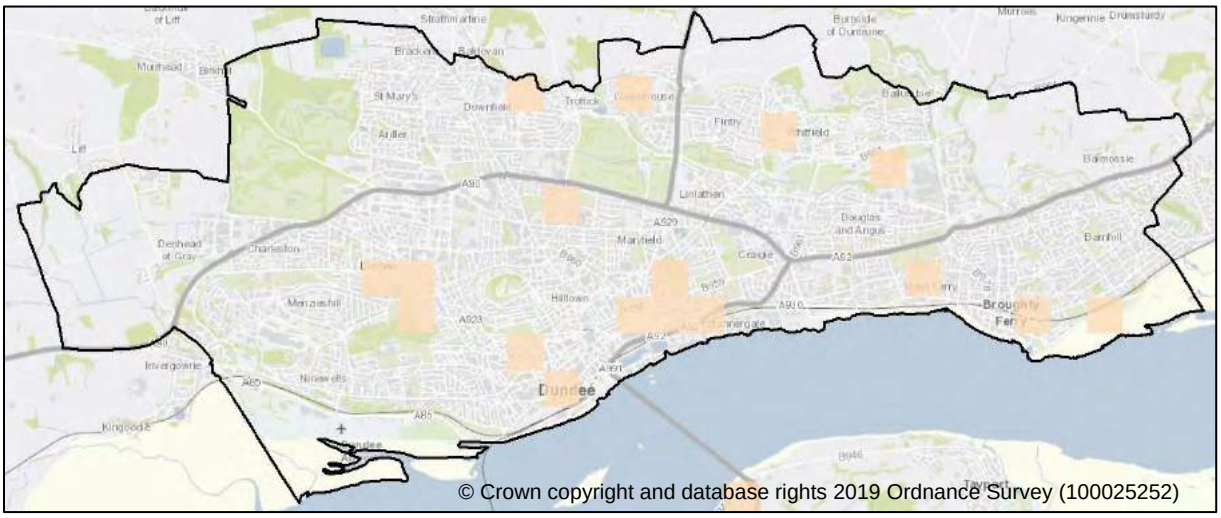
Building gain in Dundee City (2016 to 2017)



Of 230 cells that contained buildings within 2016 and/or 2017:-

- **12.6% (n=29) gained buildings, of which:-**
  - **22 gained 1 to 4 buildings**
  - **3 gained 5 to 9 buildings**
  - **3 gained 10 to 19 buildings**
  - **1 gained >19 buildings**

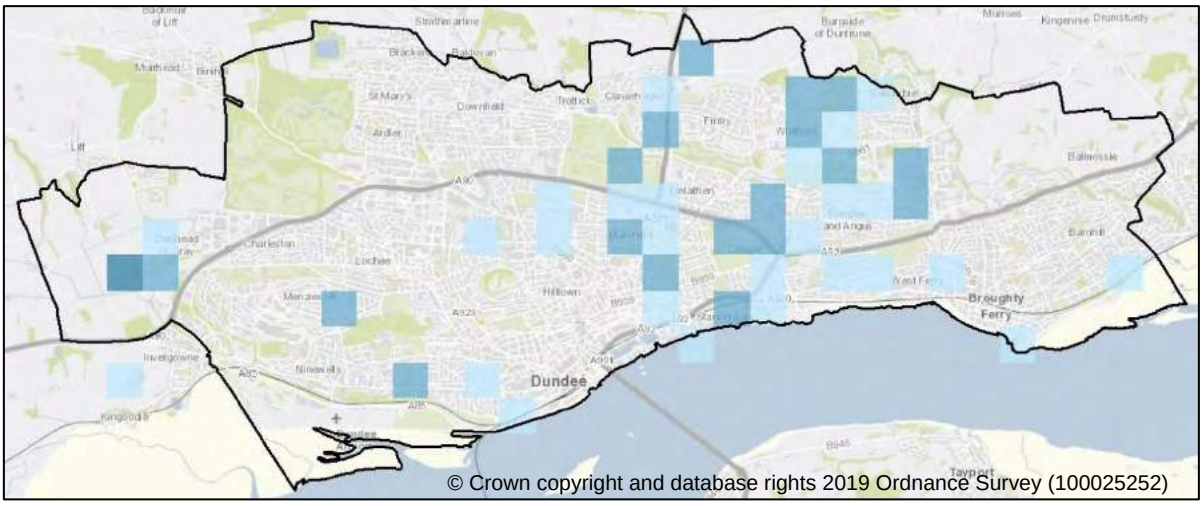
Building loss in Dundee City (2016 to 2017)



Of 230 cells that contained buildings within 2016 and/or 2017:-

- **7.4% (n=17) lost buildings, of which:-**
  - **17 lost 1 to 4 buildings**

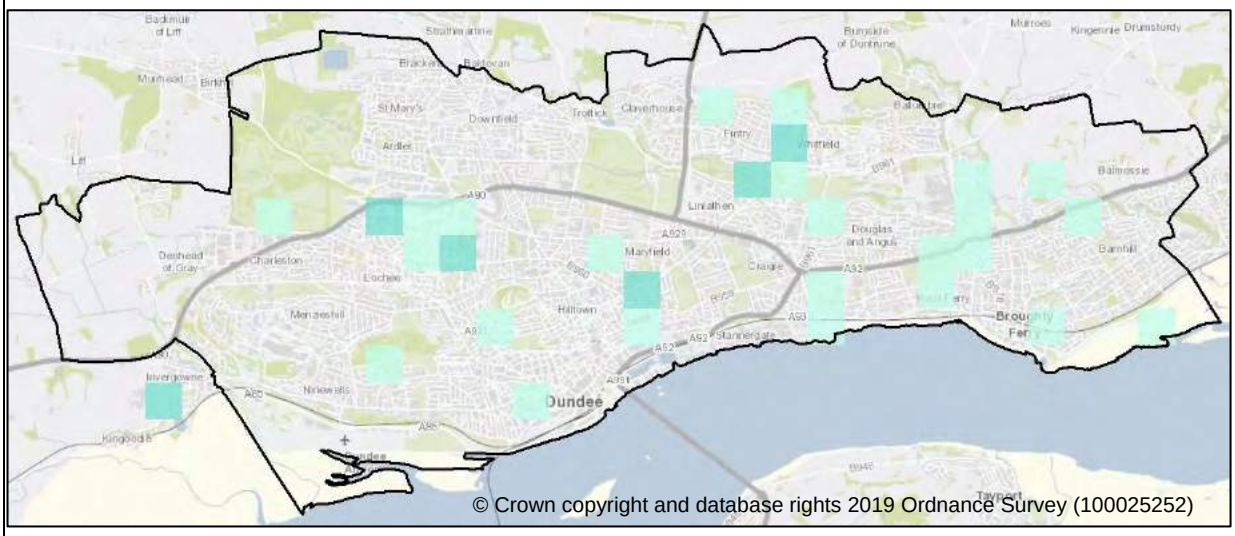
Road gain in Dundee City (2016 to 2017)



Of 240 cells that contained roads within 2016 and/or 2017:-

- **17.9% (n=43) gained roads, of which:-**
  - **24 gained 1 to 100m**
  - **18 gained 100 to 499m**
  - **1 gained 500 to 999m**

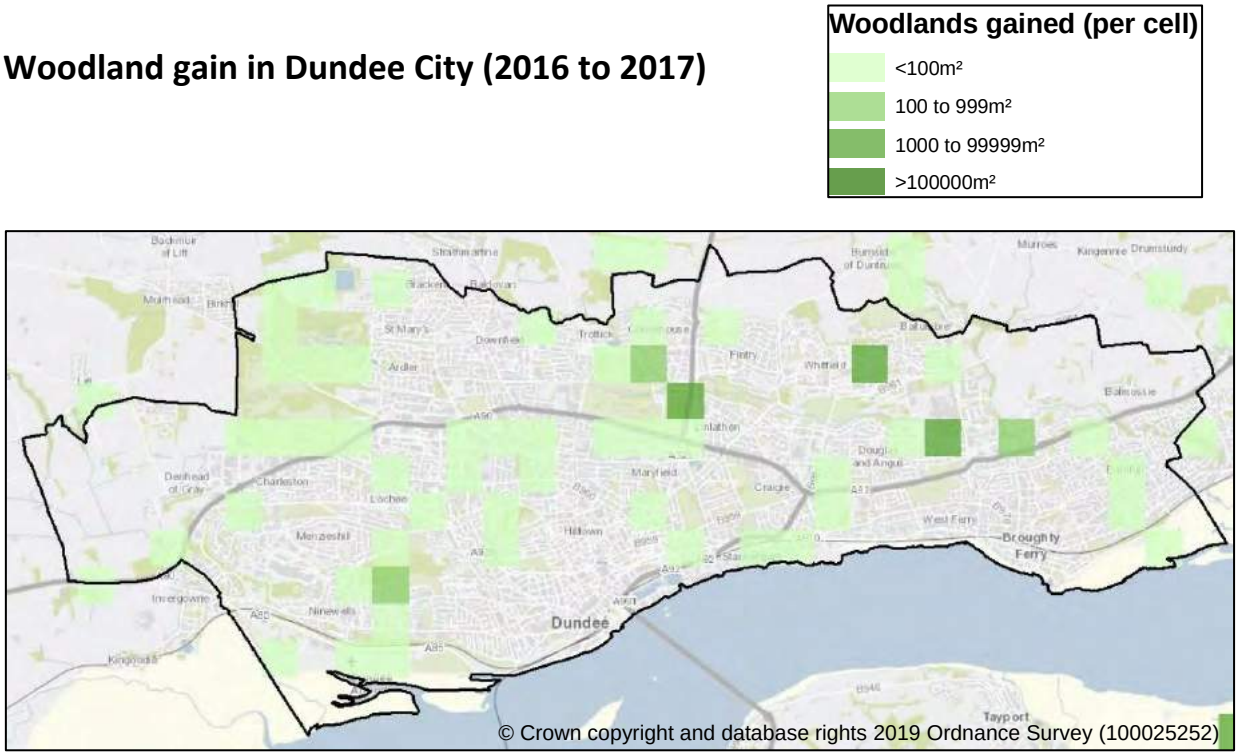
Road loss in Dundee City (2016 to 2017)



Of 240 cells that contained roads within 2016 and/or 2017:-

- **12.1% (n=29) lost roads, of which:-**
  - **24 lost 1 to 100m**
  - **5 lost 100 to 499m**

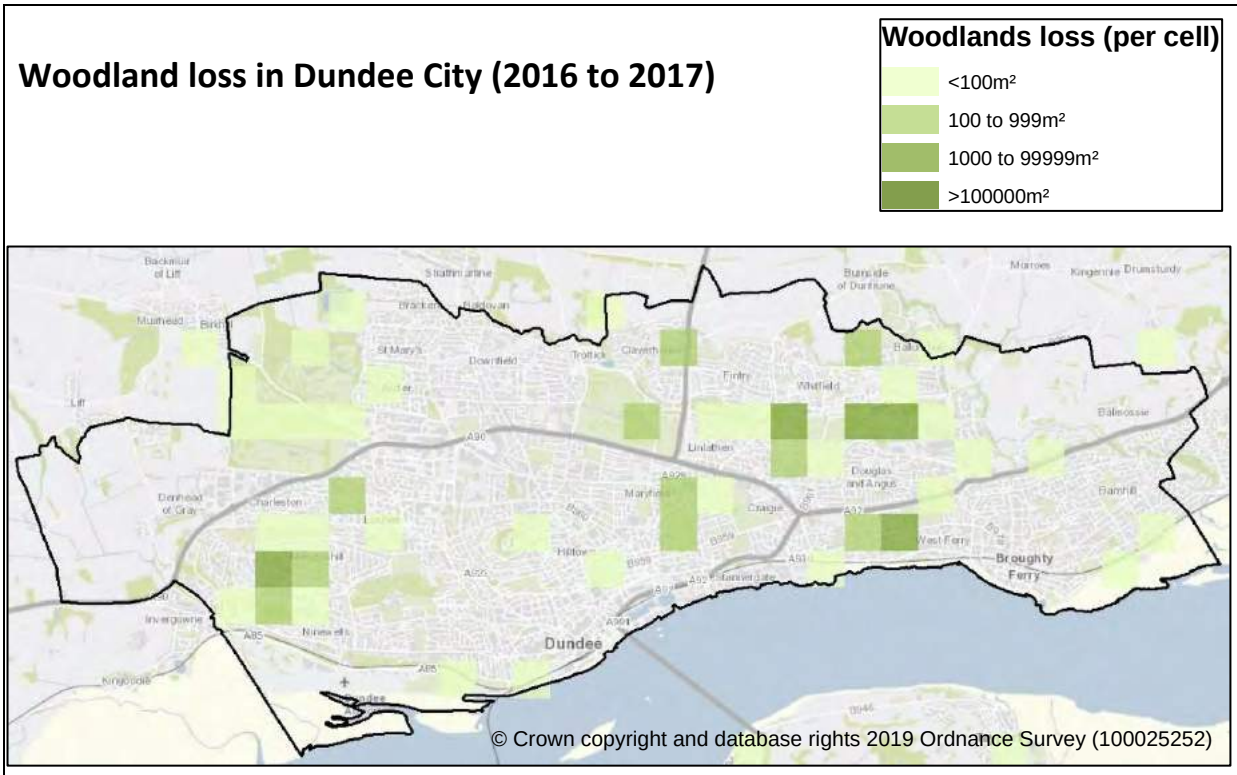
Woodland gain in Dundee City (2016 to 2017)



Of 220 cells that contained woodland within 2016 and/or 2017:-

- **23.6% (n=53) gained woodland, of which:-**
  - **47 gained <100m²**
  - **3 gained 100 to 999m²**
  - **3 gained 1000m²+**

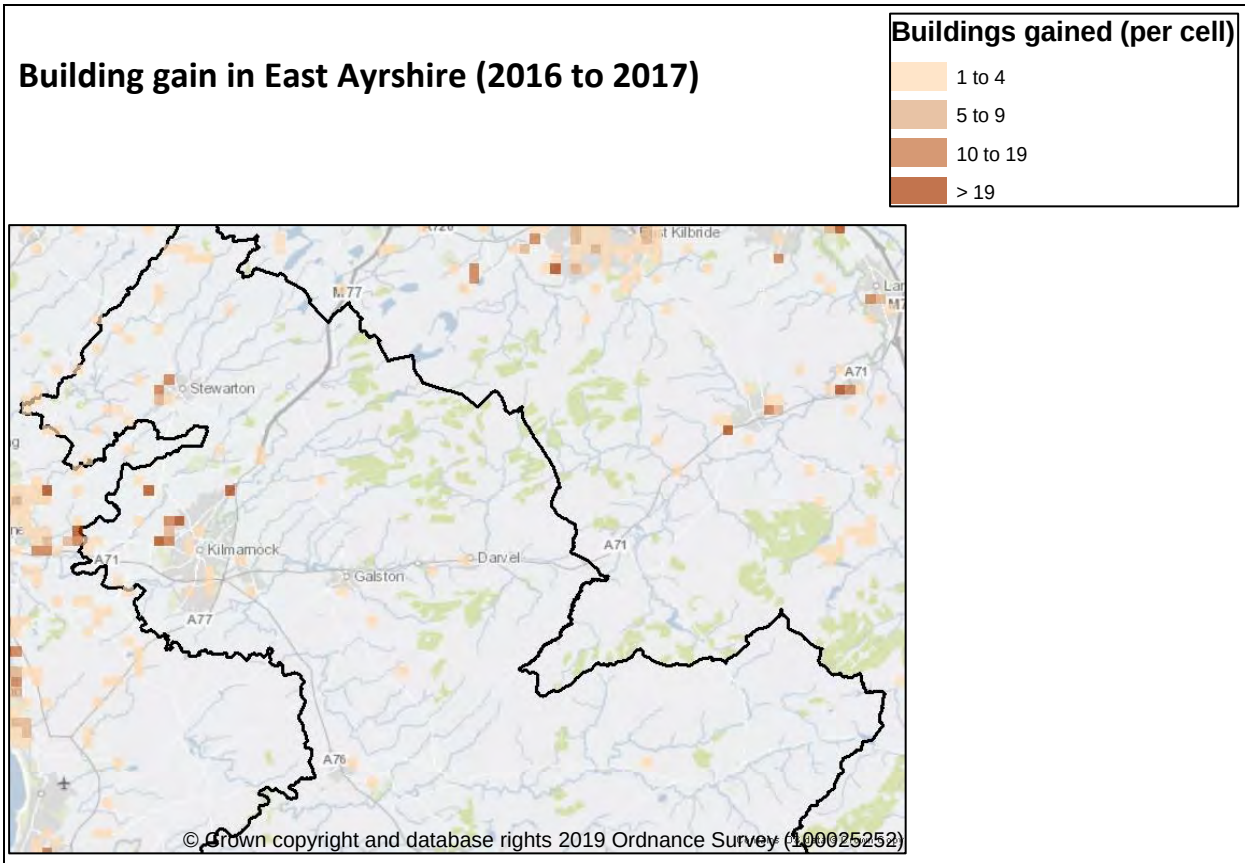
Woodland loss in Dundee City (2016 to 2017)



Of 220 cells that contained woodland within 2016 and/or 2017:-

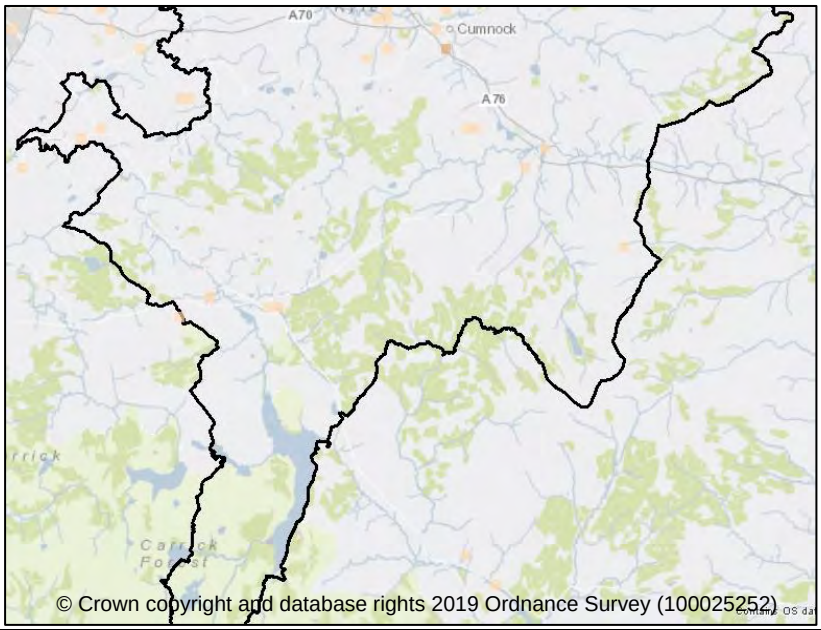
- **20% (n=44) lost woodland, of which:-**
  - **29 lost <100m²**
  - **10 lost 100 to 999m²**
  - **5 lost 1000m²+**

Building gain in East Ayrshire (2016 to 2017)

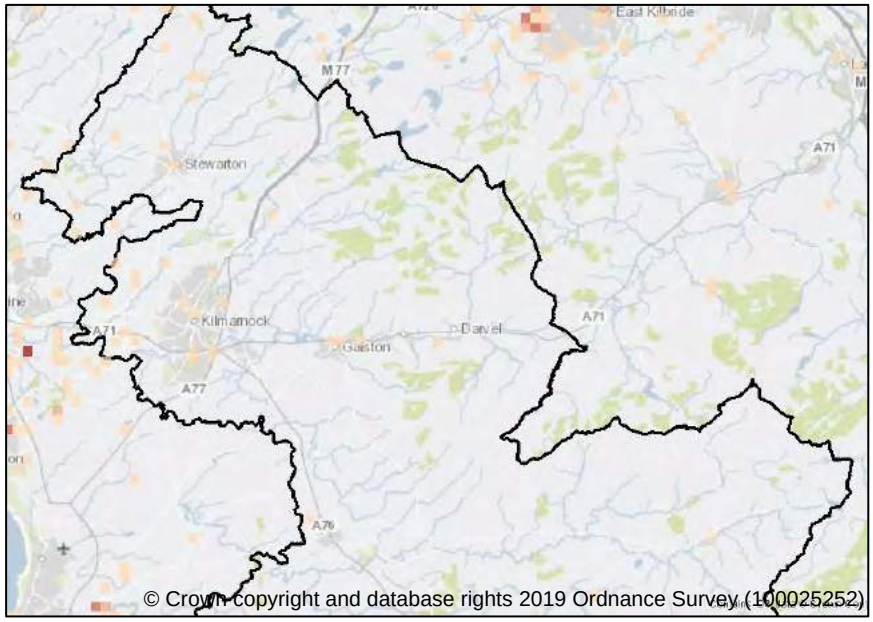


Of 1789 cells that contained buildings within 2016 and/or 2017:-

- **4.6% (n=82) gained buildings, of which:-**
  - **71 gained 1 to 4 buildings**
  - **3 gained 5 to 9 buildings**
  - **4 gained 10 to 19 buildings**
  - **4 gained >19 buildings**

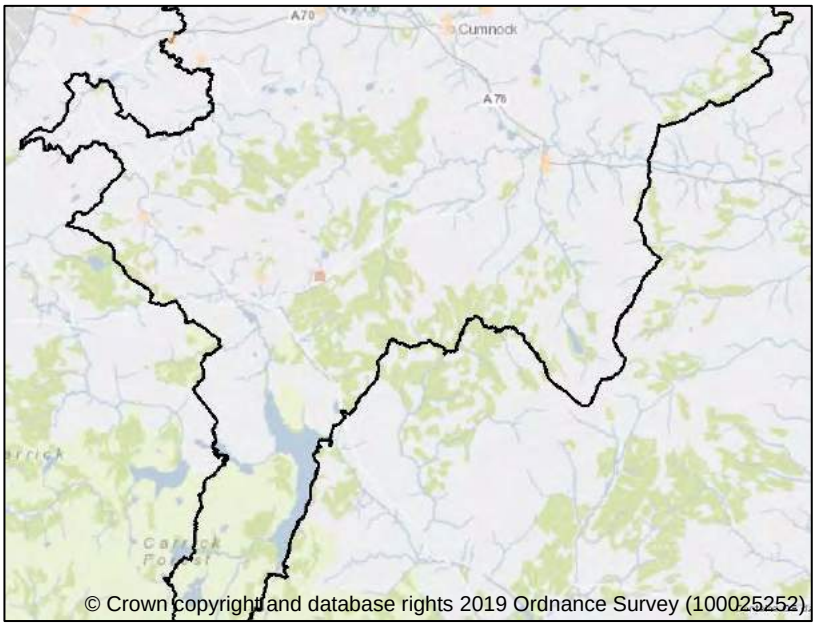


Building loss in East Ayrshire (2016 to 2017)

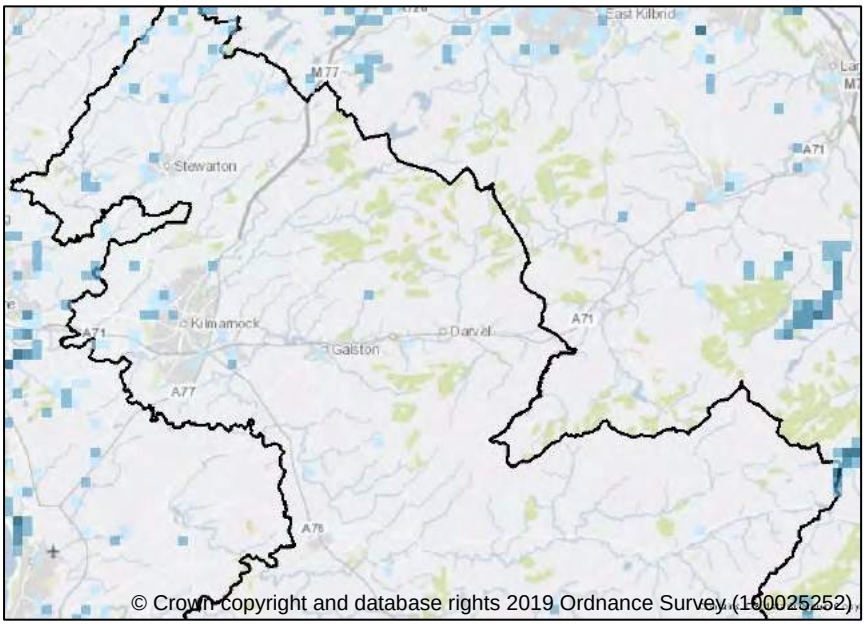


Of 1789 cells that contained buildings within 2016 and/or 2017:-

- **2.7% (n=48) lost buildings, of which:-**
  - **47 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

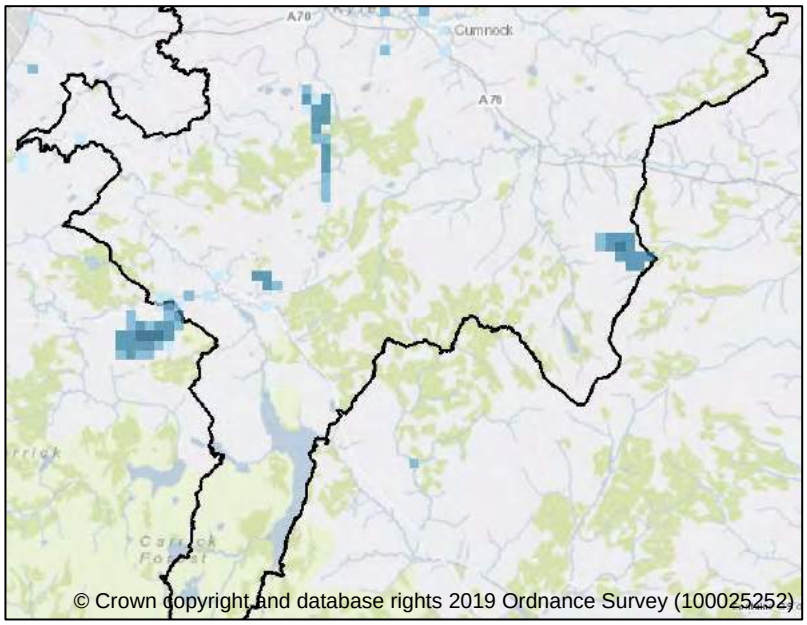


Road gain in East Ayrshire (2016 to 2017)

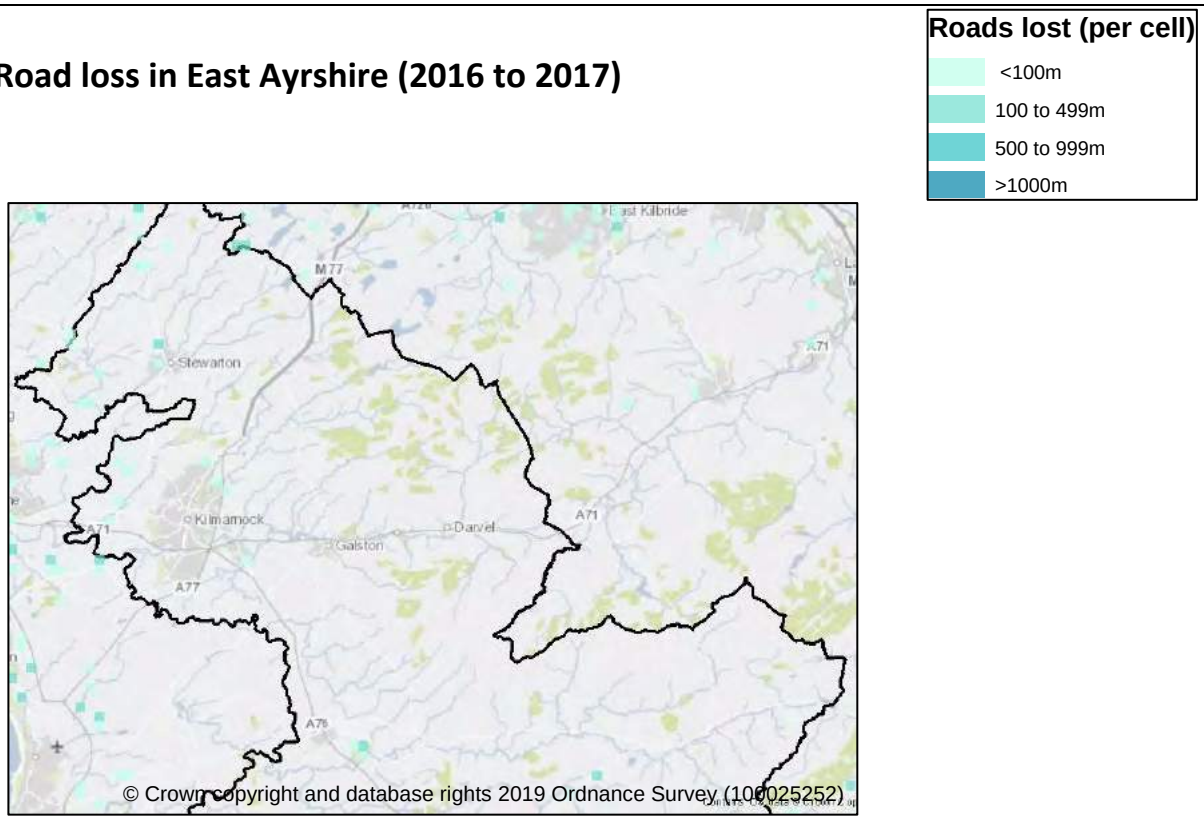


Of 2952 cells that contained roads within 2016 and/or 2017:-

- **4.0% (n=117) gained roads, of which:-**
  - **53 gained 1 to 100m**
  - **37 gained 100 to 499m**
  - **25 gained 500 to 999m**
  - **2 gained 1000m+**

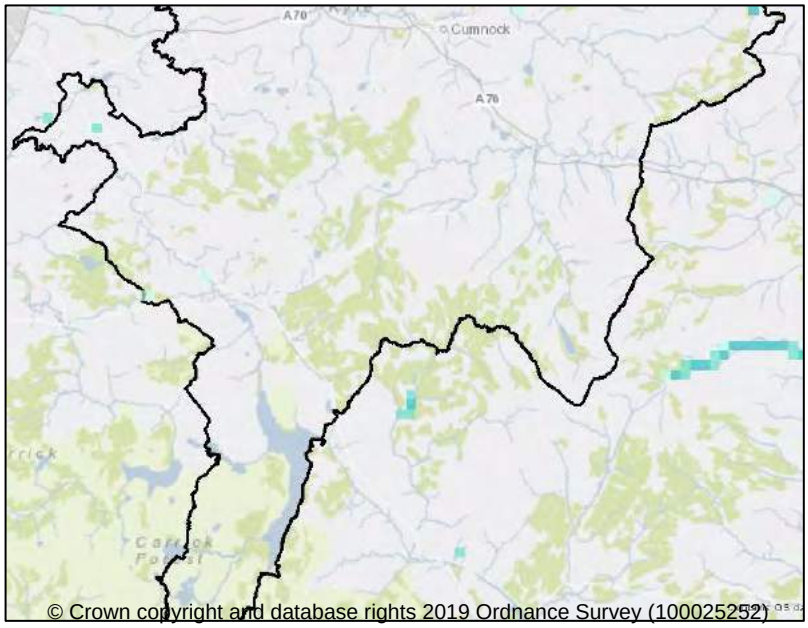


Road loss in East Ayrshire (2016 to 2017)

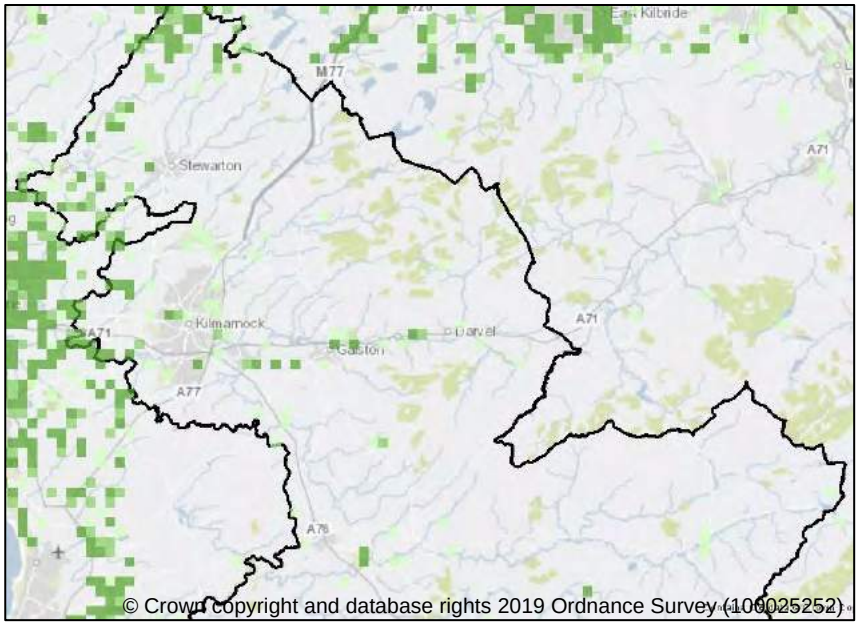


Of 2952 cells that contained roads within 2016 and/or 2017:-

- **1.2% (n=35) lost roads, of which:-**
  - **25 lost 1 to 100m**
  - **8 lost 100 to 499m**
  - **2 lost 500 to 999m**

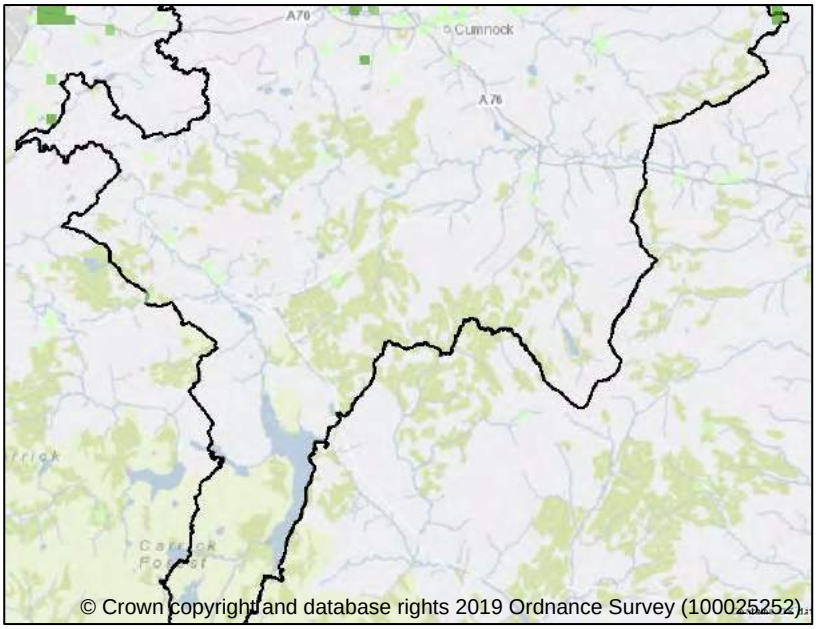


Woodland gain in East Ayrshire (2016 to 2017)

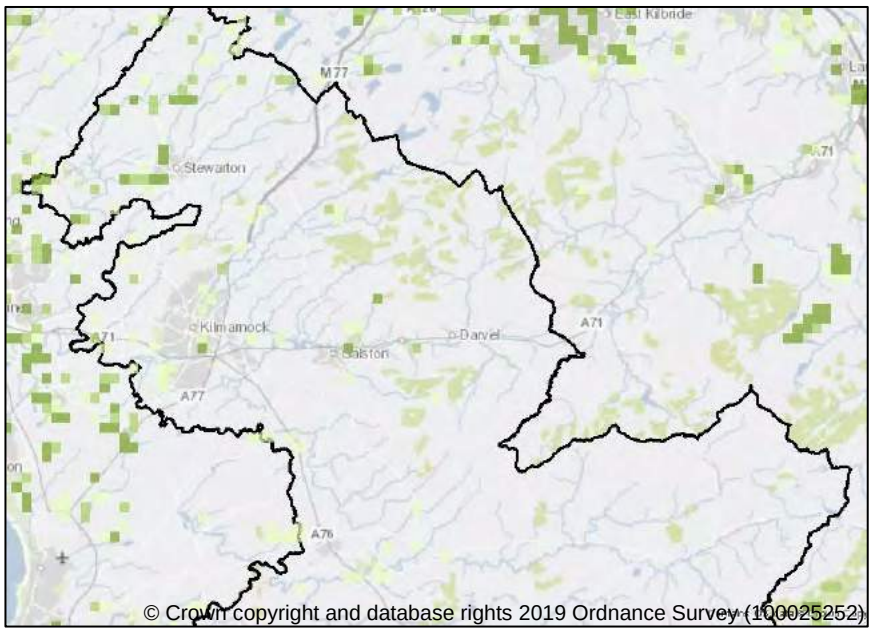


Of 3437 cells that contained woodland within 2016 and/or 2017:-

- **5.2% (n=180) gained woodland, of which:-**
  - **87 gained <100m²**
  - **34 gained 100 to 999m²**
  - **59 gained 1000m²+**

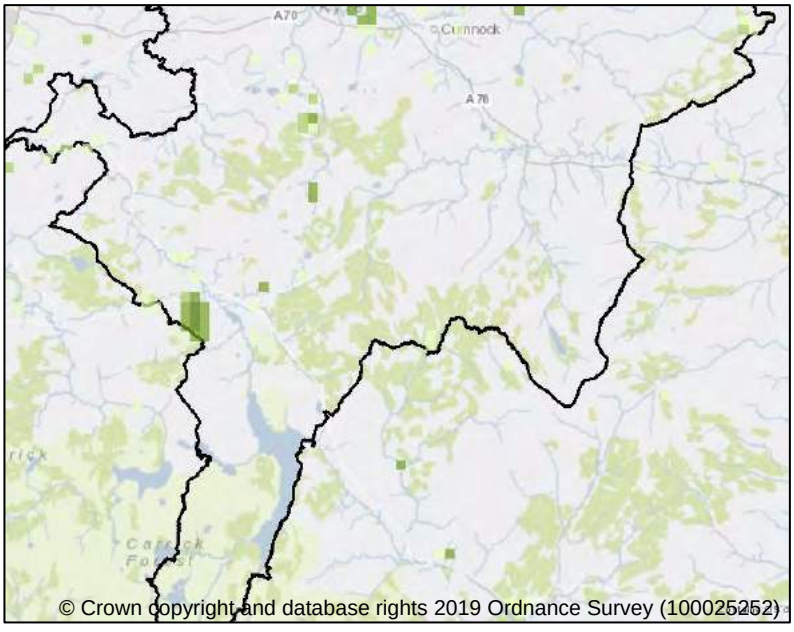


Woodland loss in East Ayrshire (2016 to 2017)

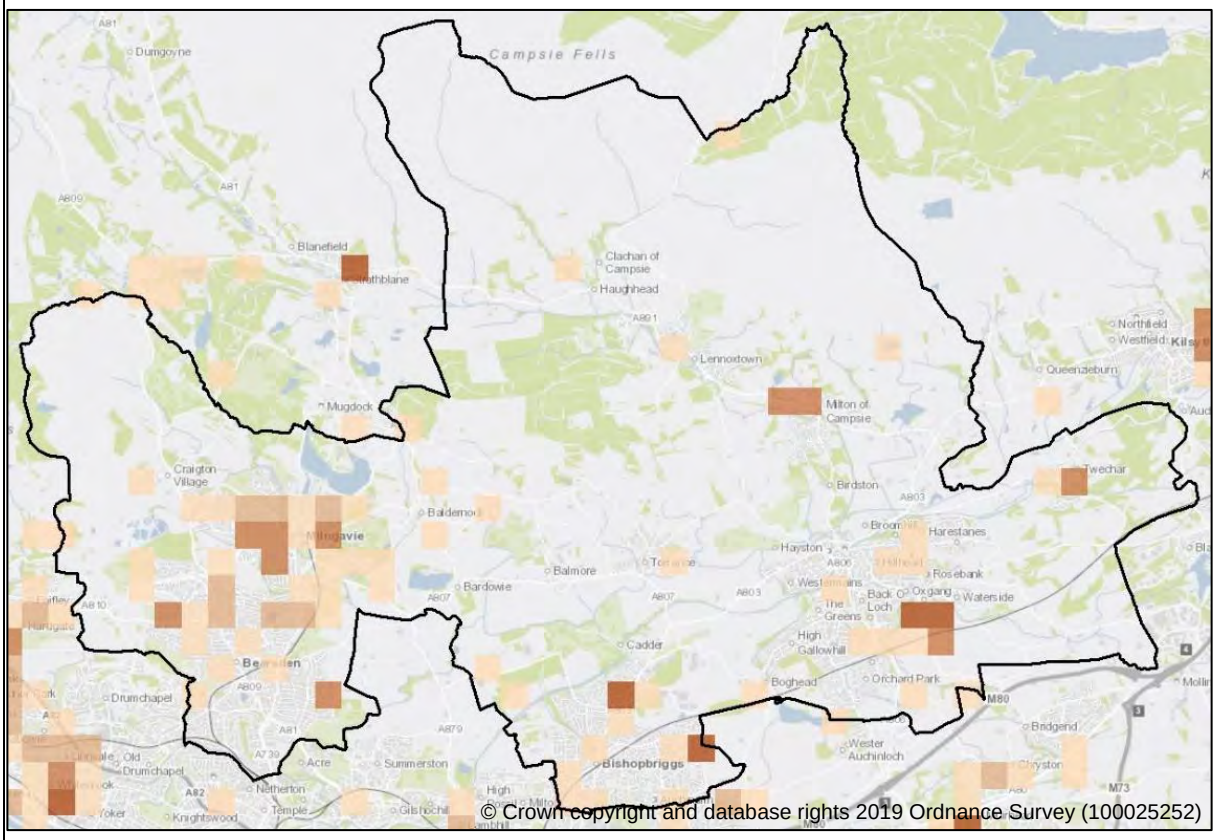


Of 3437 cells that contained woodland within 2016 and/or 2017:-

- **4.4% (n=151) lost woodland, of which:-**
  - **83 lost <100m²**
  - **26 lost 100 to 999m²**
  - **42 lost 1000m²+**



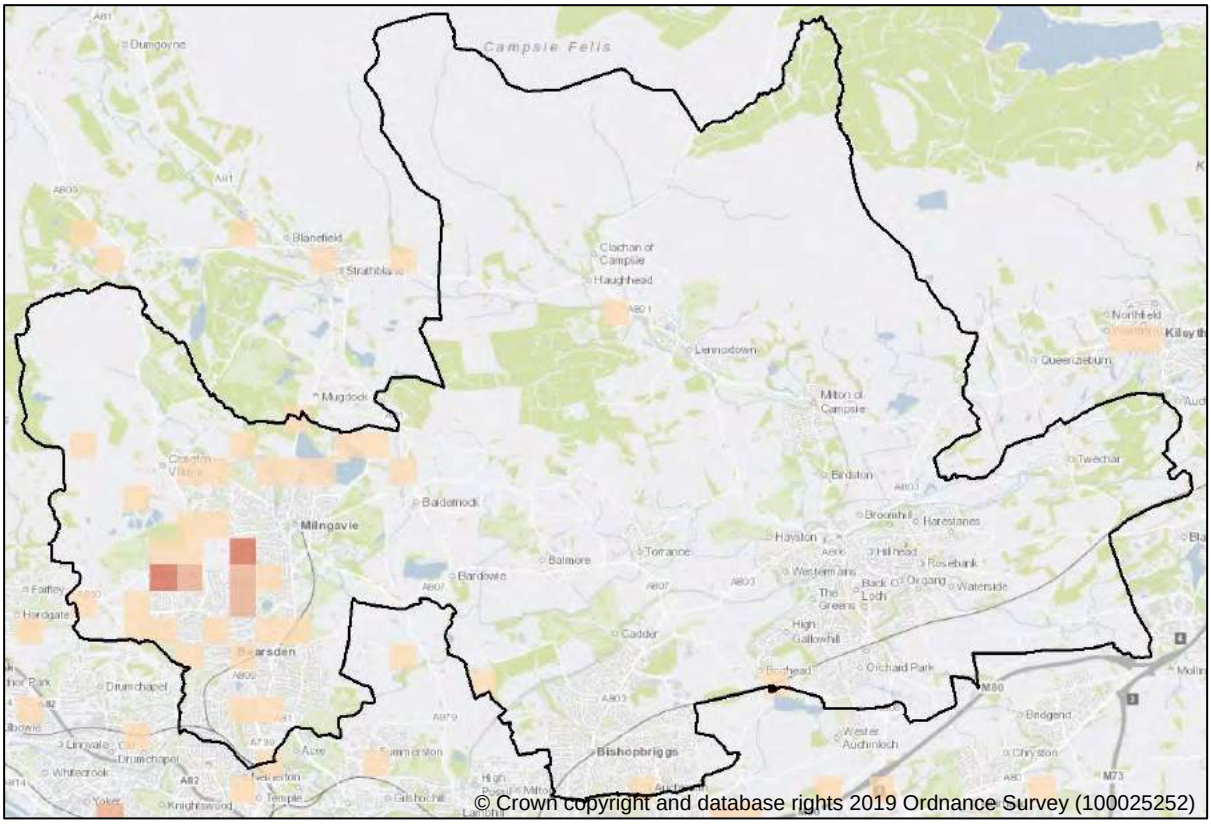
Building gain in East Dunbartonshire (2016 to 2017)



Of 417 cells that contained buildings within 2016 and/or 2017:-

- **17.3% (n=72) gained buildings, of which:-**
  - **51 gained 1 to 4 buildings**
  - **7 gained 5 to 9 buildings**
  - **10 gained 10 to 19 buildings**
  - **4 gained >19 buildings**

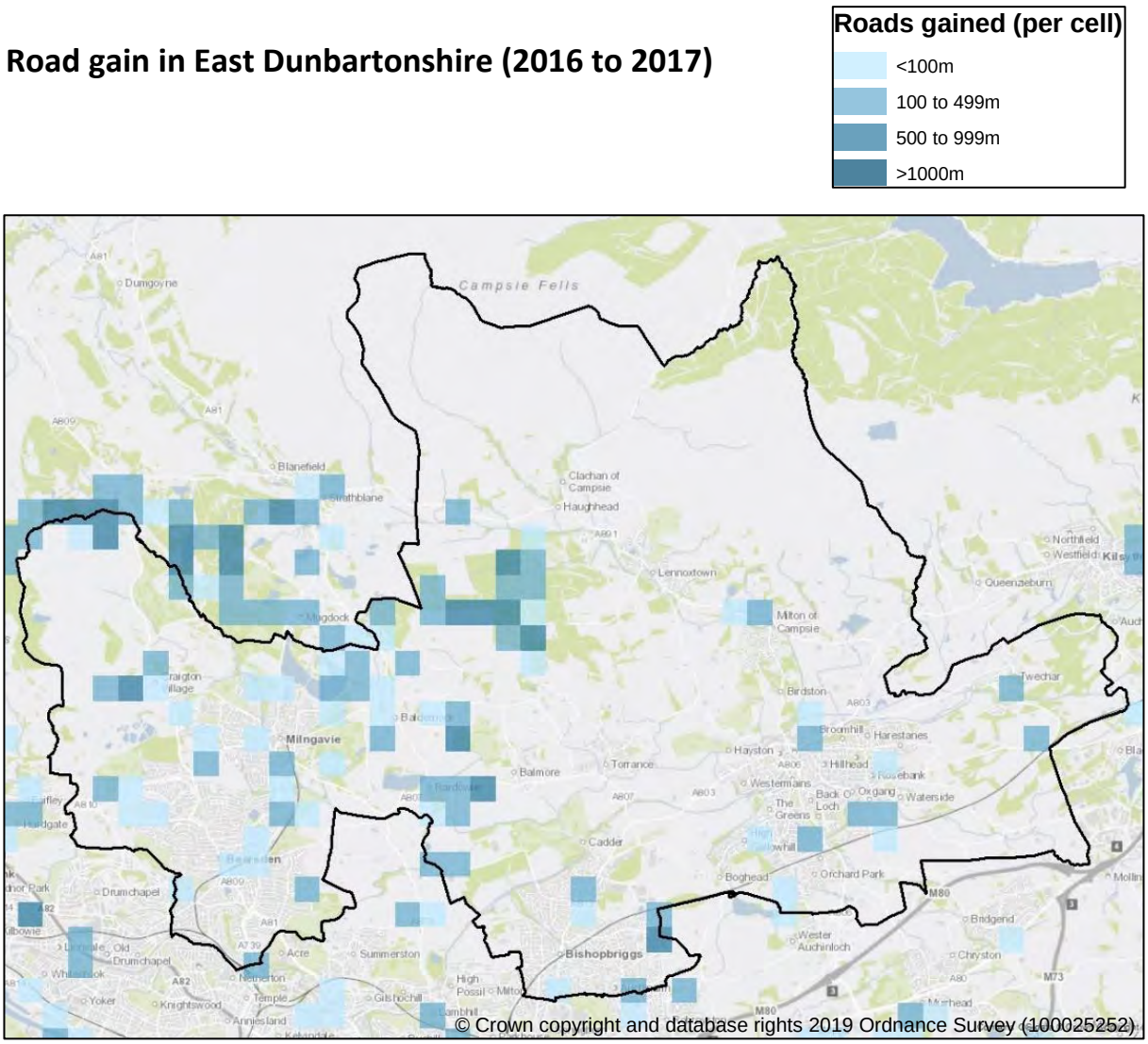
Building loss in East Dunbartonshire (2016 to 2017)



Of 417 cells that contained buildings within 2016 and/or 2017:-

- **8.9% (n=37) lost buildings, of which:-**
  - **32 lost 1 to 4 buildings**
  - **3 lost 5 to 9 buildings**
  - **2 lost 10 to 19 buildings**

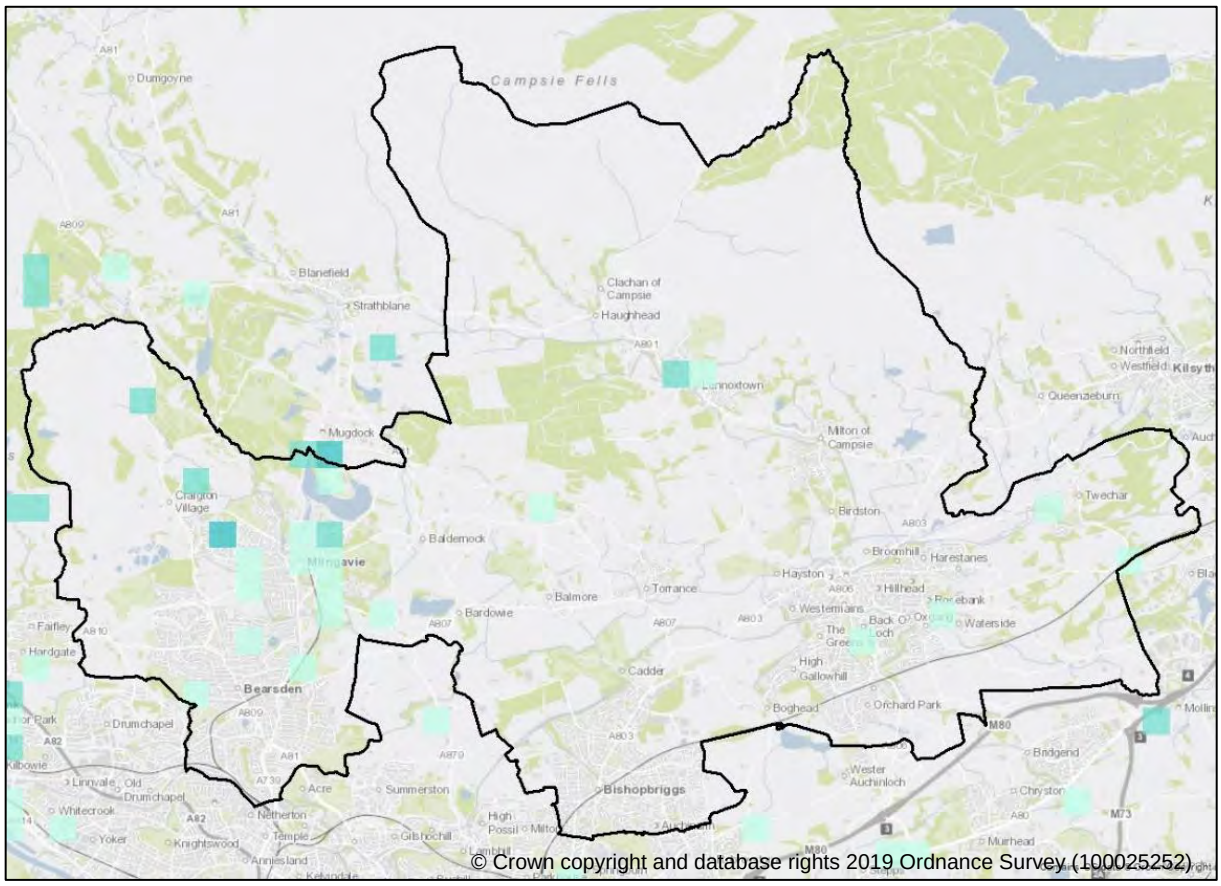
Road gain in East Dunbartonshire (2016 to 2017)



Of 477 cells that contained roads within 2016 and/or 2017:-

- **17.4% (n=83) gained roads, of which:-**
  - **35 gained 1 to 100m**
  - **37 gained 100 to 499m**
  - **11 gained 500 to 999m**

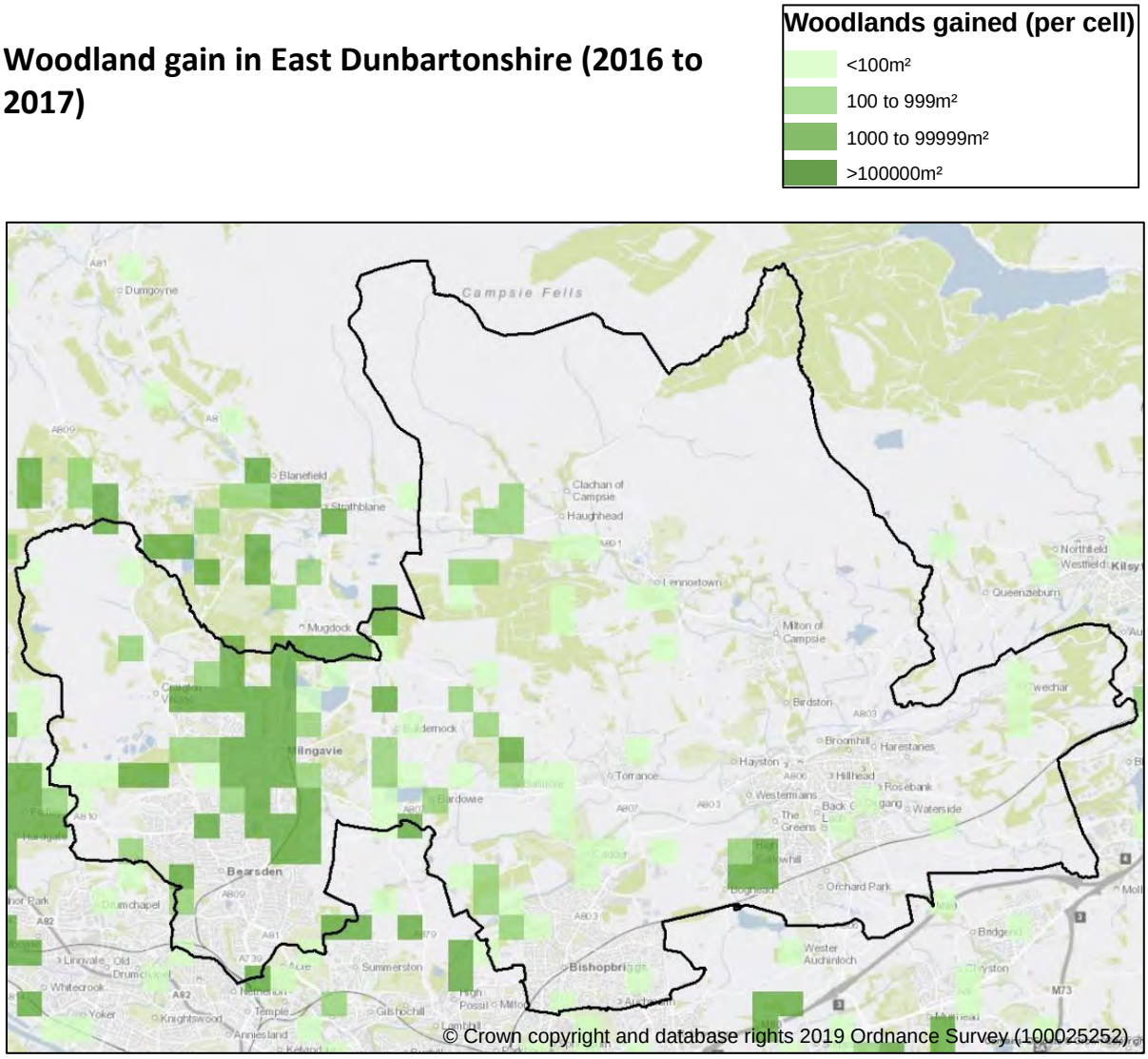
Road loss in East Dunbartonshire (2016 to 2017)



Of 477 cells that contained roads within 2016 and/or 2017:-

- **4.8% (n=23) lost roads, of which:-**
  - **17 lost 1 to 100m**
  - **15 lost 100 to 499m**
  - **1 lost 500 to 999m**

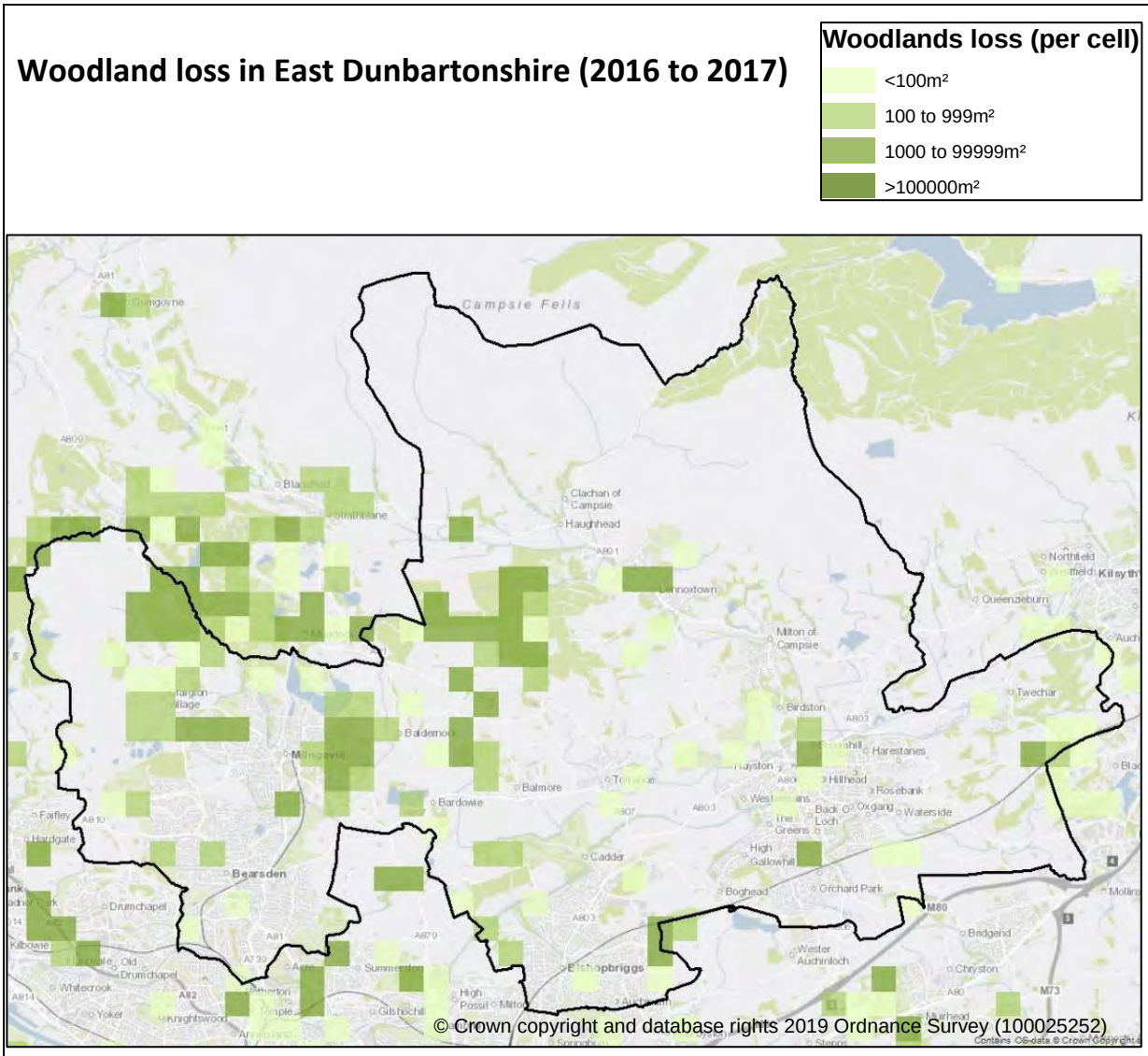
Woodland gain in East Dunbartonshire (2016 to 2017)



Of 544 cells that contained woodland within 2016 and/or 2017:-

- **19.1% (n=104) gained woodland, of which:-**
  - **44 gained <100m²**
  - **24 gained 100 to 999m²**
  - **36 gained 1000m²+**

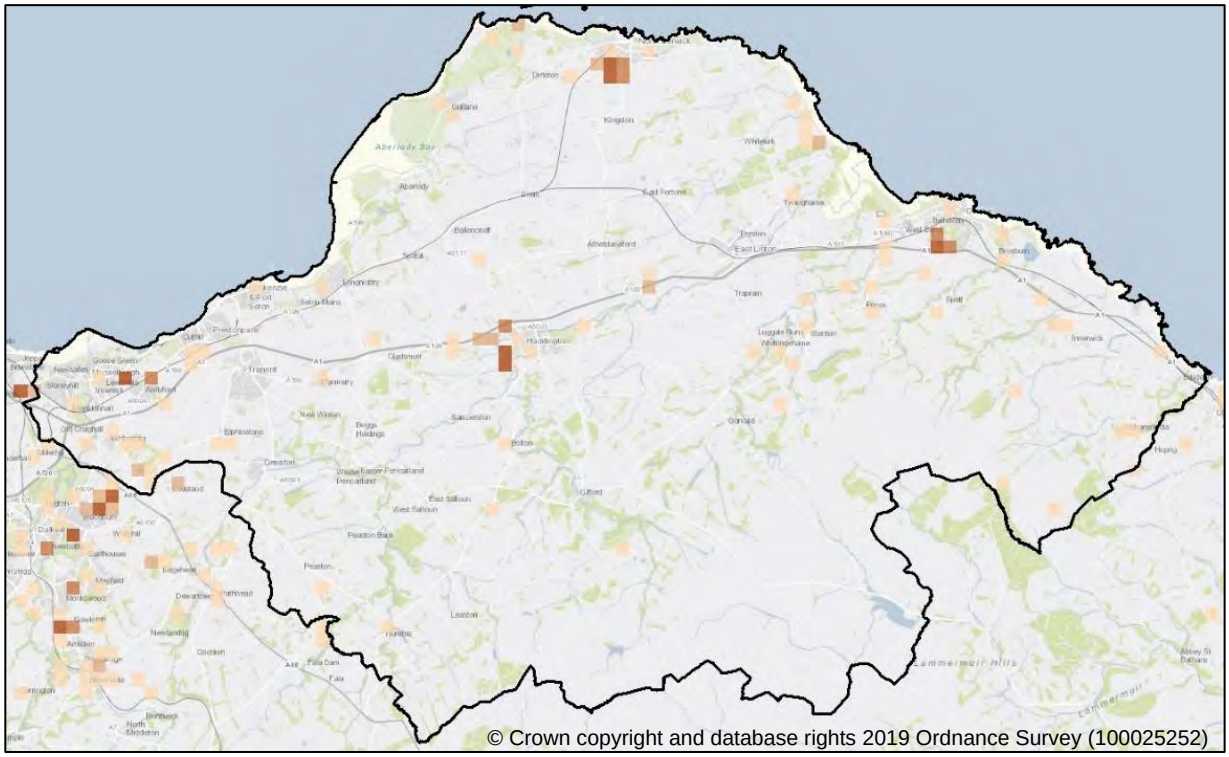
Woodland loss in East Dunbartonshire (2016 to 2017)



Of 544 cells that contained woodland within 2016 and/or 2017:-

- **19.1% (n=104) lost woodland, of which:-**
  - **39 lost <100m²**
  - **26 lost 100 to 999m²**
  - **39 lost 1000m²+**

Building gain in East Lothian (2016 to 2017)



Of 1277 cells that contained buildings within 2016 and/or 2017:-

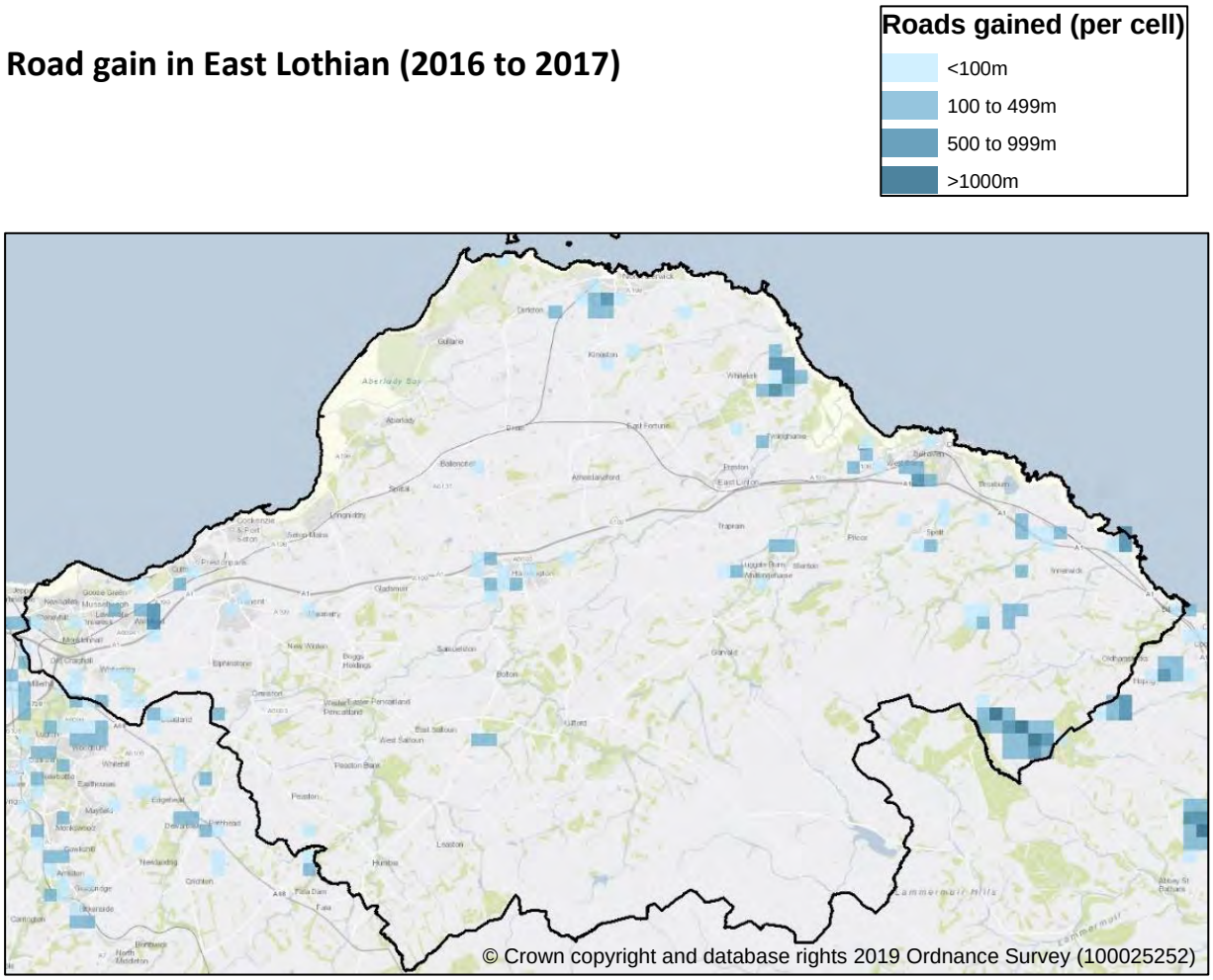
- **6.9% (n=88) gained buildings, of which:-**
  - **69 gained 1 to 4 buildings**
  - **7 gained 5 to 9 buildings**
  - **6 gained 10 to 19 buildings**
  - **6 gained >19 buildings**

Building loss in East Lothian (2016 to 2017)

Of 1277 cells that contained buildings within 2016 and/or 2017:-

- **2.7% (n=35) lost buildings, of which:-**
  - **34 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

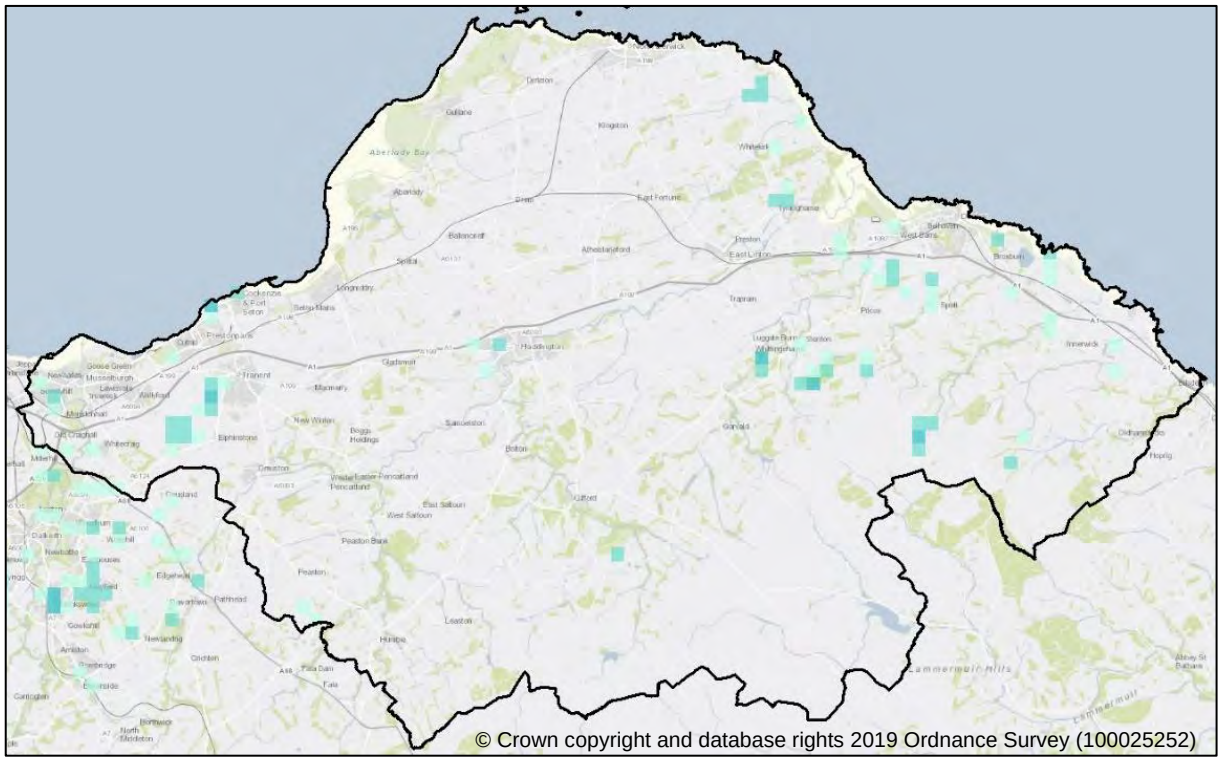
Road gain in East Lothian (2016 to 2017)



Of 1892 cells that contained roads within 2016 and/or 2017:-

- **6.2% (n=118) gained roads, of which:-**
  - **55 gained 1 to 100m**
  - **47 gained 100 to 499m**
  - **13 gained 500 to 999m**
  - **3 gained 1000m+**

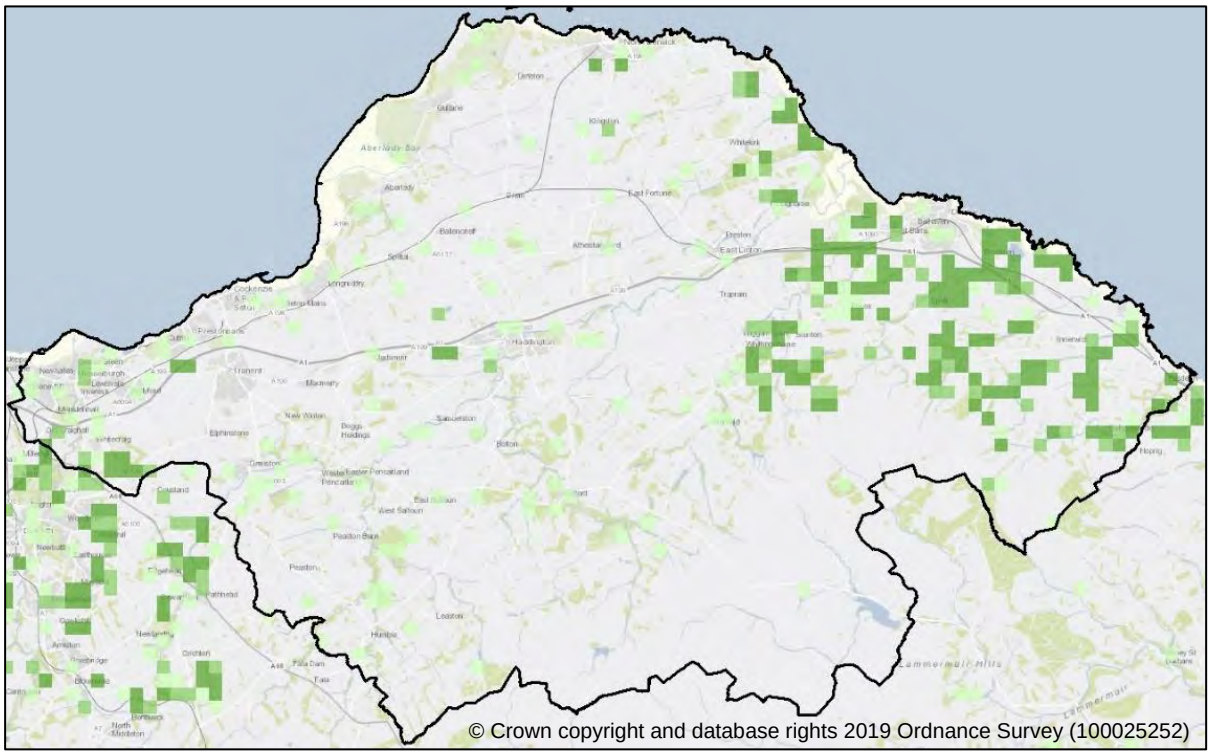
Road loss in East Lothian (2016 to 2017)



Of 1892 cells that contained roads within 2016 and/or 2017:-

- **3.7% (n=70) lost roads, of which:-**
  - **38 lost 1 to 100m**
  - **27 lost 100 to 499m**
  - **5 lost 500 to 999m**

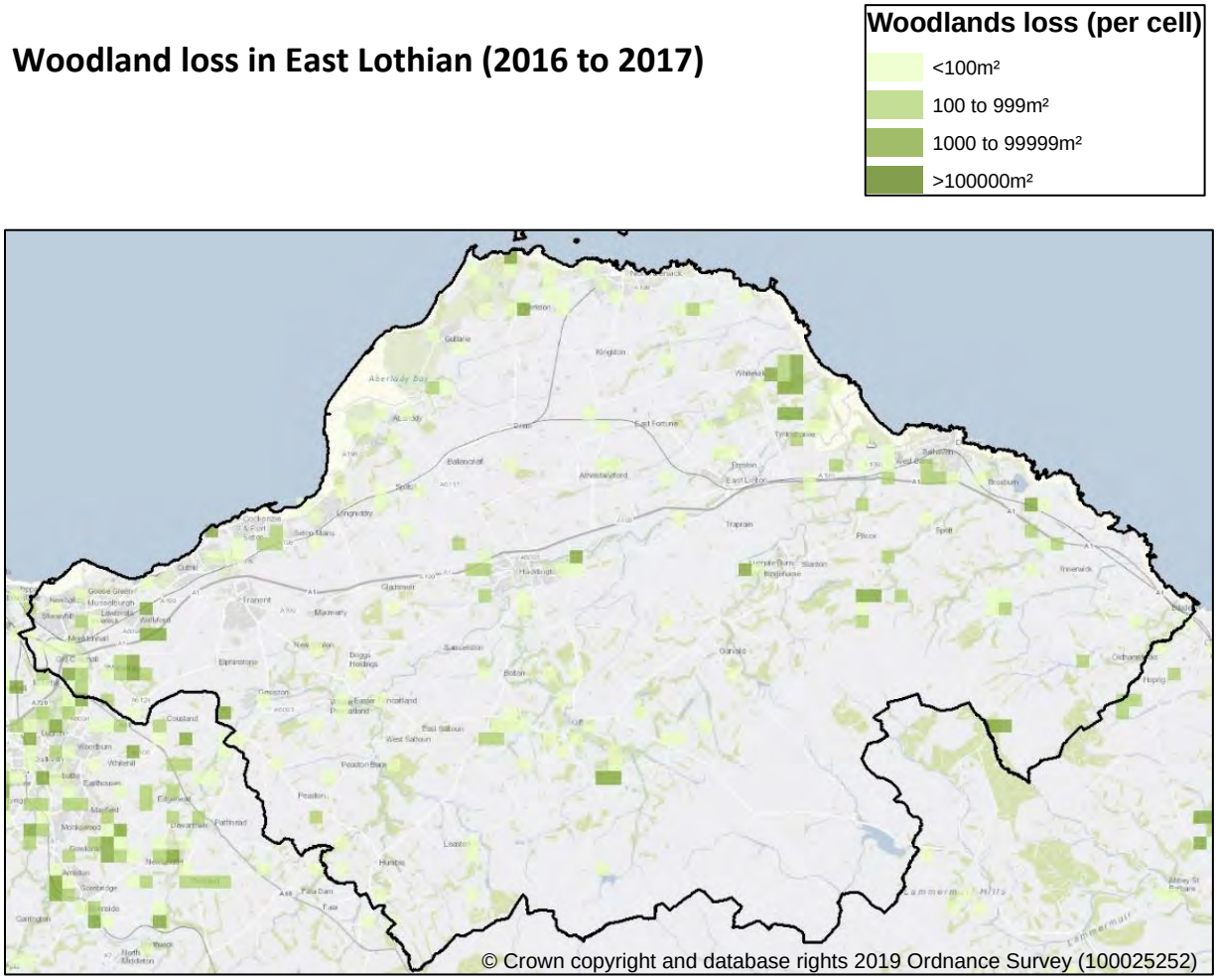
Woodland gain in East Lothian (2016 to 2017)



Of 2097 cells that contained woodland within 2016 and/or 2017:-

- **14.6% (n=307) gained woodland, of which:-**
  - **133 gained <100m²**
  - **46 gained 100 to 999m²**
  - **128 gained 1000m²+**

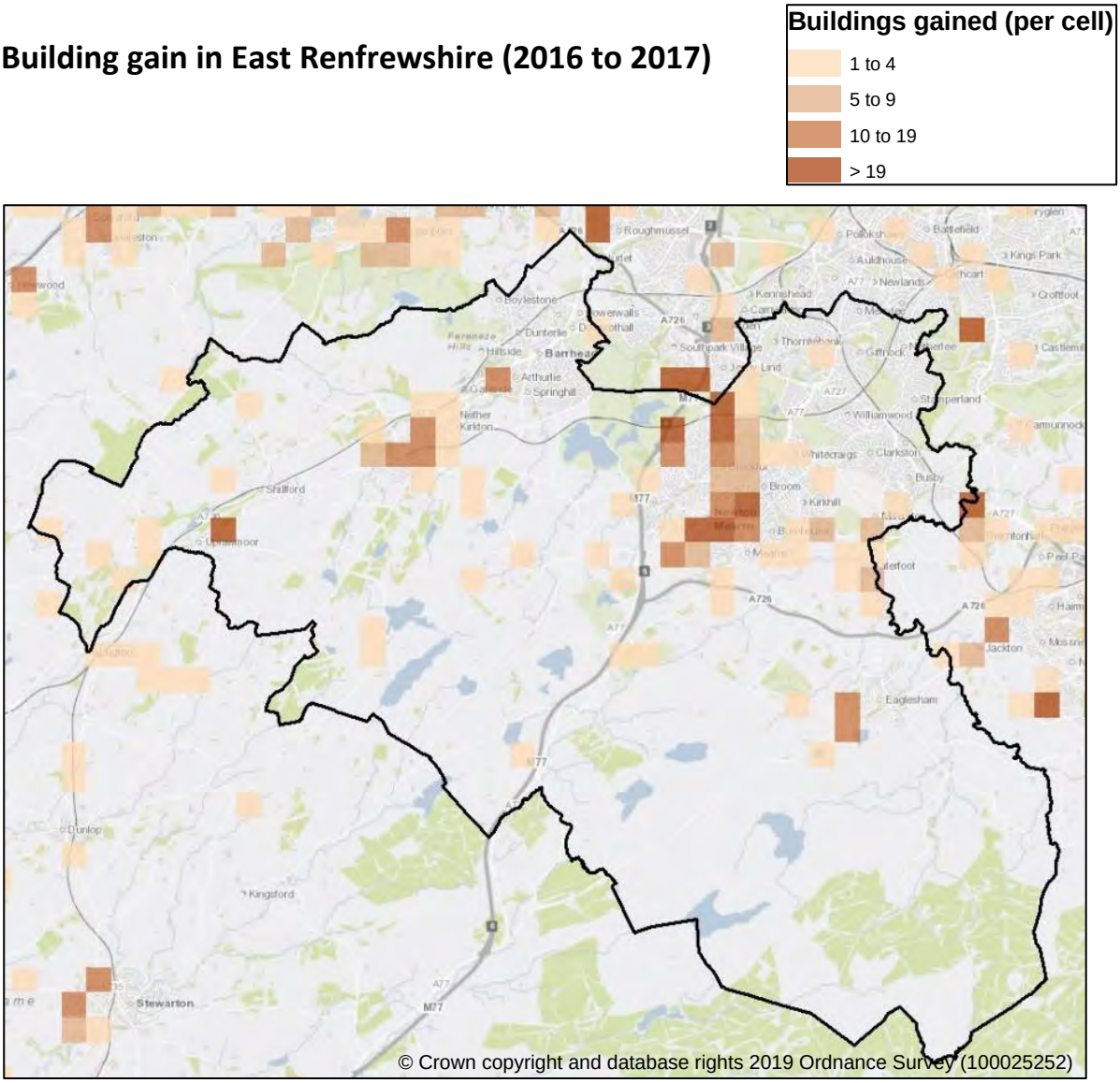
Woodland loss in East Lothian (2016 to 2017)



Of 2097 cells that contained woodland within 2016 and/or 2017:-

- **9.2% (n=193) lost woodland, of which:-**
  - **132 lost <100m²**
  - **35 lost 100 to 999m²**
  - **26 lost 1000m²+**

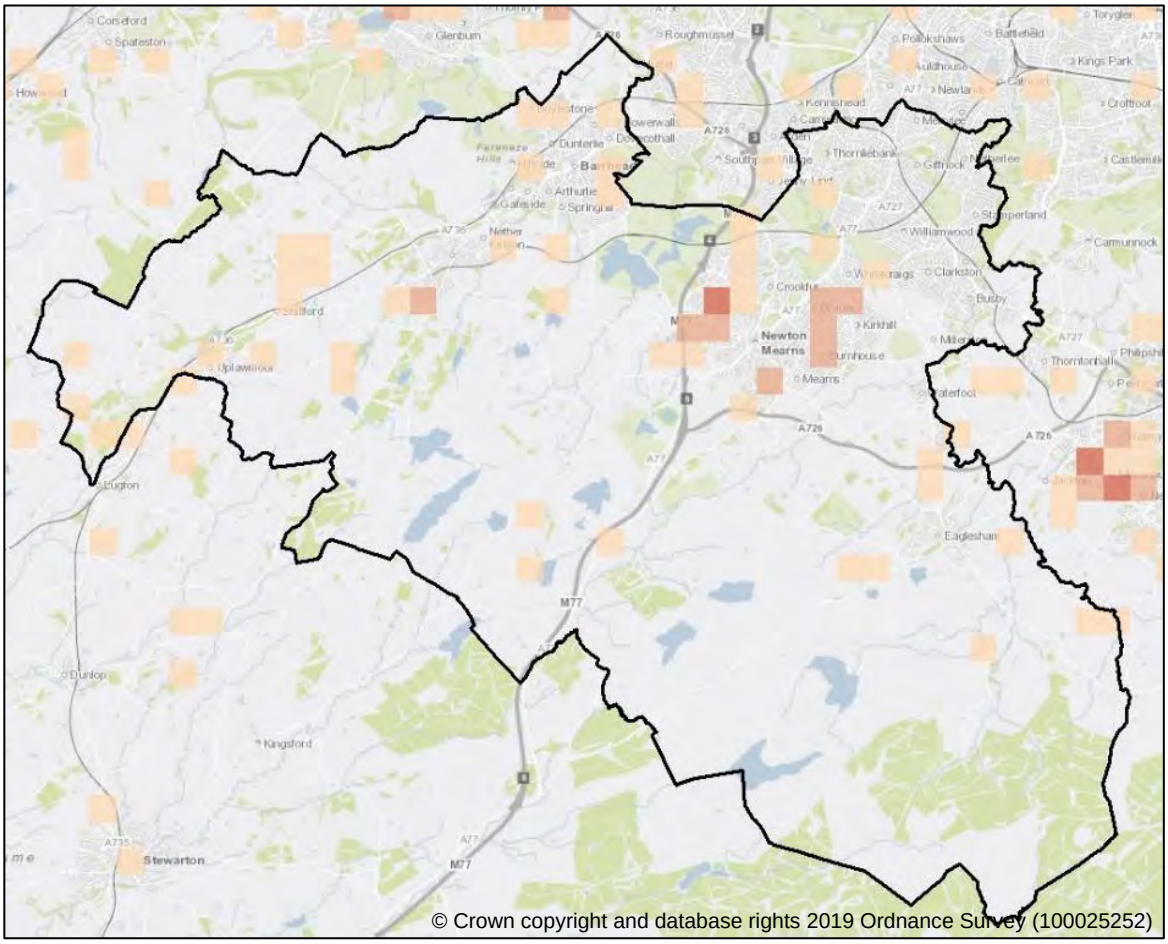
Building gain in East Renfrewshire (2016 to 2017)



Of 389 cells that contained buildings within 2016 and/or 2017:-

- **18.8% (n=73) gained buildings, of which:-**
  - **46 gained 1 to 4 buildings**
  - **9 gained 5 to 9 buildings**
  - **11 gained 10 to 19 buildings**
  - **7 gained >19 buildings**

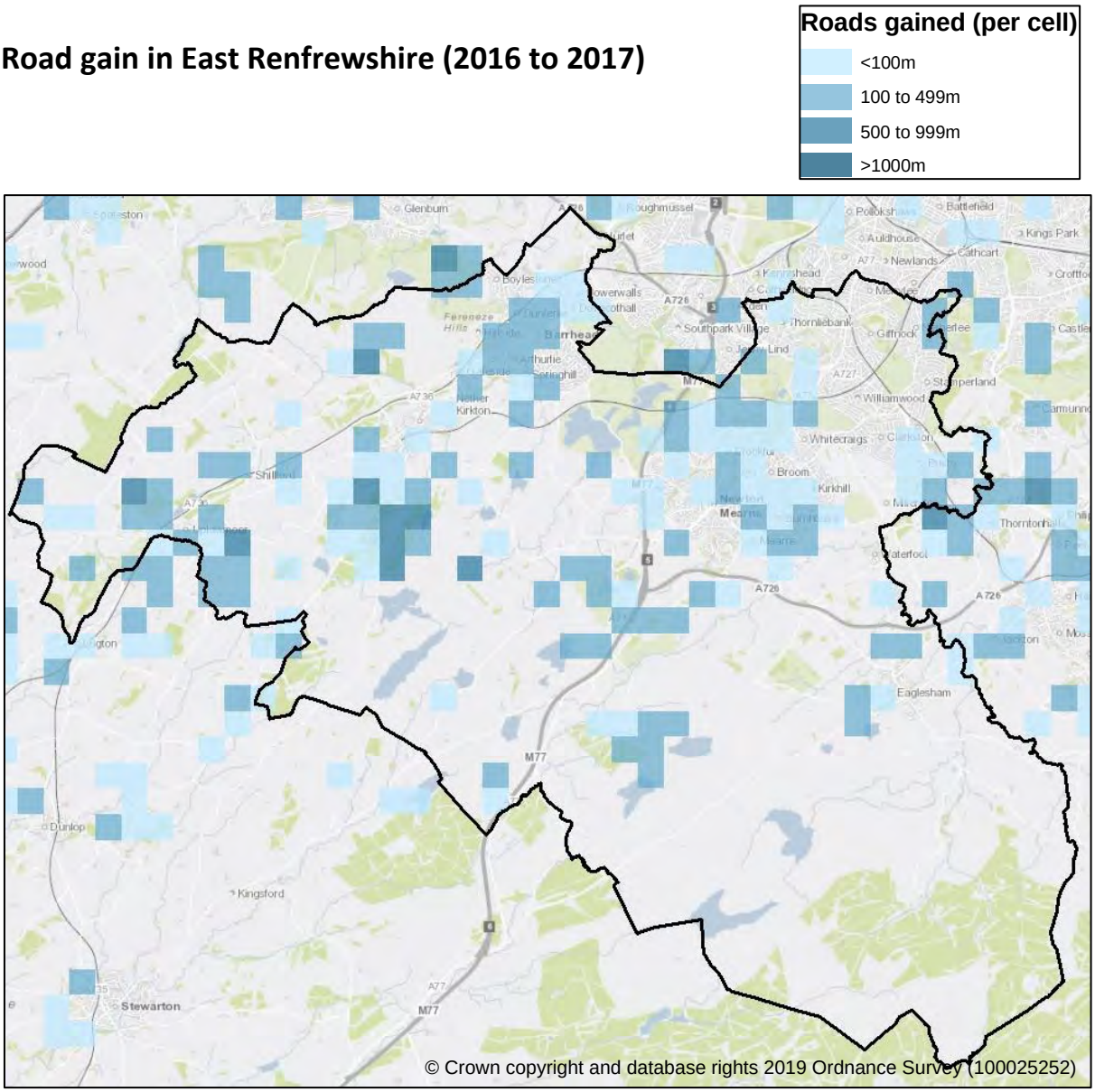
Building loss in East Renfrewshire (2016 to 2017)



Of 389 cells that contained buildings within 2016 and/or 2017:-

- **13.4% (n=52) lost buildings, of which:-**
  - **43 lost 1 to 4 buildings**
  - **8 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

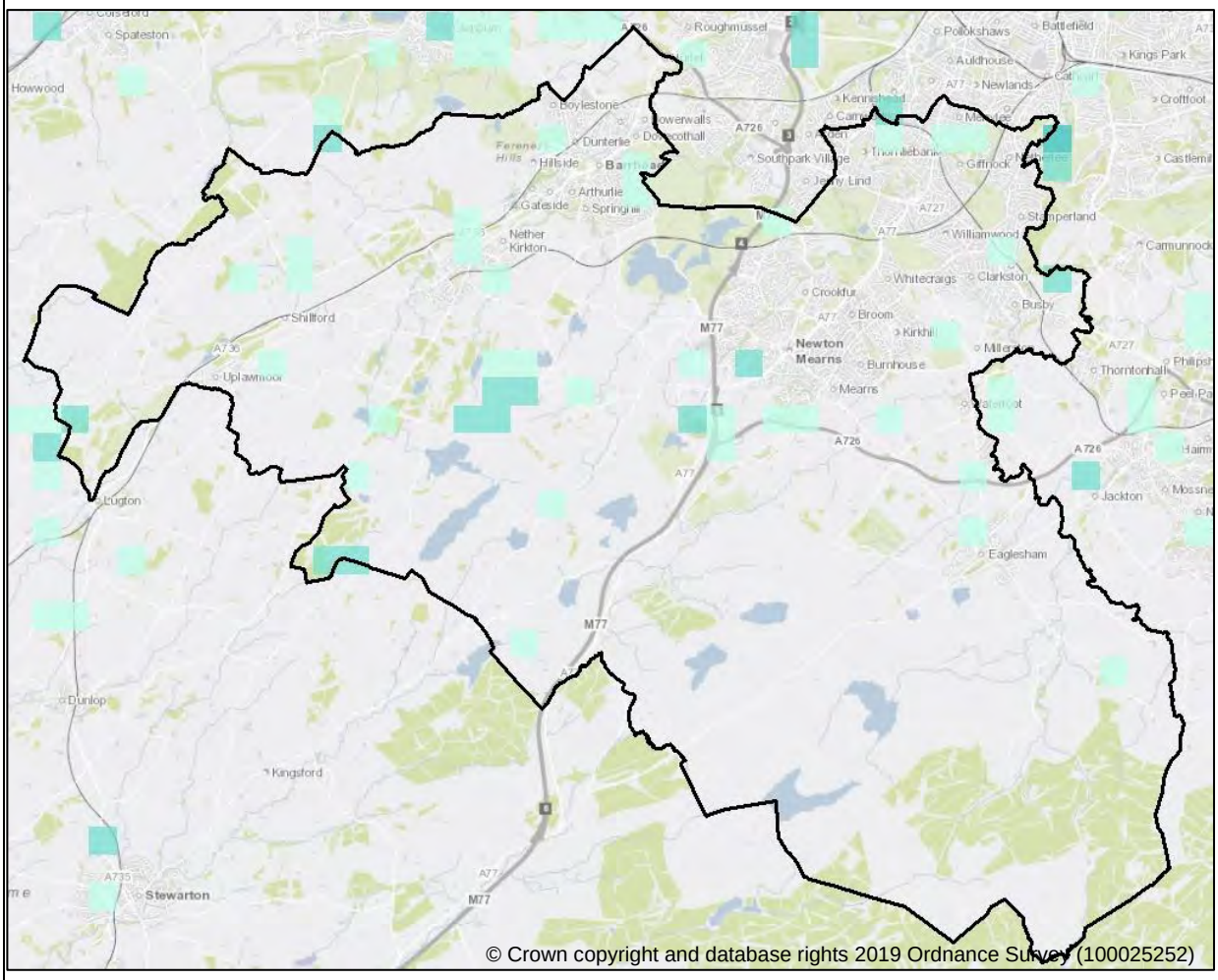
Road gain in East Renfrewshire (2016 to 2017)



Of 567 cells that contained roads within 2016 and/or 2017:-

- **25.7% (n=146) gained roads, of which:-**
  - **64 gained 1 to 100m**
  - **73 gained 100 to 499m**
  - **9 gained 500 to 999m**

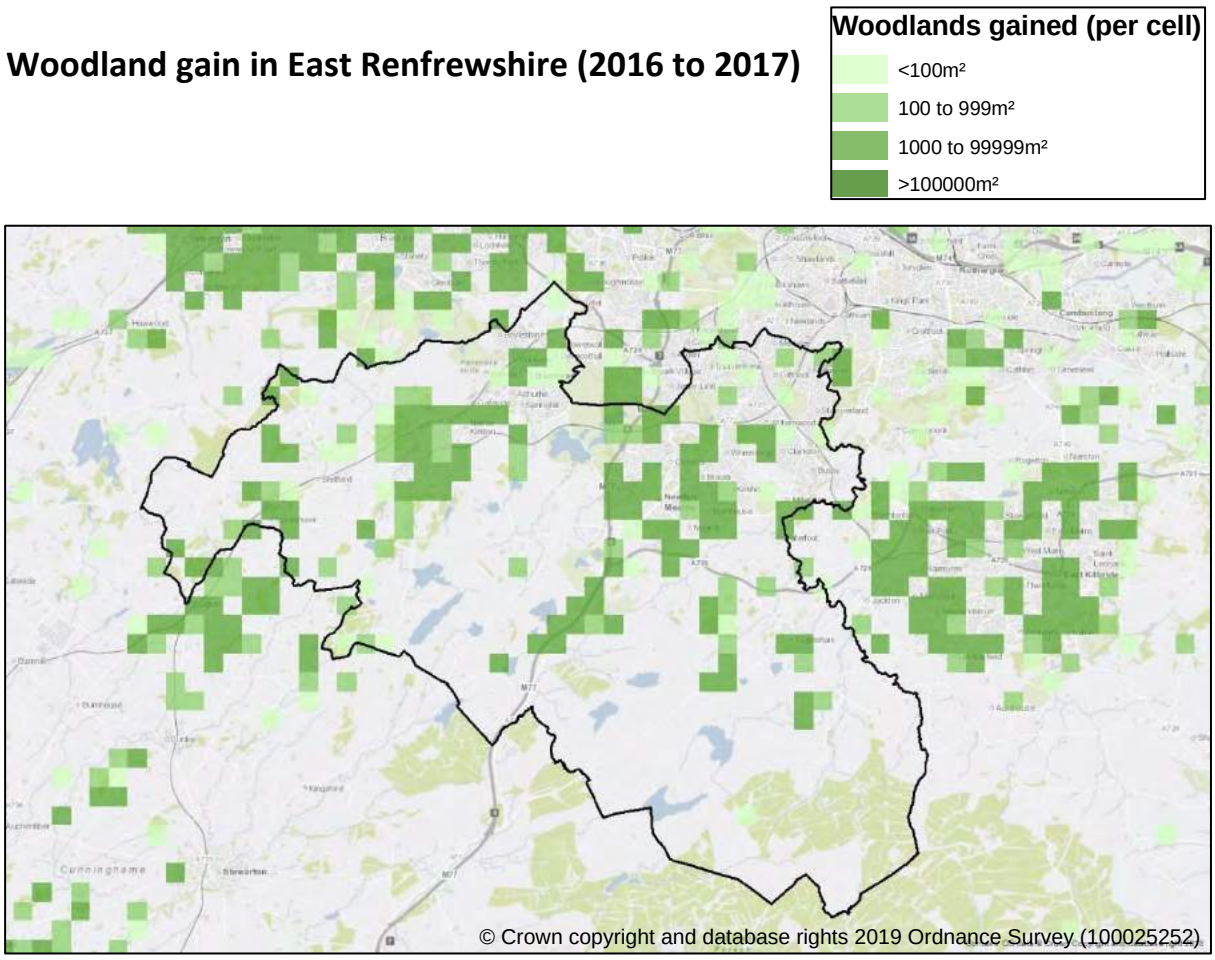
Road loss in East Renfrewshire (2016 to 2017)



Of 567 cells that contained roads within 2016 and/or 2017:-

- **7.6% (n=43) lost roads, of which:-**
  - **32 lost 1 to 100m**
  - **11 lost 100 to 499m**

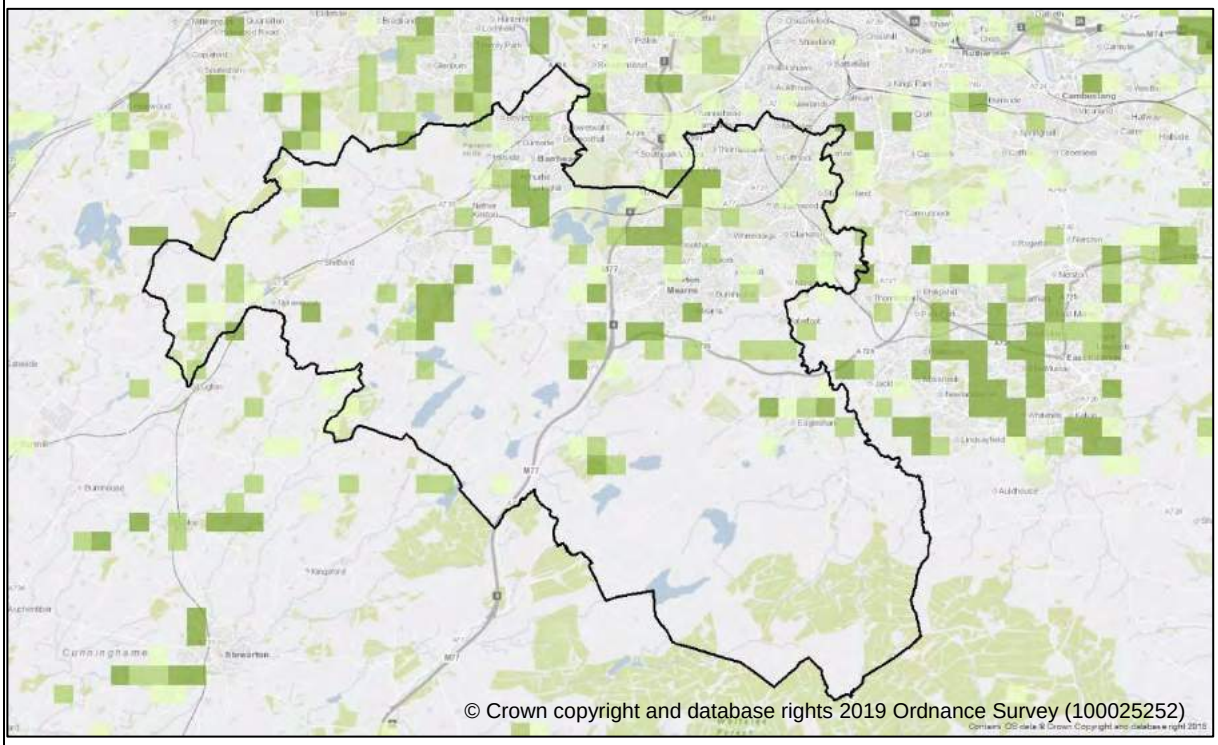
Woodland gain in East Renfrewshire (2016 to 2017)



Of 507 cells that contained woodland within 2016 and/or 2017:-

- **27.6% (n=140) gained woodland, of which:-**
  - **24 gained <100m²**
  - **32 gained 100 to 999m²**
  - **84 gained 1000m²+**

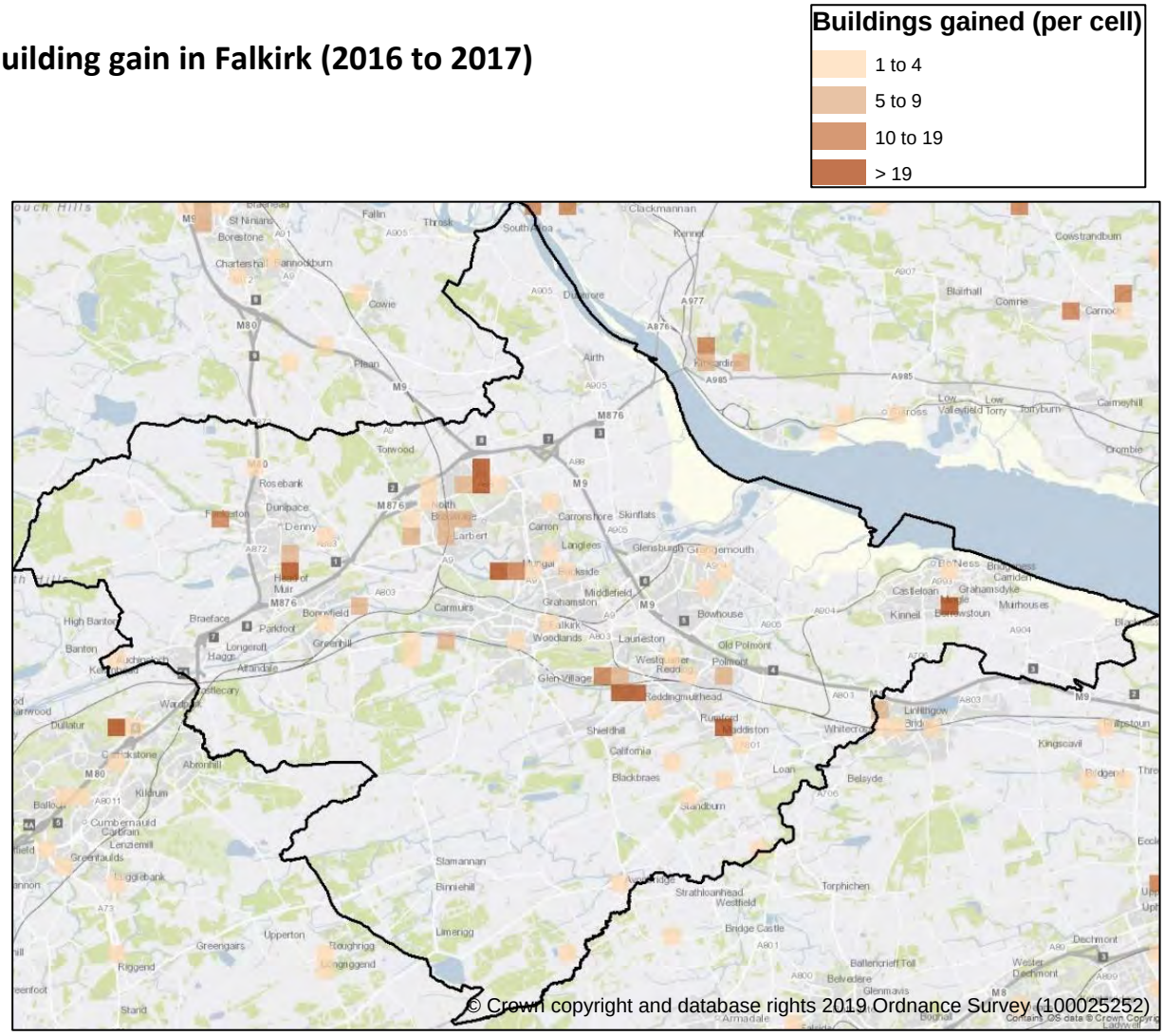
Woodland loss in East Renfrewshire (2016 to 2017)



Of 507 cells that contained woodland within 2016 and/or 2017:-

- **18.5% (n=94) lost woodland, of which:-**
  - **32 lost <100m²**
  - **33 lost 100 to 999m²**
  - **29 lost 1000m²+**

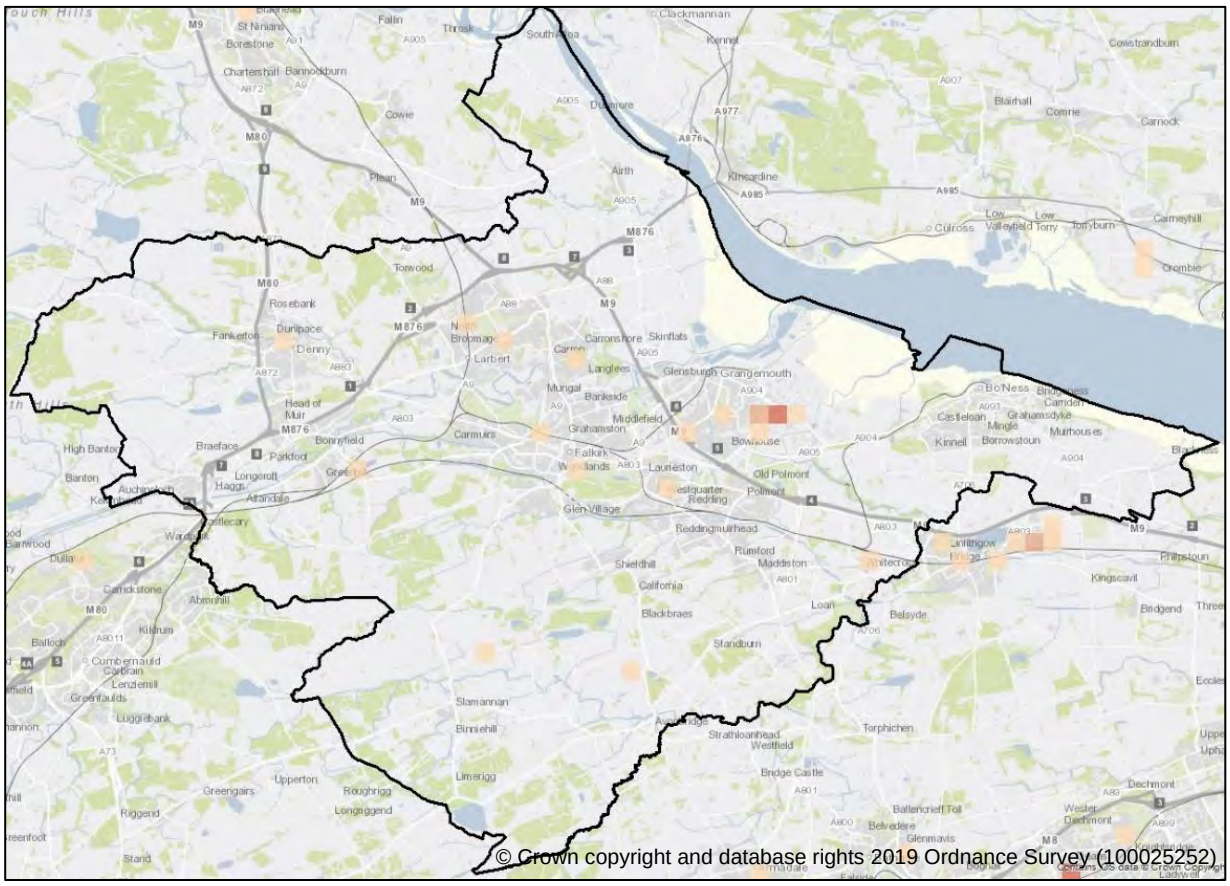
Building gain in Falkirk (2016 to 2017)



Of 843 cells that contained buildings within 2016 and/or 2017:-

- **6.2% (n=52) gained buildings, of which:-**
  - **31 gained 1 to 4 buildings**
  - **10 gained 5 to 9 buildings**
  - **3 gained 10 to 19 buildings**
  - **8 gained >19 buildings**

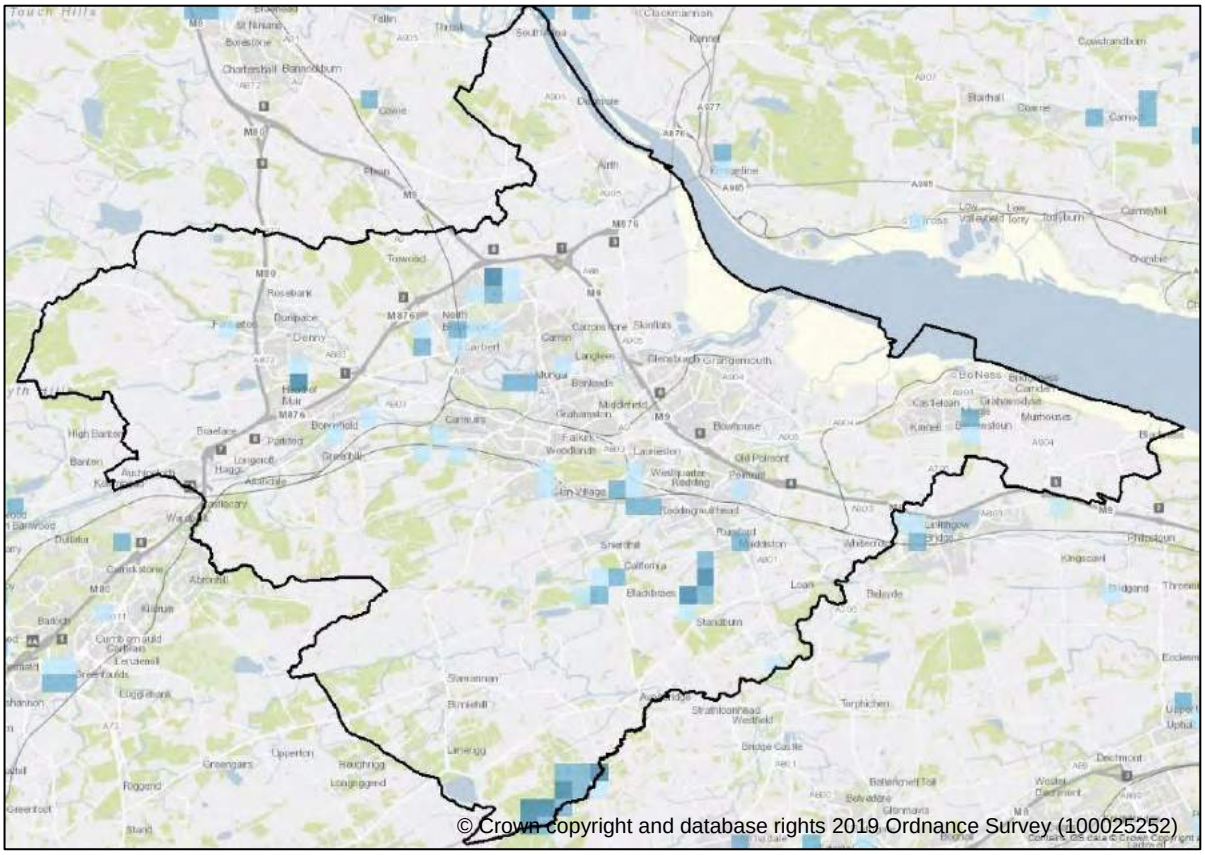
Building loss in Falkirk (2016 to 2017)



Of 843 cells that contained buildings within 2016 and/or 2017:-

- **2.0% (n=17) lost buildings, of which:-**
  - **15 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

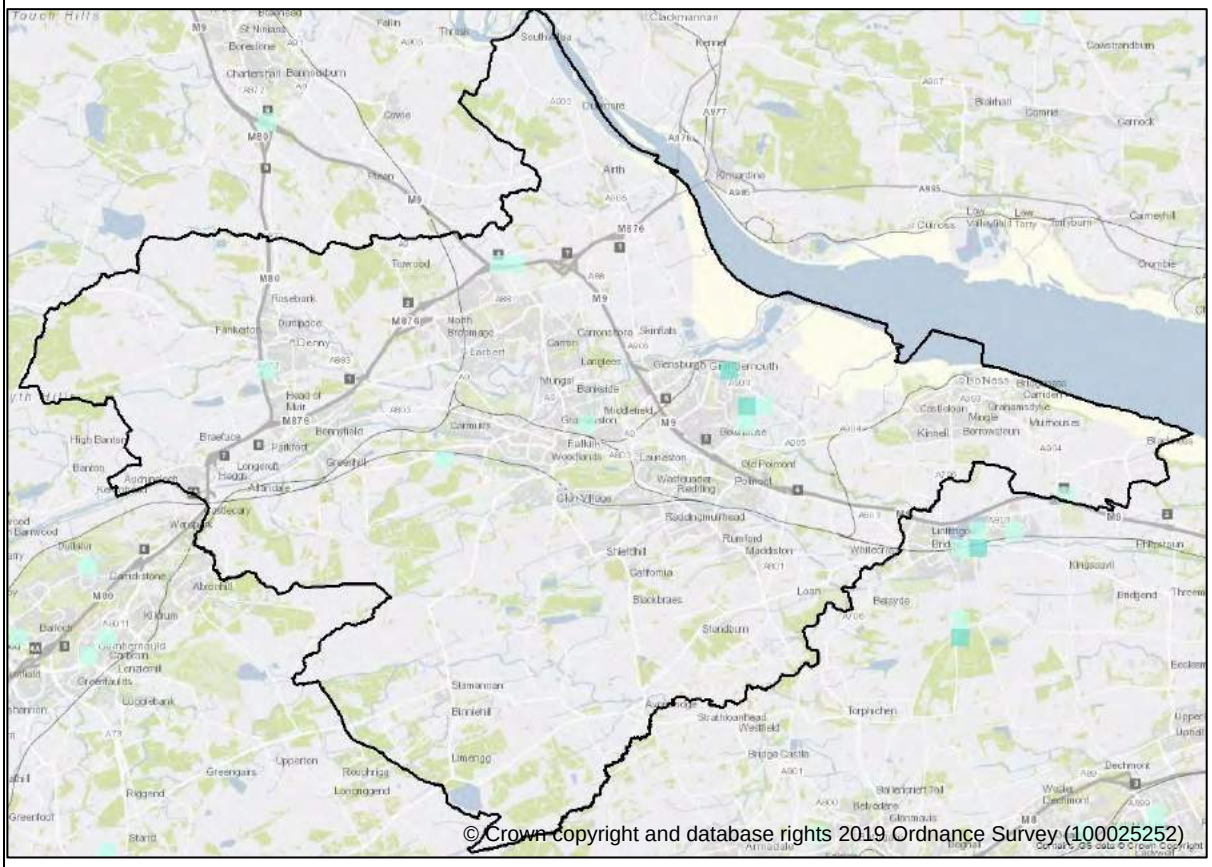
Road gain in Falkirk (2016 to 2017)



Of 991 cells that contained roads within 2016 and/or 2017:-

- **5.1% (n=51) gained roads, of which:-**
  - **25 gained 1 to 100m**
  - **17 gained 100 to 499m**
  - **9 gained 500 to 999m**

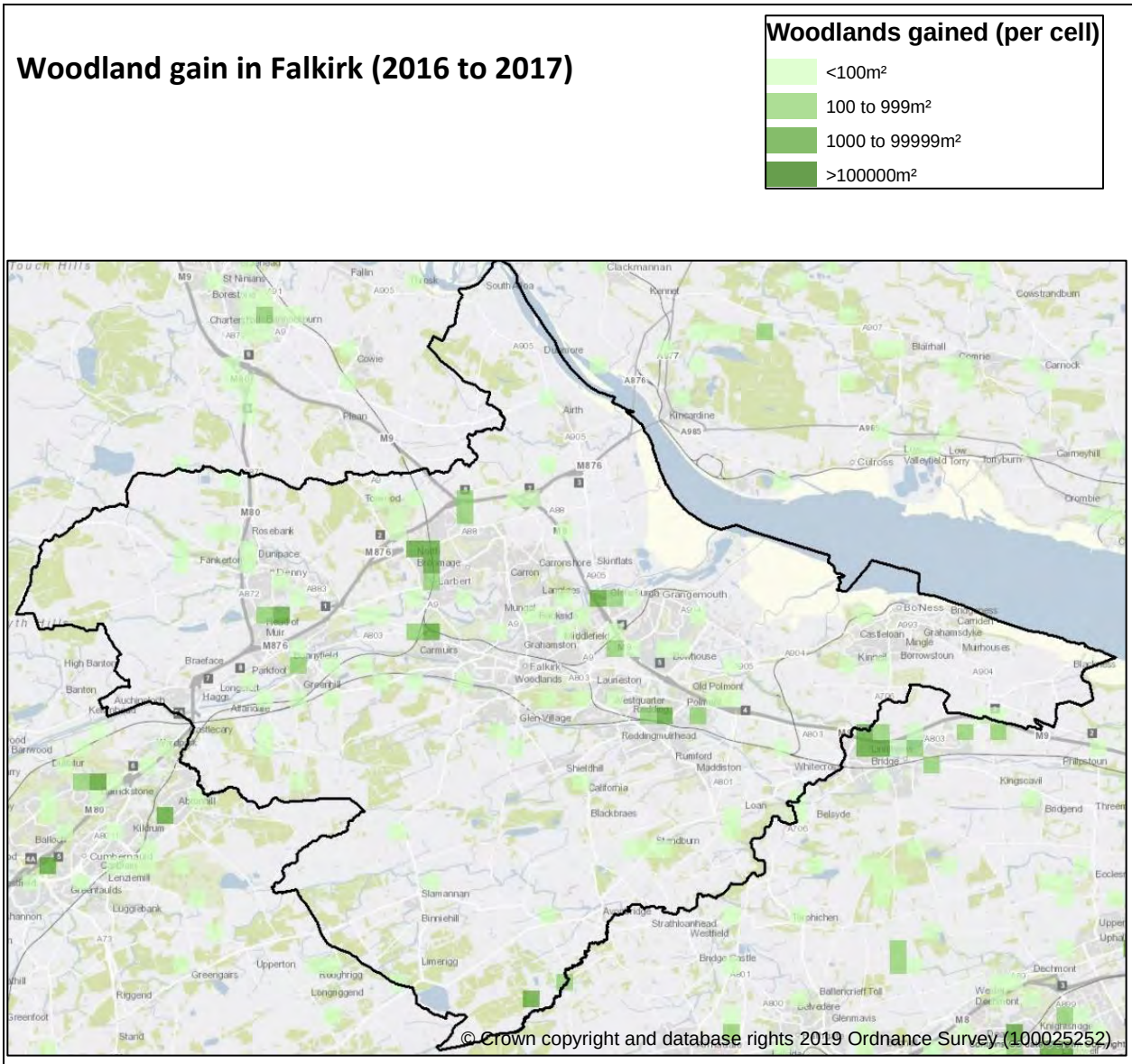
Road loss in Falkirk (2016 to 2017)



Of 991 cells that contained roads within 2016 and/or 2017:-

- **1.0% (n=10) lost roads, of which:-**
  - **8 lost 1 to 100m**
  - **2 lost 100 to 499m**

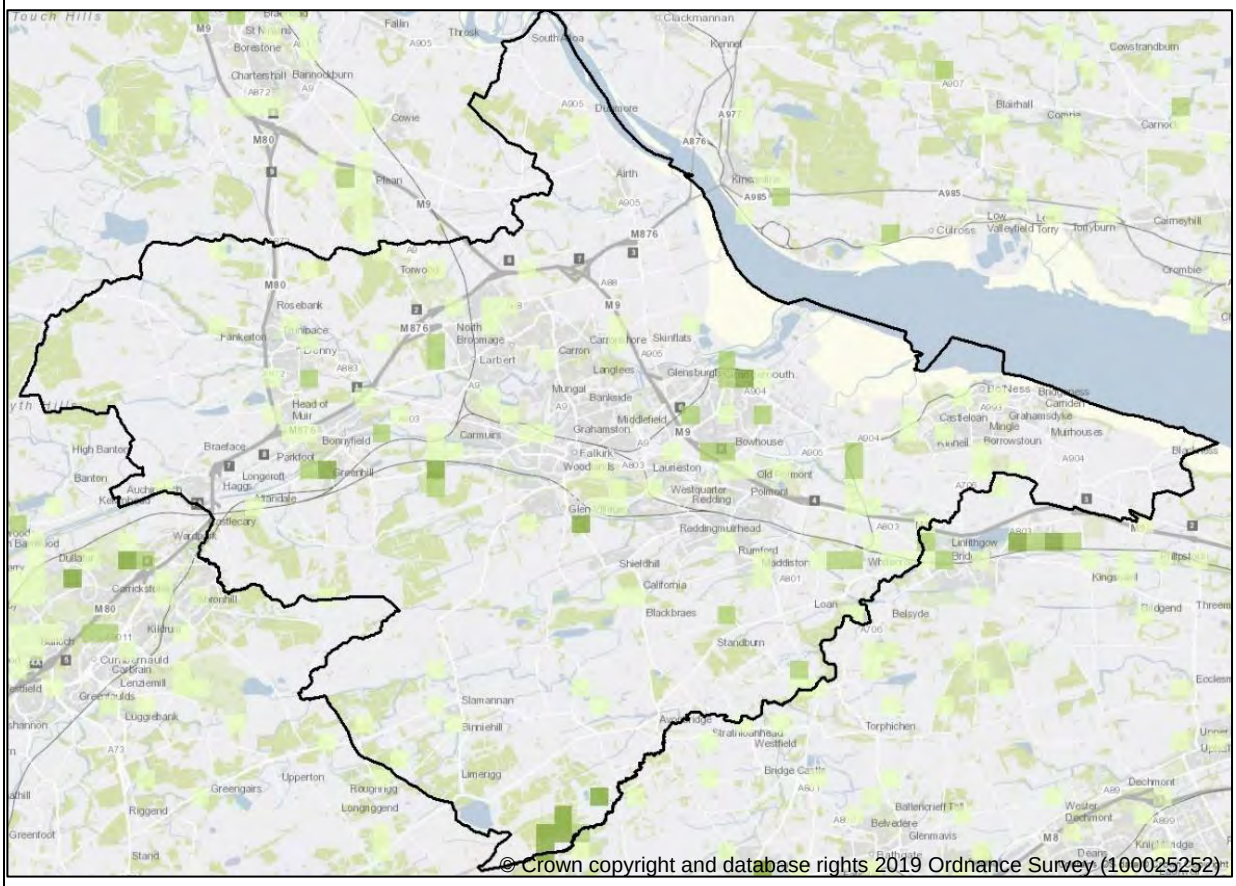
Woodland gain in Falkirk (2016 to 2017)



Of 1064 cells that contained woodland within 2016 and/or 2017:-

- **8.5% (n=90) gained woodland, of which:-**
  - **71 gained <100m²**
  - **11 gained 100 to 999m²**
  - **8 gained 1000m²+**

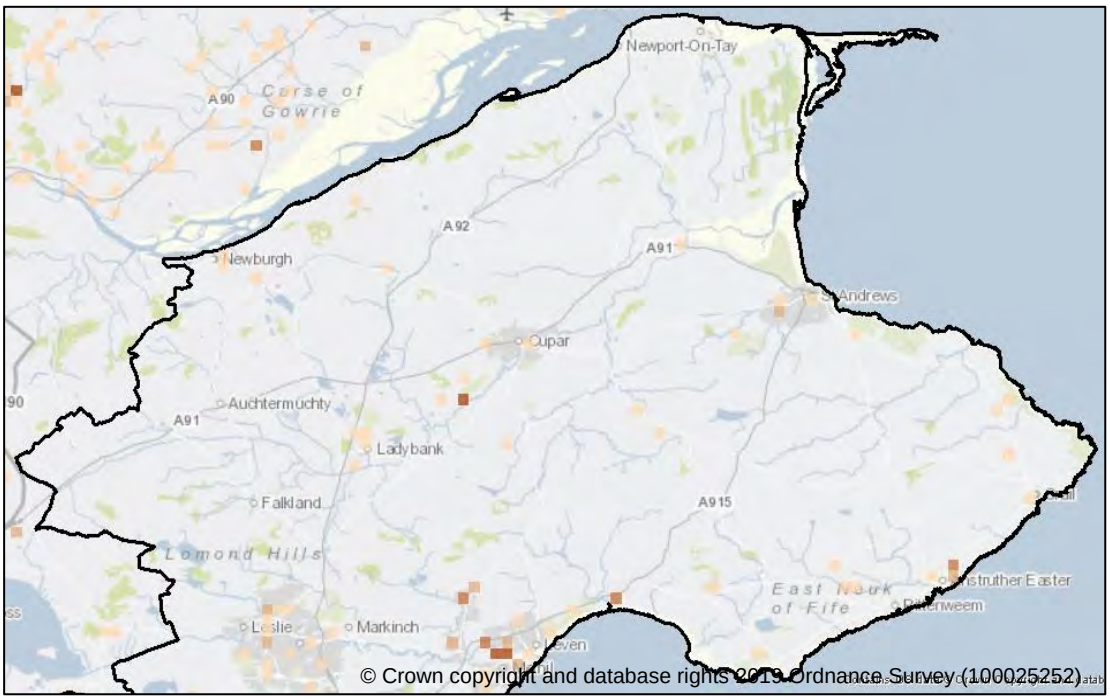
Woodland loss in Falkirk (2016 to 2017)



Of 1064 cells that contained woodland within 2016 and/or 2017:-

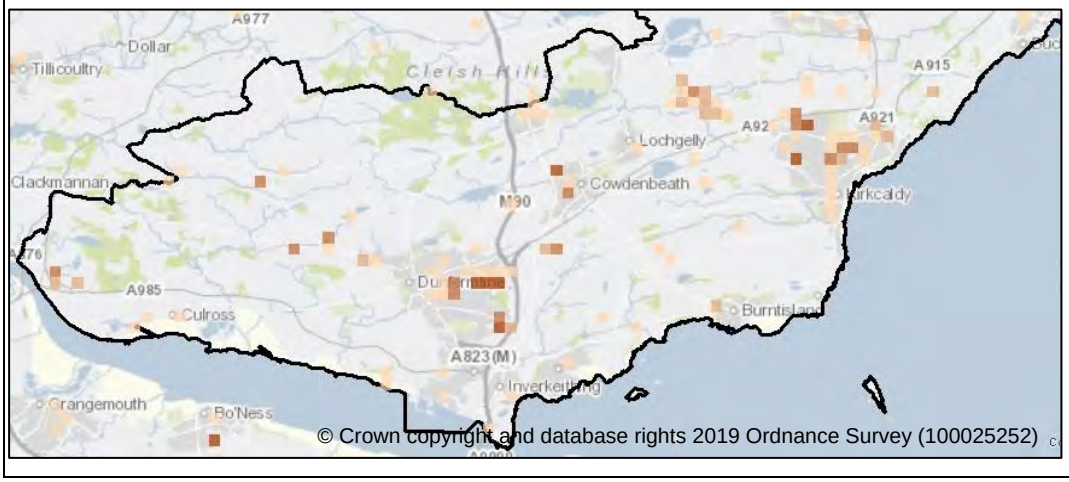
- **9.8% (n=104) lost woodland, of which:-**
  - **77 lost <100m²**
  - **18 lost 100 to 999m²**
  - **9 lost 1000m²+**

Building gain in Fife (2016 to 2017)

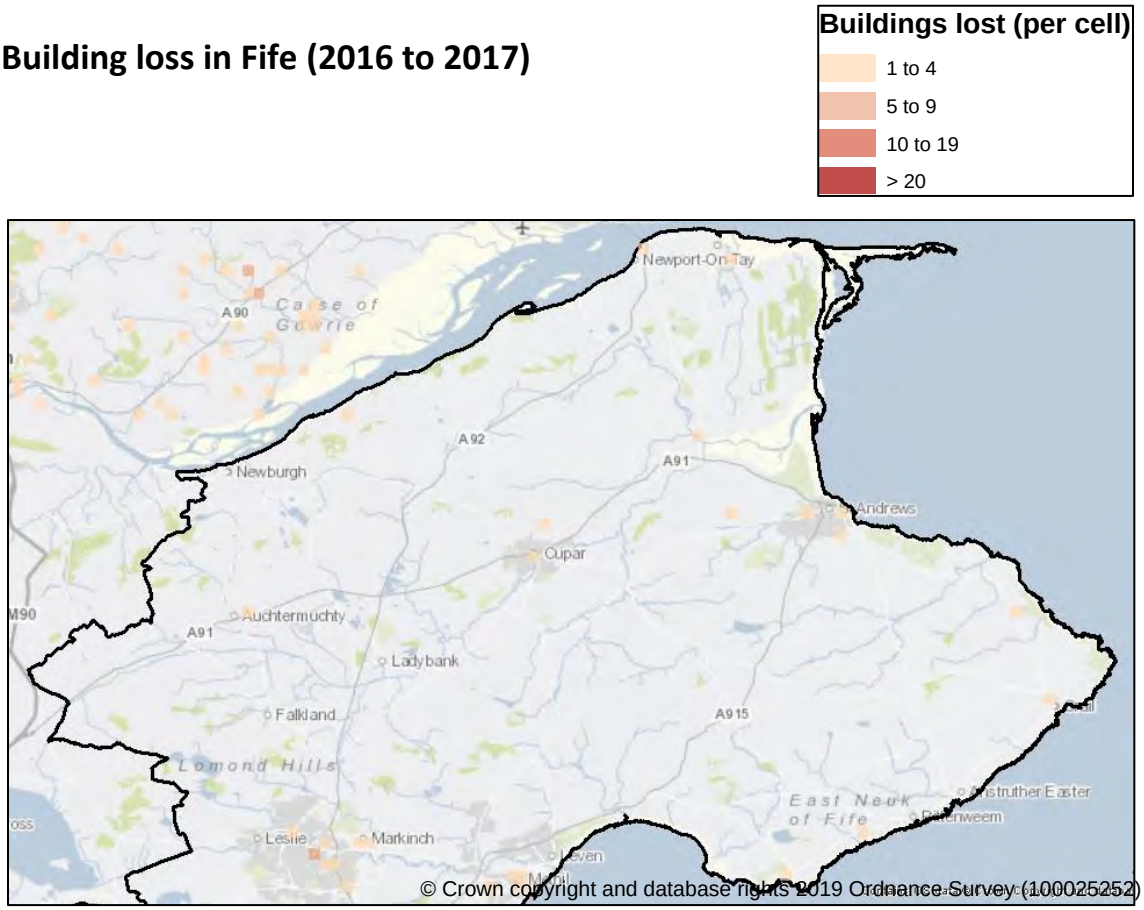


Of 3212 cells that contained buildings within 2016 and/or 2017:-

- **5.3% (n=170) gained buildings, of which:-**
  - **116 gained 1 to 4 buildings**
  - **25 gained 5 to 9 buildings**
  - **19 gained 10 to 19 buildings**
  - **10 gained >19 buildings**

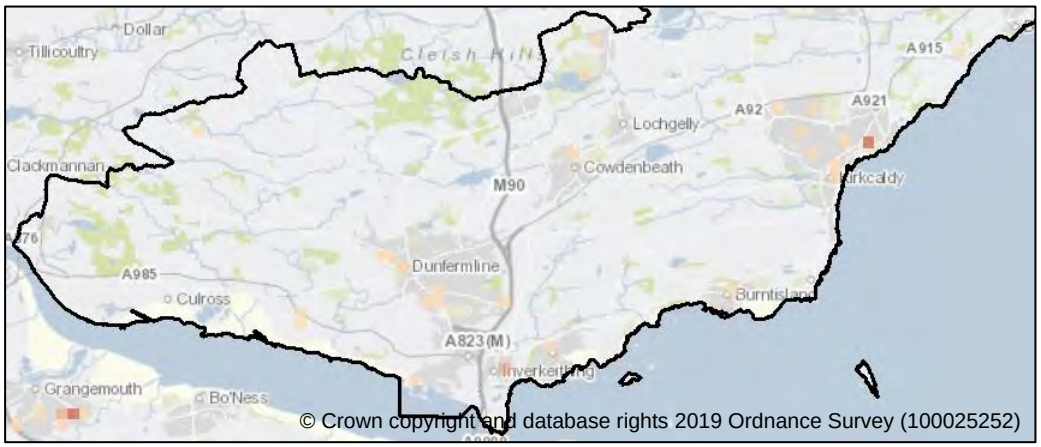


Building loss in Fife (2016 to 2017)

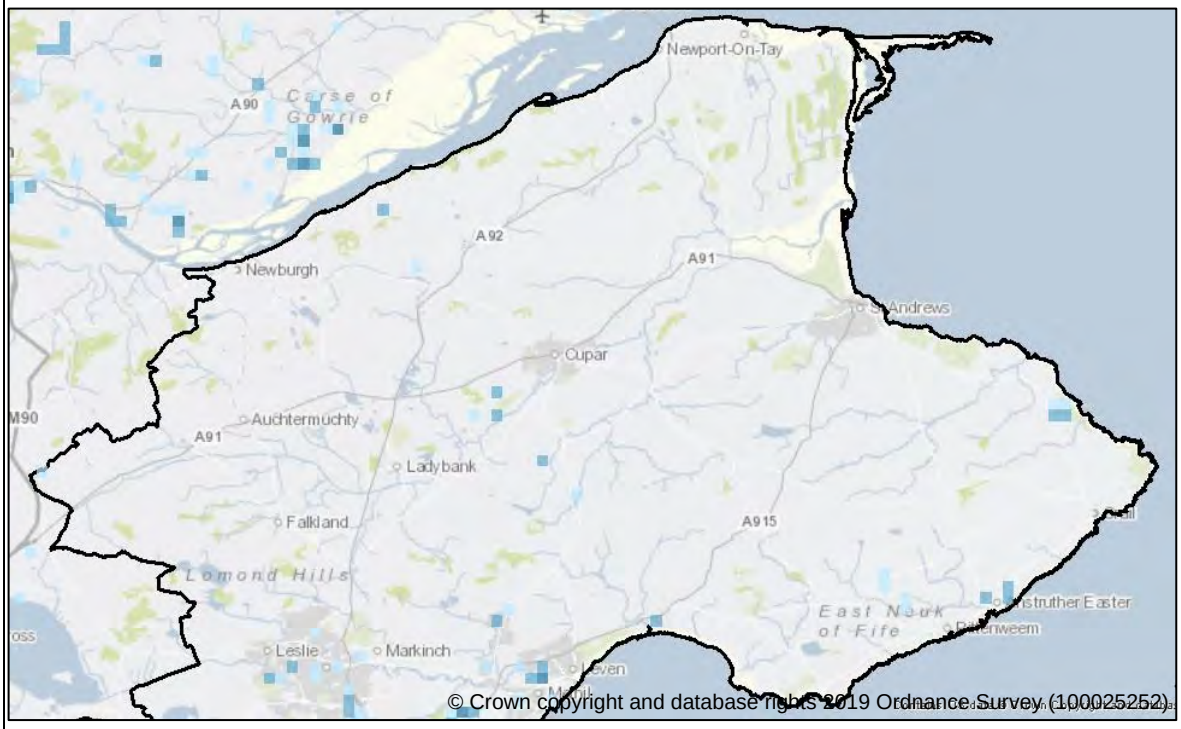


Of 3212 cells that contained buildings within 2016 and/or 2017:-

- **1.7% (n=53) lost buildings, of which:-**
  - **50 lost 1 to 4 buildings**
  - **2 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

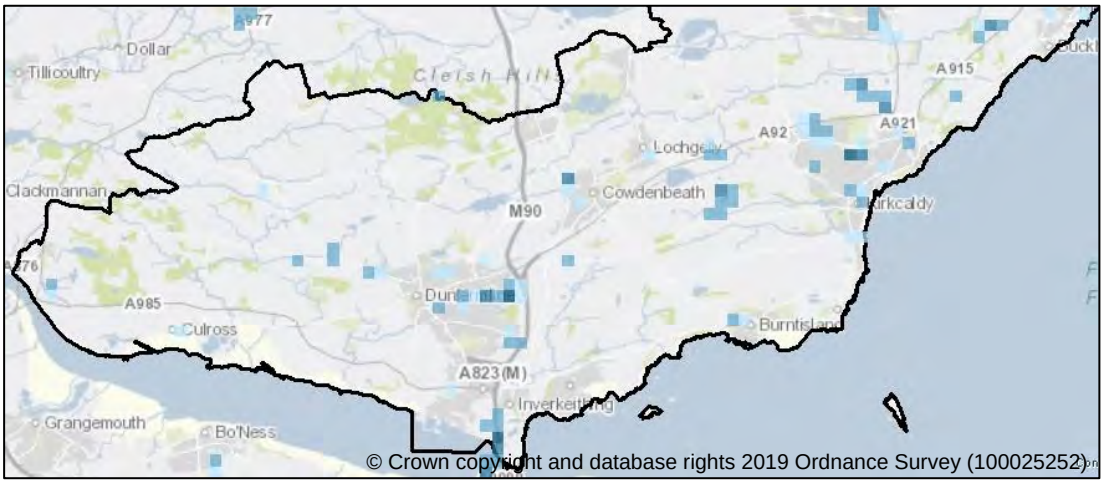


Road gain in Fife (2016 to 2017)

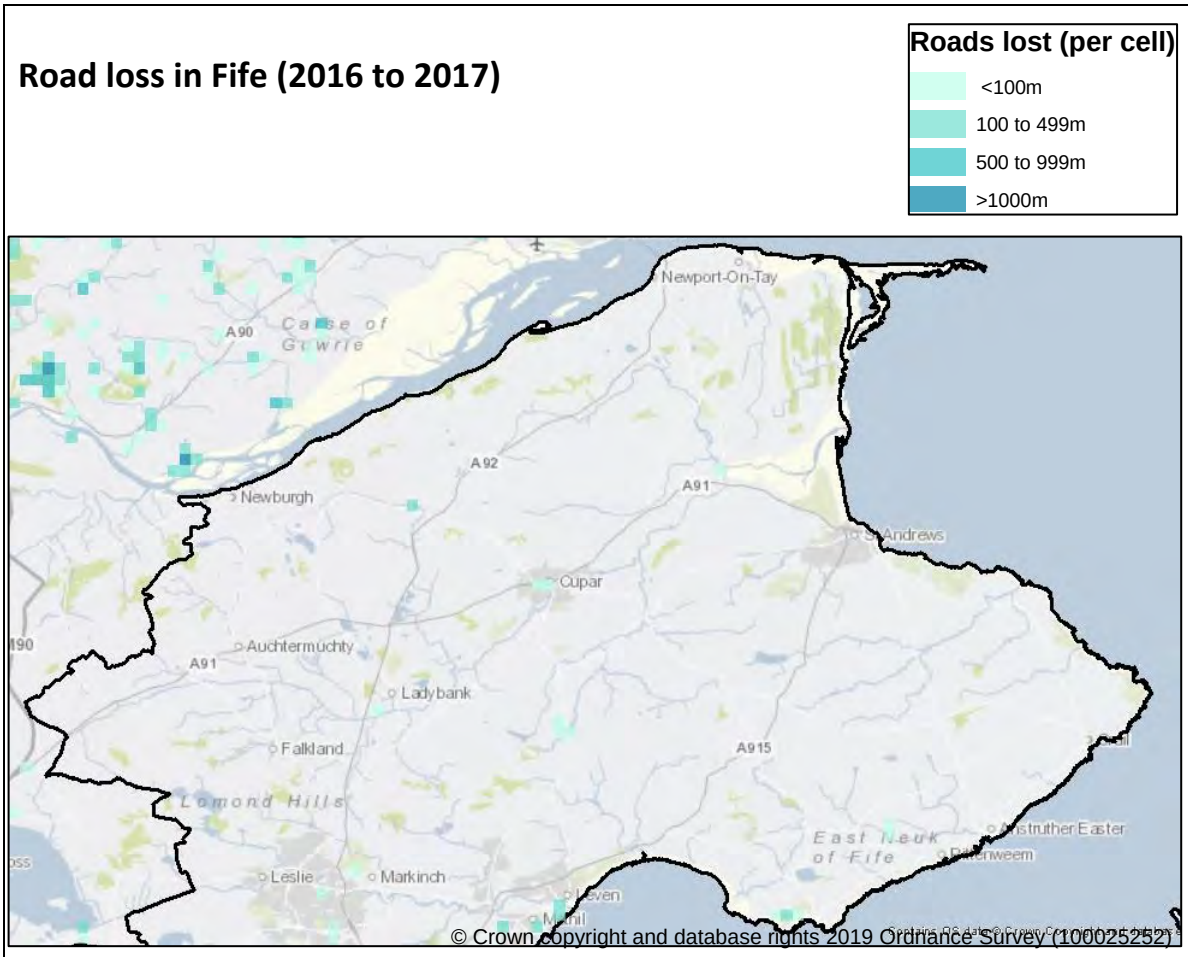


Of 4091 cells that contained roads within 2016 and/or 2017:-

- **2.9% (n=120) gained roads, of which:-**
  - **54 gained 1 to 100m**
  - **54 gained 100 to 499m**
  - **9 gained 500 to 999m**
  - **3 gained 1000m+**

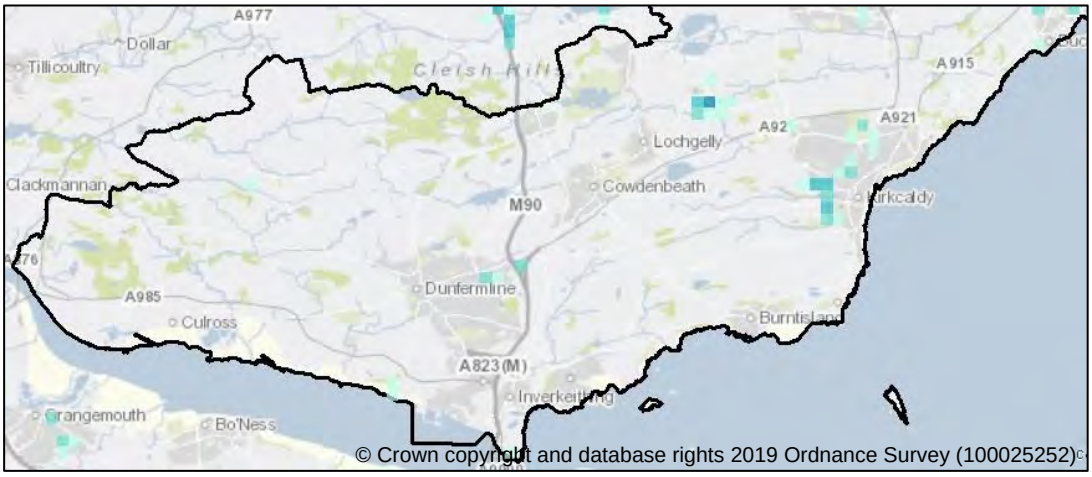


Road loss in Fife (2016 to 2017)

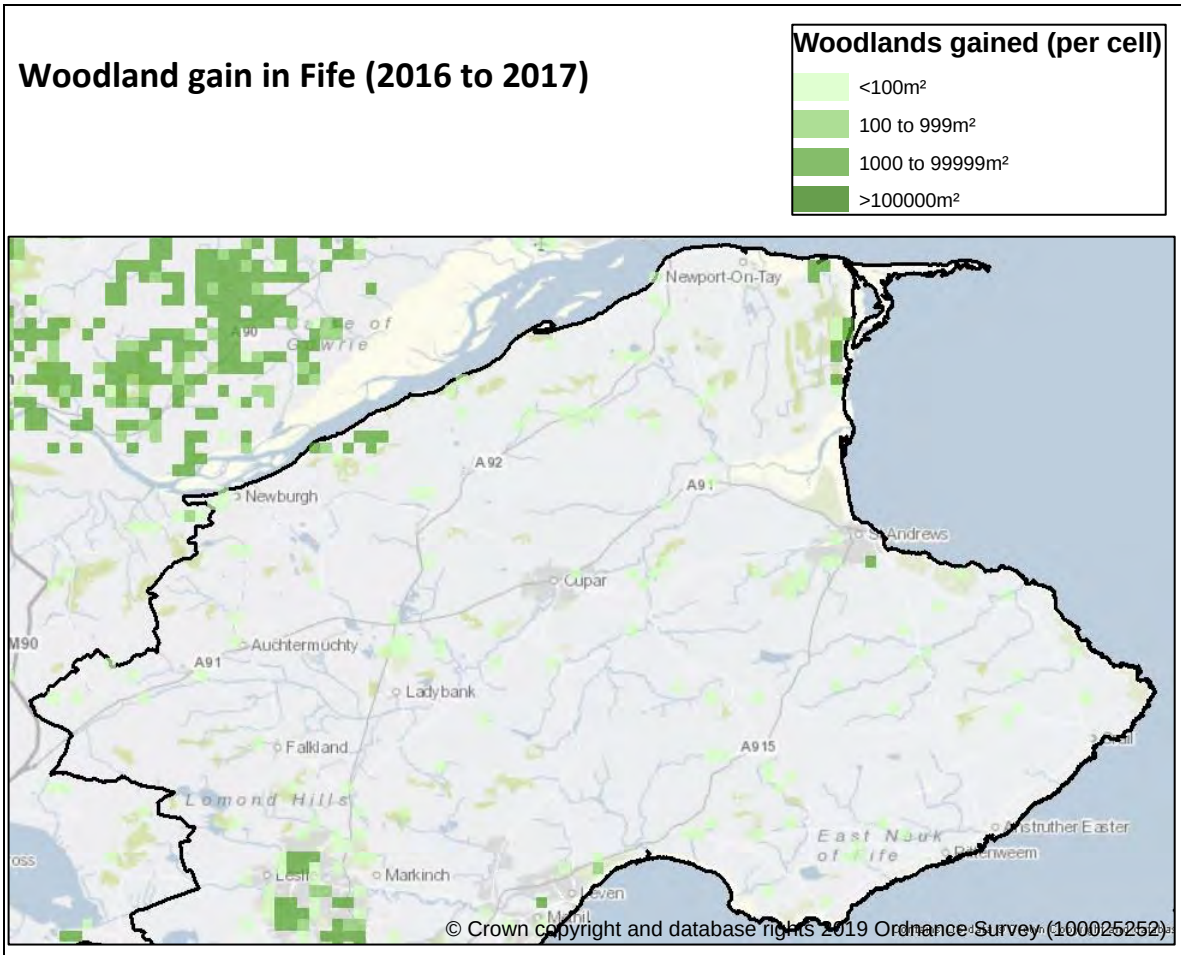


Of 4091 cells that contained roads within 2016 and/or 2017:-

- **1.3% (n=52) lost roads, of which:-**
  - **34 lost 1 to 100m**
  - **13 lost 100 to 499m**
  - **4 lost 500 to 999m**
  - **1 lost 1000m+**

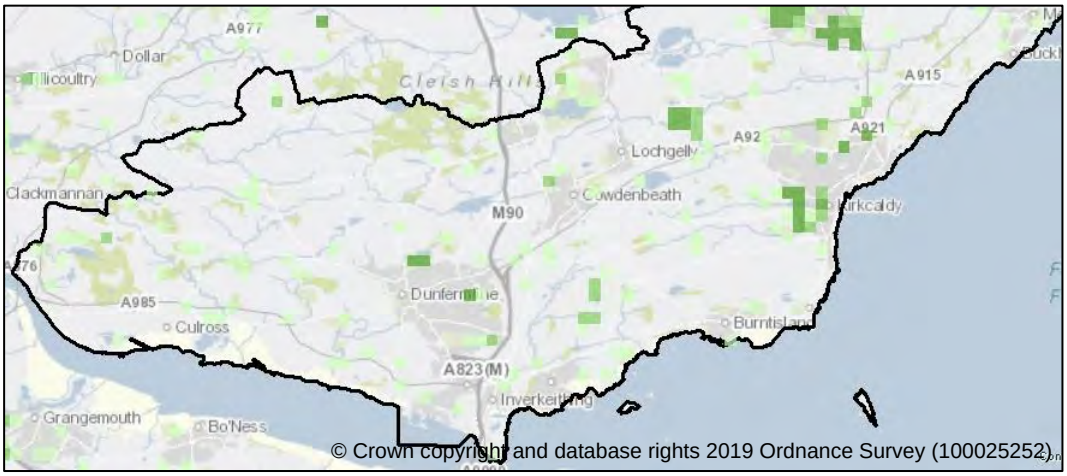


Woodland gain in Fife (2016 to 2017)

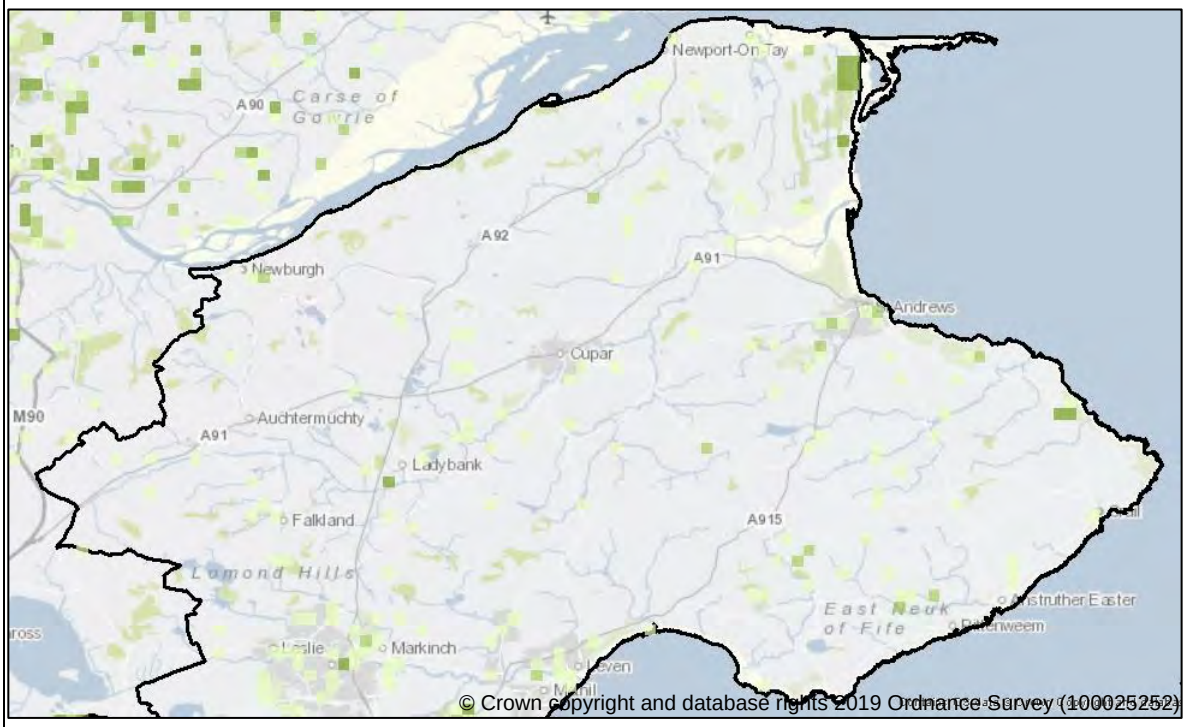


Of 4423 cells that contained woodland within 2016 and/or 2017:-

- **7.3% (n=322) gained woodland, of which:-**
  - **244 gained <100m²**
  - **26 gained 100 to 999m²**
  - **52 gained 1000m²+**

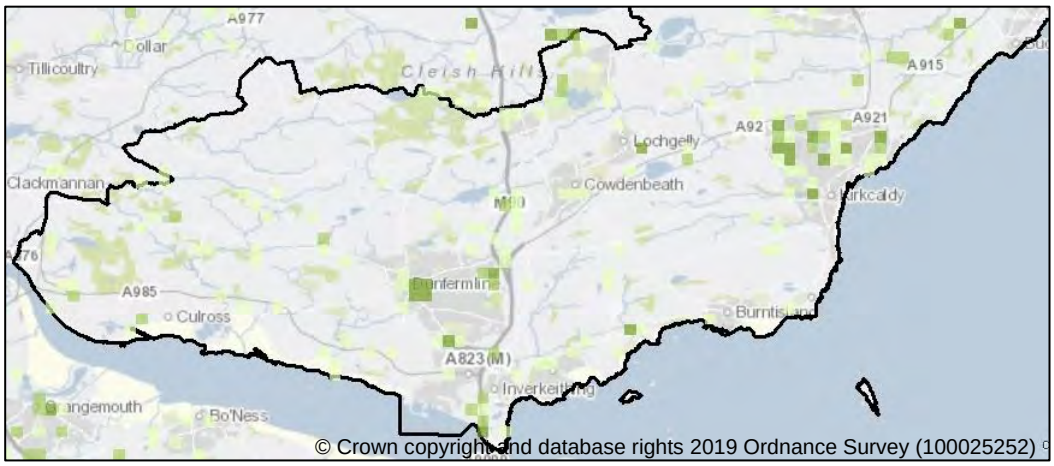


Woodland loss in Fife (2016 to 2017)

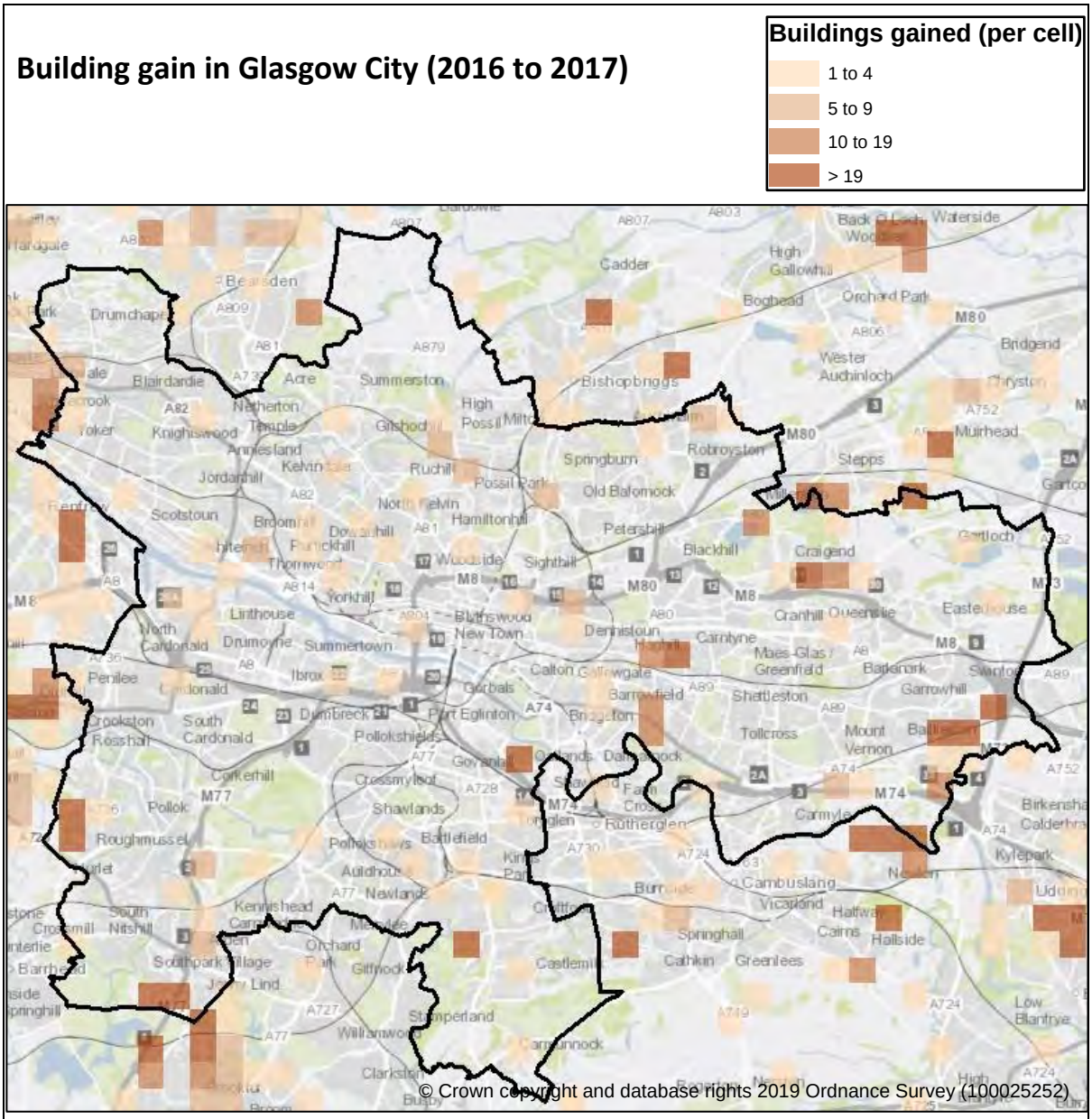


Of 4423 cells that contained woodland within 2016 and/or 2017:-

- **7.3% (n=323) lost woodland, of which:-**
  - **254 lost <100m²**
  - **38 lost 100 to 999m²**
  - **31 lost 1000m²+**



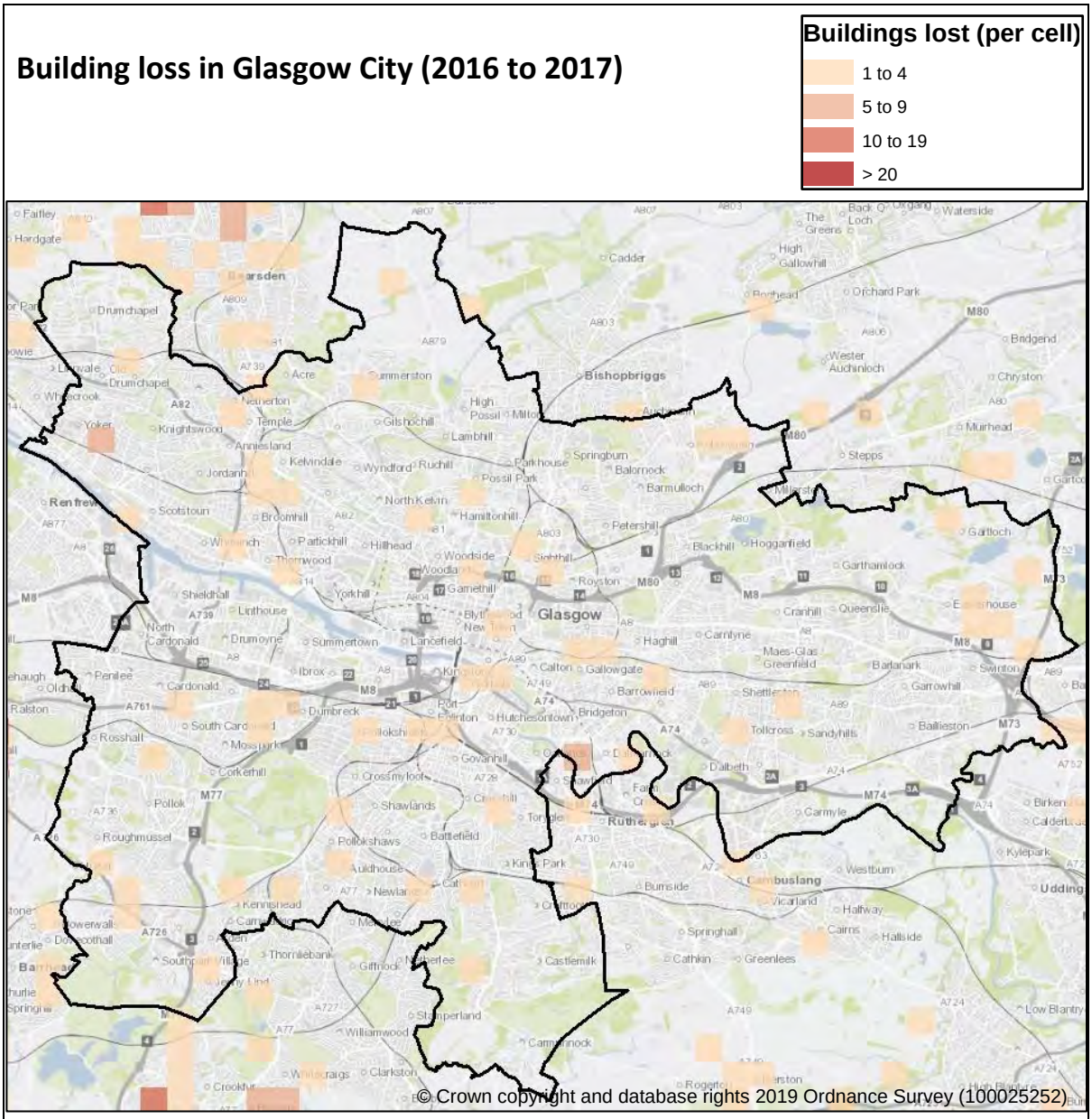
Building gain in Glasgow City (2016 to 2017)



Of 672 cells that contained buildings within 2016 and/or 2017:-

- **12.2% (n=82) gained buildings, of which:-**
  - **52 gained 1 to 4 buildings**
  - **10 gained 5 to 9 buildings**
  - **6 gained 10 to 19 buildings**
  - **14 gained >19 buildings**

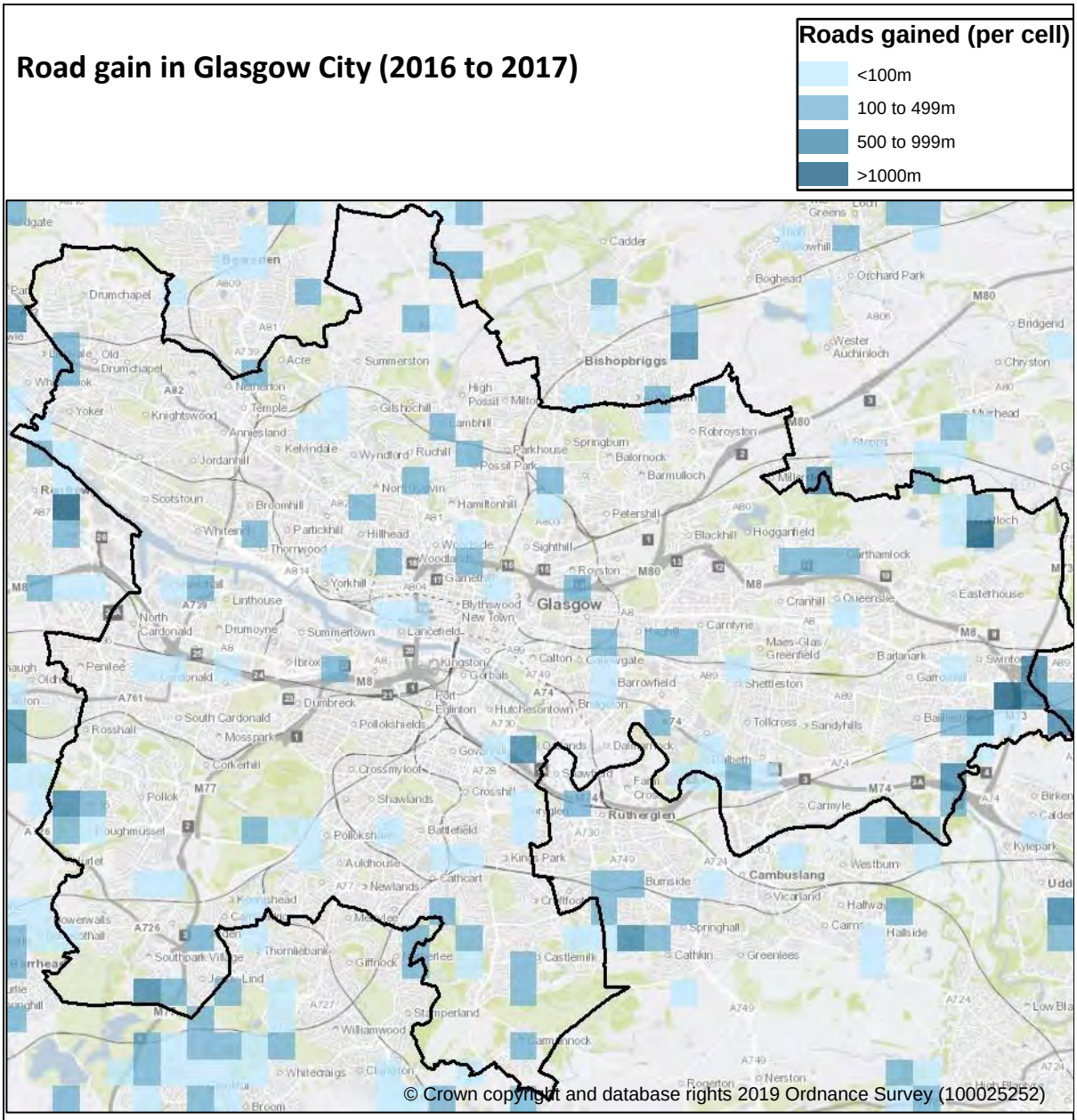
Building loss in Glasgow City (2016 to 2017)



Of 672 cells that contained buildings within 2016 and/or 2017:-

- **8.3% (n=56) lost buildings, of which**
  - **54 lost <5 buildings**
  - **2 lost >5 buildings**

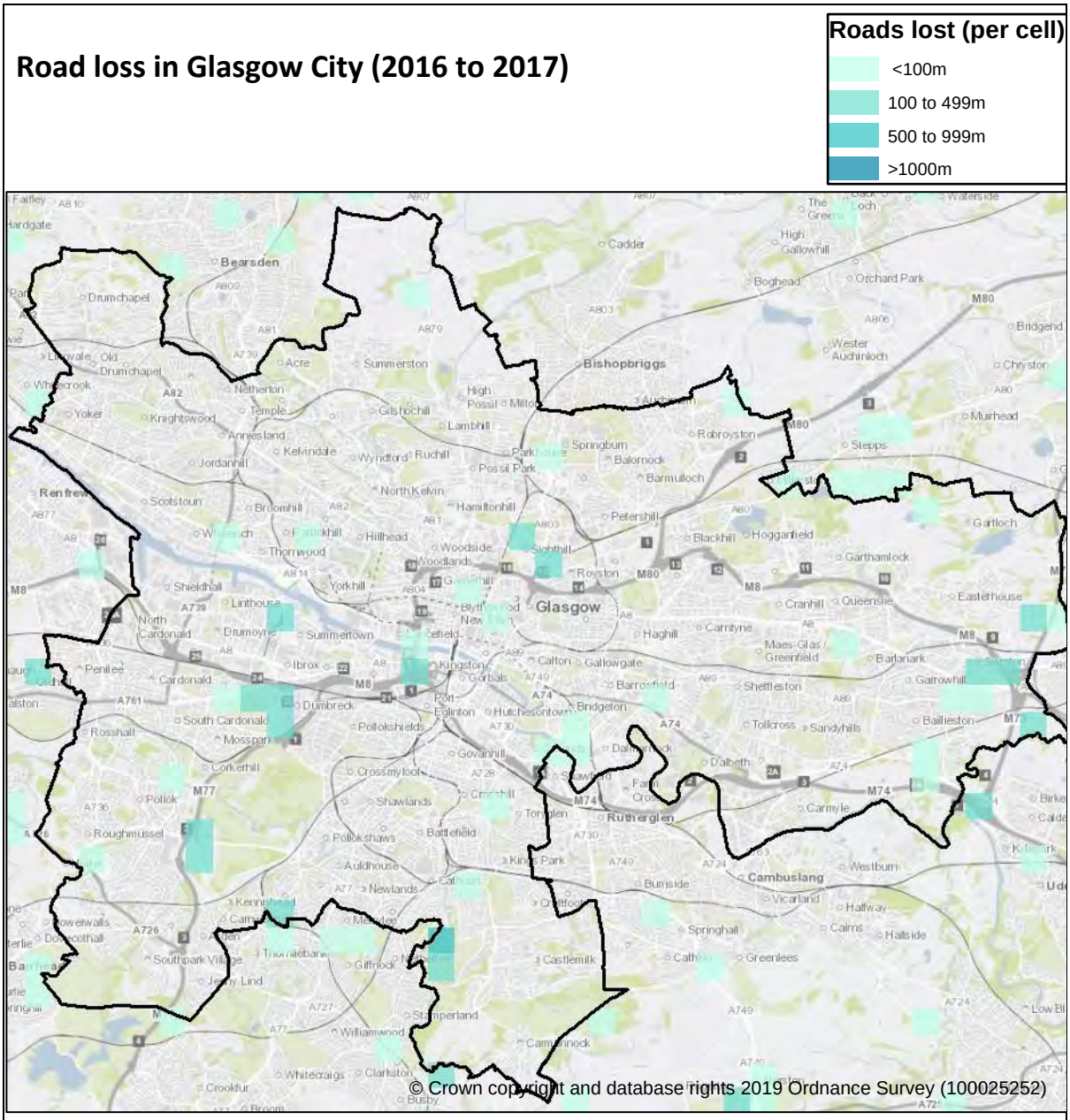
Road gain in Glasgow City (2016 to 2017)



Of 689 cells that contained roads within 2016 and/or 2017:-

- **13.5% (n=93) gained roads/road sections, of which:-**
  - **44 gained 1 to 100m**
  - **39 gained 100 to 499m**
  - **8 gained 500 to 999m**
  - **2 gained 1000m+**

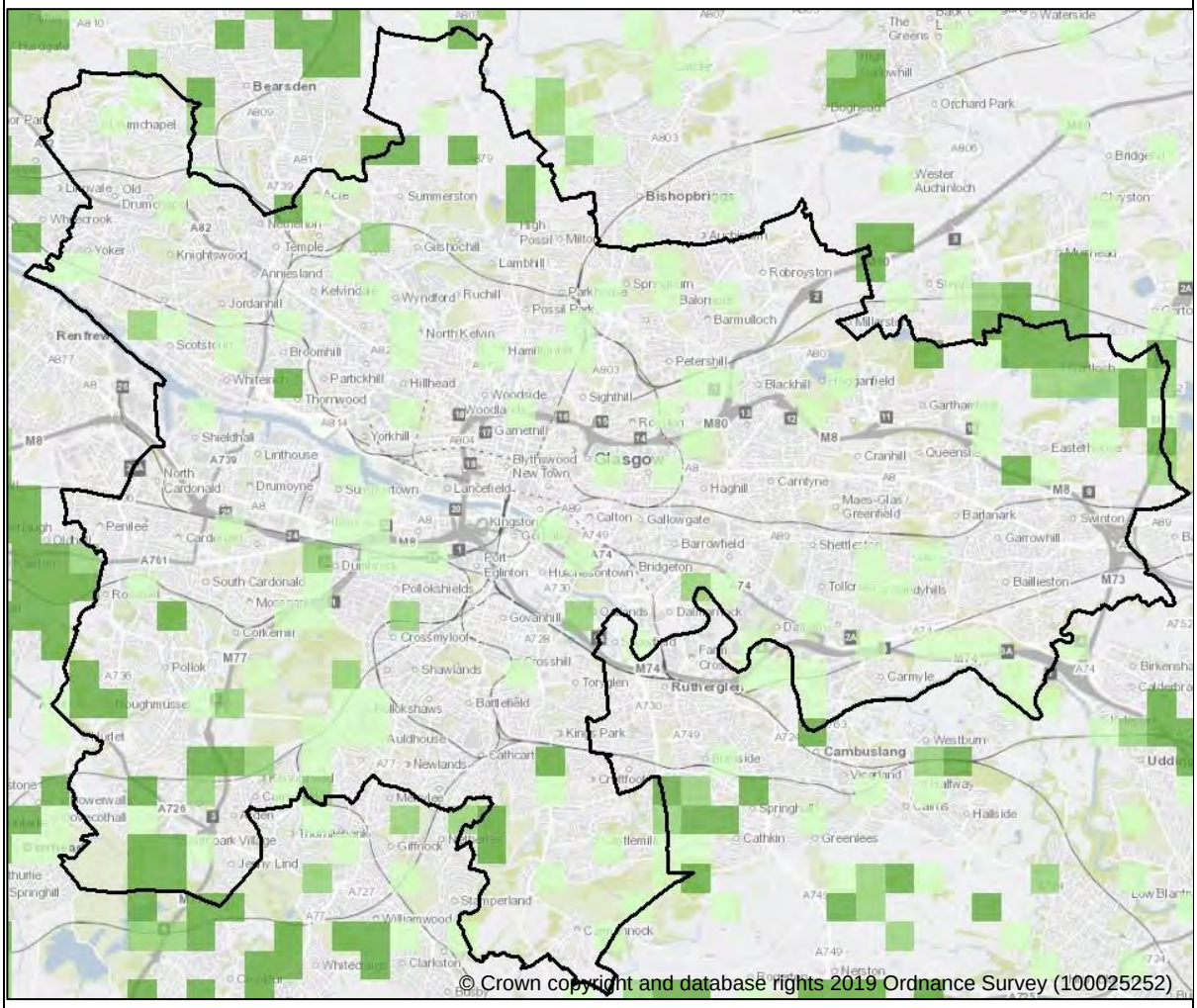
Road loss in Glasgow City (2016 to 2017)



Of 689 cells that contained roads within 2016 and/or 2017:-

- **5.8% (n=40) lost roads, of which:-**
  - **24 lost 1 to 100m**
  - **15 lost 100 to 499m**
  - **1 lost 500 to 999m**

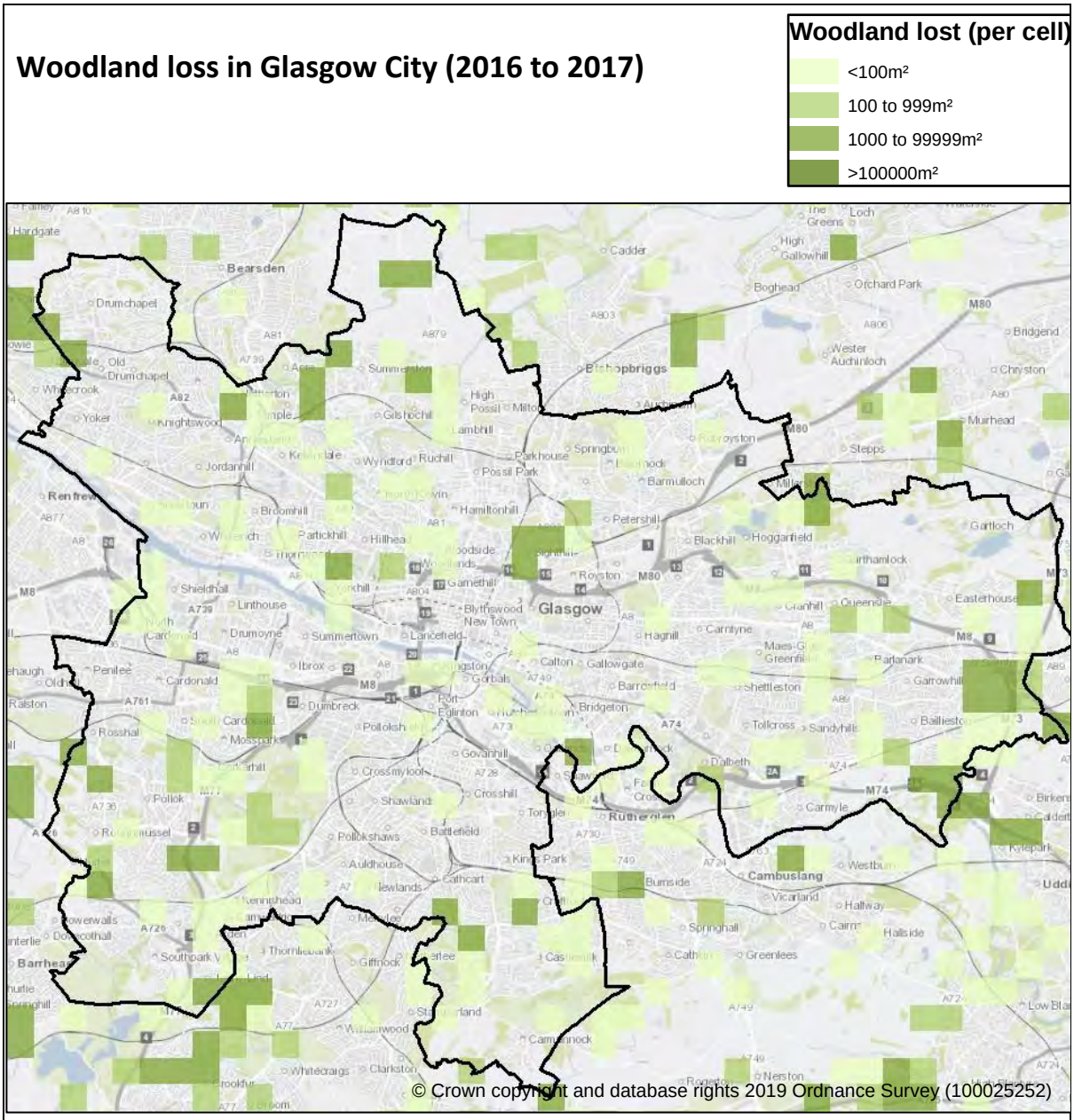
Woodland gain in Glasgow City (2016 to 2017)



Of 626 cells that contained woodland within 2016 and/or 2017:-

- **22.0% (n=138) gained woodland, of which:-**
  - **92 gained <100m²**
  - **16 gained 100 to 999m²**
  - **30 gained 1000m²+**

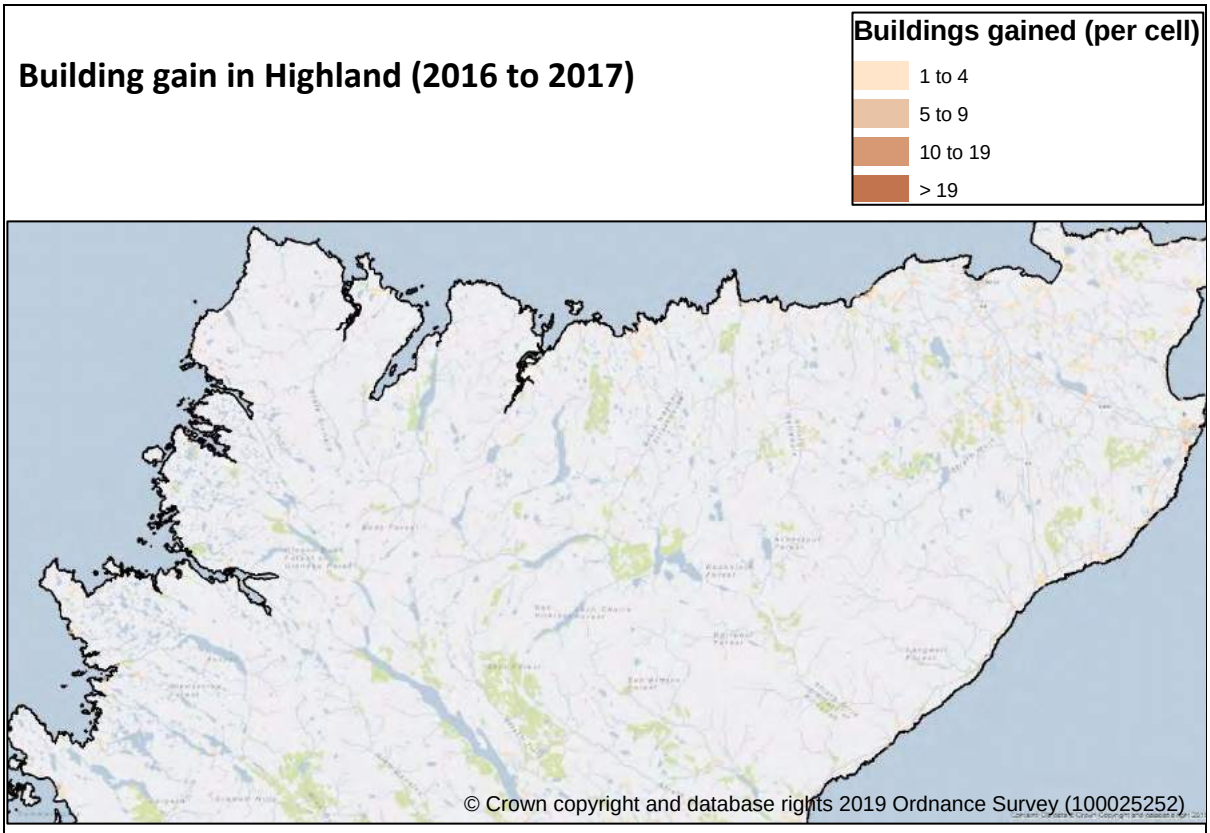
Woodland loss in Glasgow City (2016 to 2017)



Of 626 cells that contained woodland within 2016 and/or 2017:-

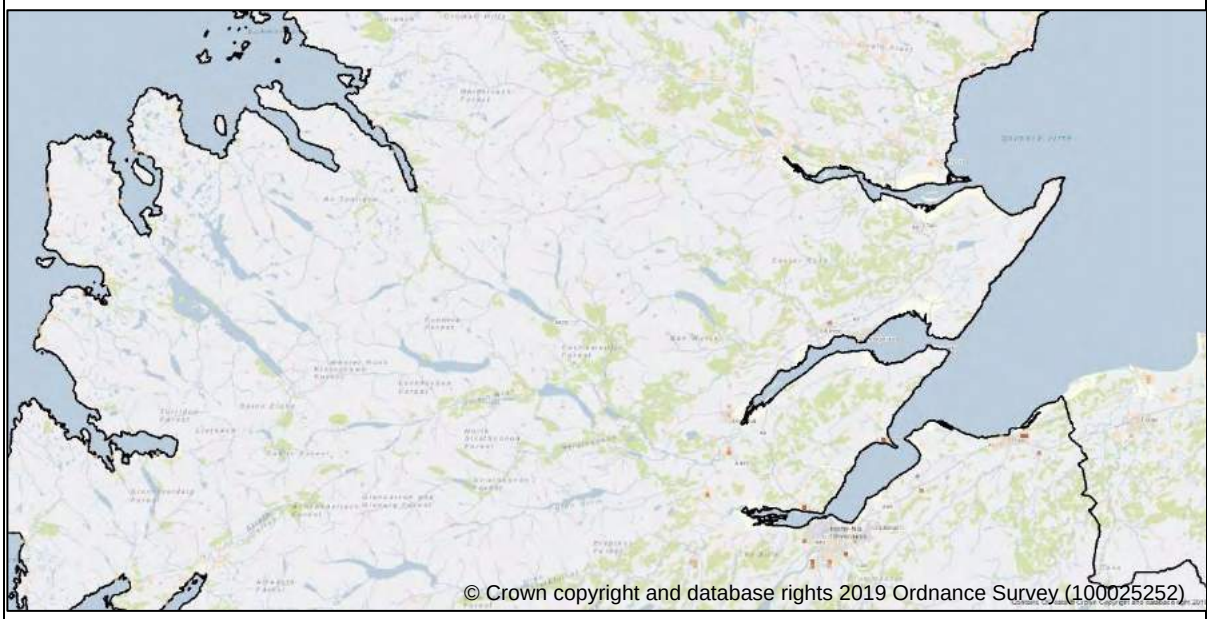
- **24.3% (n=152) lost woodland, of which**
  - **103 lost <100m²**
  - **15 lost 100 to 999m²**
  - **34 lost 1000m²+**

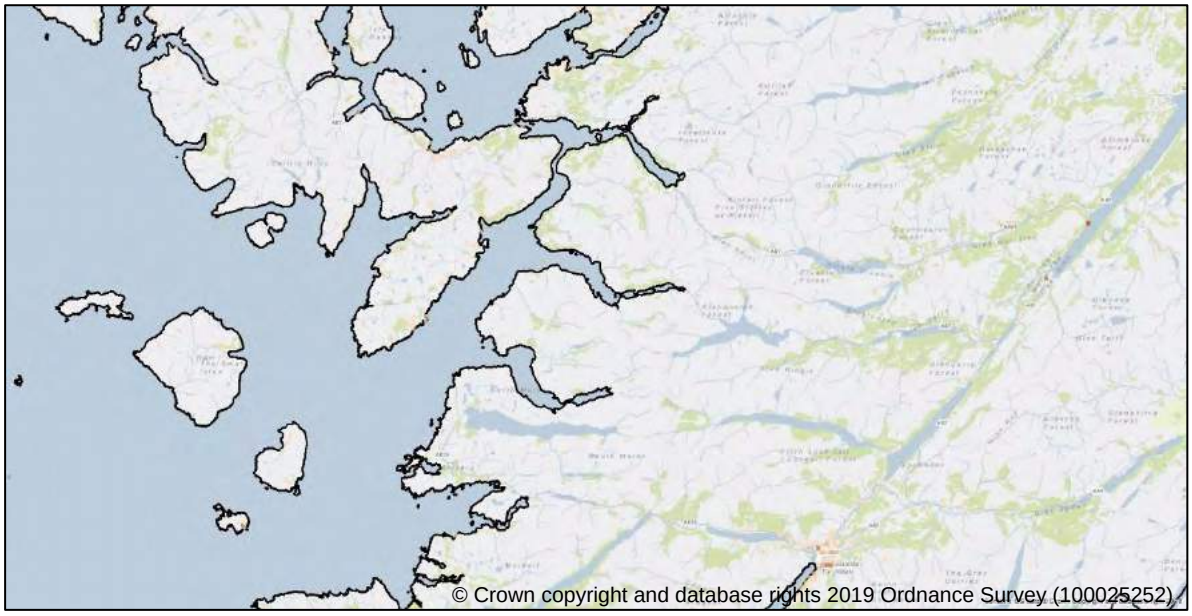
Building gain in Highland (2016 to 2017)



Of 12256 cells that contained buildings within 2016 and/or 2017:-

- **7.6% (n=932) gained buildings, of which:-**
  - **887 gained 1 to 4 buildings**
  - **25 gained 5 to 9 buildings**
  - **12 gained 10 to 19 buildings**
  - **8 gained >19 buildings**

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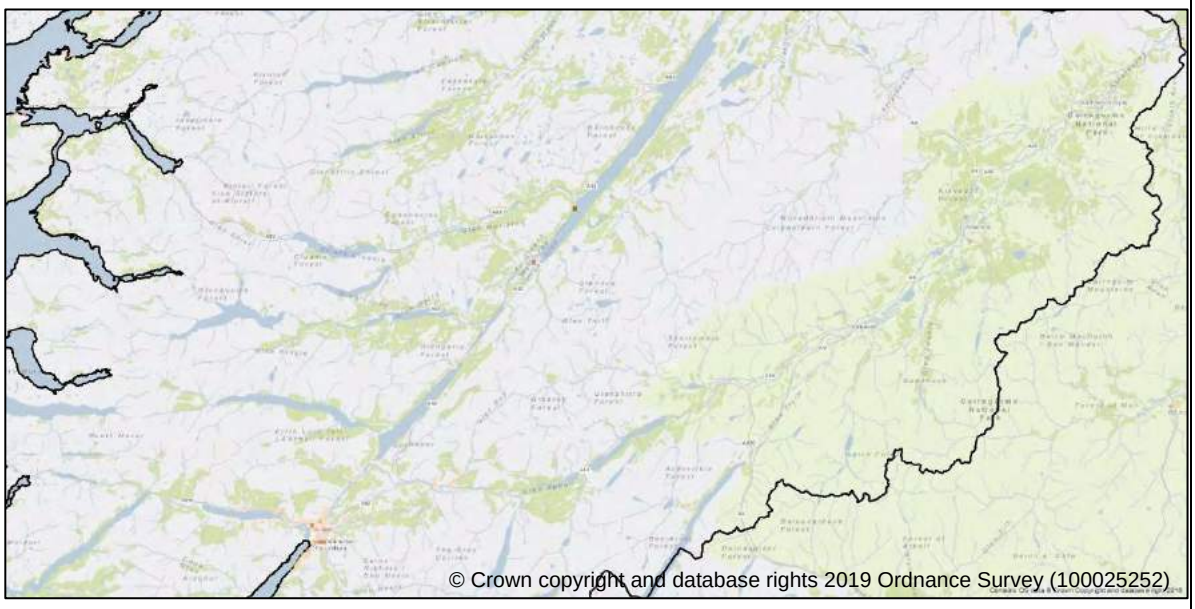
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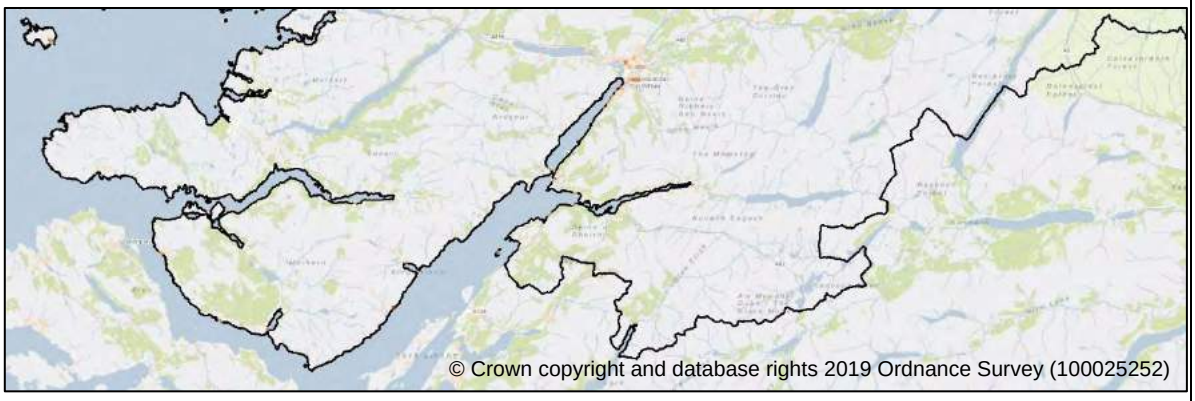
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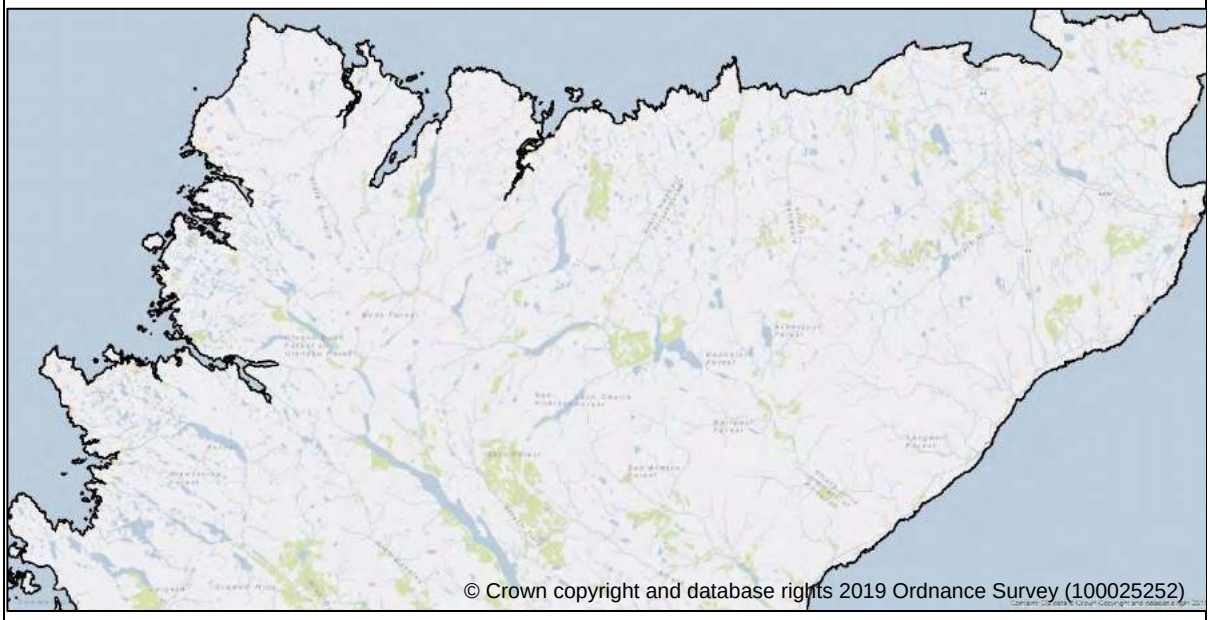
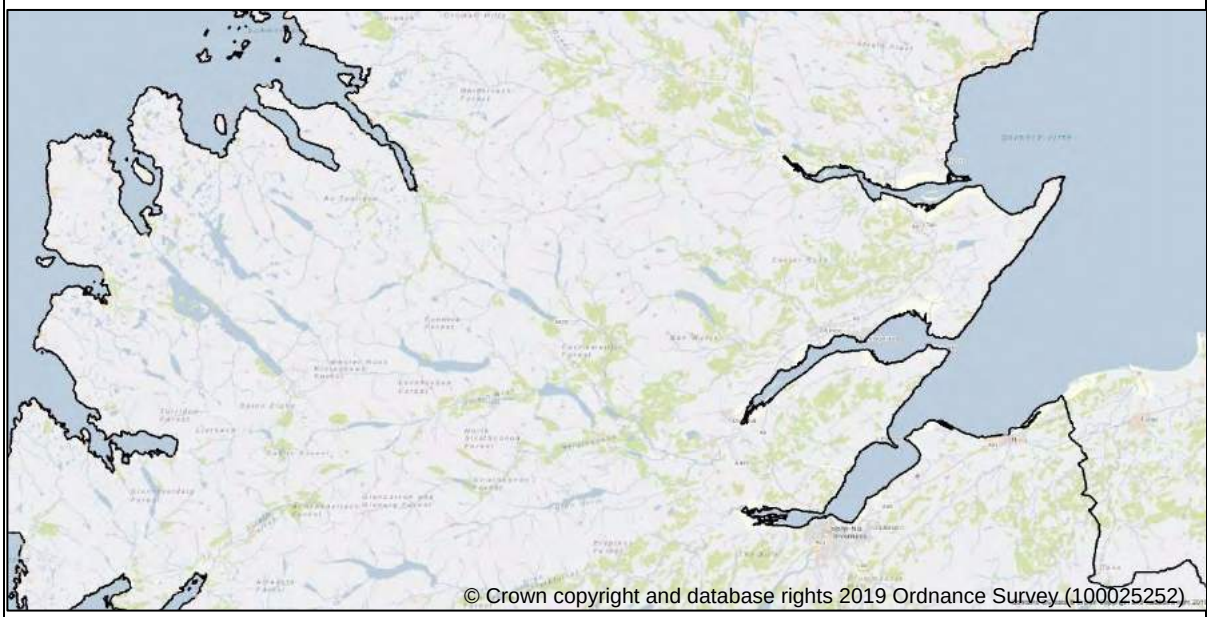
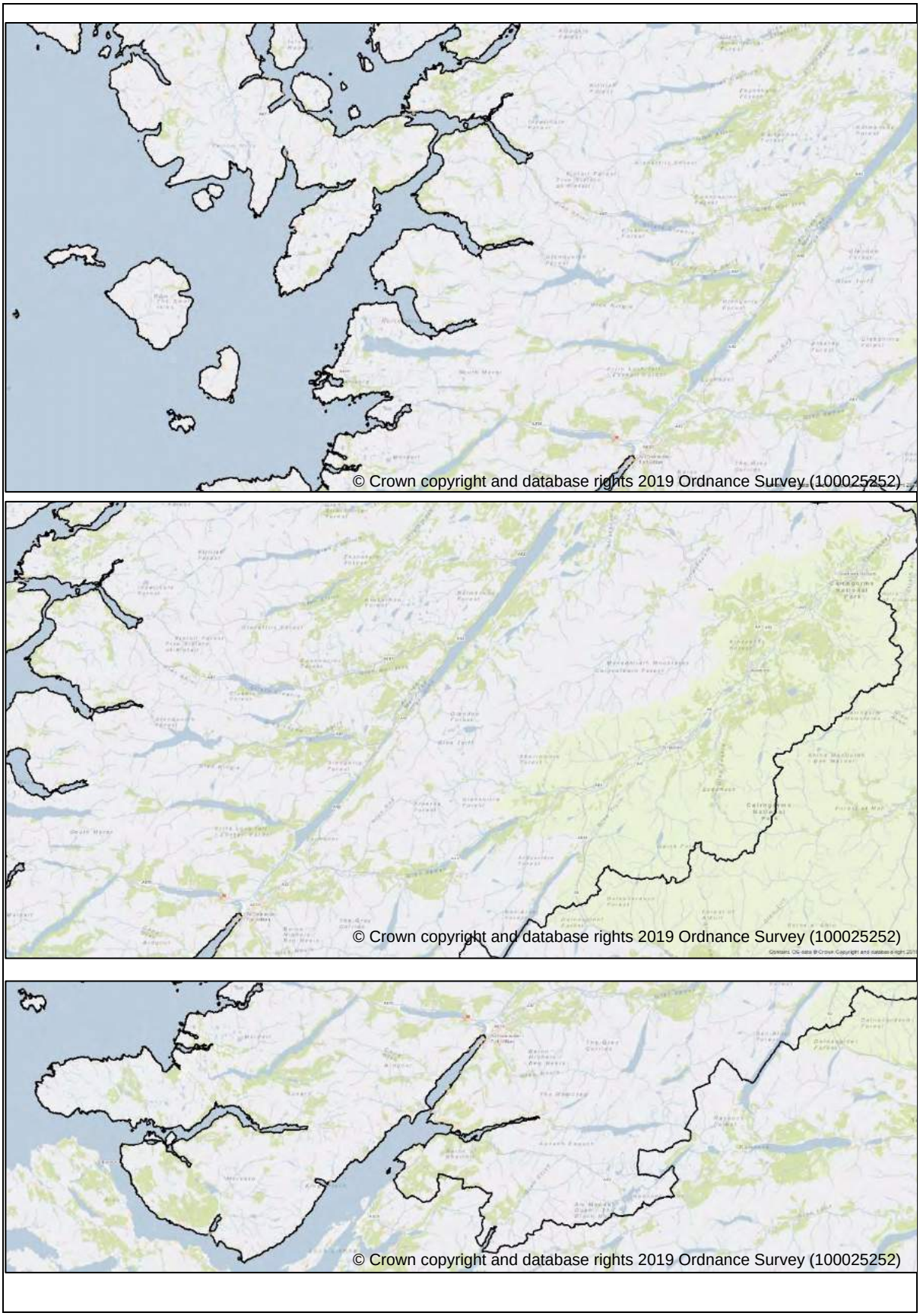
Building loss in Highland (2016 to 2017)



Of 12256 cells that contained buildings within 2016 and/or 2017:-

- **3.5% (n=429) lost buildings, of which:-**
  - **425 lost 1 to 4 buildings**
  - **3 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

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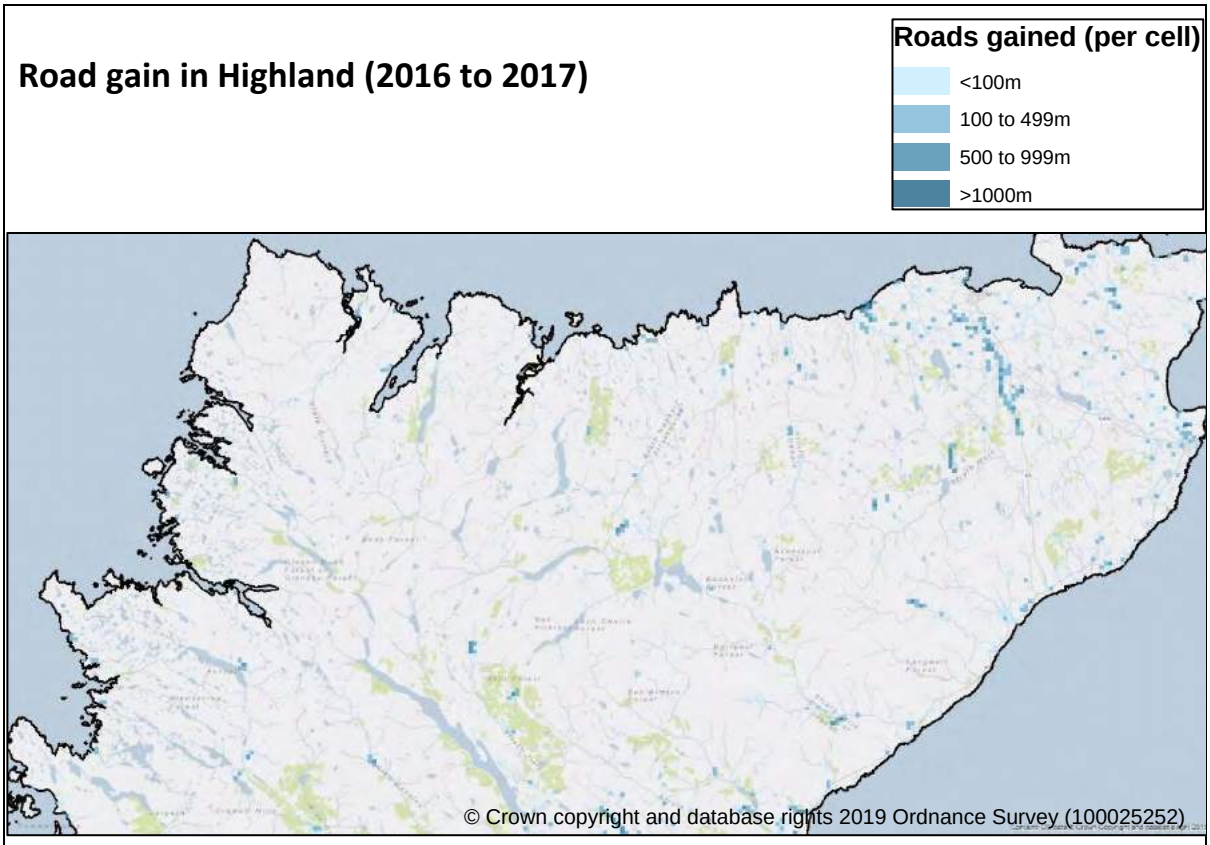
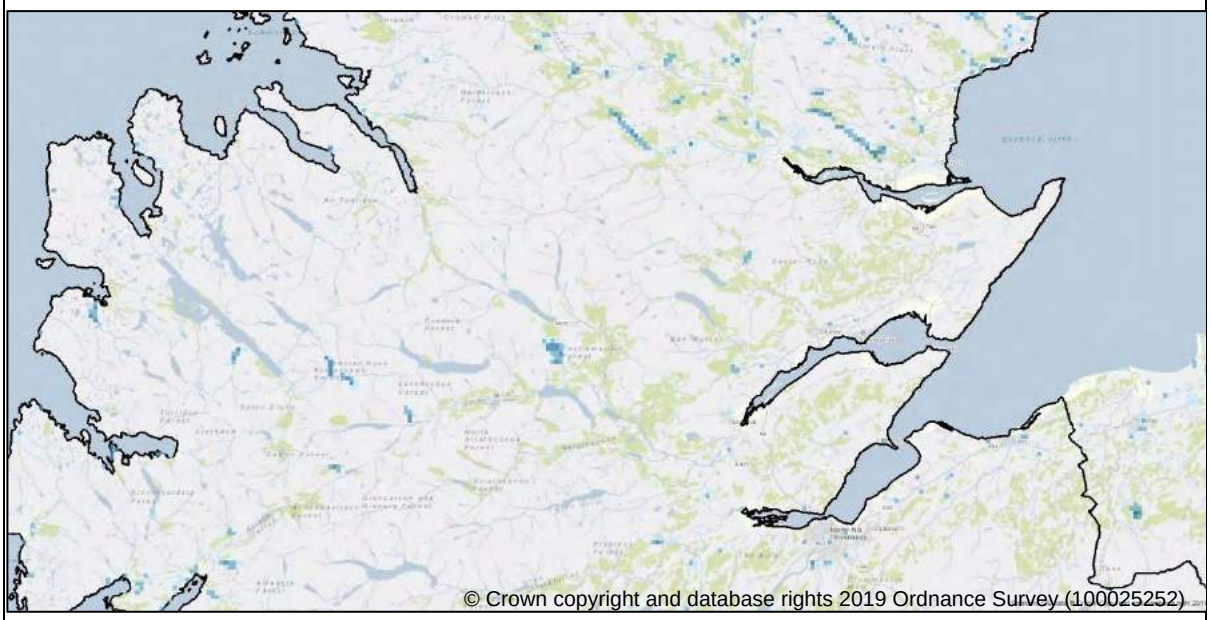
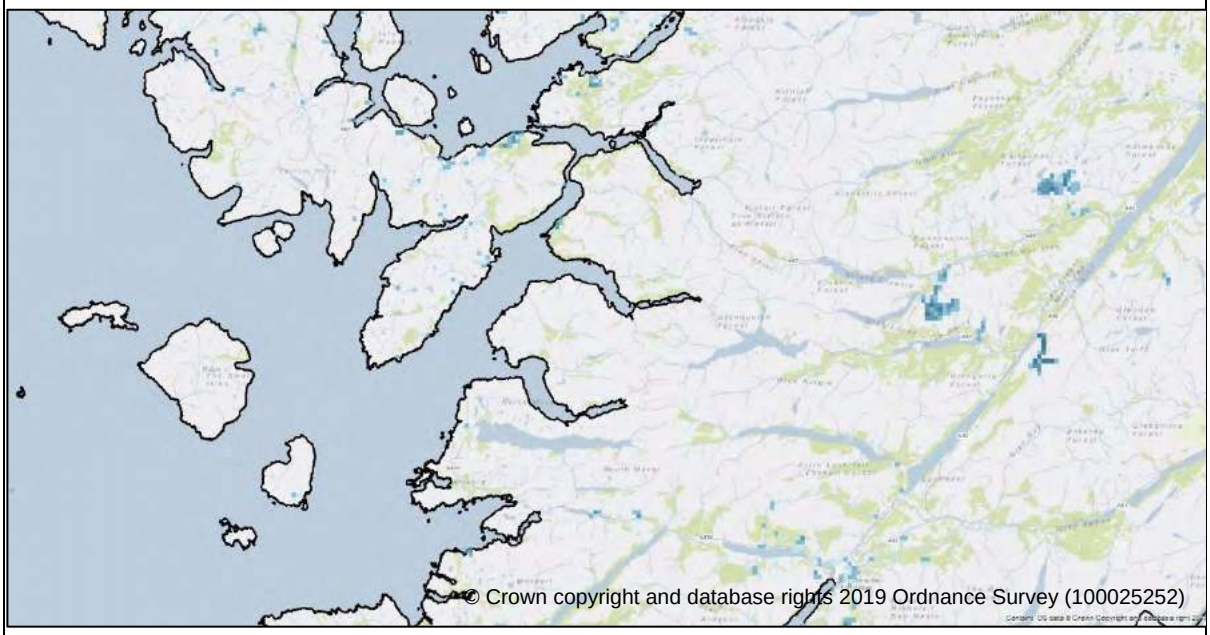
Road gain in Highland (2016 to 2017)



Of 26045 cells that contained roads within 2016 and/or 2017:-

- **6.4% (n=1672) gained roads, of which:-**
  - **731 gained 1 to 100m**
  - **719 gained 100 to 499m**
  - **203 gained 500 to 999m**
  - **19 gained 1000m+**

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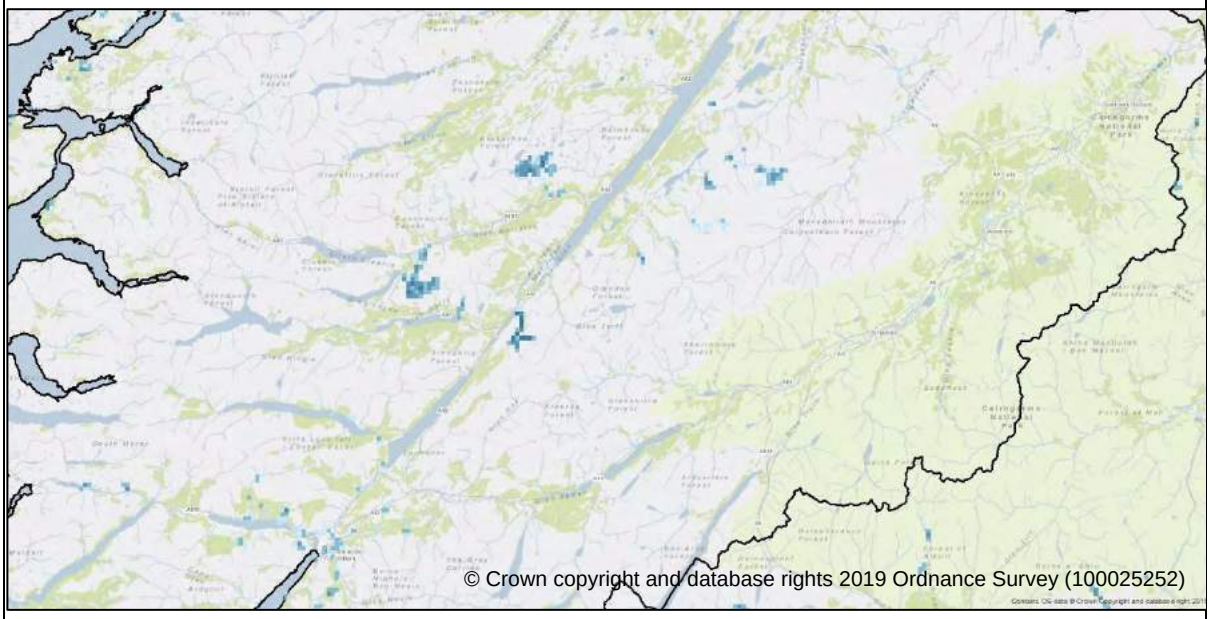
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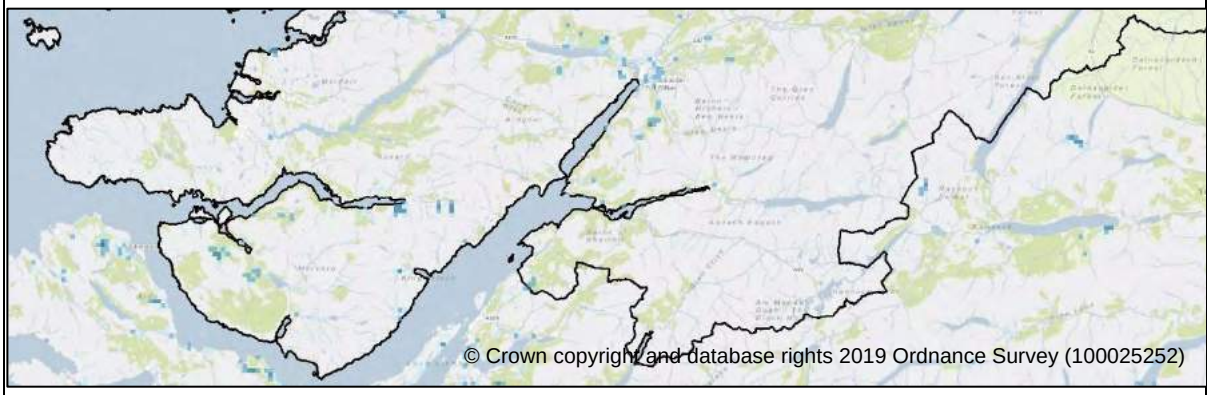
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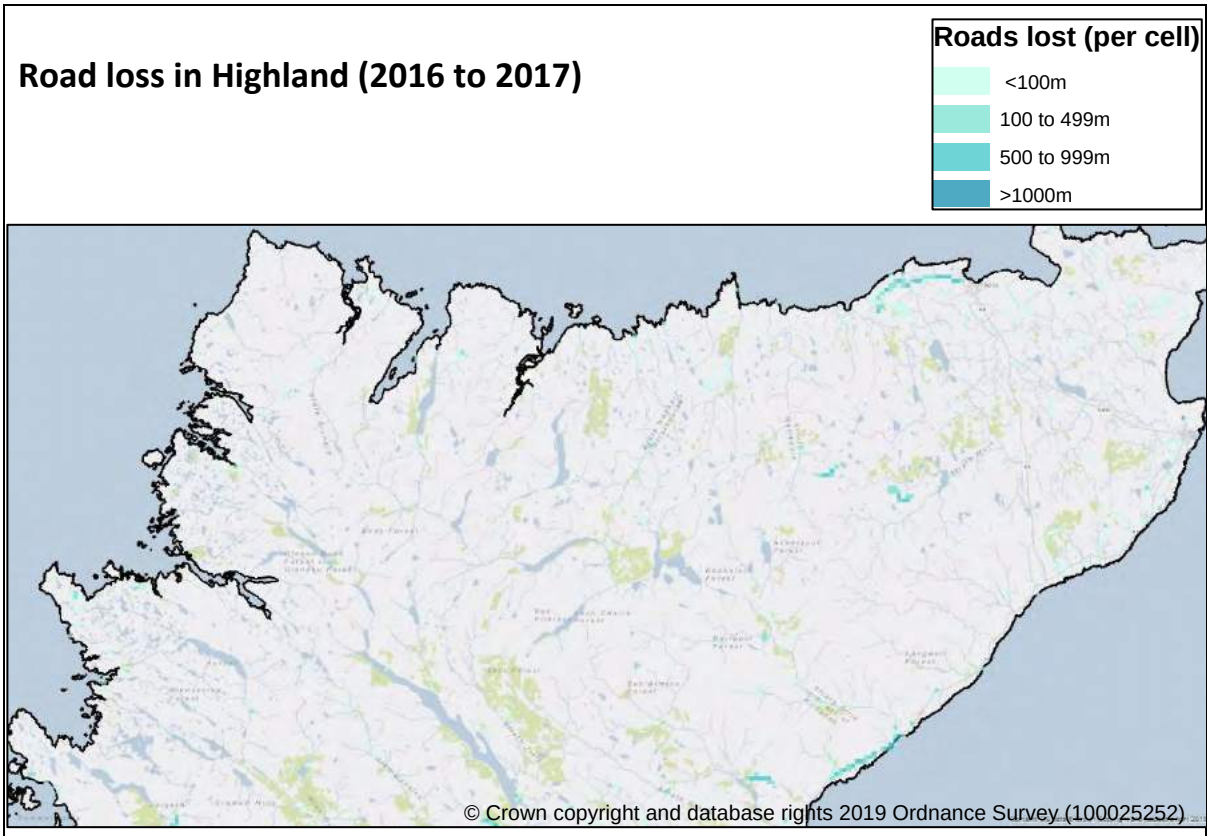
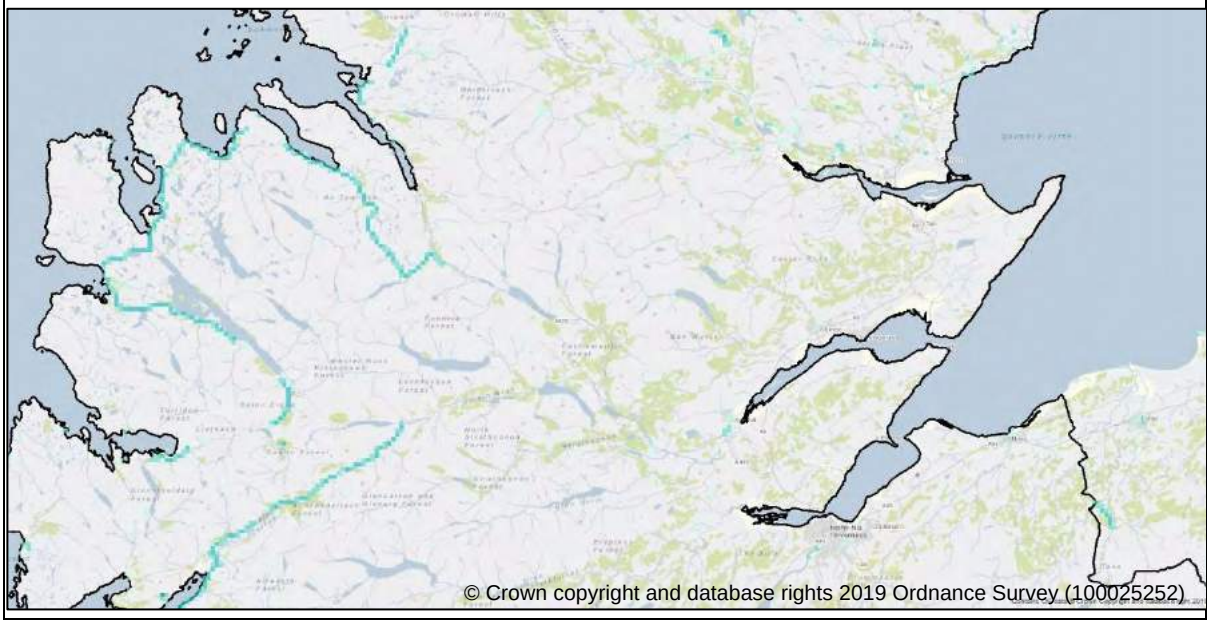
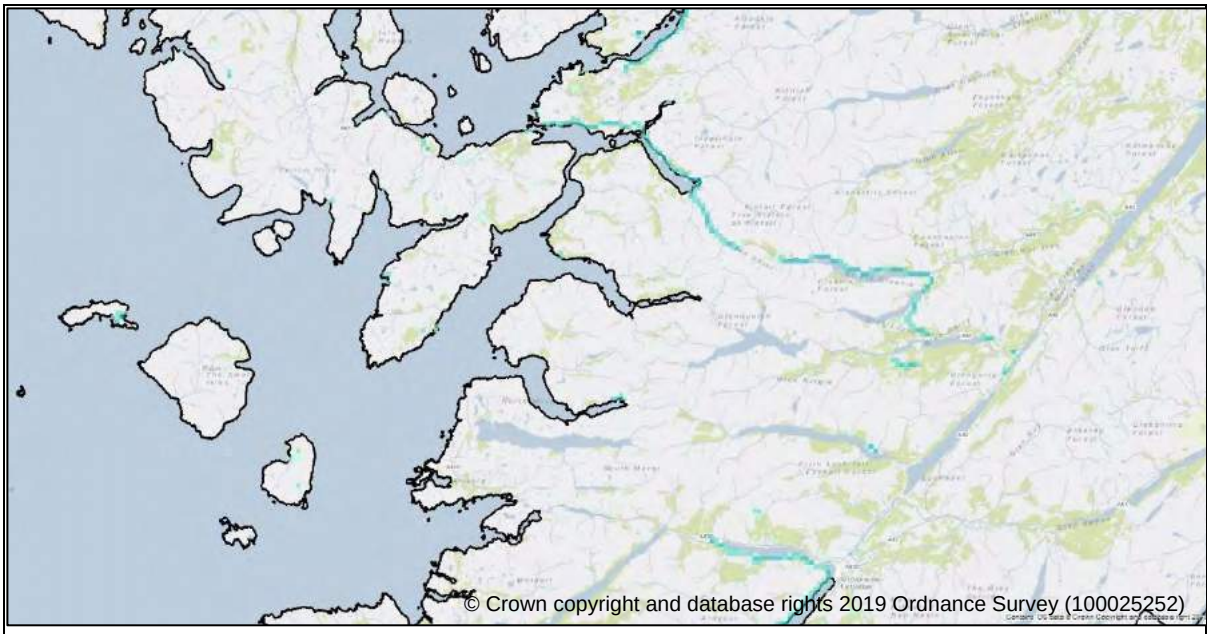
Road loss in Highland (2016 to 2017)



Of cells that contained roads within 2016 and/or 2017:-

- **5.7% (n=1496) lost roads, of which:-**
  - **675 lost 1 to 100m**
  - **482 lost 100 to 499m**
  - **337 lost 500 to 999m**
  - **2 lost 1000m+**

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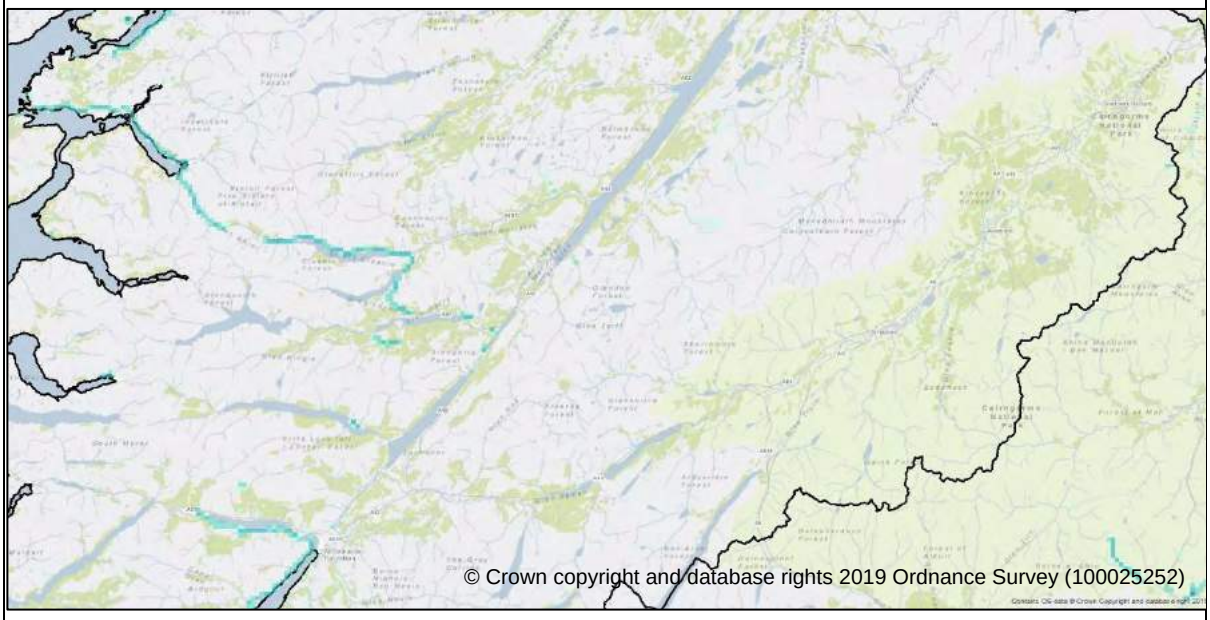
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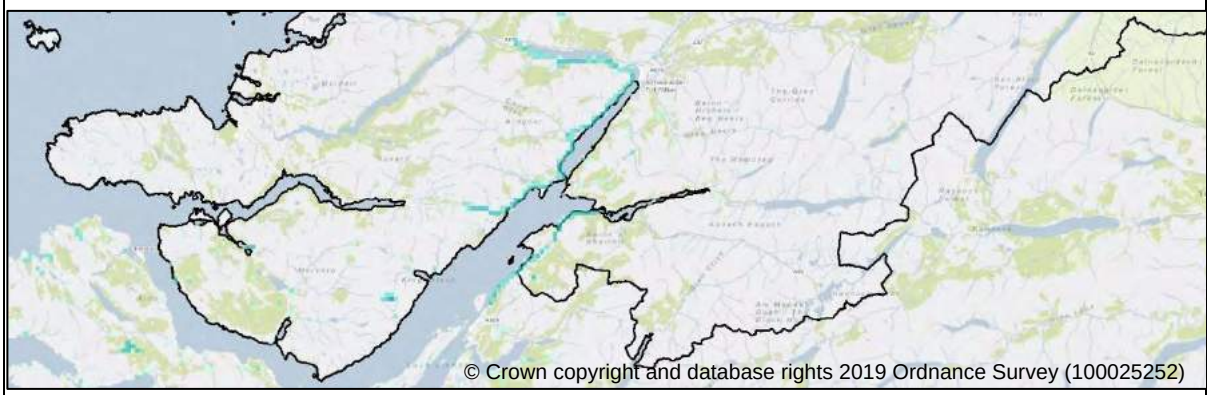
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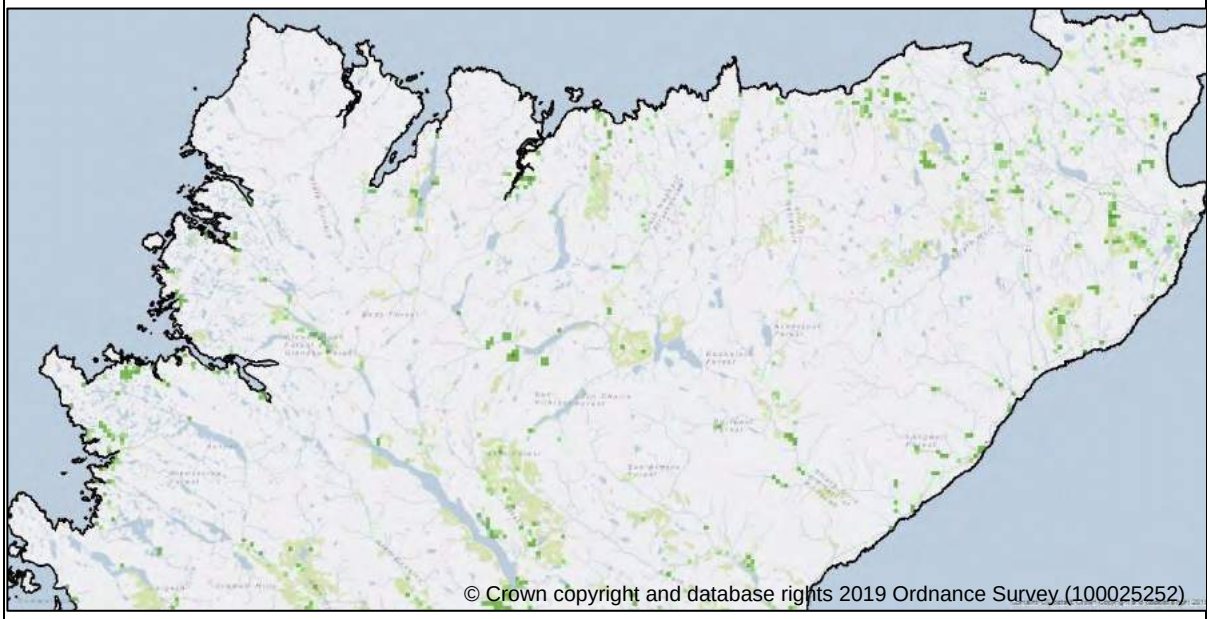
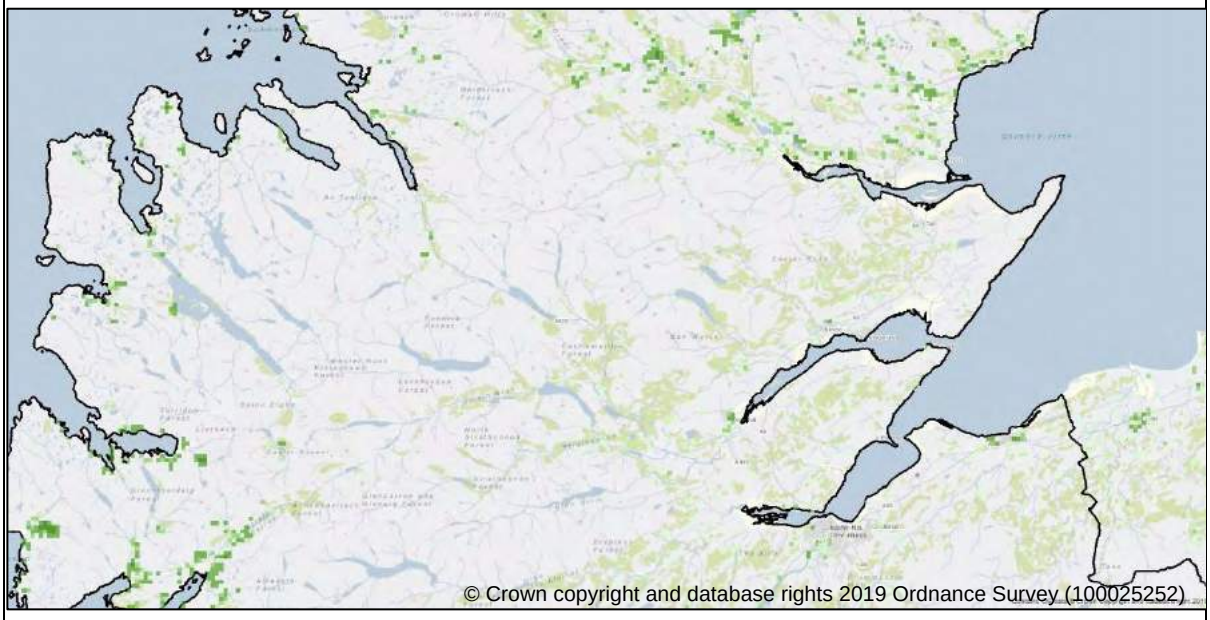
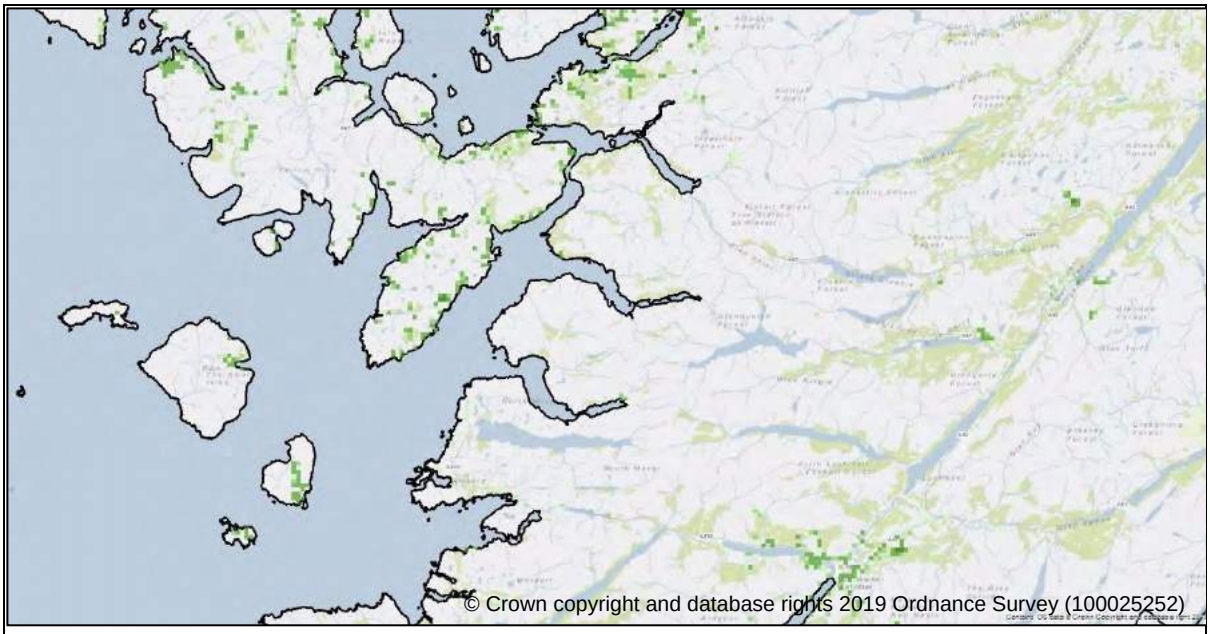
Woodland gain in Highland (2016 to 2017)



Of 39460 cells that contained woodland within 2016 and/or 2017:-

- **7.5% (n=2962) gained woodland, of which:-**
  - **966 gained <100m²**
  - **801 gained 100 to 999m²**
  - **1195 gained 1000m²+**

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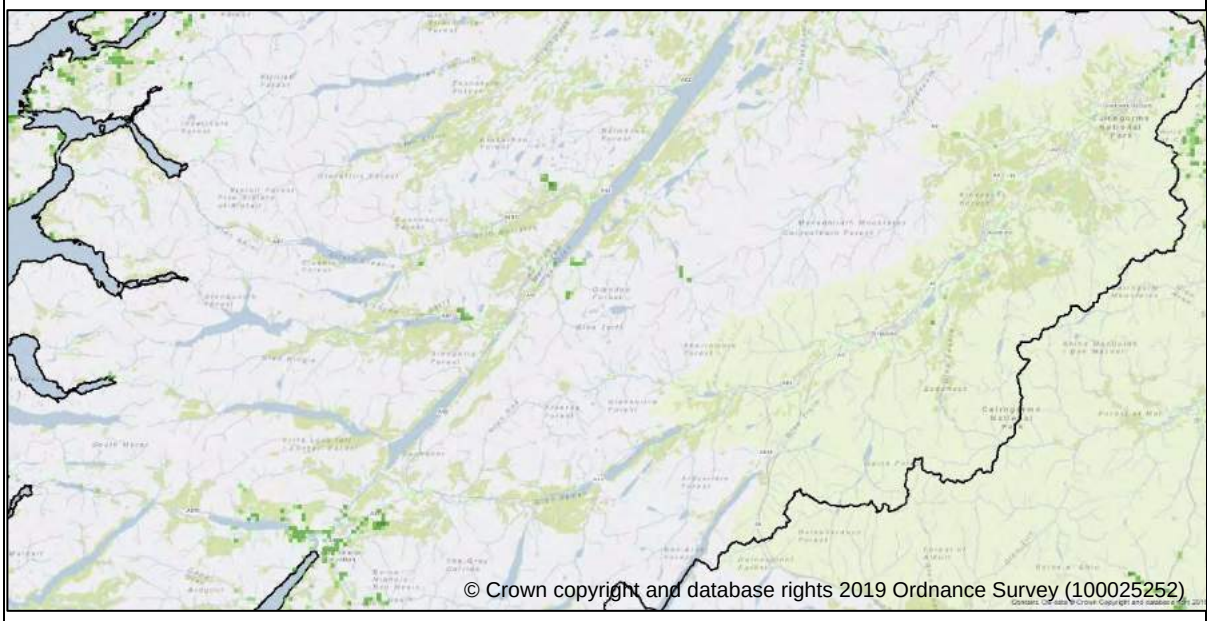
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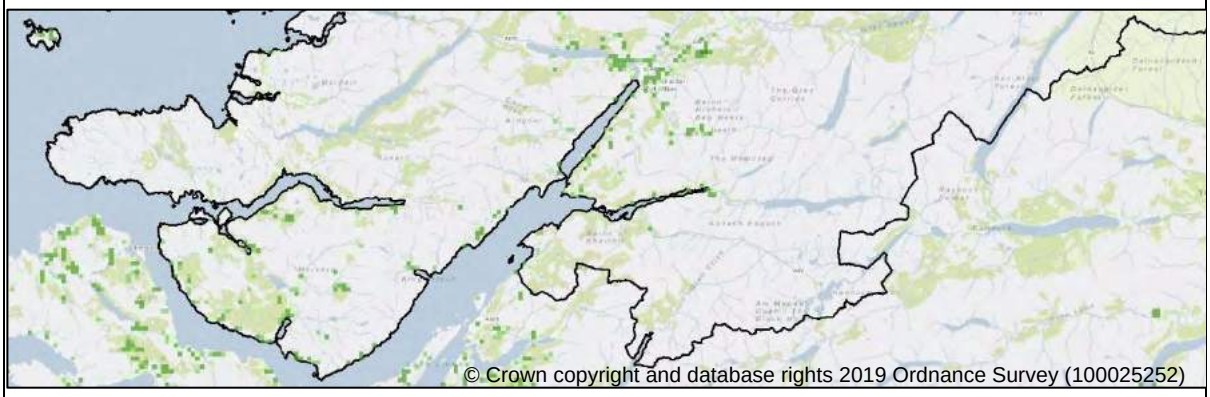
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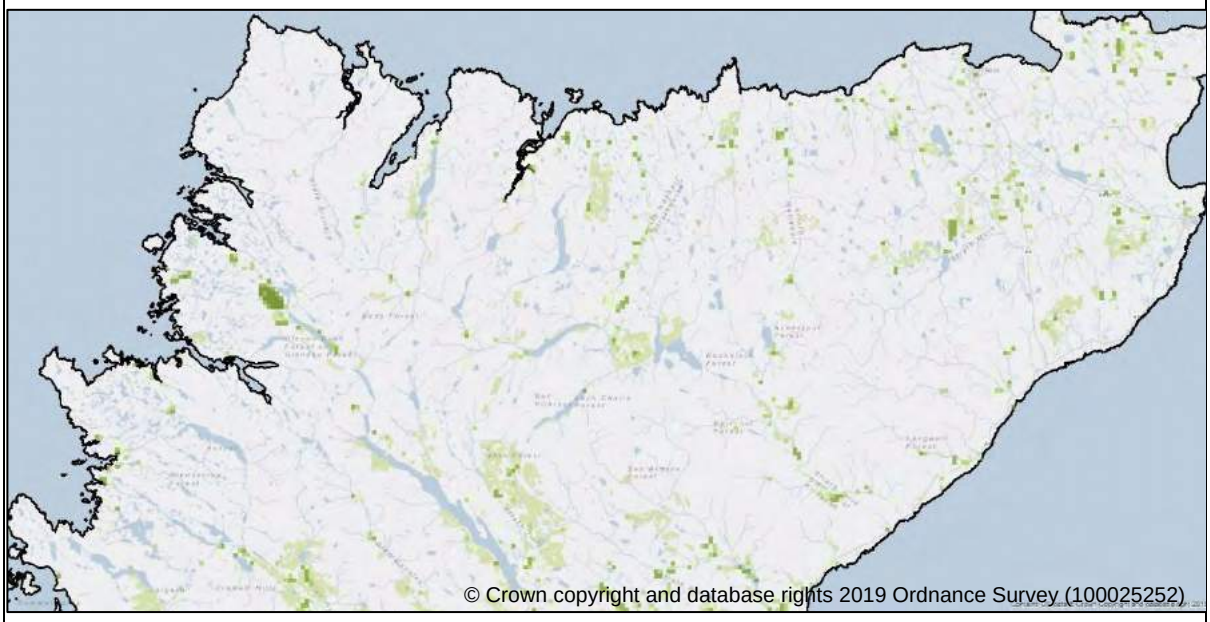
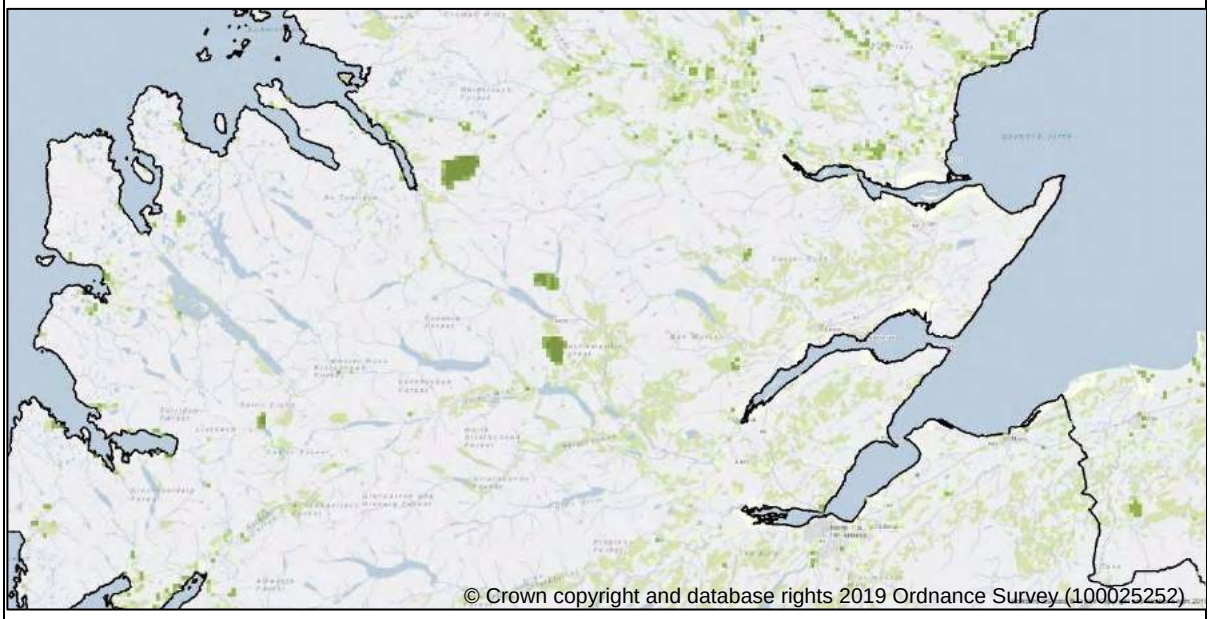
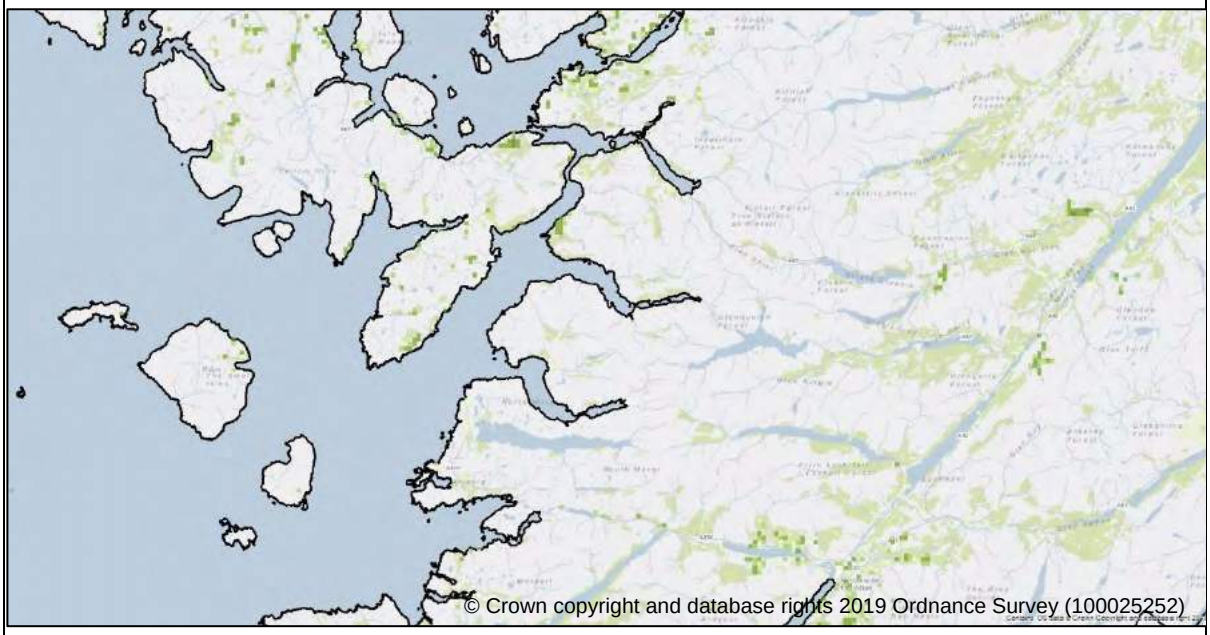
Woodland loss in Highland (2016 to 2017)



Of 39460 cells that contained woodland within 2016 and/or 2017:-

- **6.8% (n=2703) lost woodland, of which:-**
  - **1011 lost <100m²**
  - **765 lost 100 to 999m²**
  - **927 lost 1000m**

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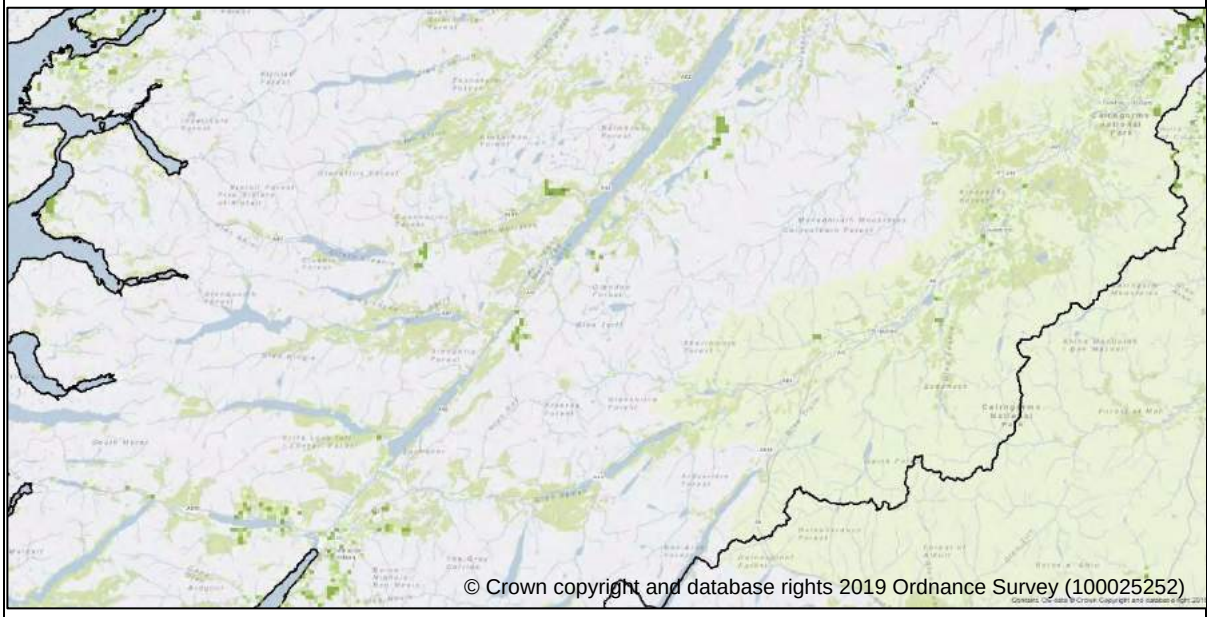
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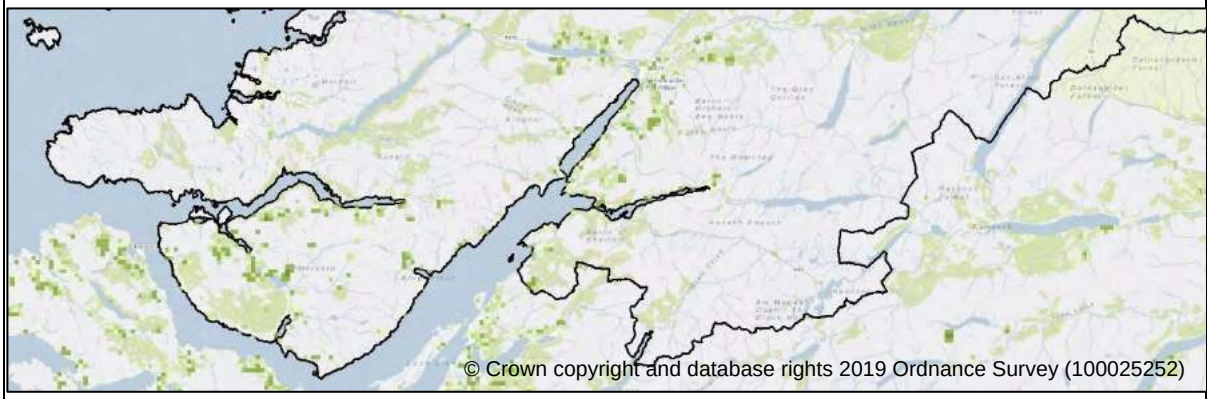
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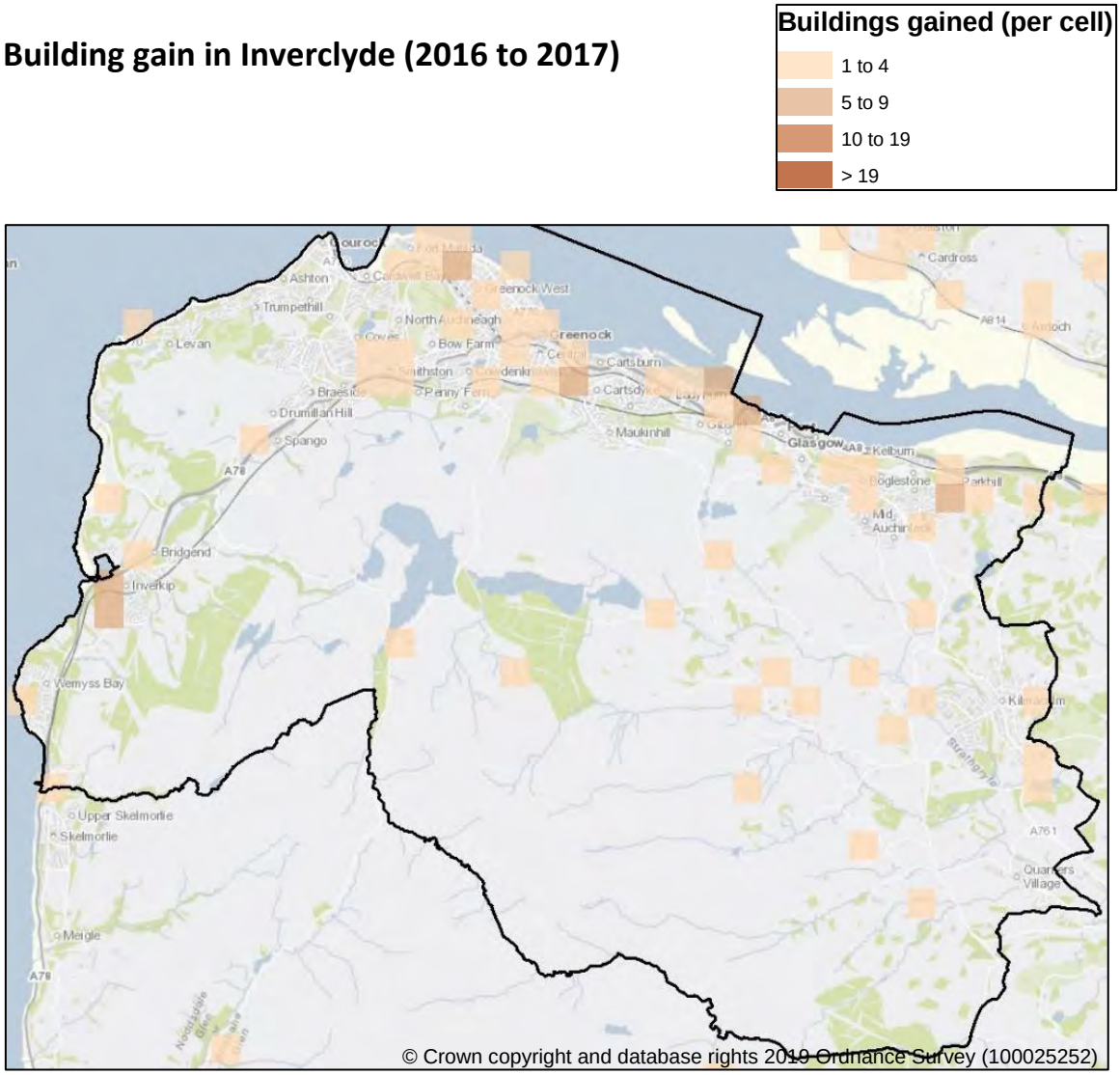
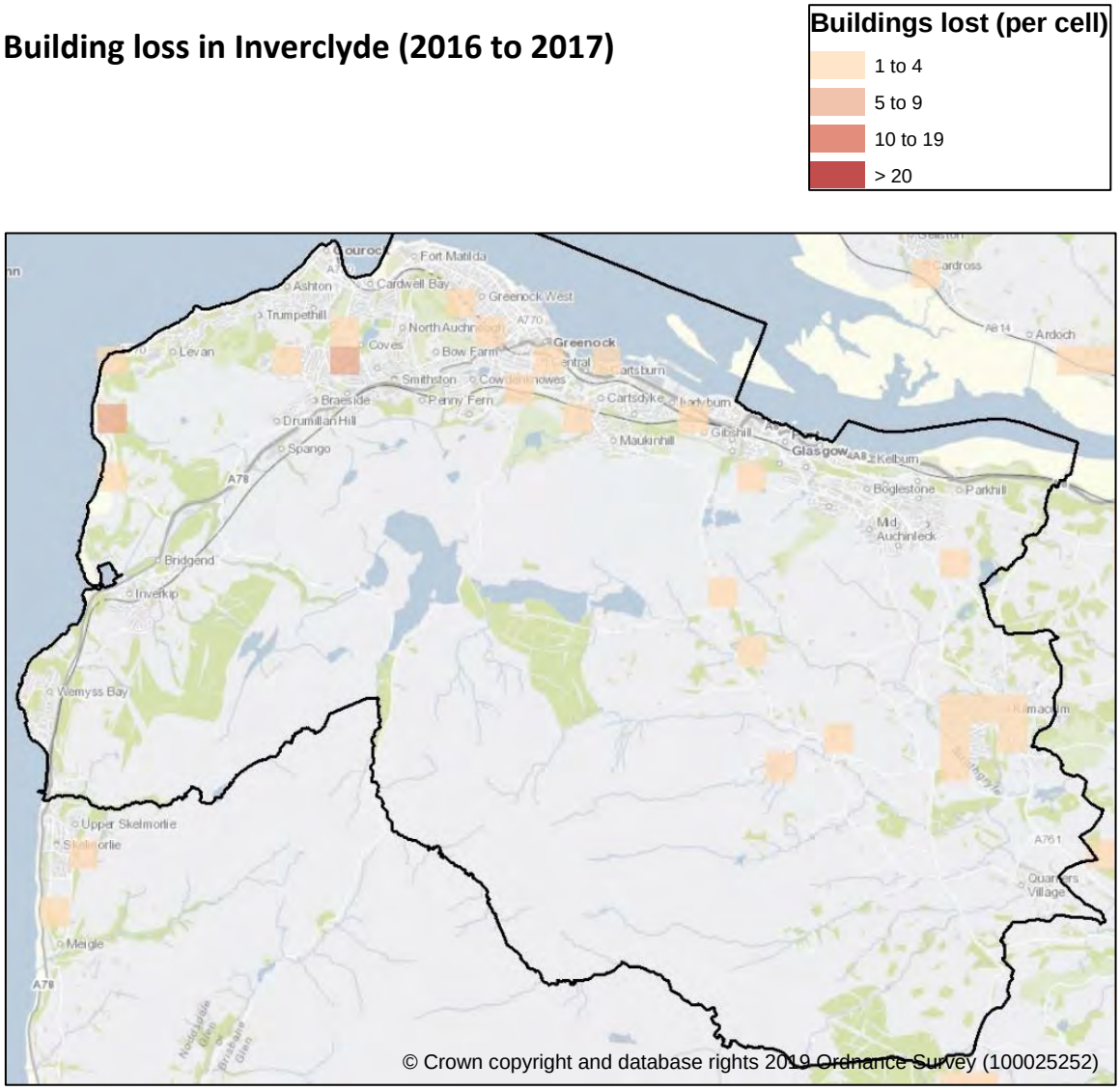
Building gain in Inverclyde (2016 to 2017)



Of 319 cells that contained buildings within 2016 and/or 2017:-

- **18.2% (n=58) gained buildings, of which:-**
  - **51 gained 1 to 4 buildings**
  - **7 gained 5 to 9 buildings**

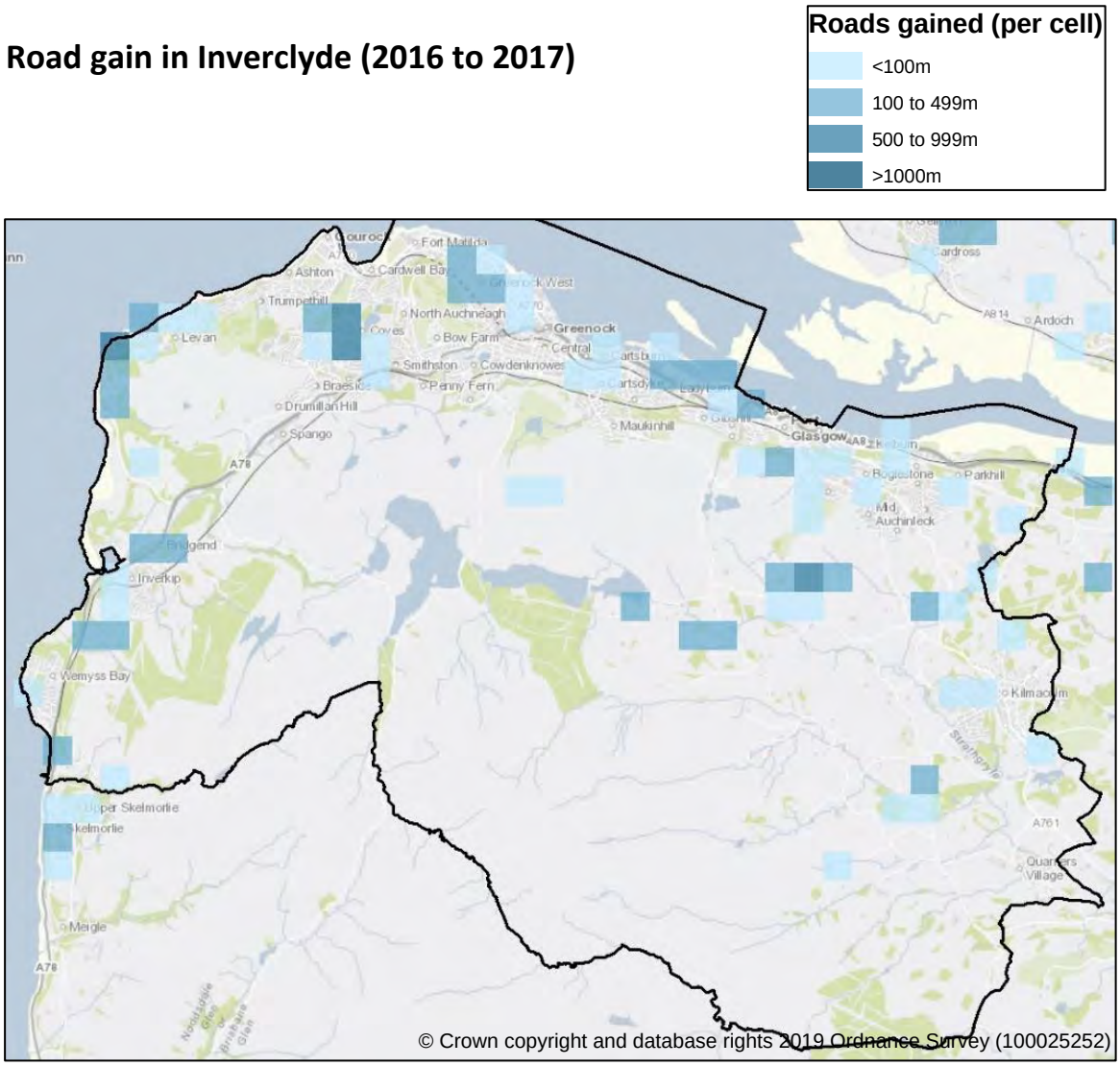
Building loss in Inverclyde (2016 to 2017)



Of 319 cells that contained buildings within 2016 and/or 2017:-

- **7.8% (n=25) lost buildings, of which:-**
  - **23 lost 1 to 4 buildings**
  - **2 lost 5 to 9 buildings**

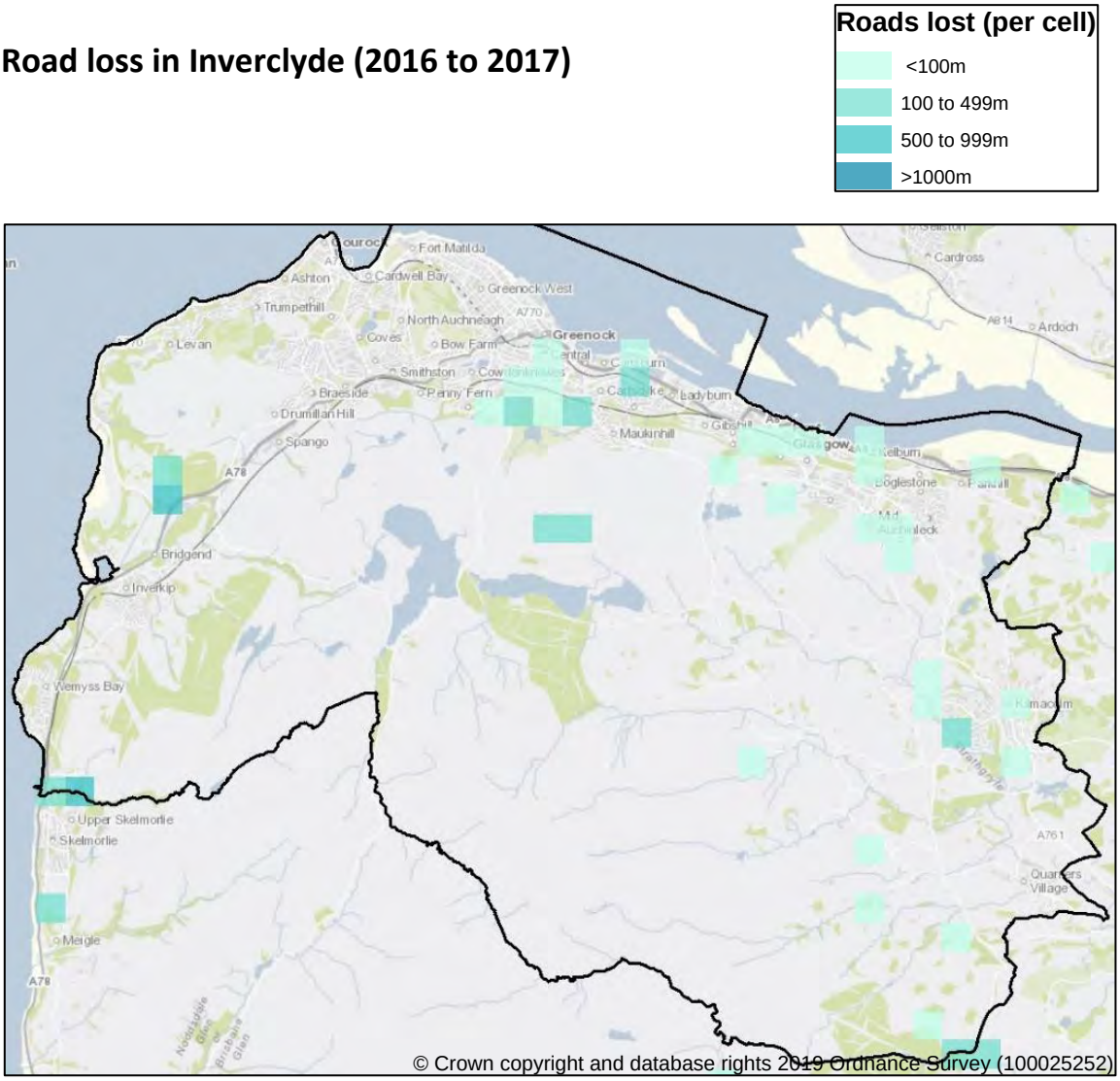
Road gain in Inverclyde (2016 to 2017)



Of 407 cells that contained roads within 2016 and/or 2017:-

- **16.7% (n=68) gained roads, of which:-**
  - **41 gained 1 to 100m**
  - **23 gained 100 to 499m**
  - **4 gained 500 to 999m**

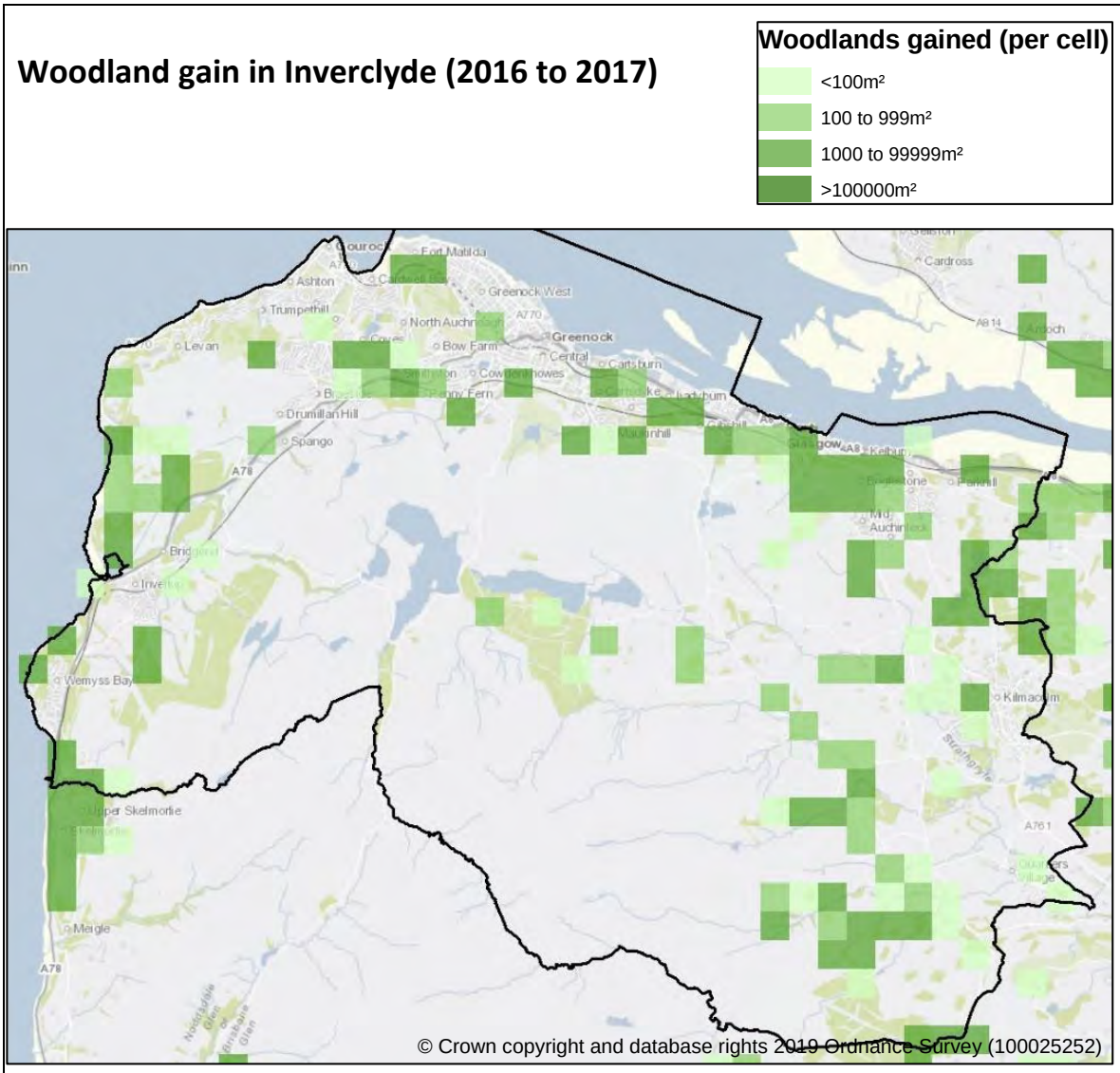
Road loss in Inverclyde (2016 to 2017)



Of 407 cells that contained roads within 2016 and/or 2017:-

- **8.8% (n=36) lost roads, of which:-**
  - **26 lost 1 to 100m**
  - **8 lost 100 to 499m**
  - **2 lost 500 to 999m**

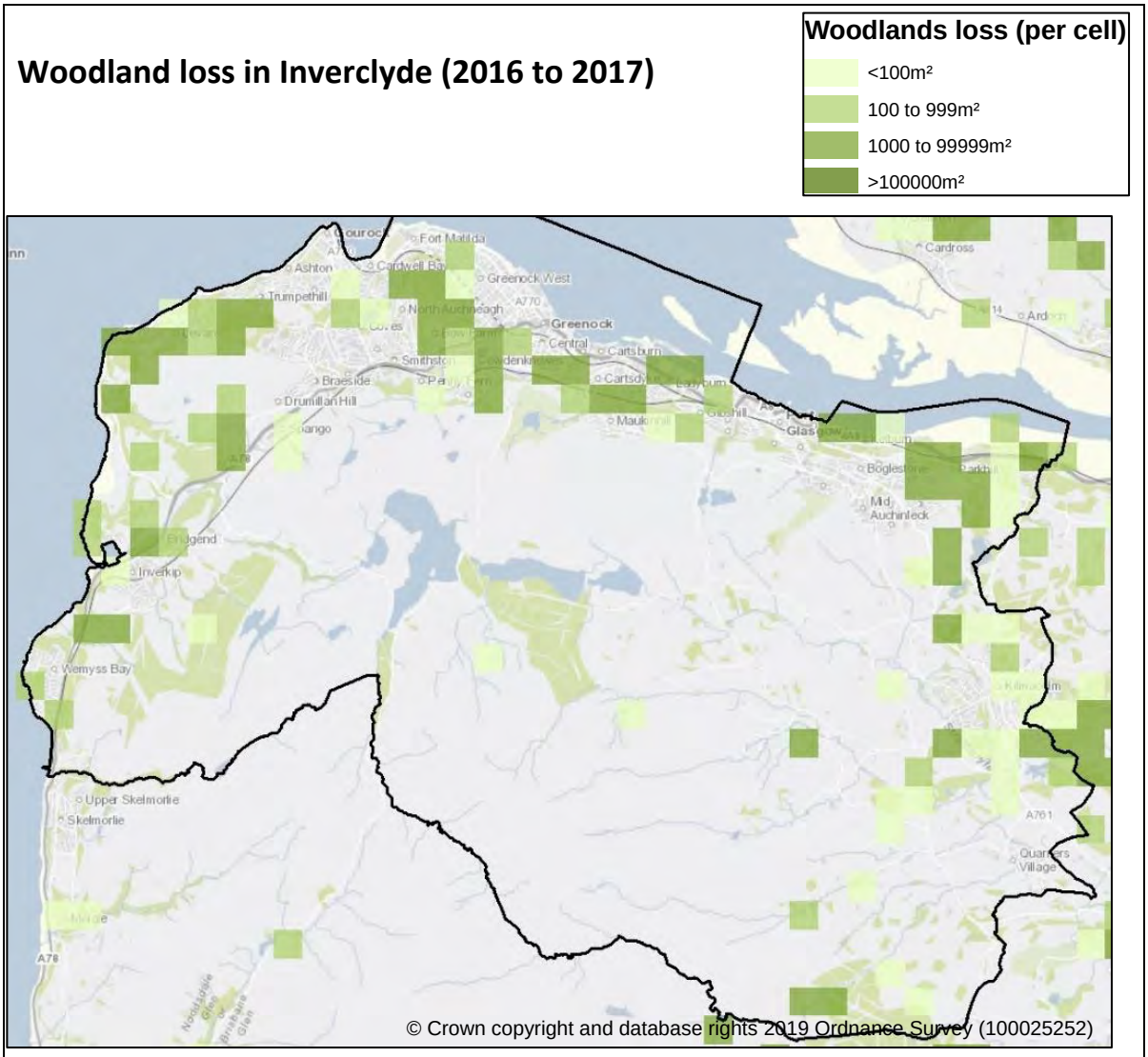
Woodland gain in Inverclyde (2016 to 2017)



Of 422 cells that contained woodland within 2016 and/or 2017:-

- **27.7% (n=117) gained woodland, of which:-**
  - **32 gained <100m²**
  - **31 gained 100 to 999m²**
  - **54 gained 1000m²+**

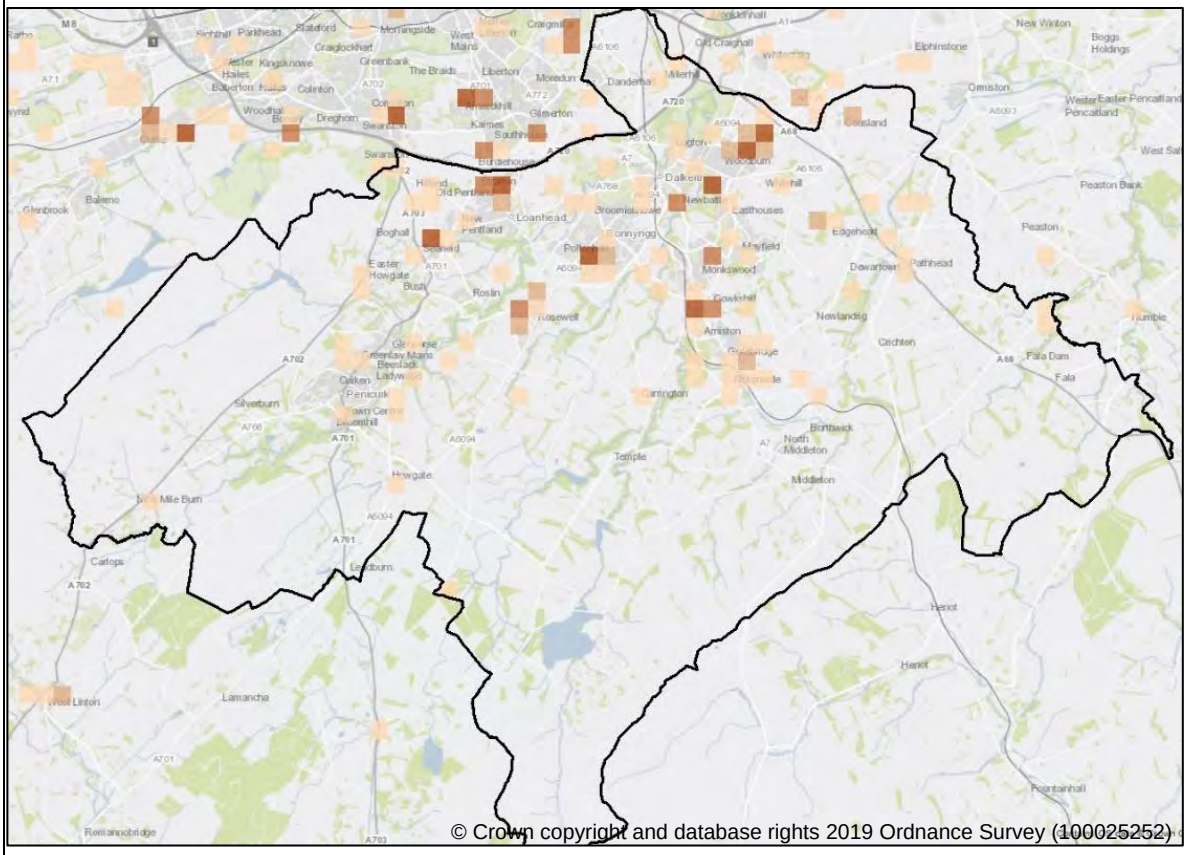
Woodland loss in Inverclyde (2016 to 2017)



Of 422 cells that contained woodland within 2016 and/or 2017:-

- **23.7% (n=100) lost woodland, of which:-**
  - **33 lost <100m²**
  - **23 lost 100 to 999m²**
  - **44 lost 1000m²+**

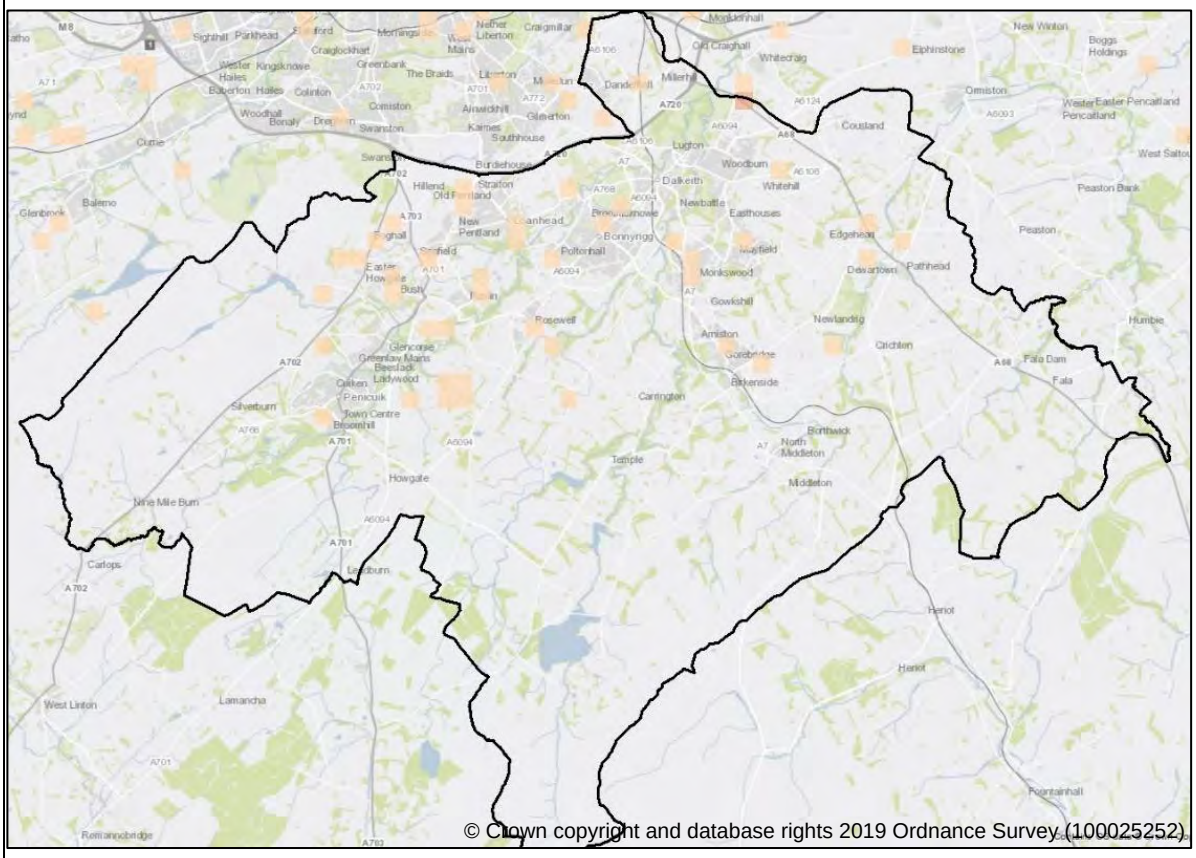
Building gain in Midlothian (2016 to 2017)



Of 679 cells that contained buildings within 2016 and/or 2017:-

- **14.0% (n=95) gained buildings, of which:-**
  - **73 gained 1 to 4 buildings**
  - **10 gained 5 to 9 buildings**
  - **5 gained 10 to 19 buildings**
  - **7 gained >19 buildings**

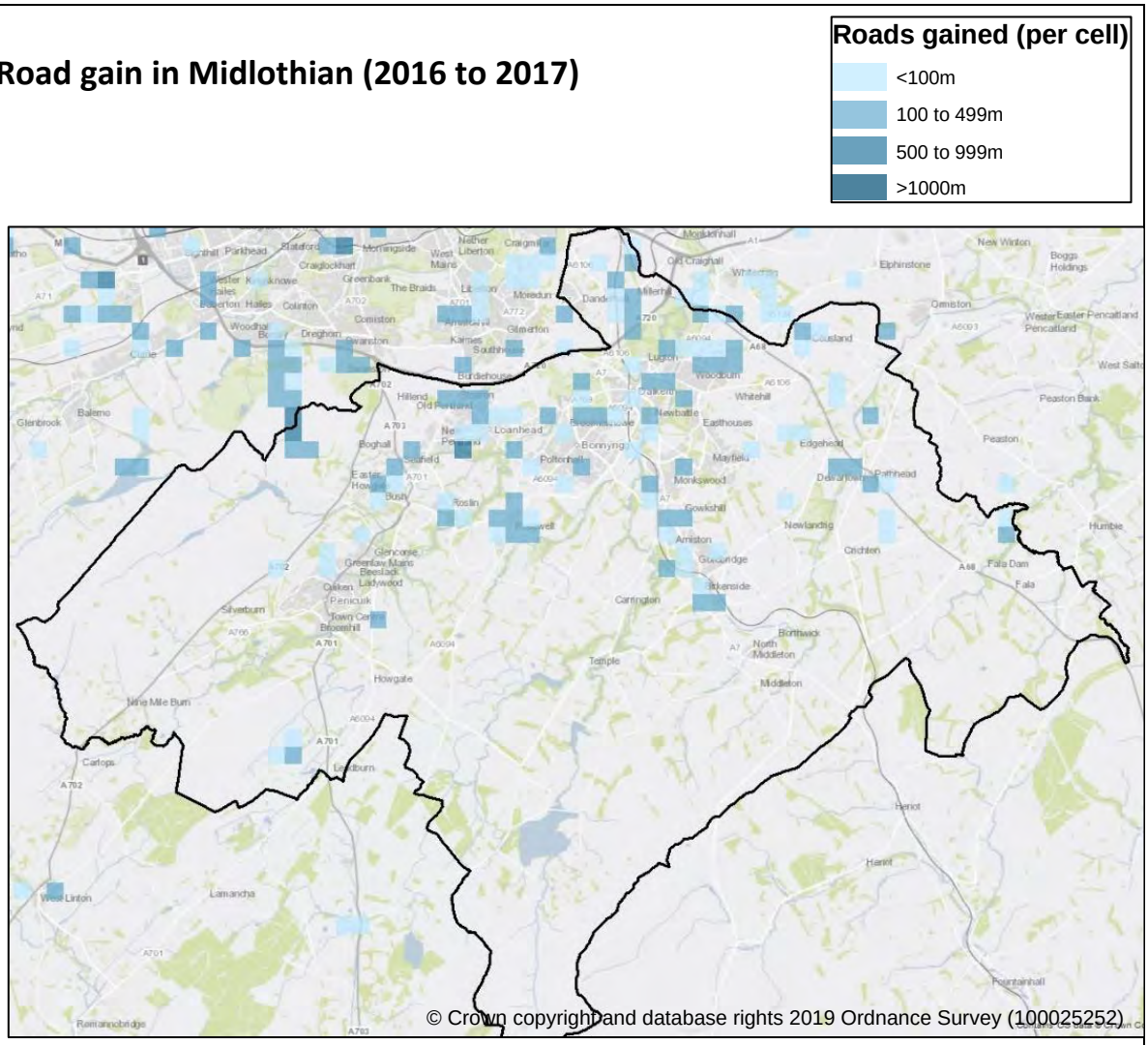
Building loss in Midlothian (2016 to 2017)



Of 679 cells that contained buildings within 2016 and/or 2017:-

- **6.3% (n=43) lost buildings, of which:-**
  - **42 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

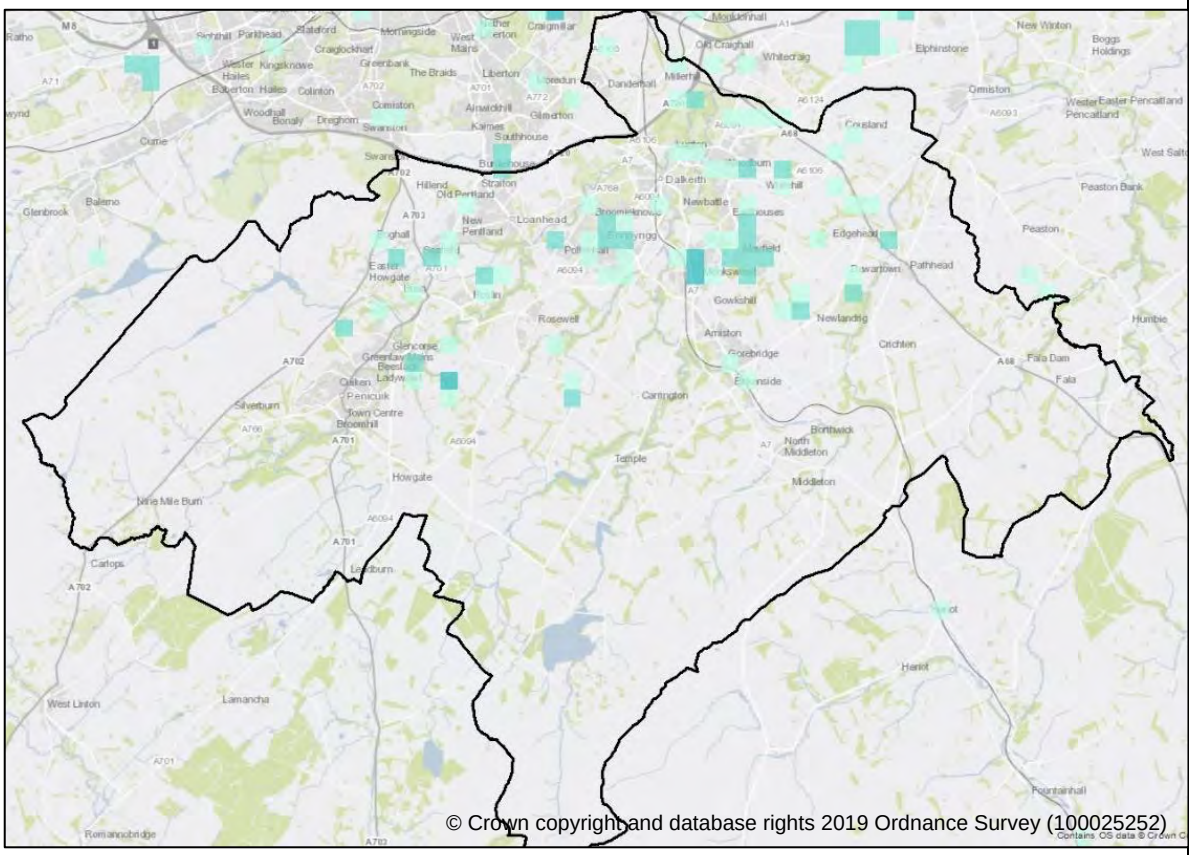
Road gain in Midlothian (2016 to 2017)



Of 926 cells that contained roads within 2016 and/or 2017:-

- **11.1% (n=103) gained roads, of which:-**
  - **50 gained 1 to 100m**
  - **51 gained 100 to 499m**
  - **2 gained 500 to 999m**

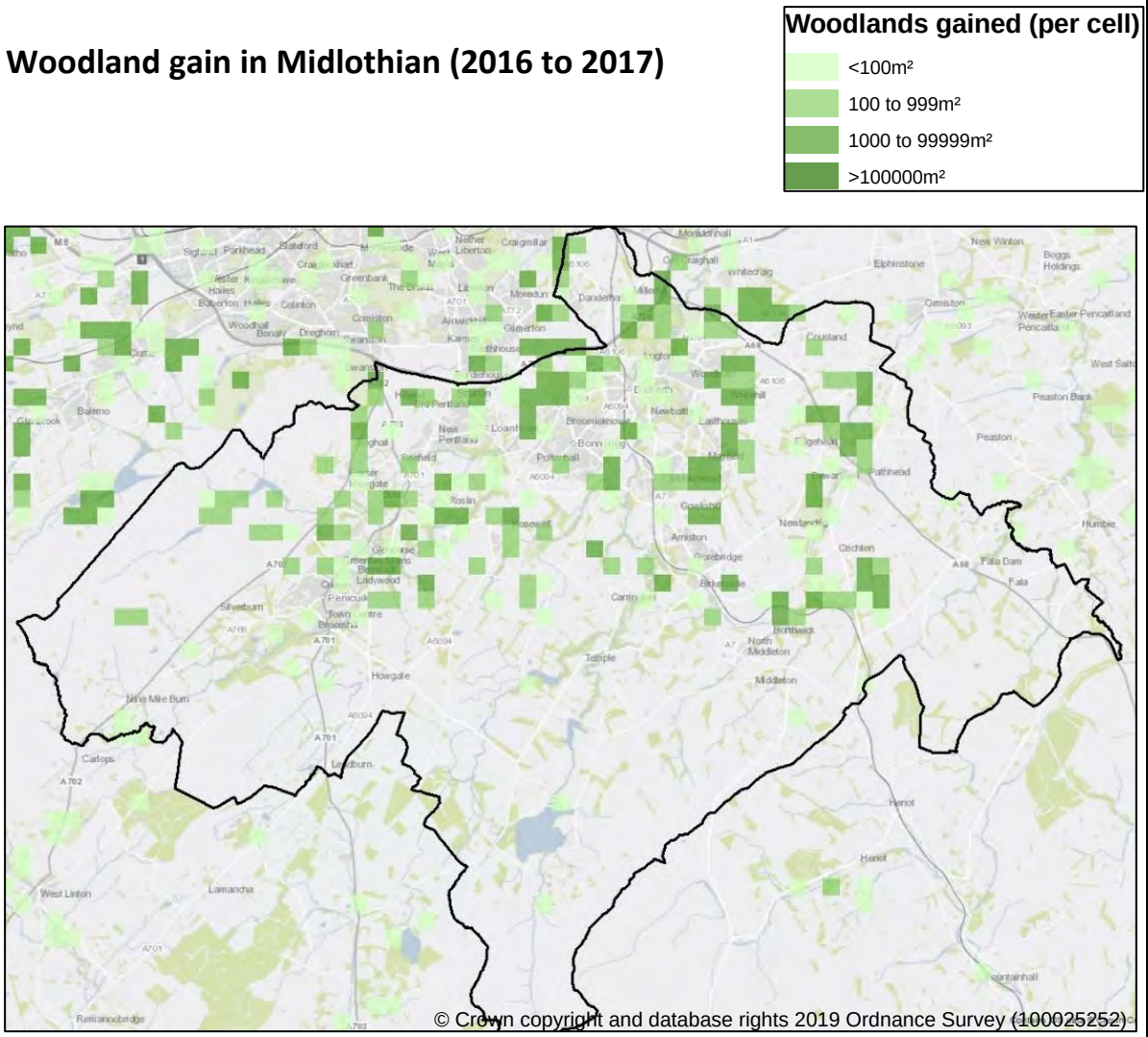
Road loss in Midlothian (2016 to 2017)



Of 926 cells that contained roads within 2016 and/or 2017:-

- **7.9% (n=73) lost roads, of which:-**
  - **48 lost 1 to 100m**
  - **22 lost 100 to 499m**
  - **3 lost 500 to 999m**

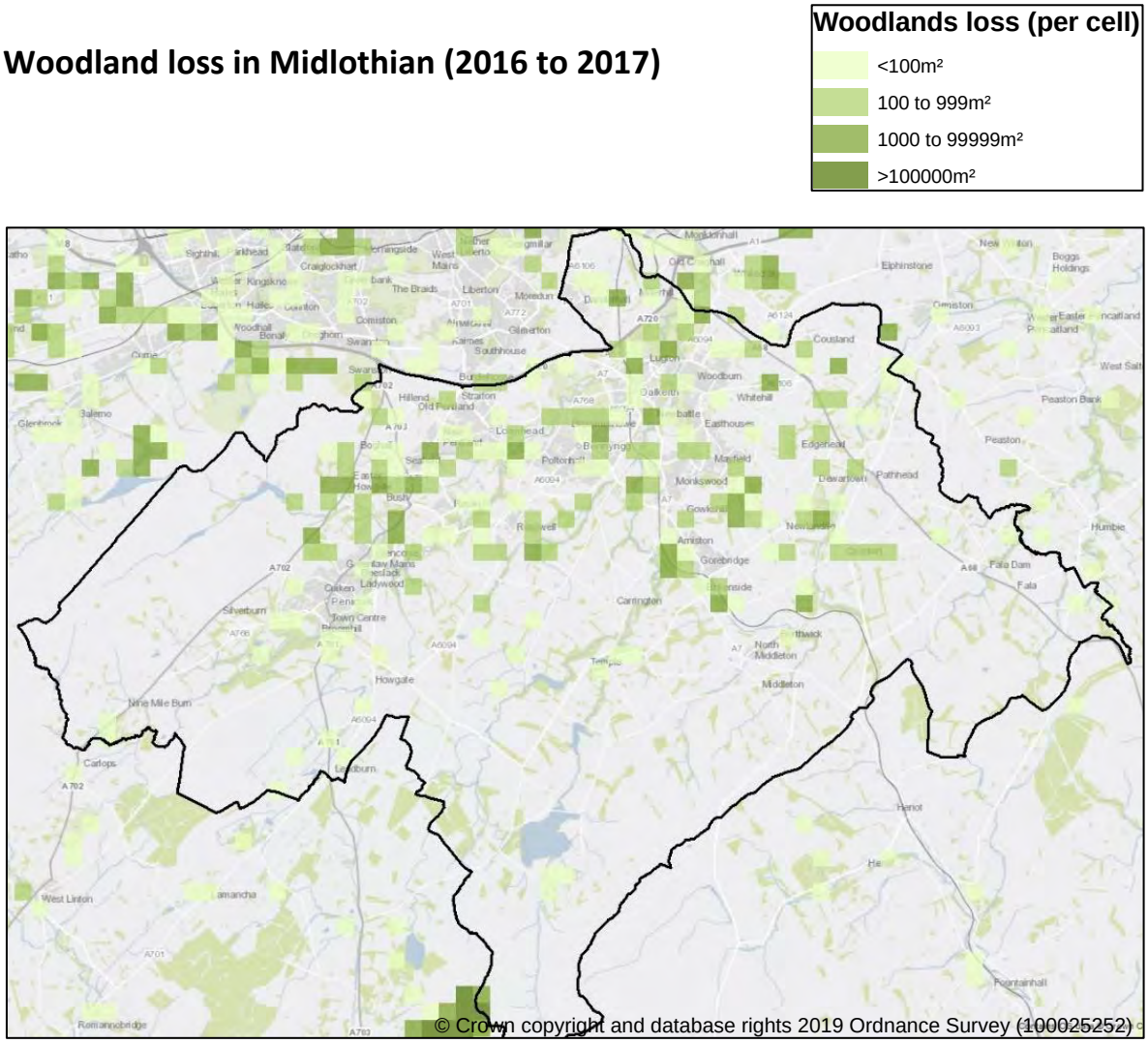
Woodland gain in Midlothian (2016 to 2017)



Of 1145 cells that contained woodland within 2016 and/or 2017:-

- **17.6% (n=202) gained woodland, of which:-**
  - **70 gained <100m²**
  - **70 gained 100 to 999m²**
  - **62 gained 1000m²+**

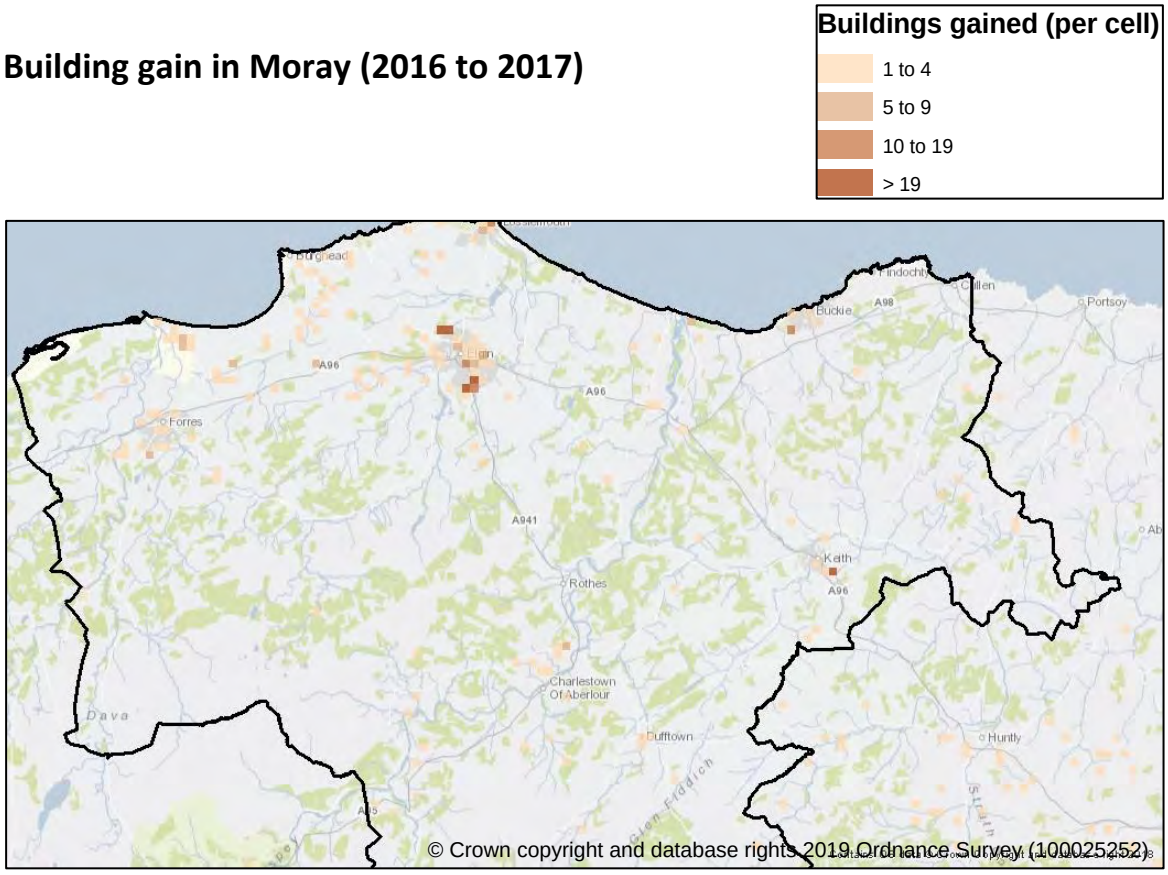
Woodland loss in Midlothian (2016 to 2017)



Of 1145 cells that contained woodland within 2016 and/or 2017:-

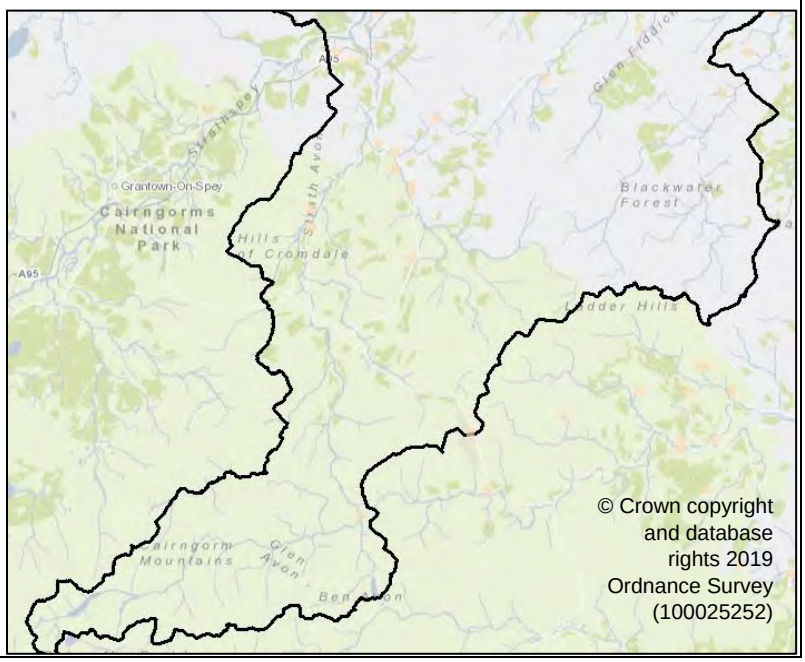
- **16.2% (n=186) lost woodland, of which:-**
  - **92 lost <100m²**
  - **65 lost 100 to 999m²**
  - **29 lost 1000m²+**

Building gain in Moray (2016 to 2017)

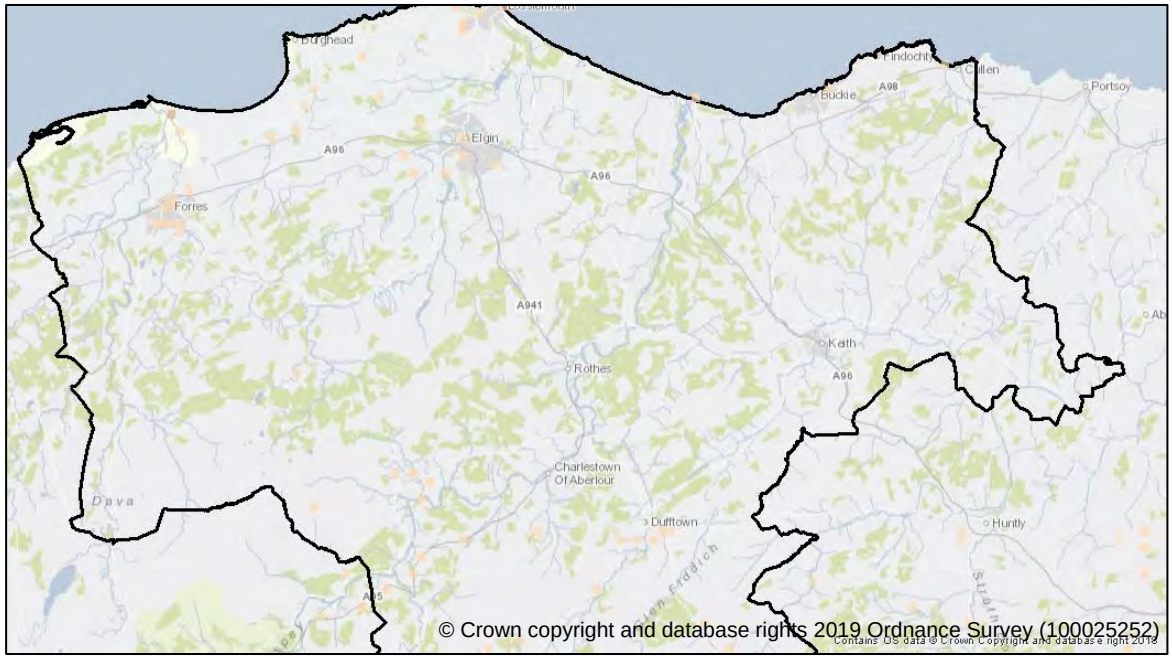


Of 3137 cells that contained buildings within 2016 and/or 2017:-

- **5.5% (n=173) gained buildings, of which:-**
  - **153 gained 1 to 4 buildings**
  - **11 gained 5 to 9 buildings**
  - **4 gained 10 to 19 buildings**
  - **5 gained >19 buildings**

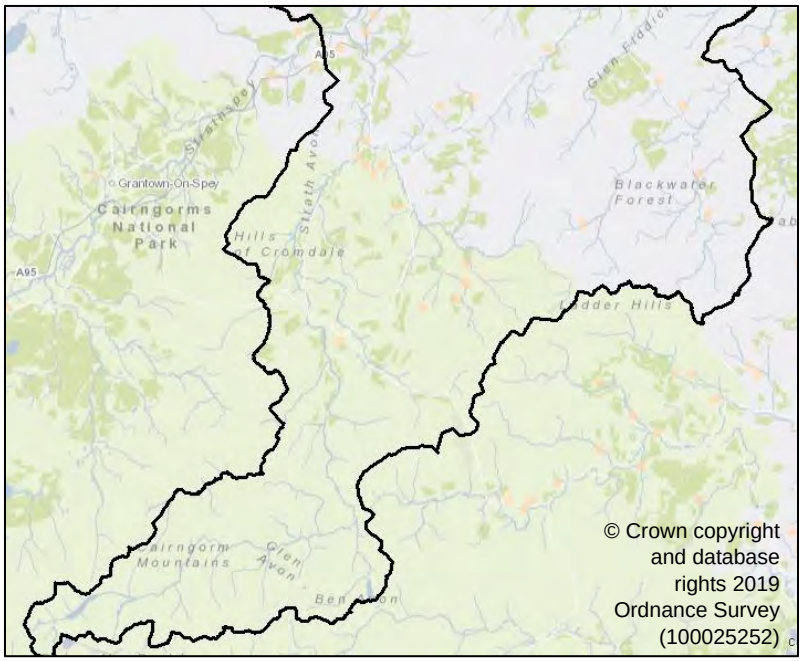


Building loss in Moray (2016 to 2017)

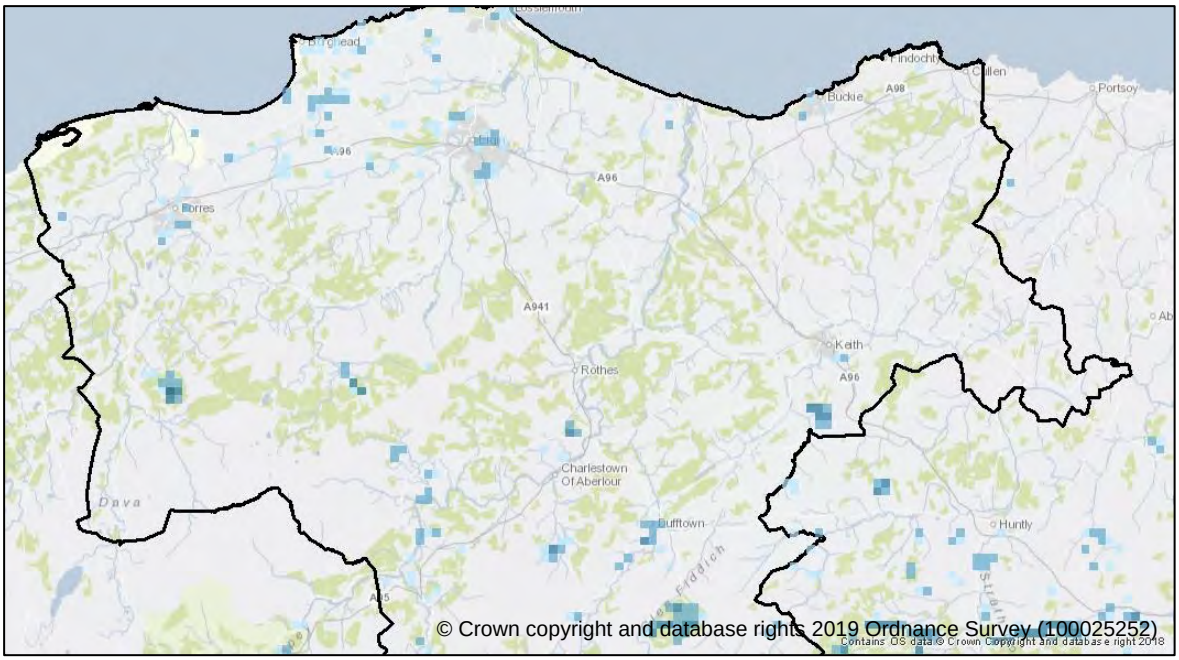


Of 3137 cells that contained buildings within 2016 and/or 2017:-

- **2.1% (n=66) lost buildings, of which:-**
  - **65 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

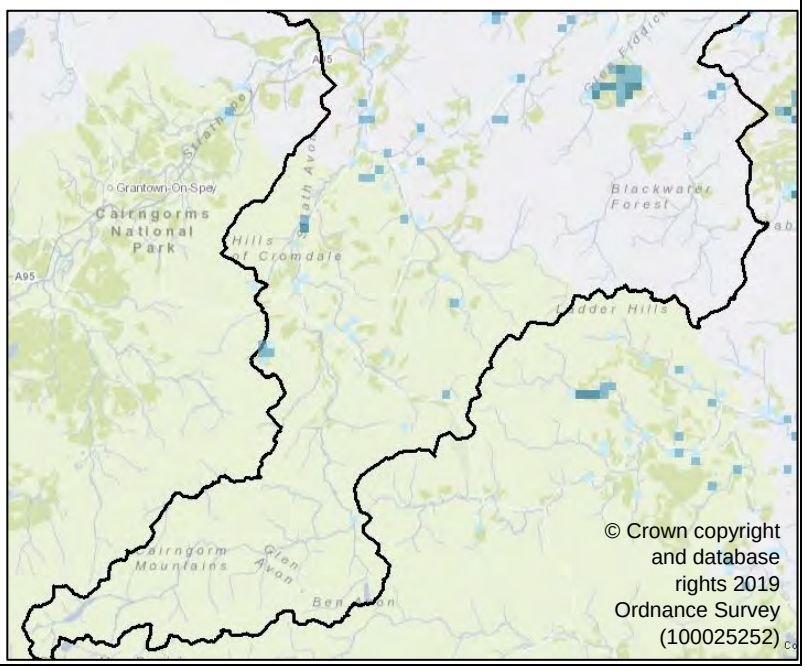


Road gain in Moray (2016 to 2017)

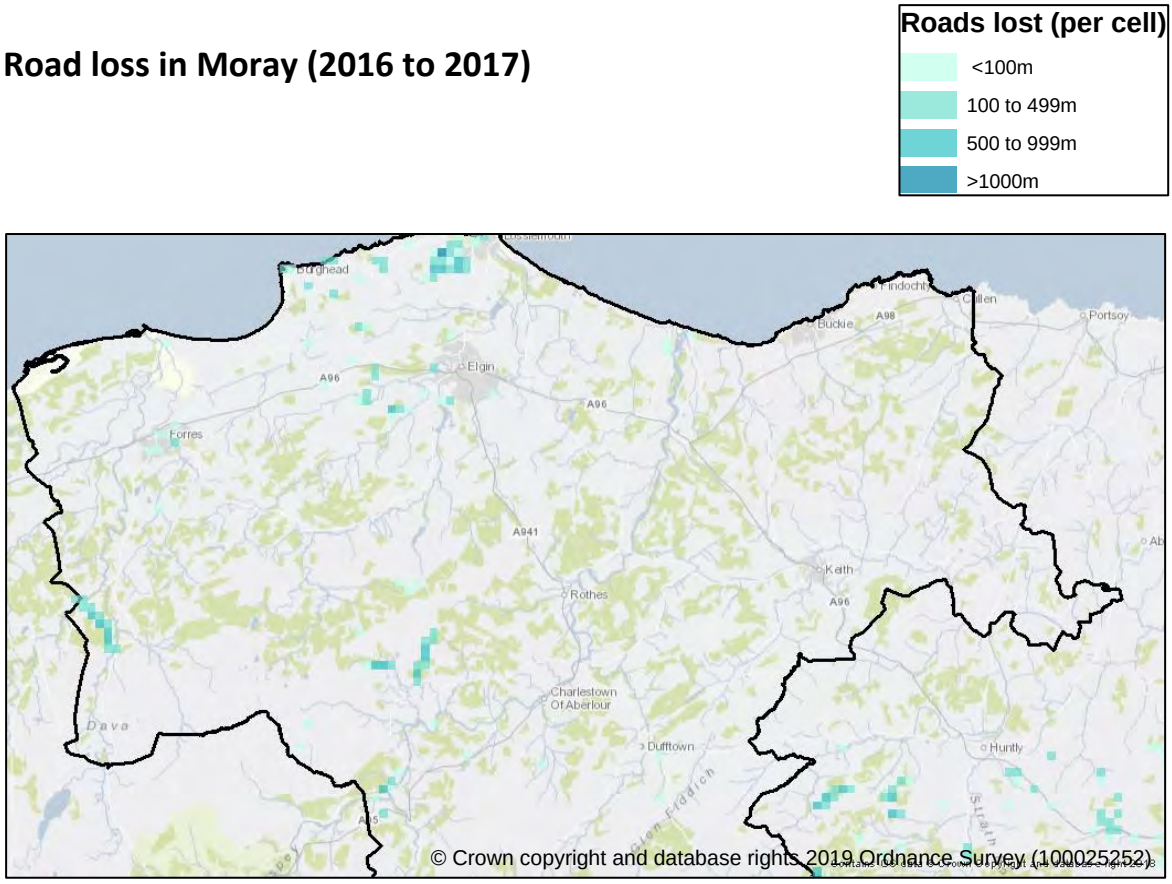


Of 4888 cells that contained roads within 2016 and/or 2017:-

- **4.8% (n=235) gained roads, of which:-**
  - **114 gained 1 to 100m**
  - **101 gained 100 to 499m**
  - **19 gained 500 to 999m**
  - **1 gained 1000m+**

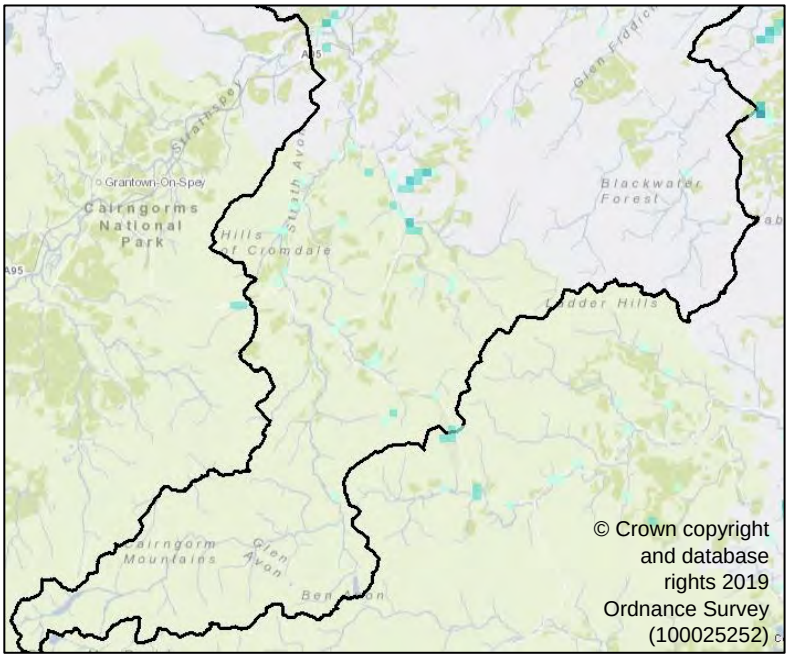


Road loss in Moray (2016 to 2017)

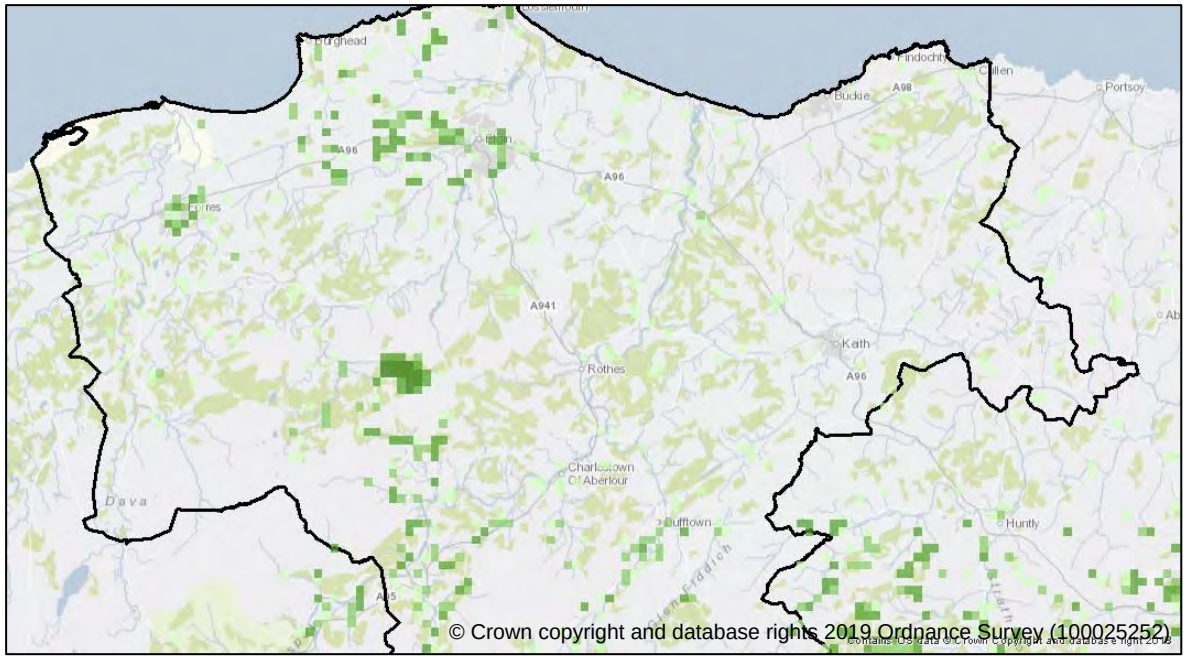


Of 4888 cells that contained roads within 2016 and/or 2017:-

- **3.0% (n=145) lost roads, of which:-**
  - **74 lost 1 to 100m**
  - **52 lost 100 to 499m**
  - **18 lost 500 to 999m**
  - **1 lost 1000m+**

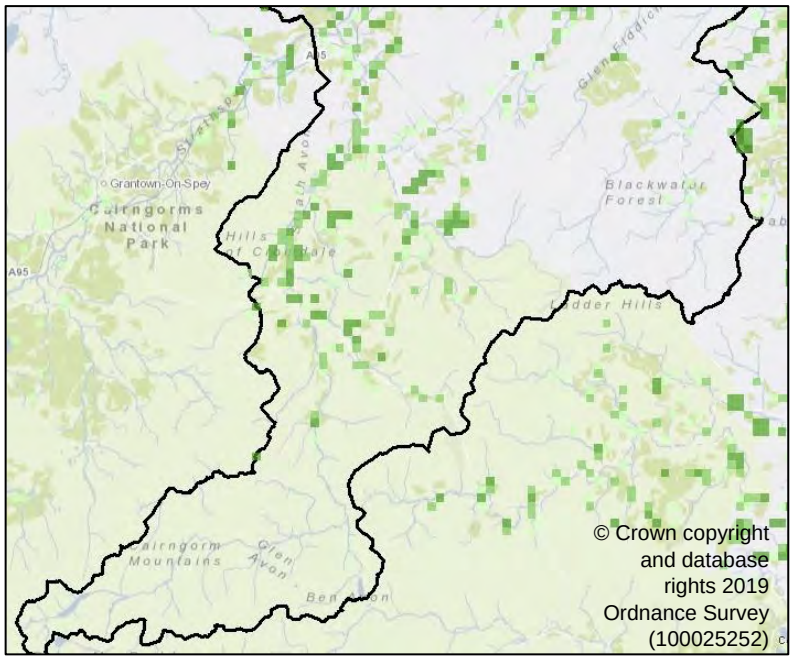


Woodland gain in Moray (2016 to 2017)

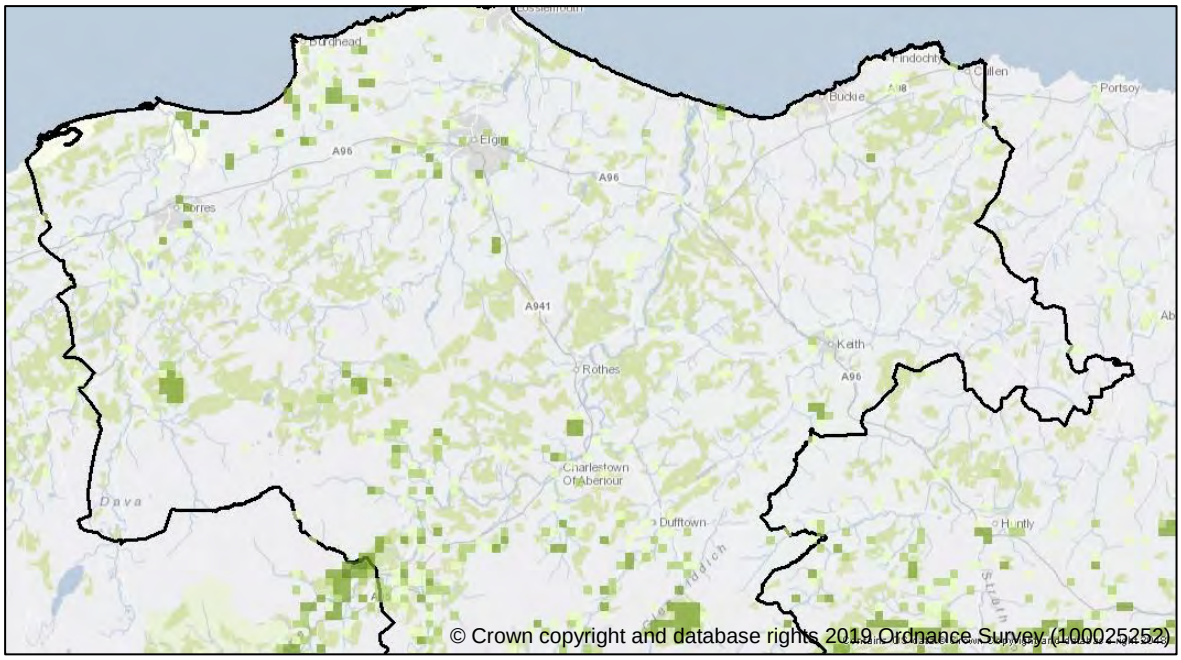


Of 6335 cells that contained woodland within 2016 and/or 2017:-

- **8.8% (n=558) gained woodland, of which:-**
  - **259 gained <100m²**
  - **143 gained 100 to 999m²**
  - **156 gained 1000m²+**

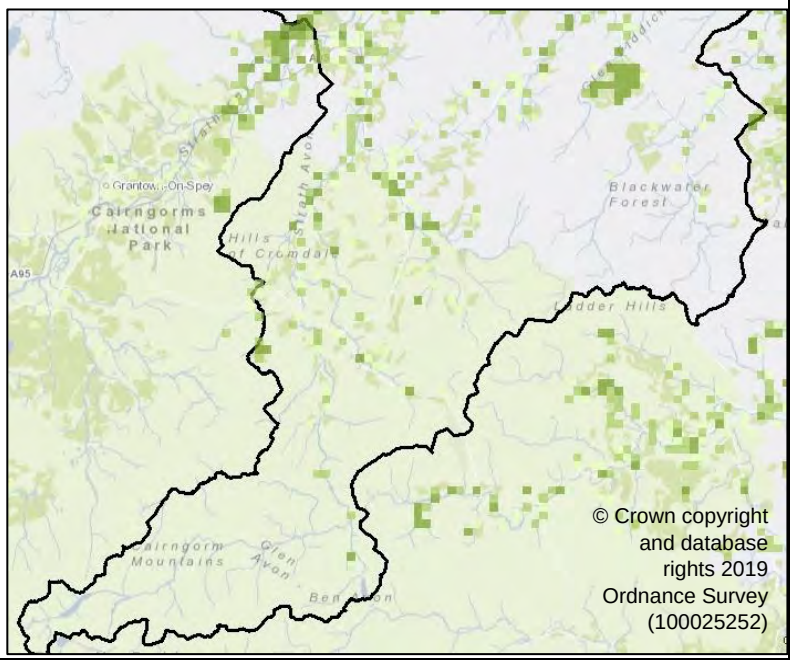


Woodland loss in Moray (2016 to 2017)

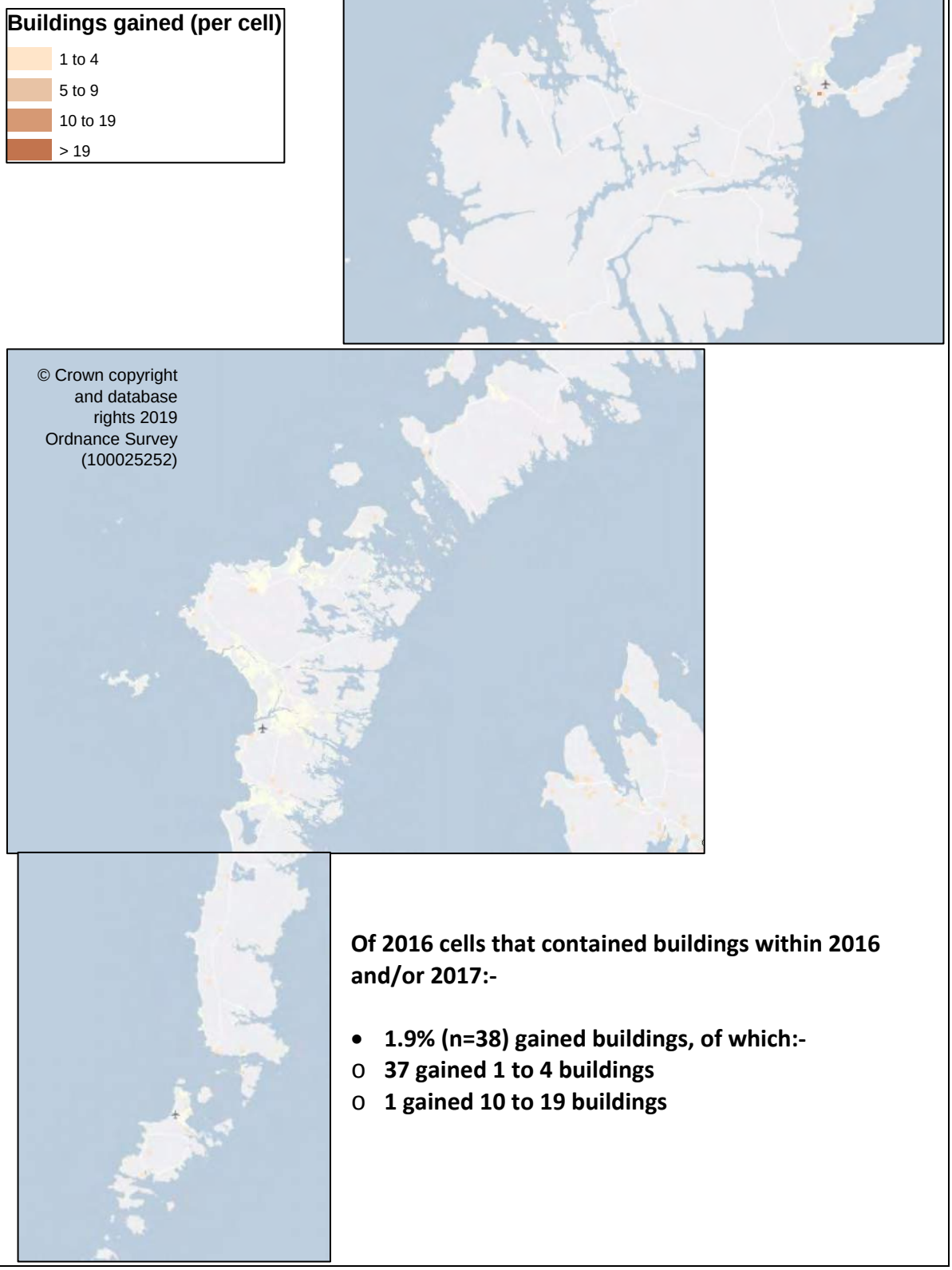


Of 6335 cells that contained woodland within 2016 and/or 2017:-

- **8.5% (n=541) lost woodland, of which:-**
  - **272 lost <100m²**
  - **145 lost 100 to 999m²**
  - **124 lost 1000m²+**



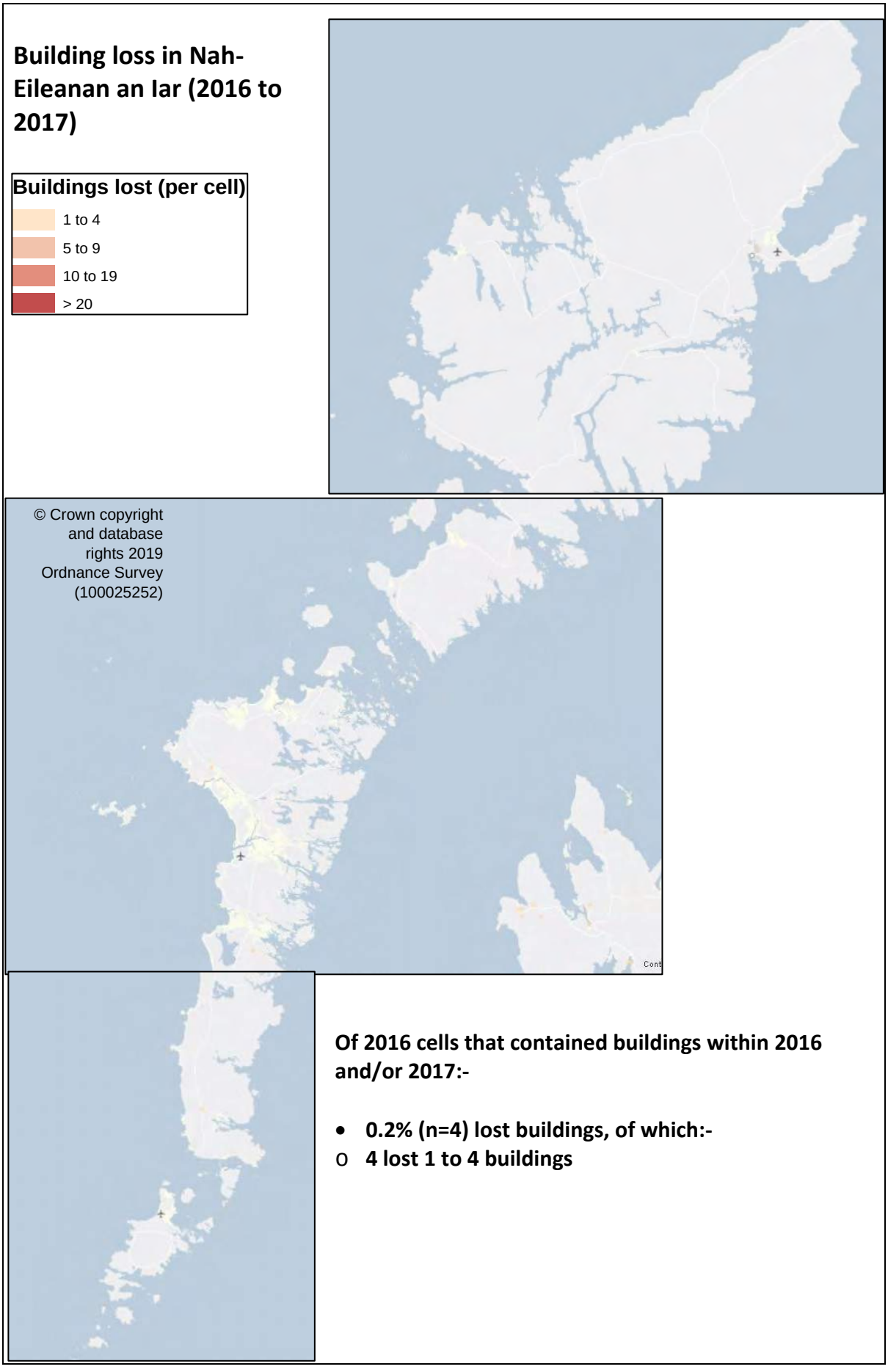
Building gain in Nah-Eileanan an Iar (2016 to 2017)



Of 2016 cells that contained buildings within 2016 and/or 2017:-

- **1.9% (n=38) gained buildings, of which:-**
  - **37 gained 1 to 4 buildings**
  - **1 gained 10 to 19 buildings**

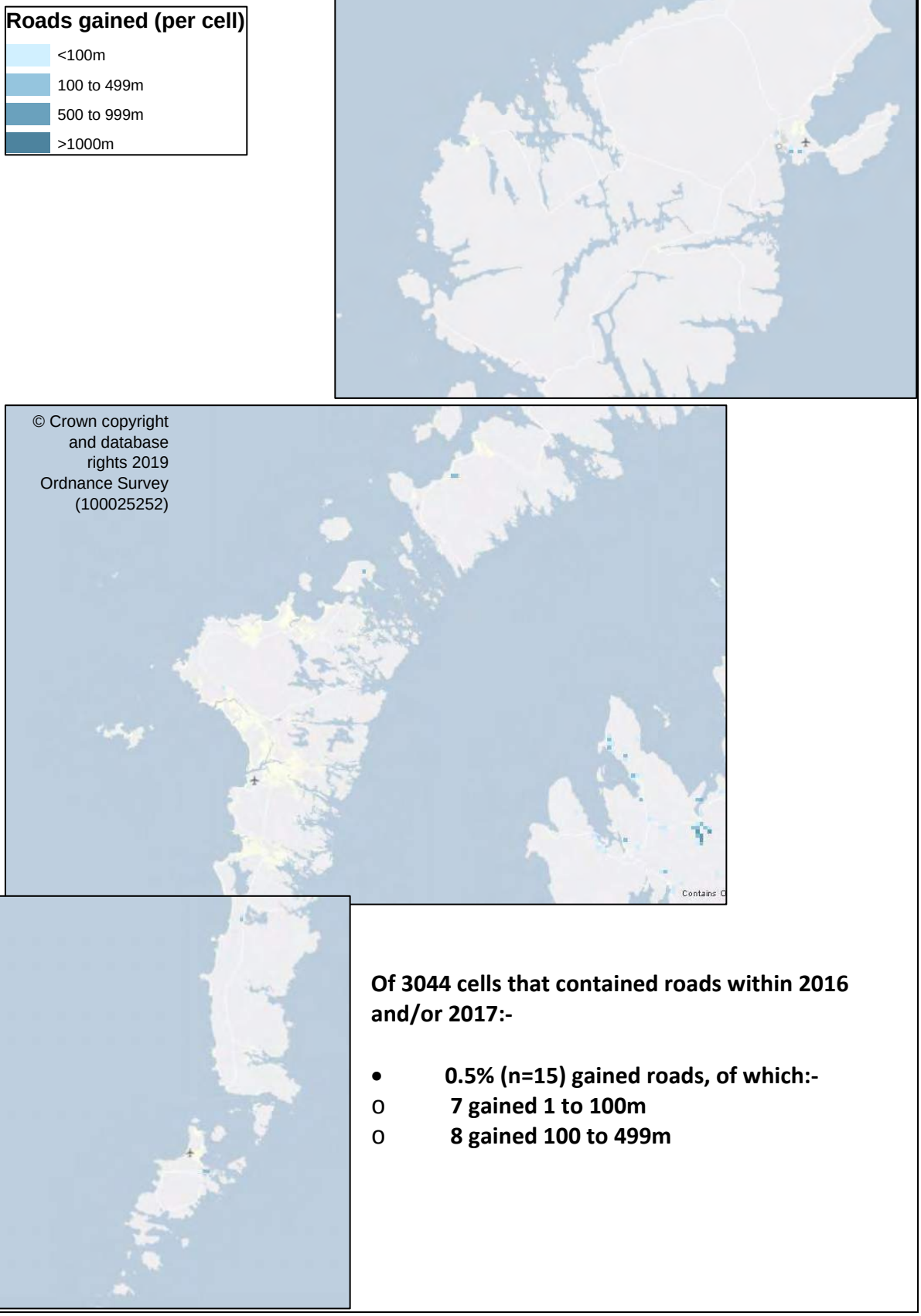
Building loss in Nah-Eileanan an Iar (2016 to 2017)



Of 2016 cells that contained buildings within 2016 and/or 2017:-

- **0.2% (n=4) lost buildings, of which:-**
  - **4 lost 1 to 4 buildings**

Road gain in Nah-Eileanan an Iar (2016 to 2017)



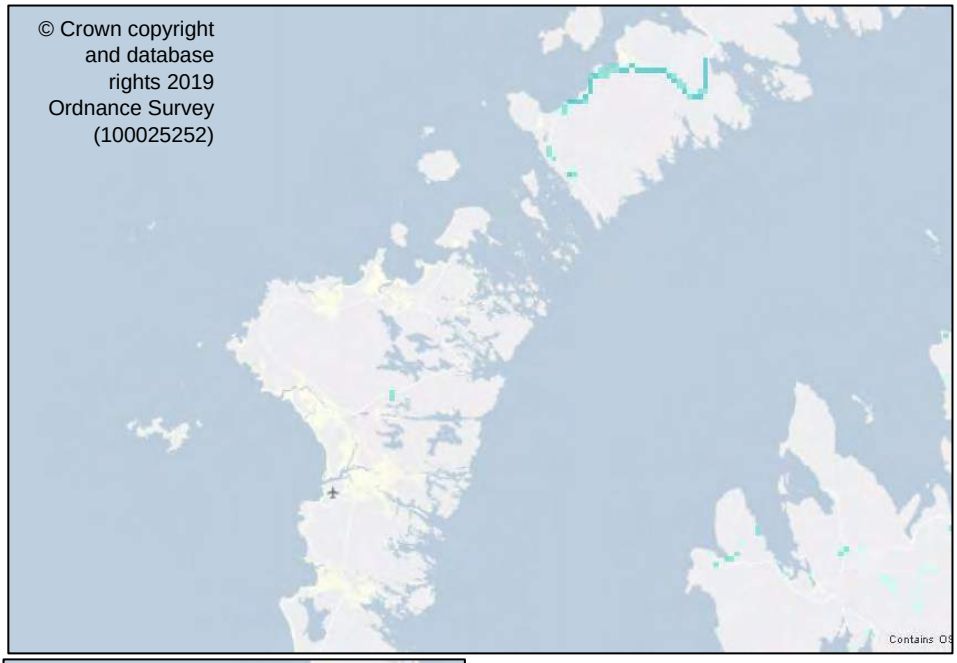
Of 3044 cells that contained roads within 2016 and/or 2017:-

- **0.5% (n=15) gained roads, of which:-**
  - **7 gained 1 to 100m**
  - **8 gained 100 to 499m**

Road loss in Nah-Eileanan an Iar (2016 to 2017)

Roads lost (per cell)

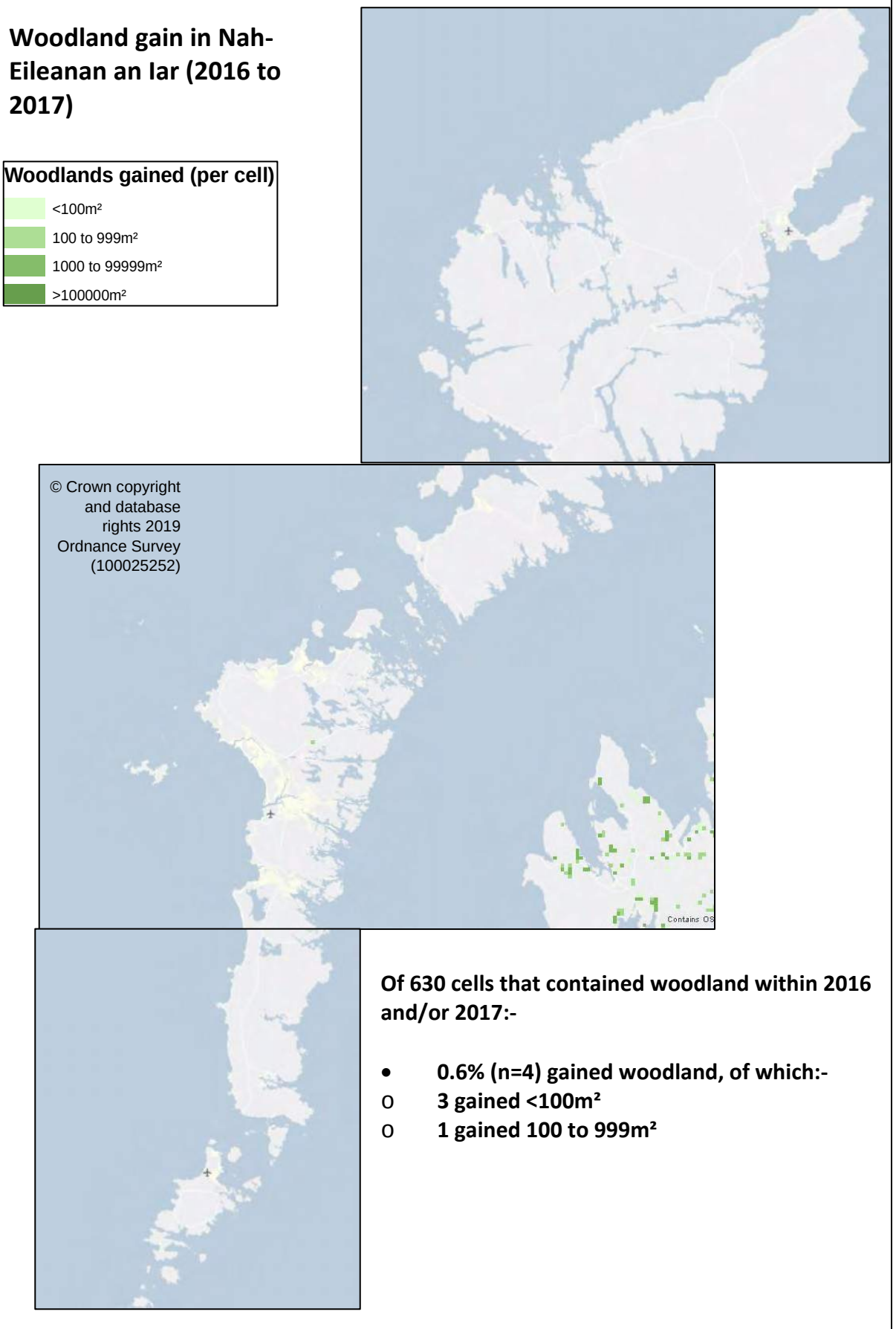
- <100m
- 100 to 499m
- 500 to 999m
- >1000m



Of 3044 cells that contained roads within 2016 and/or 2017:-

- **3.3% (n=101) lost roads, of which:-**
  - **16 lost 1 to 100m**
  - **40 lost 100 to 499m**
  - **45 lost 500 to 999m**

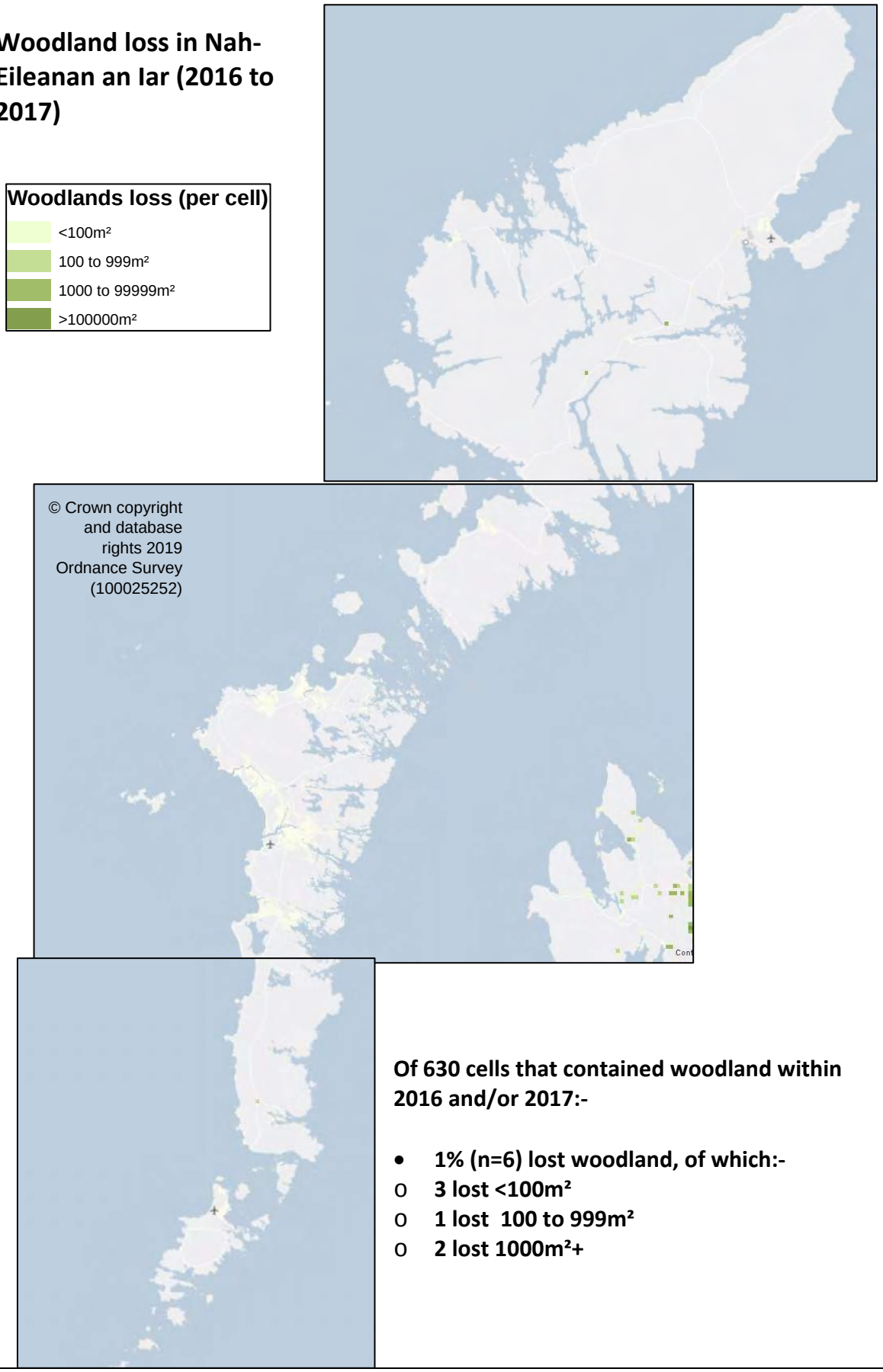
Woodland gain in Nah-Eileanan an Iar (2016 to 2017)



Of 630 cells that contained woodland within 2016 and/or 2017:-

- **0.6% (n=4) gained woodland, of which:-**
  - **3 gained <100m²**
  - **1 gained 100 to 999m²**

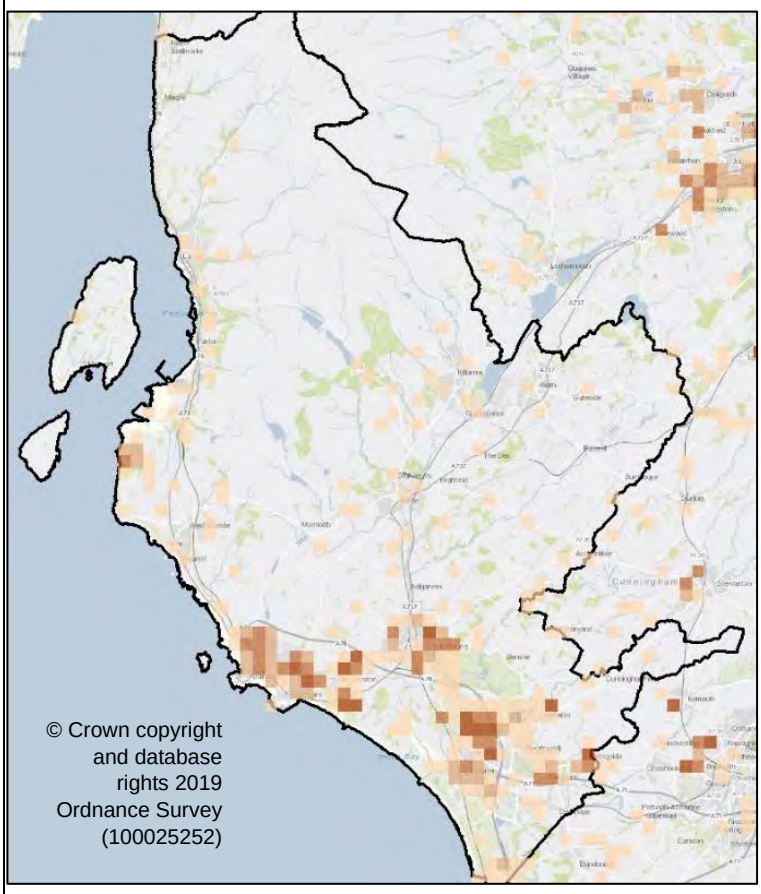
Woodland loss in Nah-Eileanan an Iar (2016 to 2017)



Of 630 cells that contained woodland within 2016 and/or 2017:-

- **1% (n=6) lost woodland, of which:-**
  - **3 lost <100m²**
  - **1 lost 100 to 999m²**
  - **2 lost 1000m²+**

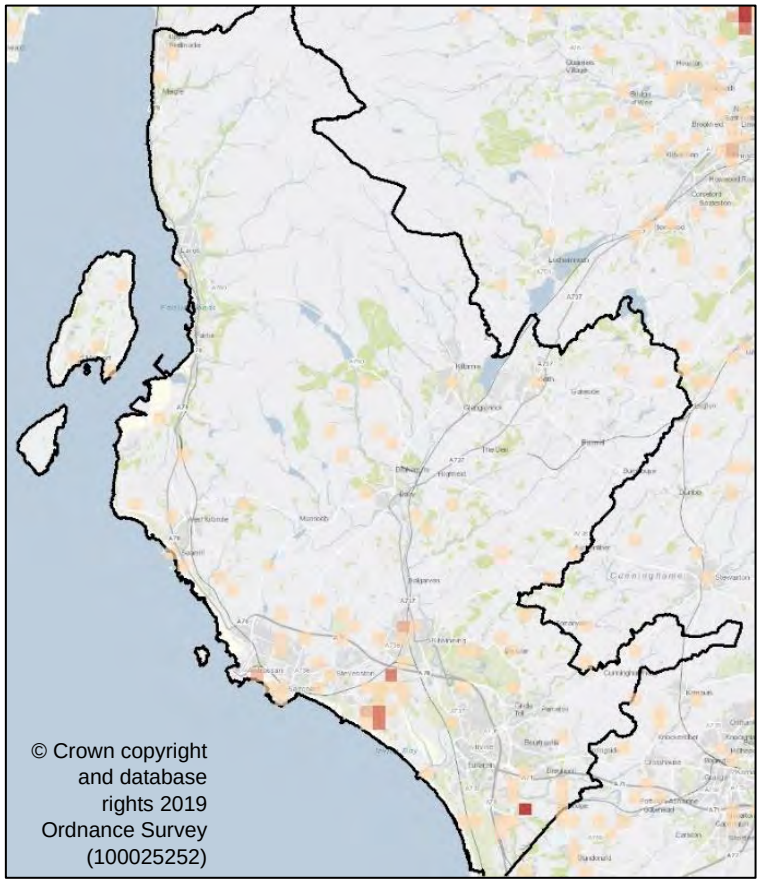
Building gain in North Ayrshire (2016 to 2017)



Of 1275 cells that contained buildings within 2016 and/or 2017:-

- **20.9% (n=267) gained buildings, of which:-**
  - **196 gained 1 to 4 buildings**
  - **30 gained 5 to 9 buildings**
  - **27 gained 10 to 19 buildings**
  - **14 gained >19 buildings**

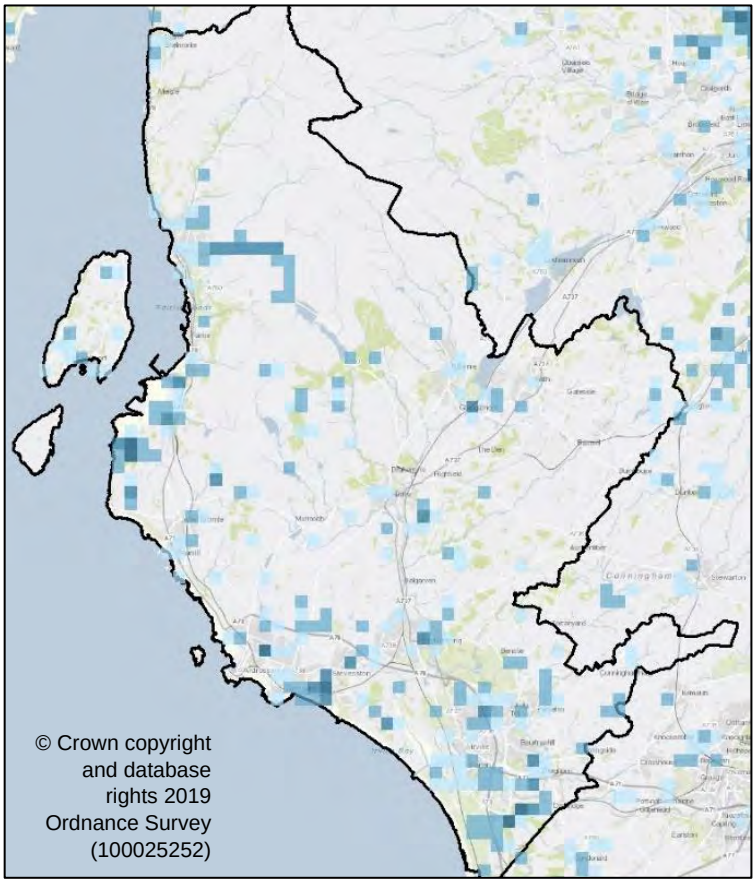
Building loss in North Ayrshire (2016 to 2017)



Of 1275 cells that contained buildings within 2016 and/or 2017:-

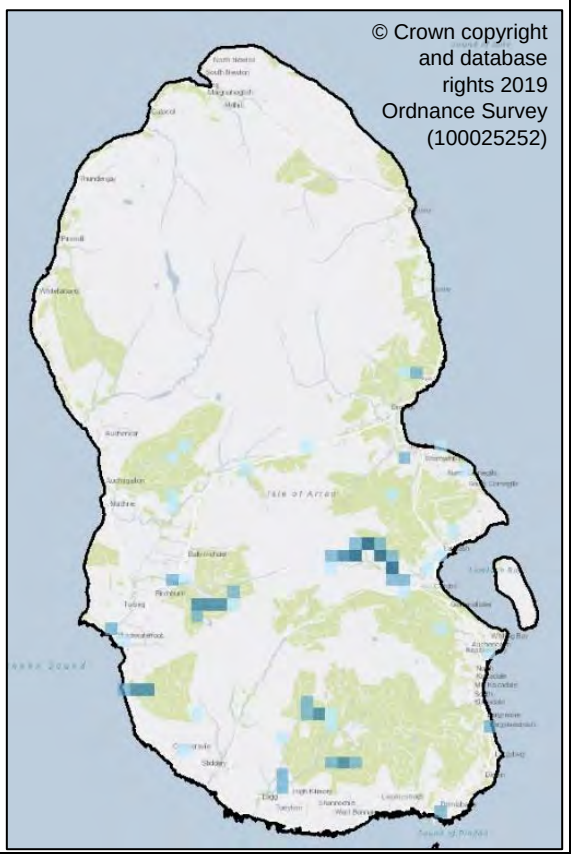
- **7.8% (n=99) lost buildings, of which:-**
  - **92 lost 1 to 4 buildings**
  - **3 lost 5 to 9 buildings**
  - **3 lost 10 to 19 buildings**
  - **1 lost >19 buildings**

Road gain in North Ayrshire (2016 to 2017)

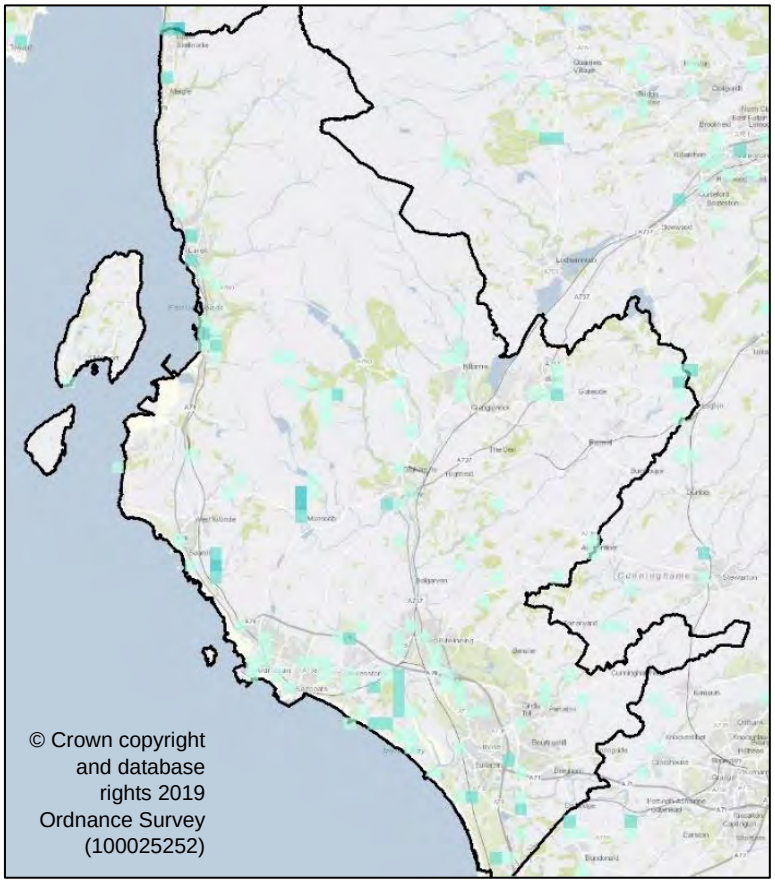


Of 1789 cells that contained roads within 2016 and/or 2017:-

- **16.7% (n=298) gained roads, of which:-**
  - **135 gained 1 to 100m**
  - **122 gained 100 to 499m**
  - **31 gained 500 to 999m**
  - **10 gained 1000m+**



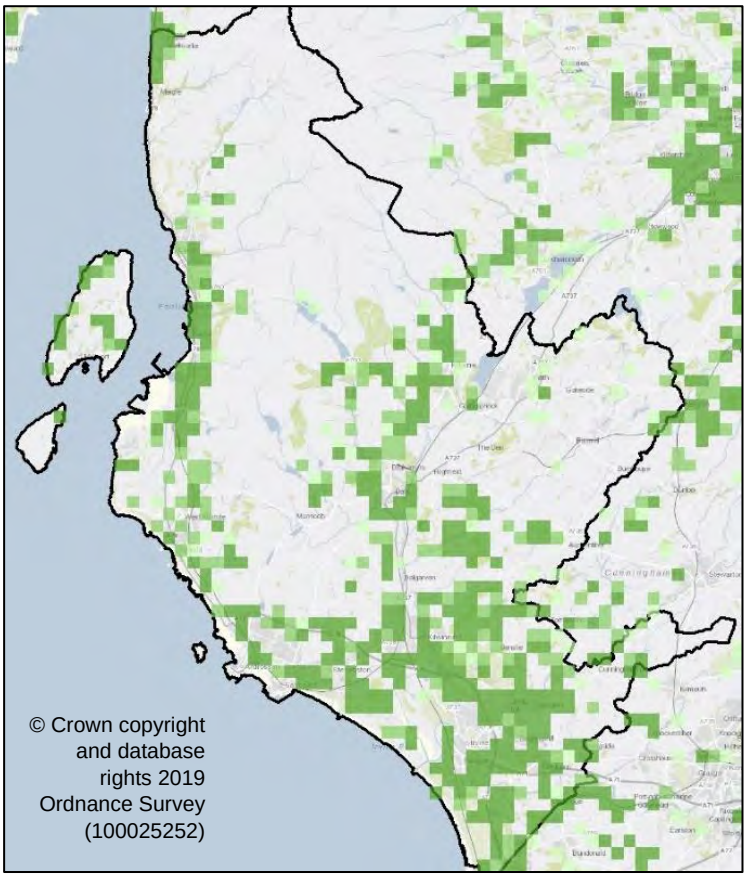
Road loss in North Ayrshire (2016 to 2017)



Of 1789 cells that contained roads within 2016 and/or 2017:-

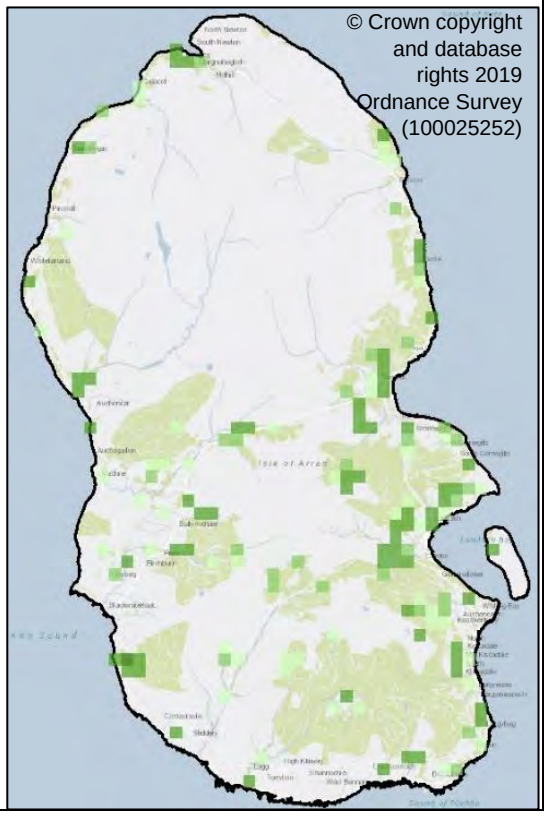
- **12.4% (n=221) lost roads, of which:-**
  - **126 lost 1 to 100m**
  - **53 lost 100 to 499m**
  - **42 lost 500 to 999m**

Woodland gain in North Ayrshire (2016 to 2017)

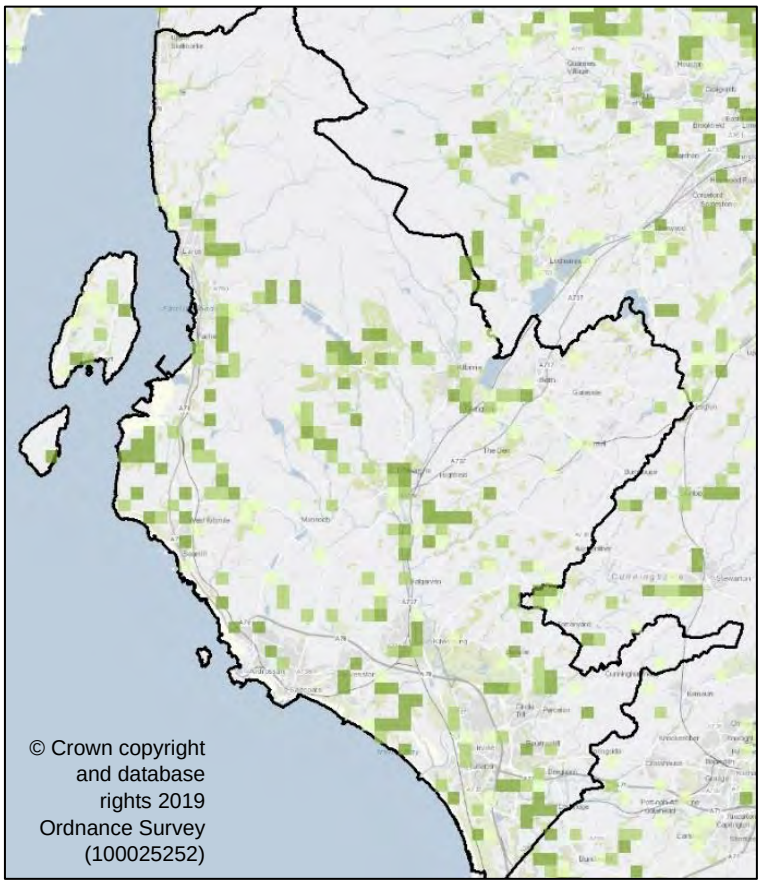


Of 2188 cells that contained woodland within 2016 and/or 2017:-

- **29.1% (n=636) gained woodland, of which:-**
  - **100 gained <100m²**
  - **150 gained 100 to 999m²**
  - **386 gained 1000m²+**

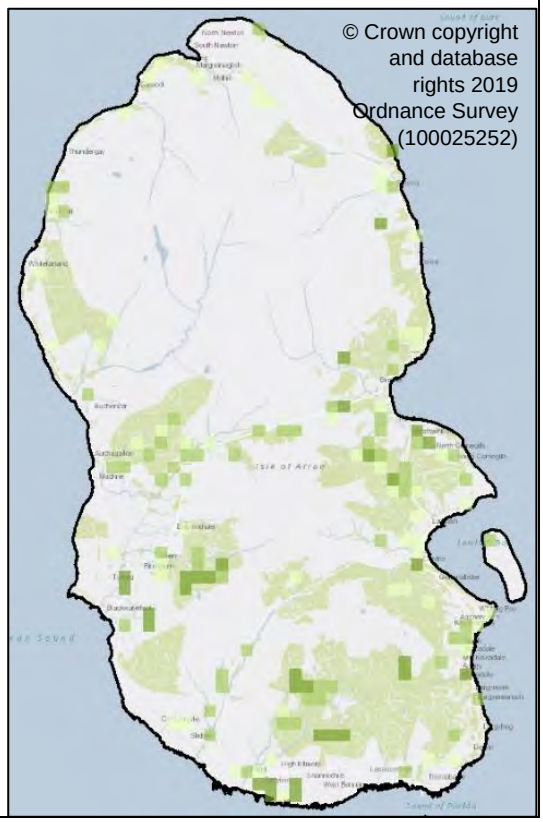


Woodland loss in North Ayrshire (2016 to 2017)

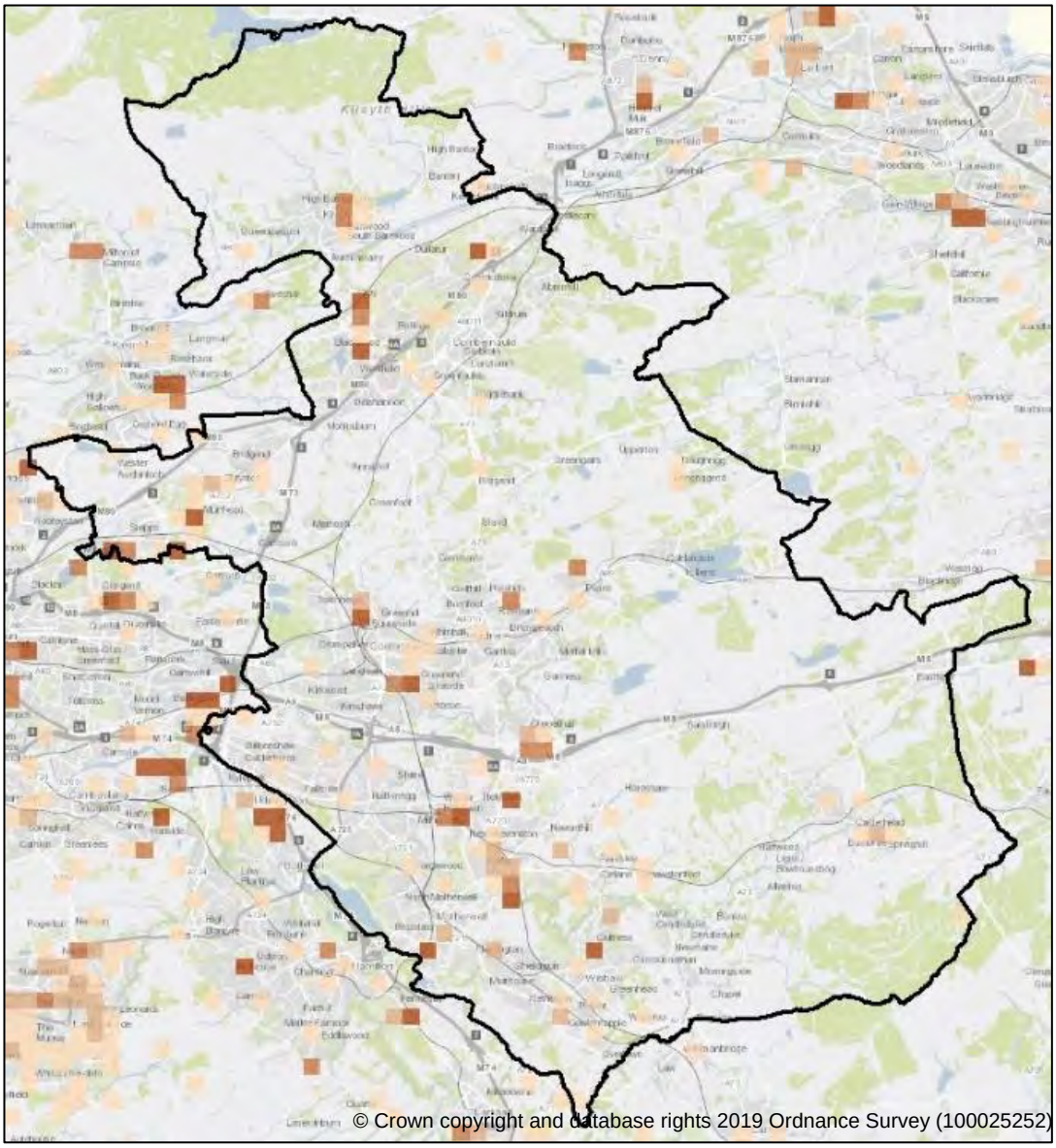


Of 2188 cells that contained woodland within 2016 and/or 2017:-

- **17.7% (n=387) lost woodland, of which:-**
  - **113 lost <100m²**
  - **142 lost 100 to 999m²**
  - **132 lost 1000m²+**



Building gain in North Lanarkshire (2016 to 2017)



Of 1241 cells that contained buildings within 2016 and/or 2017:-

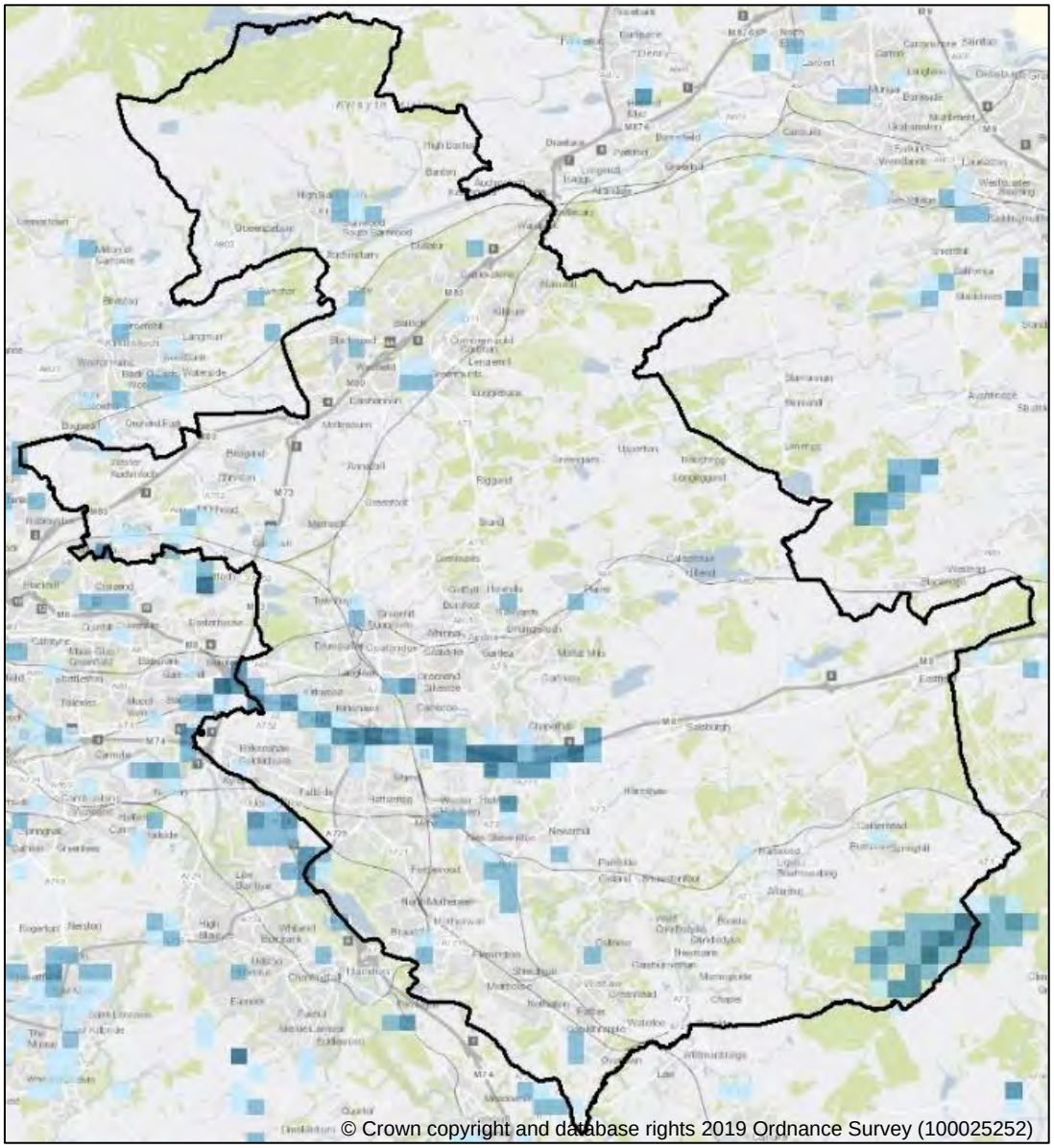
- **8.1% (n=100) gained buildings, of which:-**
  - **66 gained 1 to 4 buildings**
  - **12 gained 5 to 9 buildings**
  - **11 gained 10 to 19 buildings**
  - **11 gained >19 buildings**

Building loss in North Lanarkshire (2016 to 2017)

Of 1241 cells that contained buildings within 2016 and/or 2017:-

- **2.3% (n=29) lost buildings, of which:-**
  - **28 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

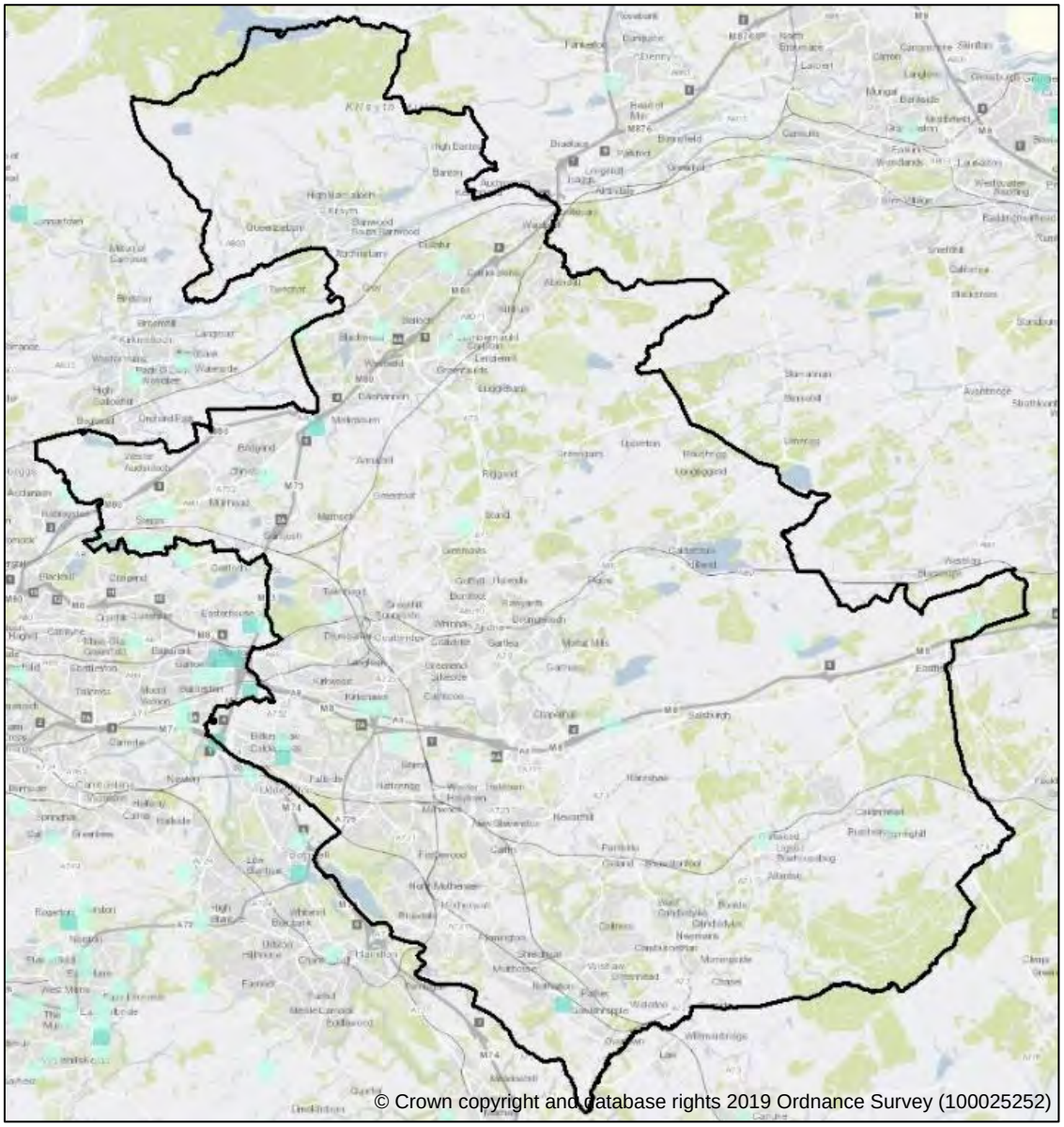
Road gain in North Lanarkshire (2016 to 2017)



Of 1537 cells that contained roads within 2016 and/or 2017:-

- **7.9% (n=121) gained roads, of which:-**
  - **41 gained 1 to 100m**
  - **47 gained 100 to 499m**
  - **24 gained 500 to 999m**
  - **9 gained 1000m+**

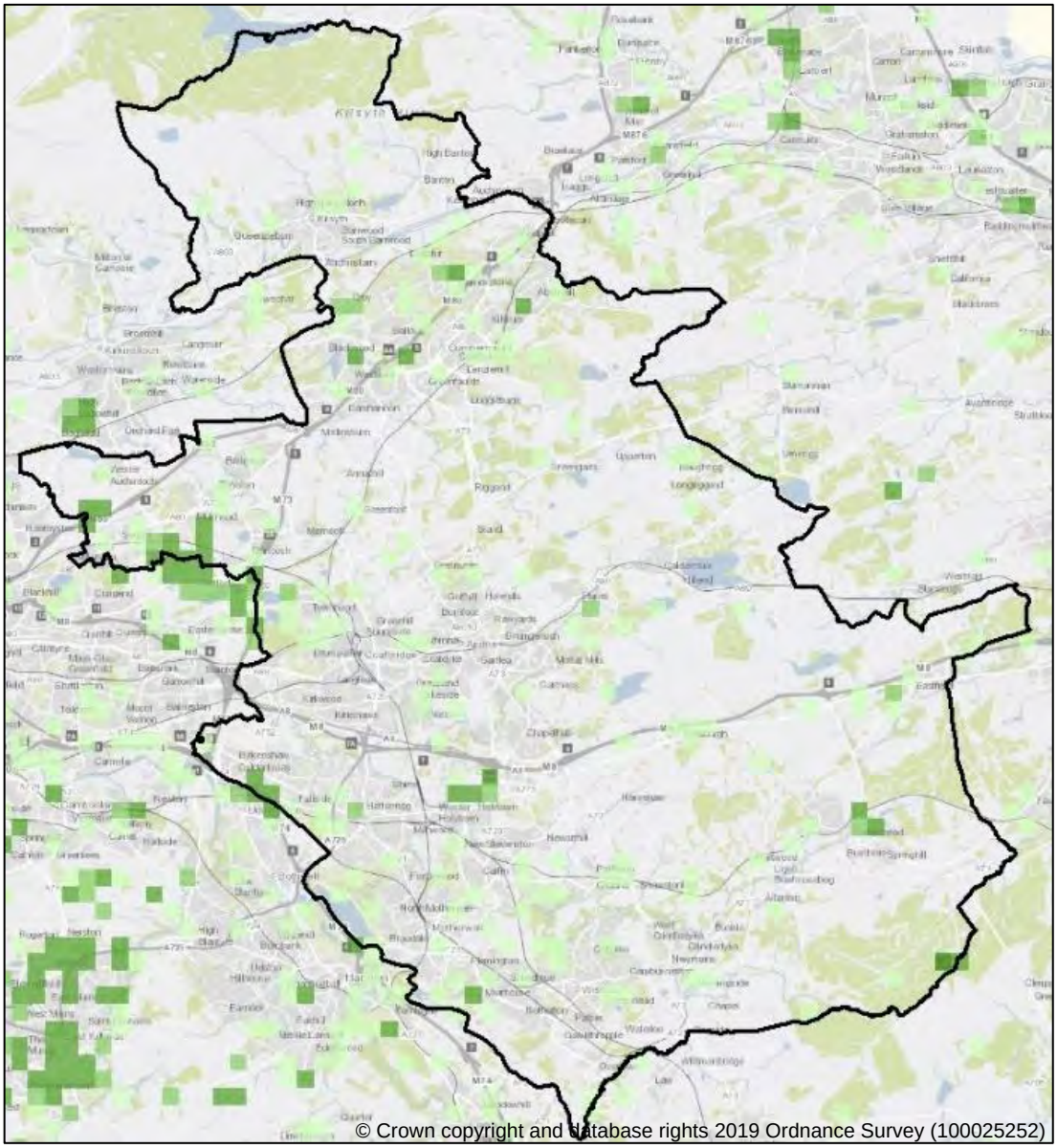
Road loss in North Lanarkshire (2016 to 2017)



Of 1537 cells that contained roads within 2016 and/or 2017:-

- **1.8% (n=27) lost roads, of which:-**
  - **24 lost 1 to 100m**
  - **3 lost 100 to 499m**

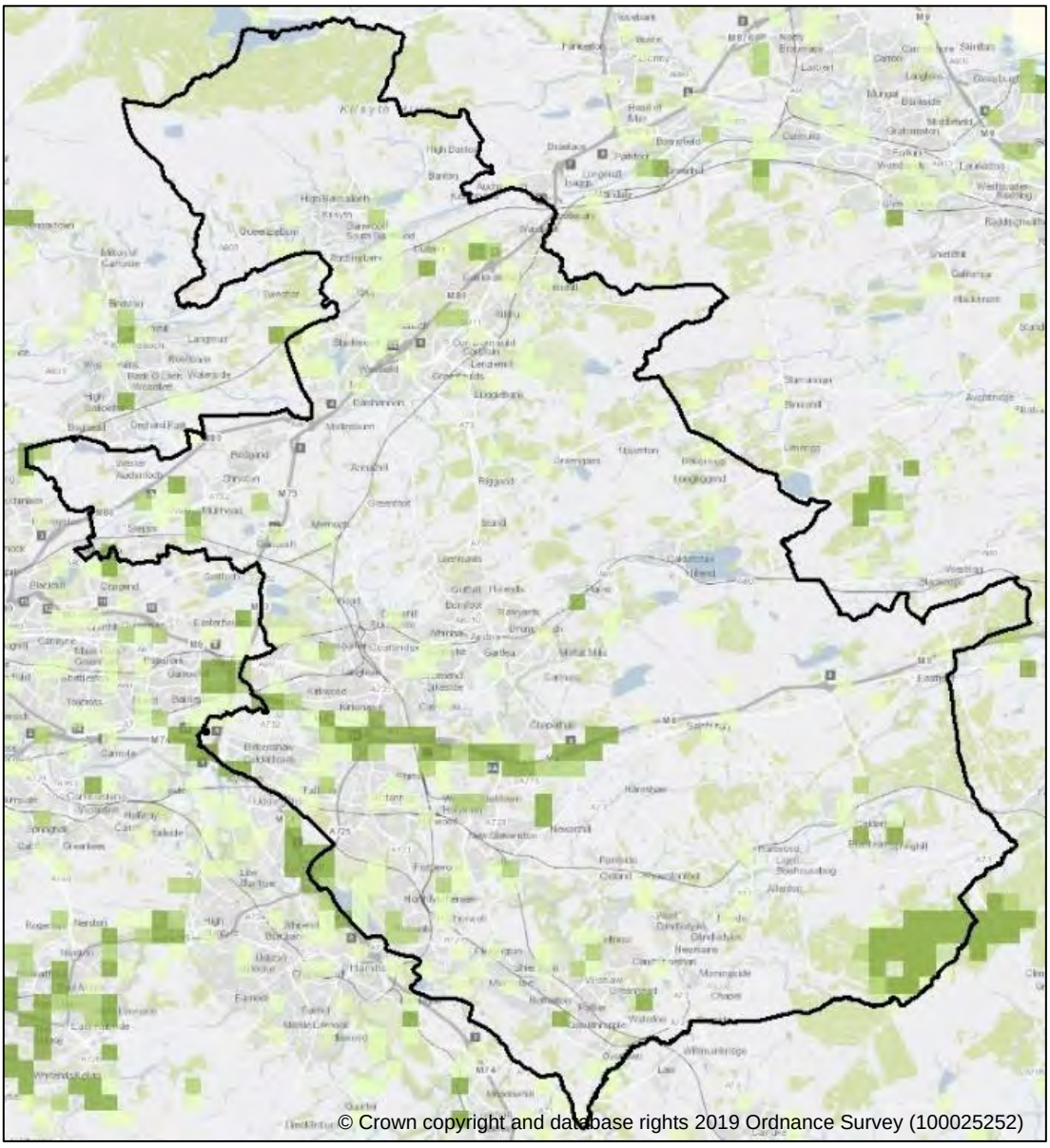
Woodland gain in North Lanarkshire (2016 to 2017)



Of 1680 cells that contained woodland within 2016 and/or 2017:-

- **9.9% (n=167) gained woodland, of which:-**
  - **134 gained <100m²**
  - **10 gained 100 to 999m²**
  - **23 gained 1000m²+**

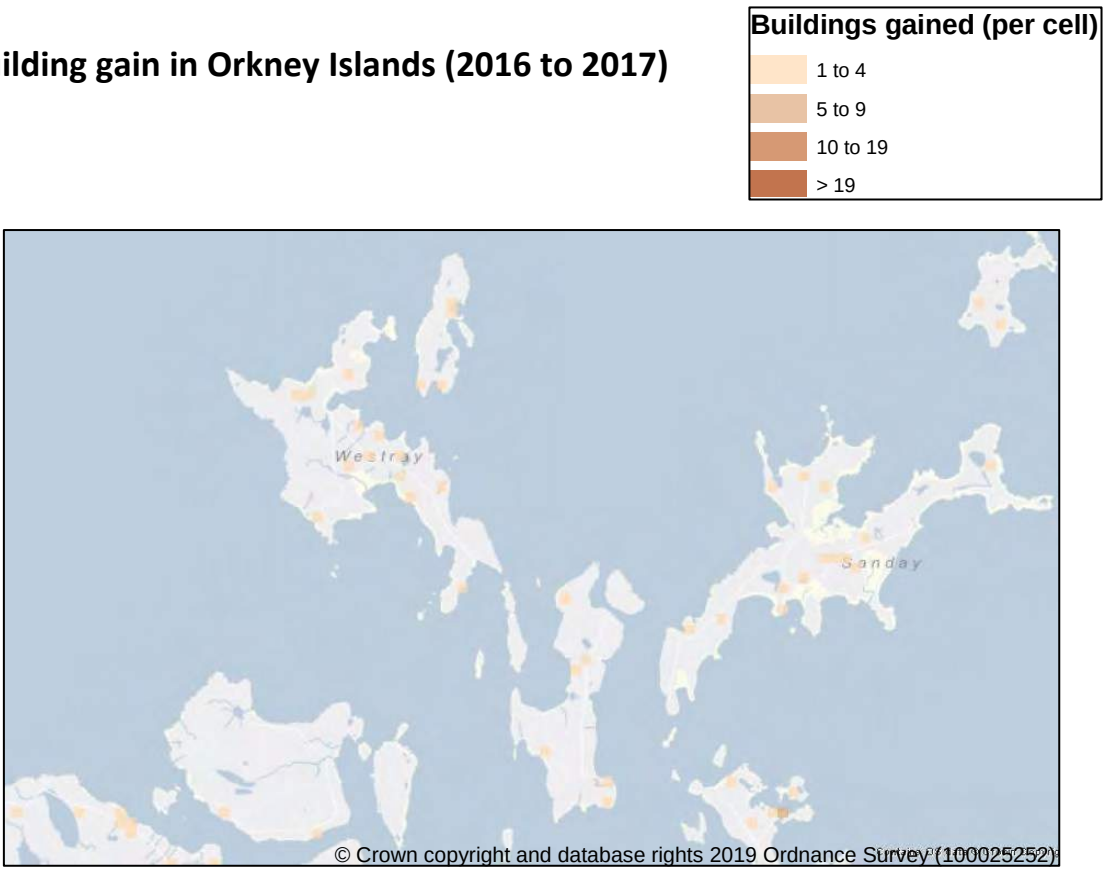
Woodland loss in North Lanarkshire (2016 to 2017)



Of 1680 cells that contained woodland within 2016 and/or 2017:-

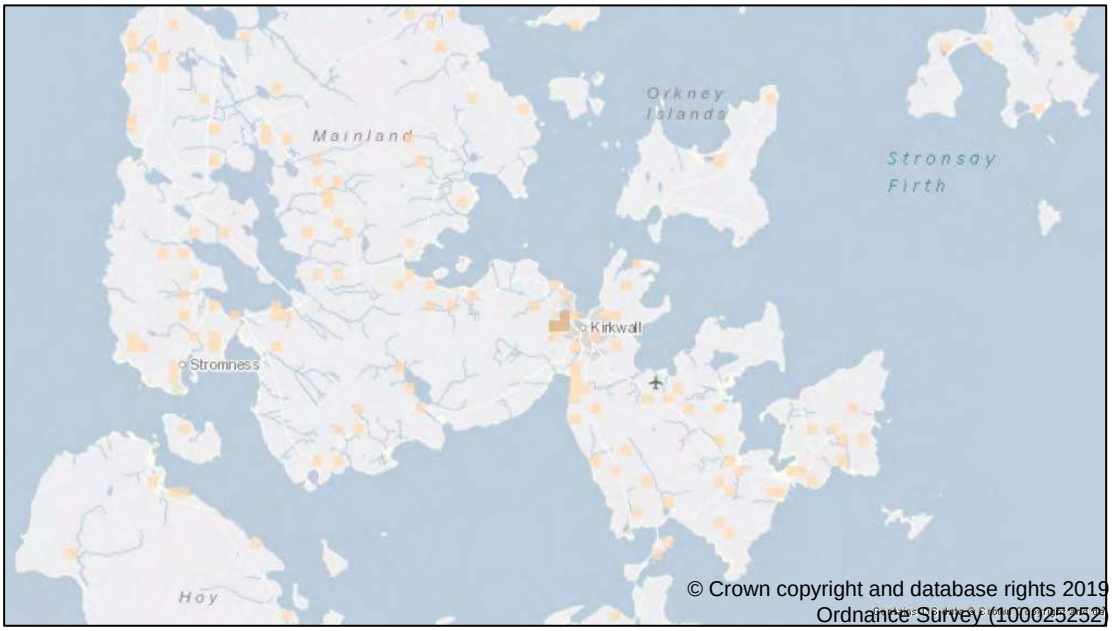
- **13.0% (n=219) lost woodland, of which:-**
  - **127 lost <100m²**
  - **36 lost 100 to 999m²**
  - **56 lost 1000m²+**

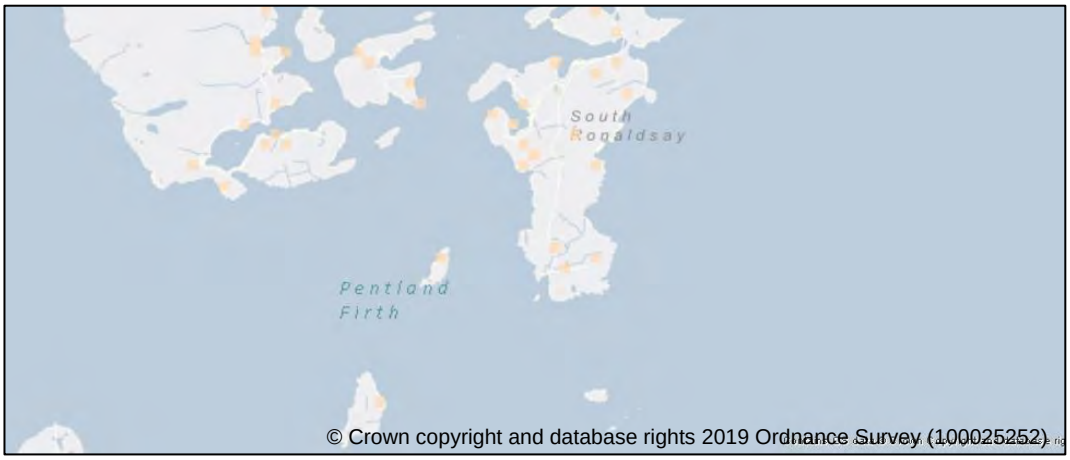
Building gain in Orkney Islands (2016 to 2017)



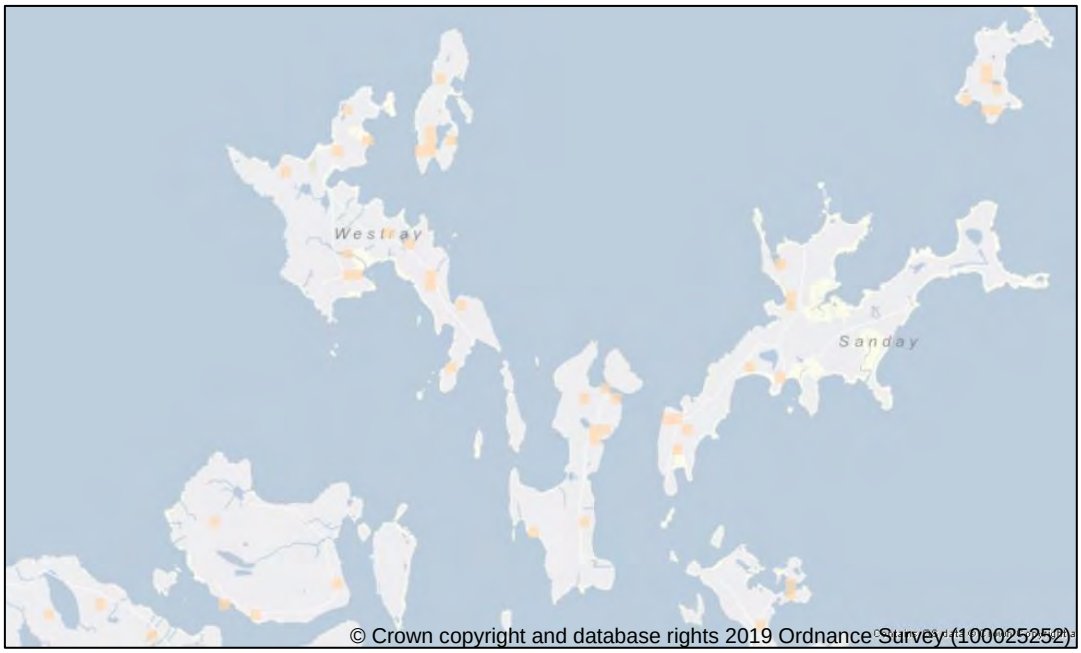
Of 2152 cells that contained buildings within 2016 and/or 2017:-

- **9.9% (n=214) gained buildings, of which:-**
  - **210 gained 1 to 4 buildings**
  - **4 gained 5 to 9 buildings**



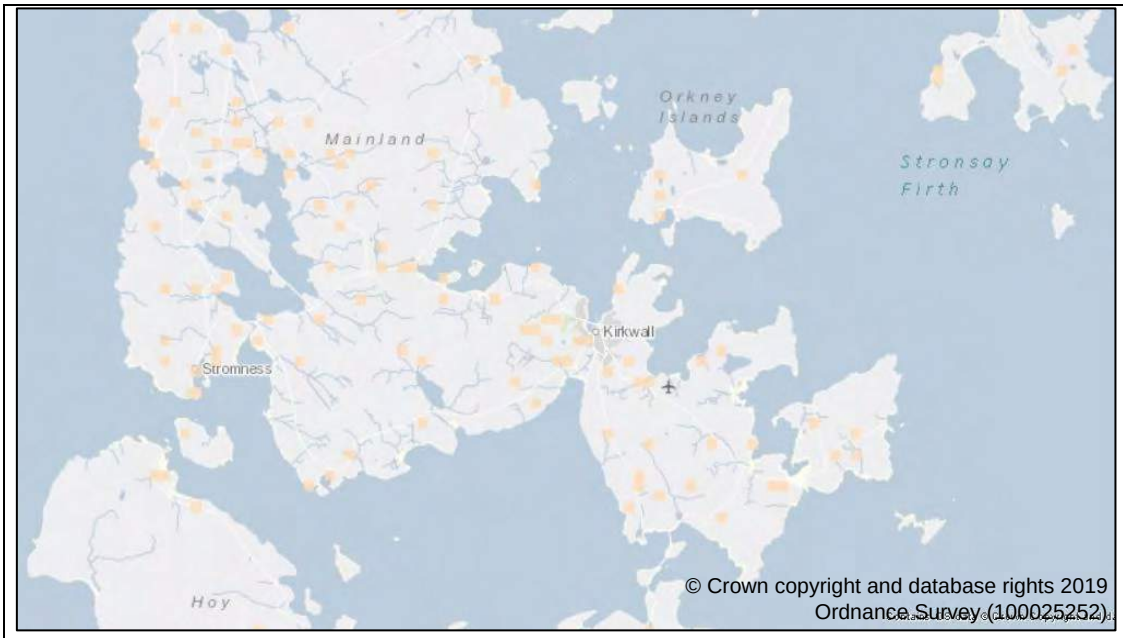


Building loss in Orkney Islands (2016 to 2017)



Of 2152 cells that contained buildings within 2016 and/or 2017:-

- **2.3% (n=29) lost buildings, of which:-**
  - **28 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**


Orkney Islands
Mainland
Stronsay Firth
Kirkwall
Stromness
Hoy
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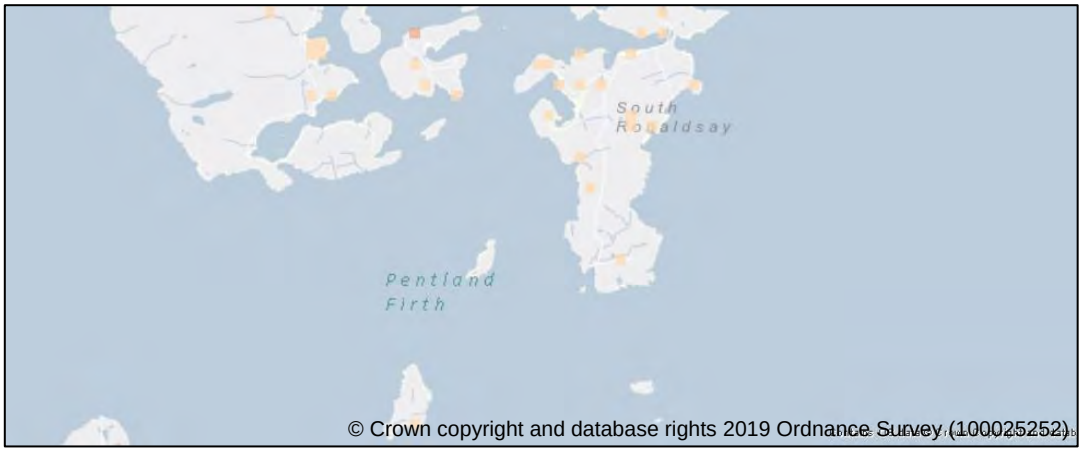
South Ronaldsay
Pentland Firth
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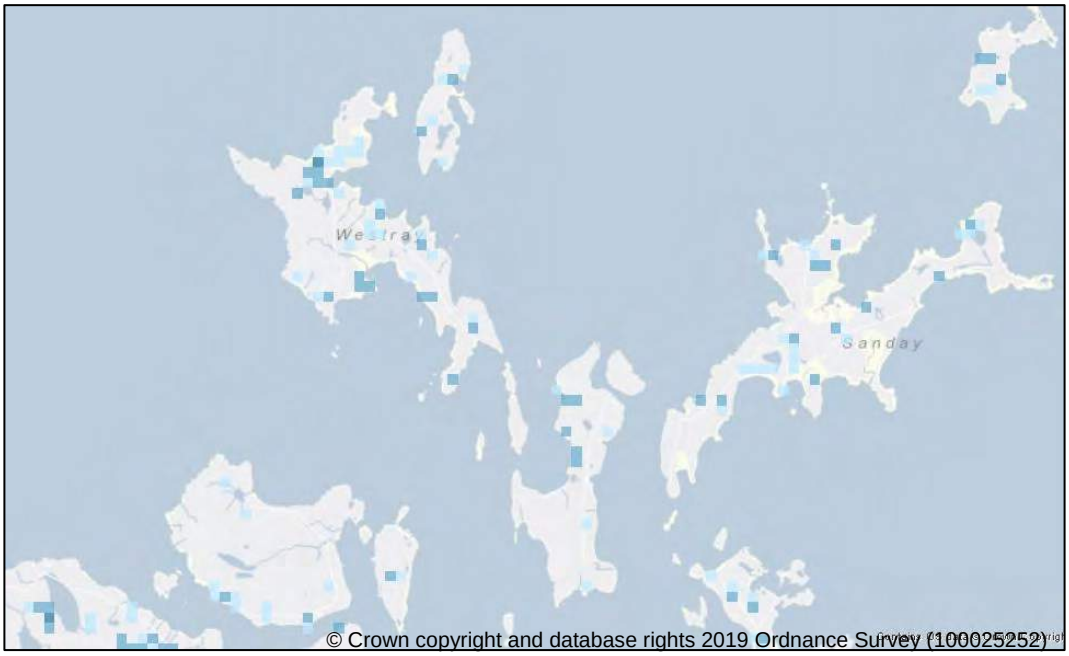
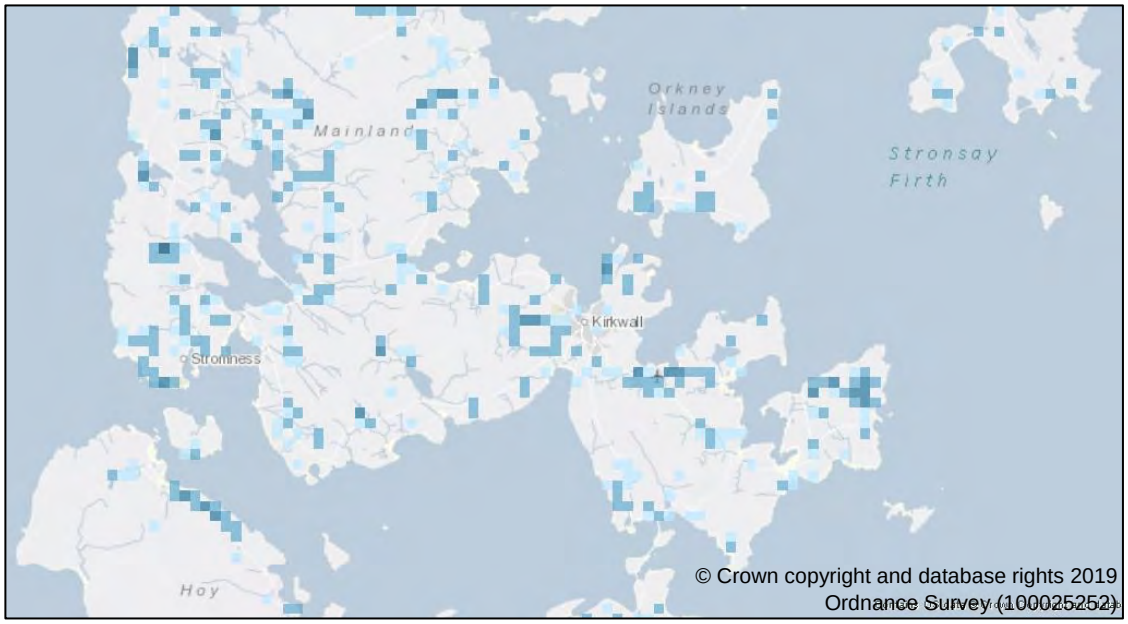
Road gain in Orkney Islands (2016 to 2017)



Of 2447 cells that contained roads within 2016 and/or 2017:-

- **24.8% (n=608) gained roads, of which:-**
  - **270 gained 1 to 100m**
  - **301 gained 100 to 499m**
  - **33 gained 500 to 999m**
  - **4 gained 1000m+**


Orkney Islands
Mainland
Stronsay Firth
Kirkwall
Stromness
Hoy
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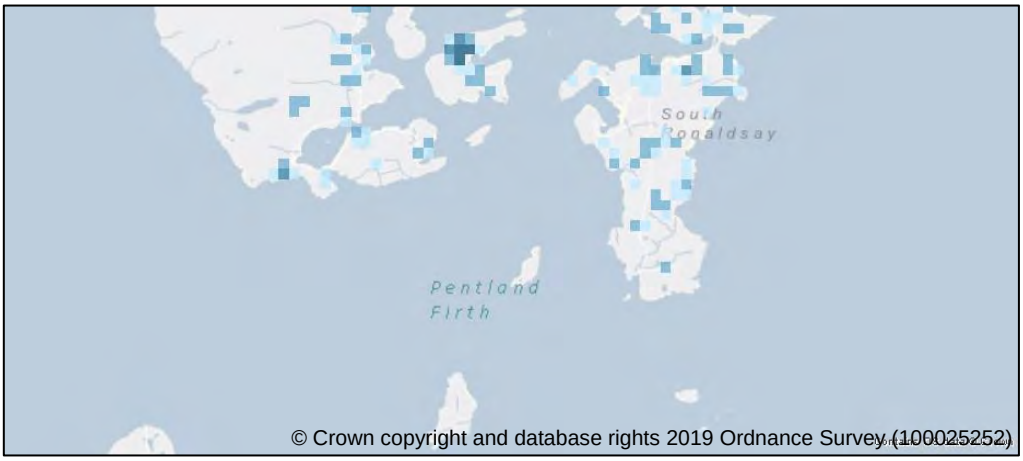
South Ronaldsay
Pentland Firth
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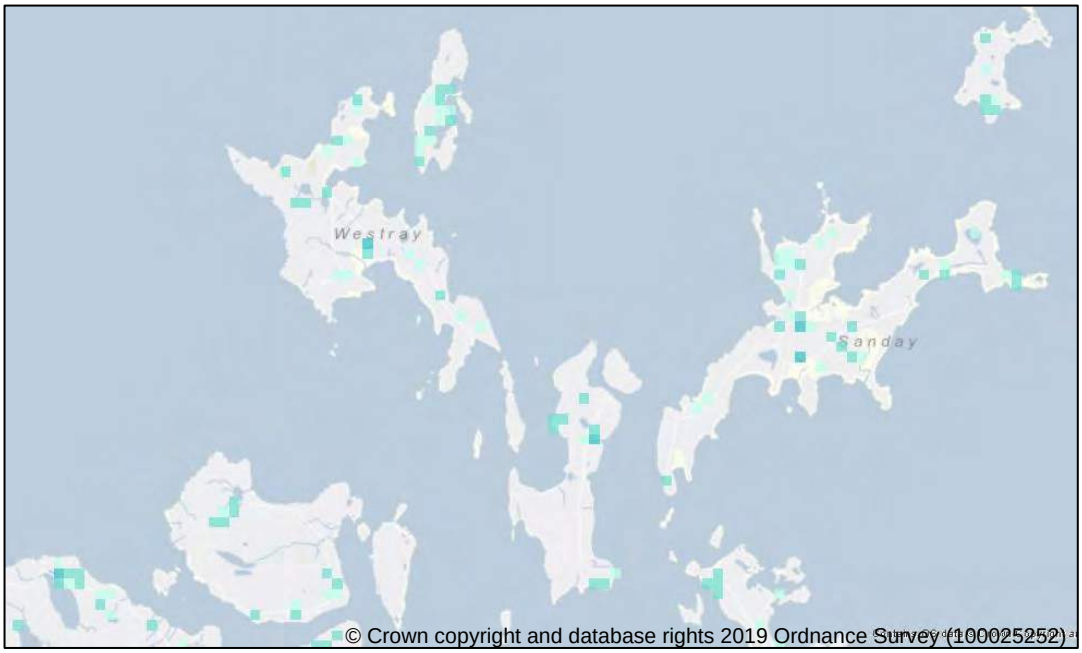
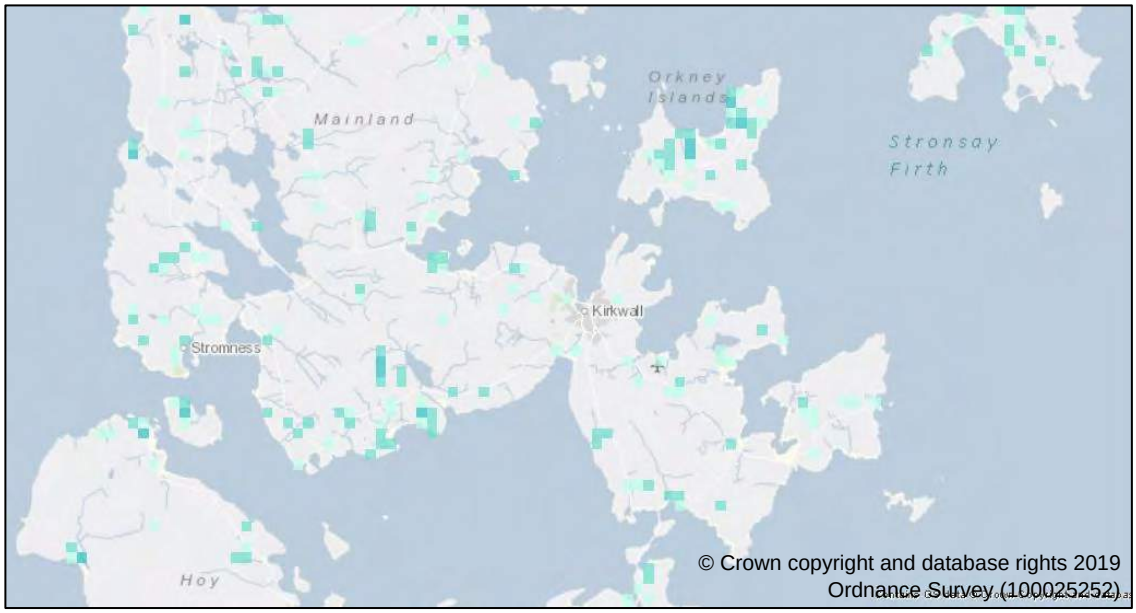
Road loss in Orkney Islands (2016 to 2017)



Of 2447 cells that contained roads within 2016 and/or 2017:-

- **15.7% (n=384) lost roads, of which:-**
  - **192 lost 1 to 100m**
  - **173 lost 100 to 499m**
  - **19 lost 500 to 999m**


Orkney Islands
Mainland
Stronsay Firth
Kirkwall
Stromness
Hoy
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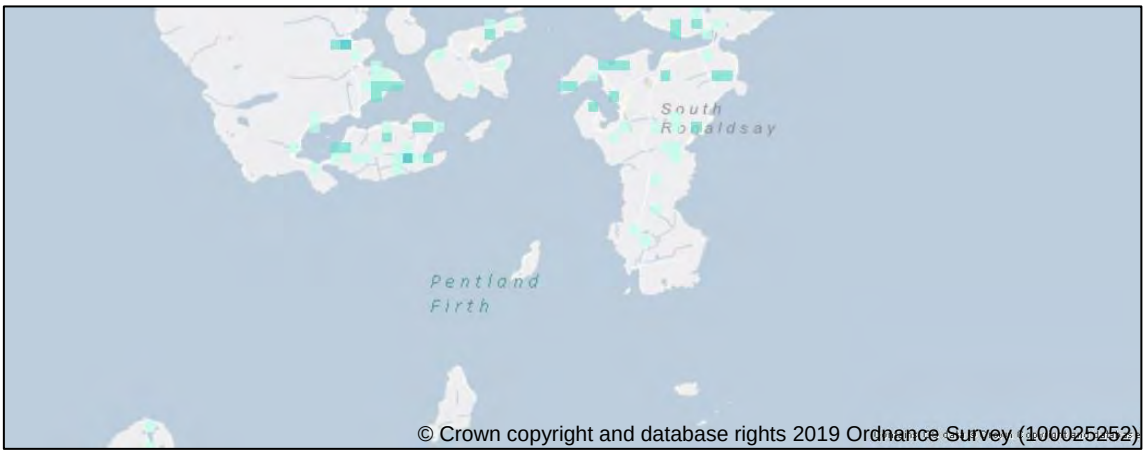
South Ronaldsay
Pentland Firth
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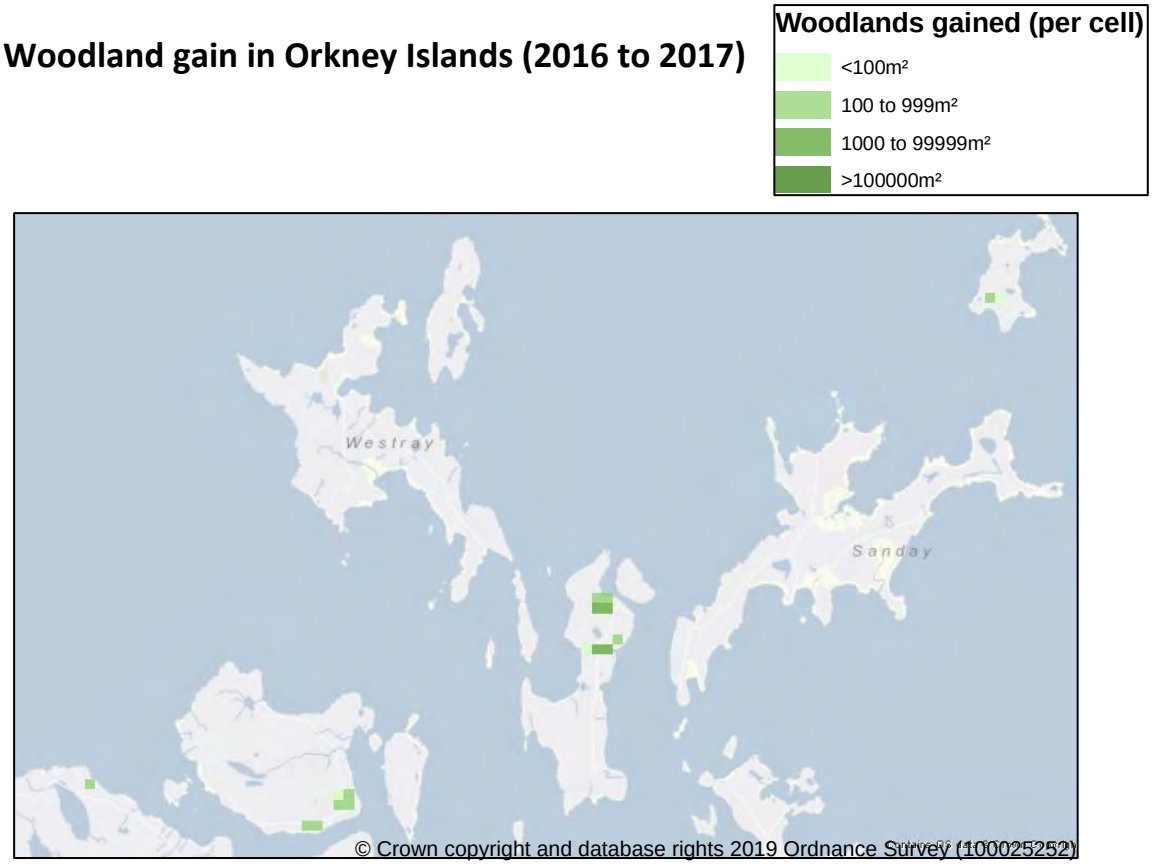
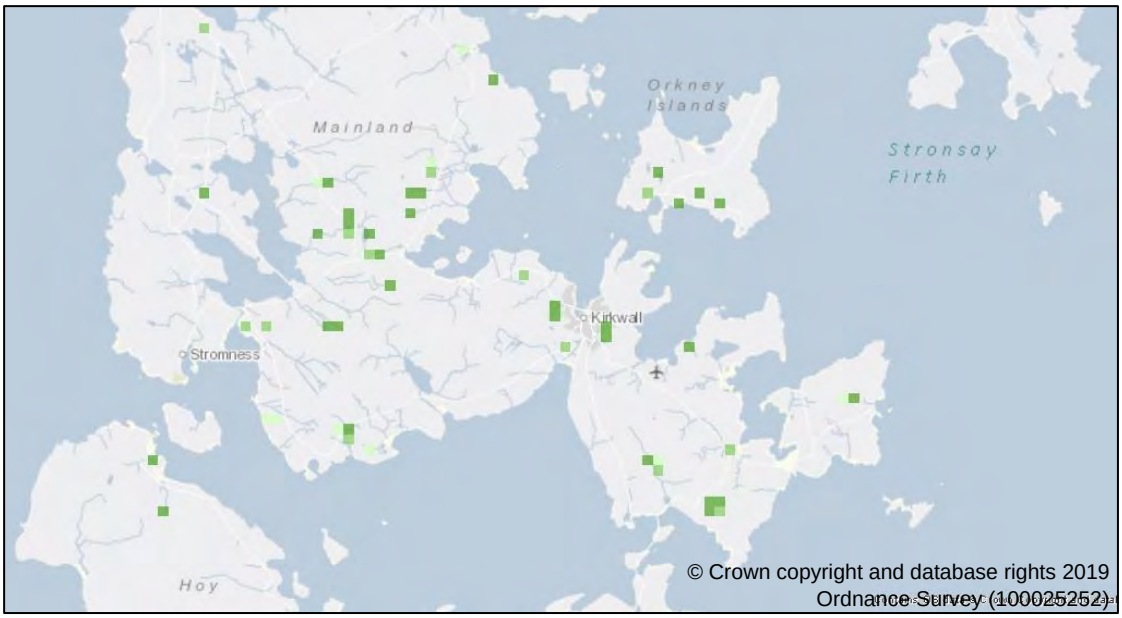
Woodland gain in Orkney Islands (2016 to 2017)



Of 252 cells that contained woodland within 2016 and/or 2017:-

- **35.7% (n=90) gained woodland, of which:-**
  - **15 gained <100m²**
  - **27 gained 100 to 999m²**
  - **48 gained 1000m²+**


Orkney Islands
Mainland
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Stromness
Hoy
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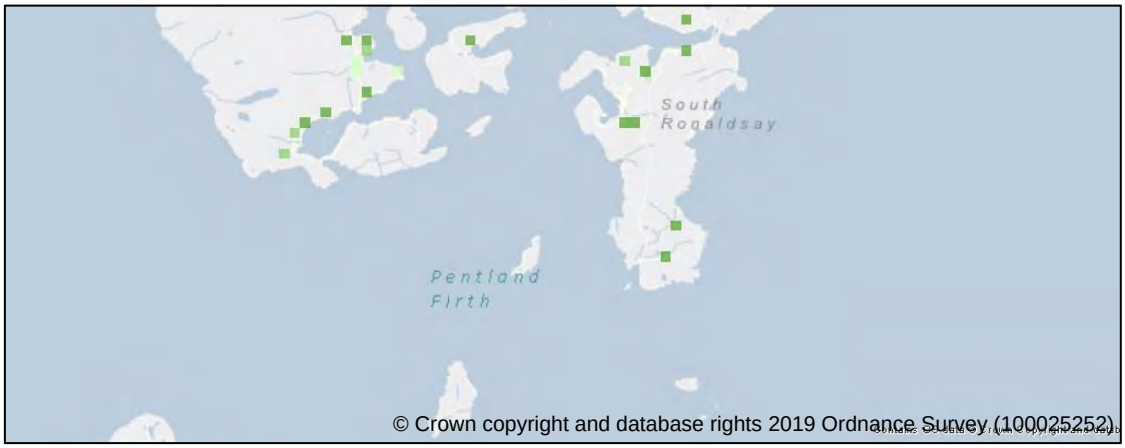
South Ronaldsay
Pentland Firth
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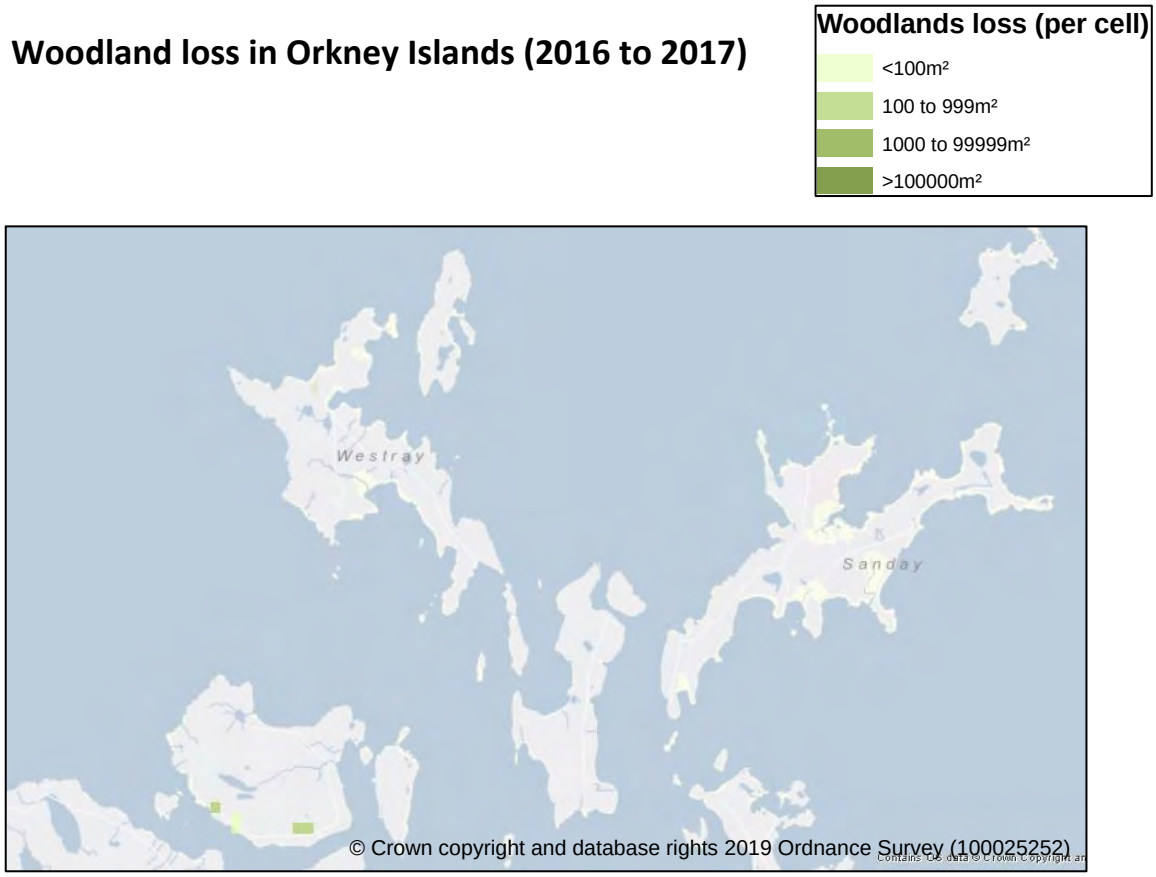
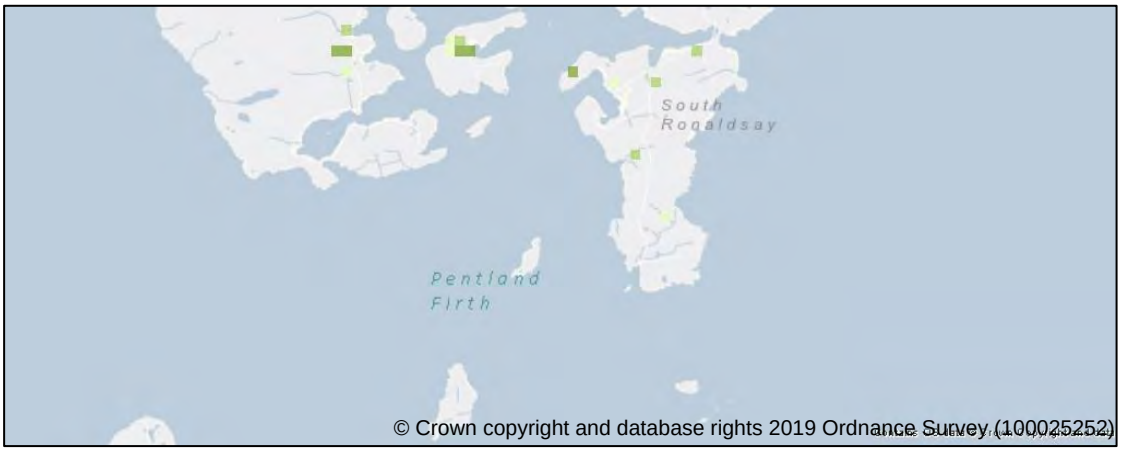
Woodland loss in Orkney Islands (2016 to 2017)

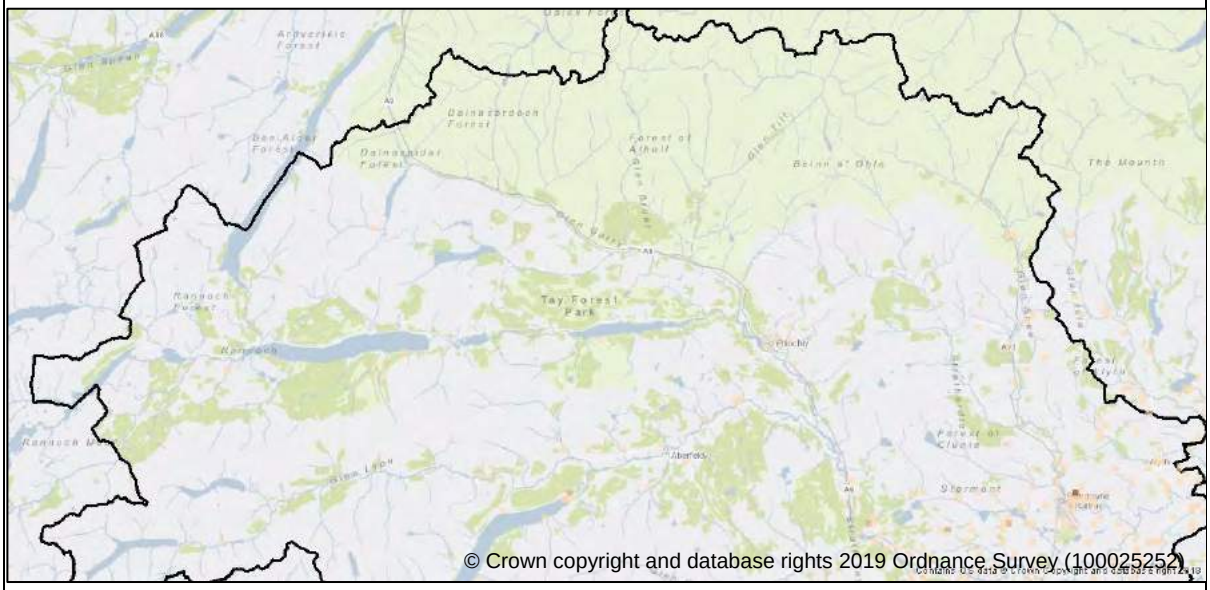


Of 252 cells that contained woodland within 2016 and/or 2017:-

- **14.7% (n=37) lost woodland, of which:-**
  - **12 lost <100m²**
  - **16 lost 100 to 999m²**
  - **9 lost 1000m²+**

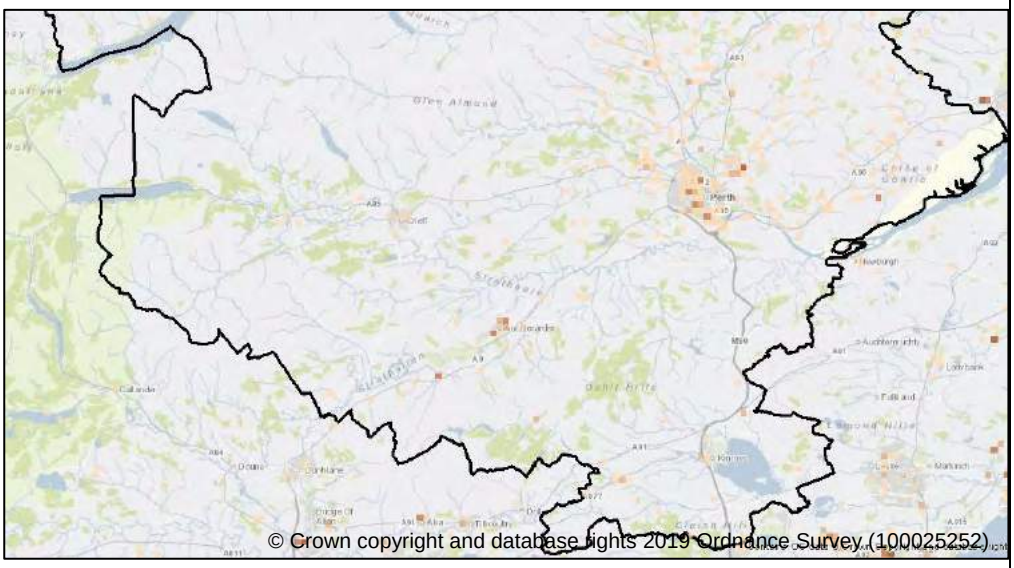


Building gain in Perth and Kinross (2016 to 2017)

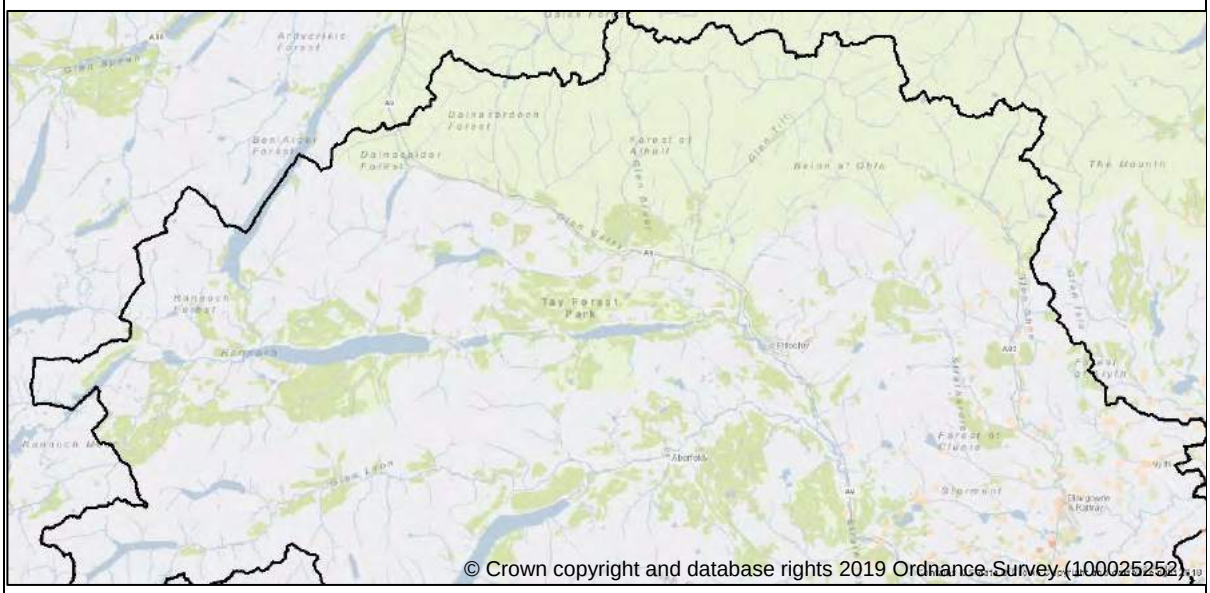


Of 5032 cells that contained buildings within 2016 and/or 2017:-

- **8.3% (n=420) gained buildings, of which:-**
  - **389 gained 1 to 4 buildings**
  - **21 gained 5 to 9 buildings**
  - **8 gained 10 to 19 buildings**
  - **2 gained >19 buildings**

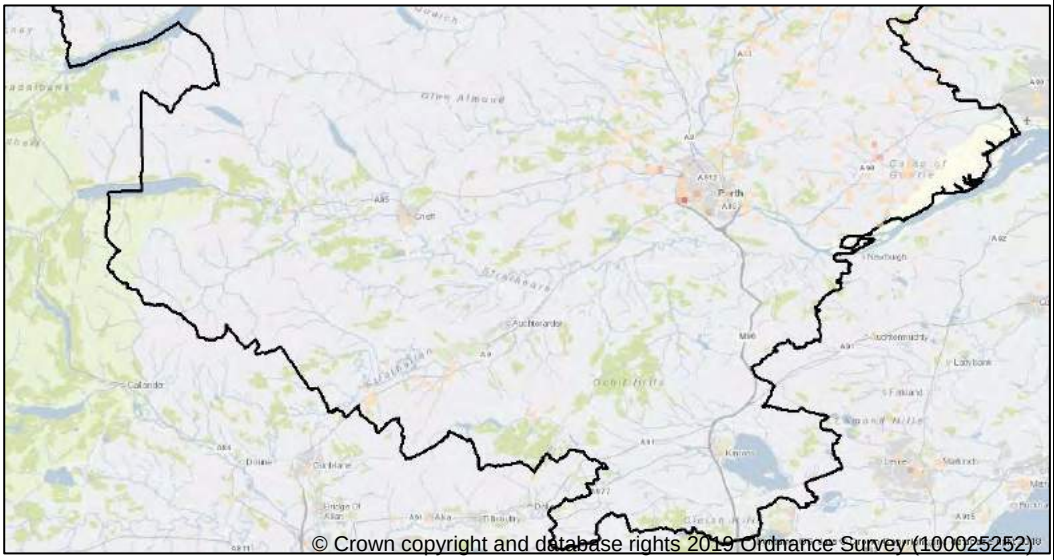


Building loss in Perth and Kinross (2016 to 2017)

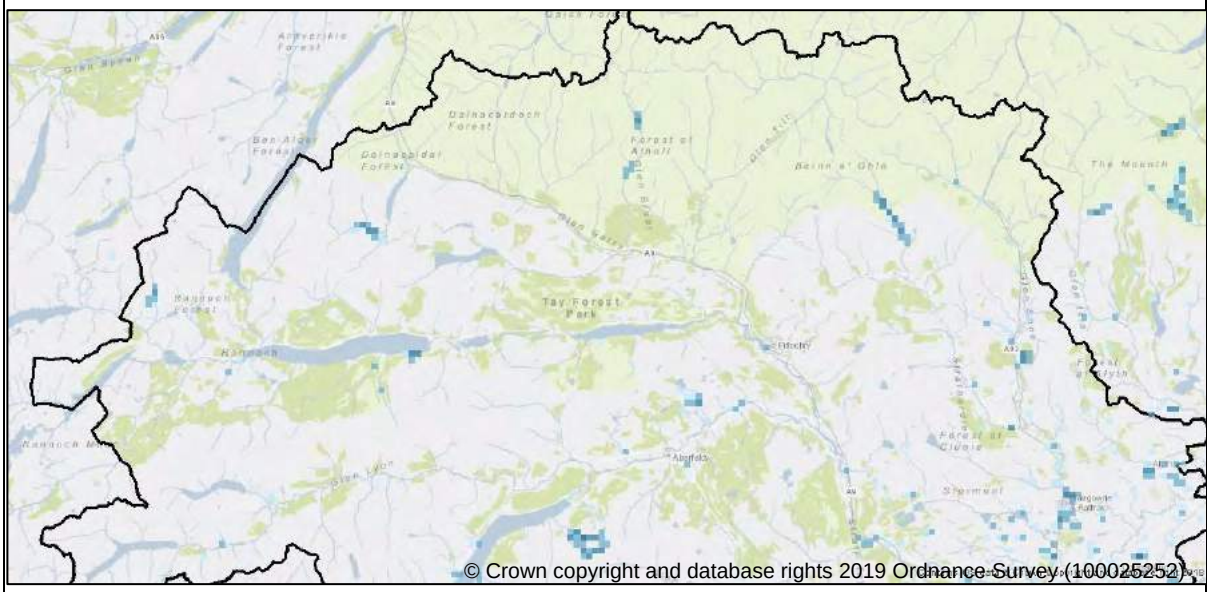


Of 5032 cells that contained buildings within 2016 and/or 2017:-

- **5.1% (n=256) lost buildings, of which:-**
  - **247 lost 1 to 4 buildings**
  - **8 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

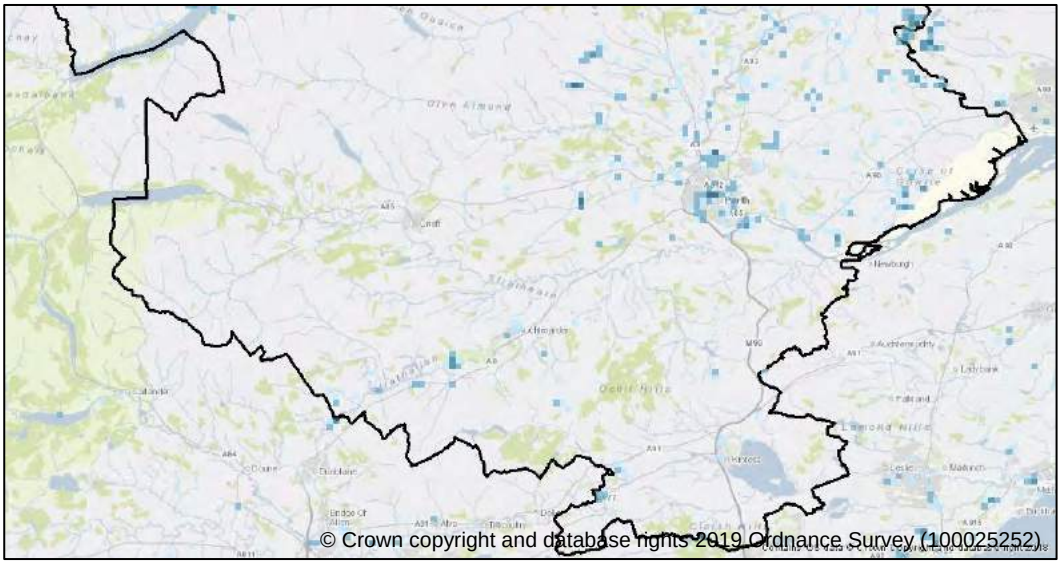


Road gain in Perth and Kinross (2016 to 2017)

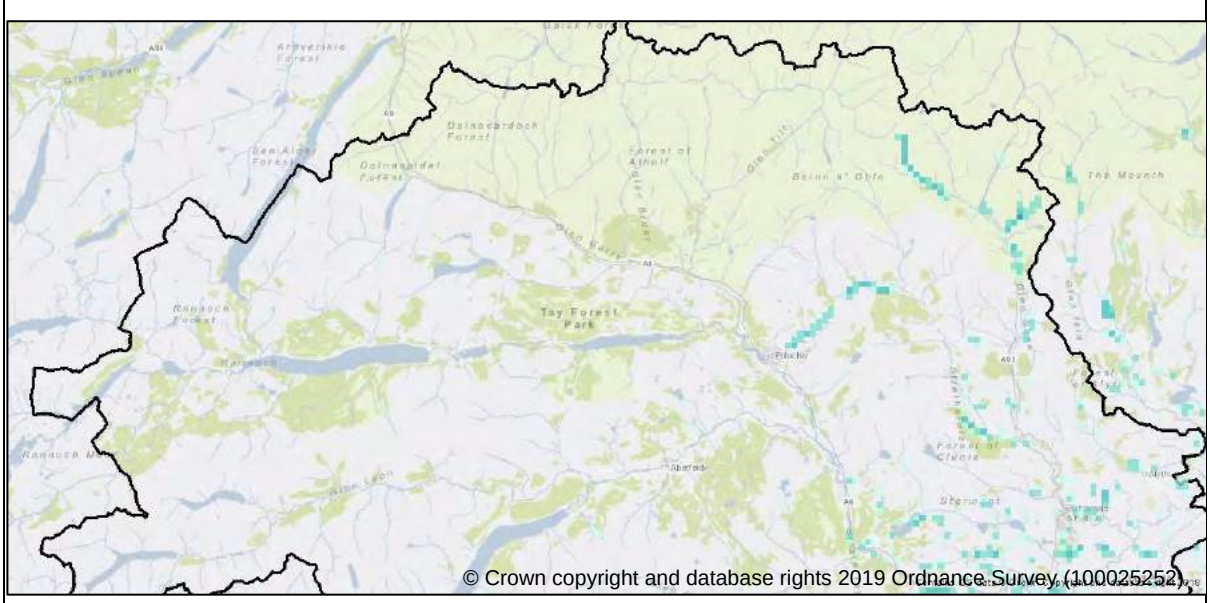


Of 8695 cells that contained roads within 2016 and/or 2017:-

- **5.7% (n=499) gained roads, of which:-**
  - **230 gained 1 to 100m**
  - **217 gained 100 to 499m**
  - **44 gained 500 to 999m**
  - **8 gained 1000m+**

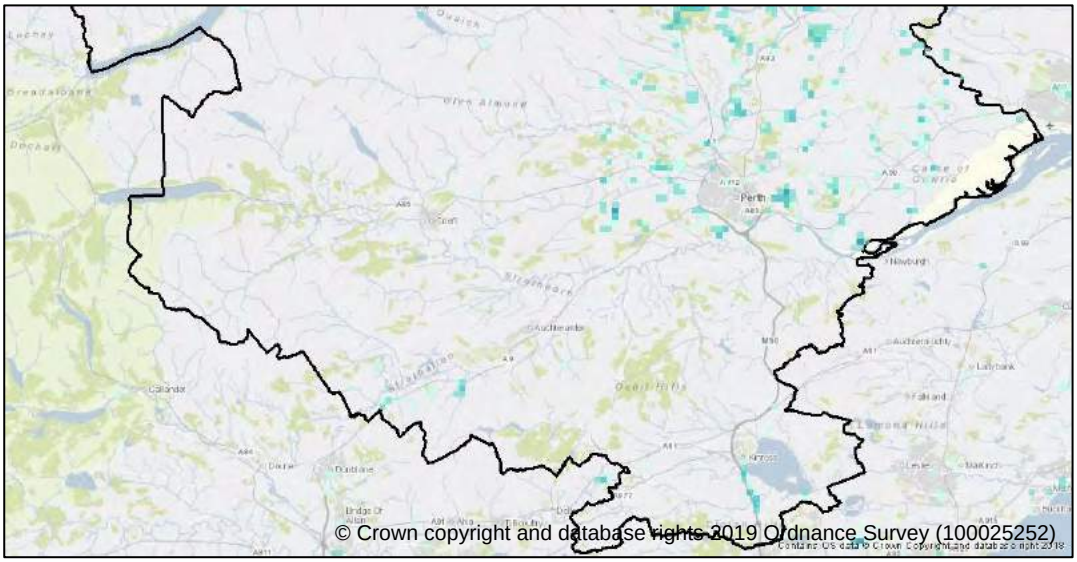


Road loss in Perth and Kinross (2016 to 2017)

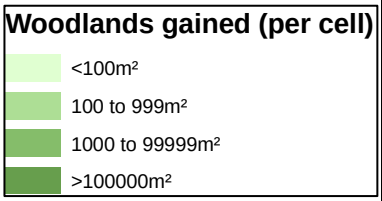


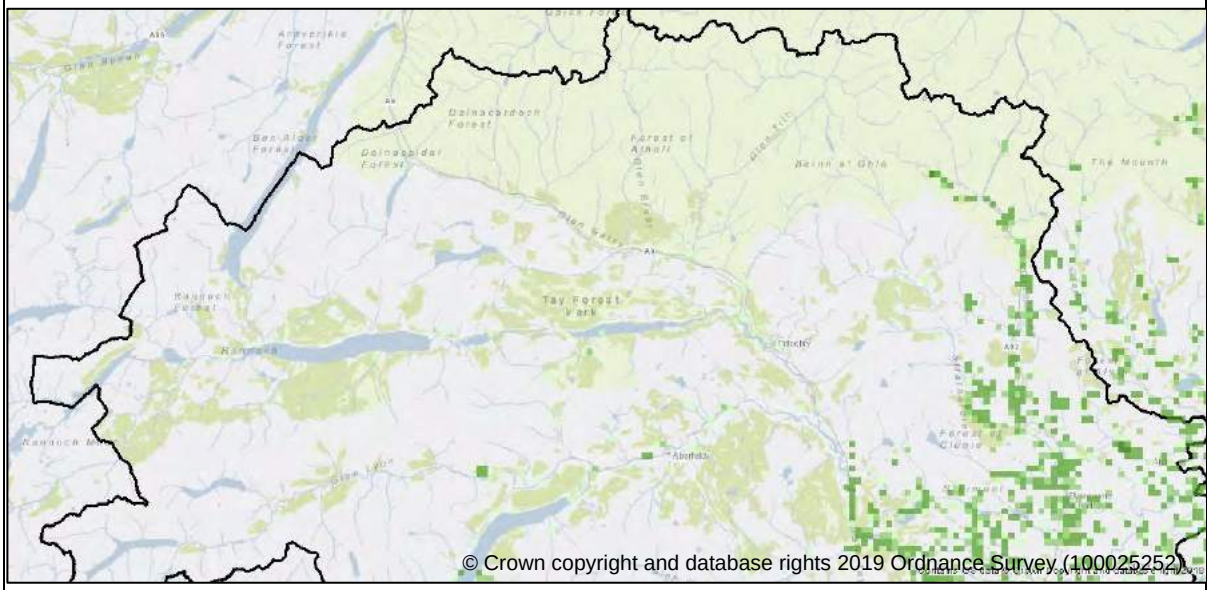
Of 8695 cells that contained roads within 2016 and/or 2017:-

- **6.7% (n=584) lost roads, of which:-**
  - **253 lost 1 to 100m**
  - **252 lost 100 to 499m**
  - **75 lost 500 to 999m**
  - **4 lost 1000m+**



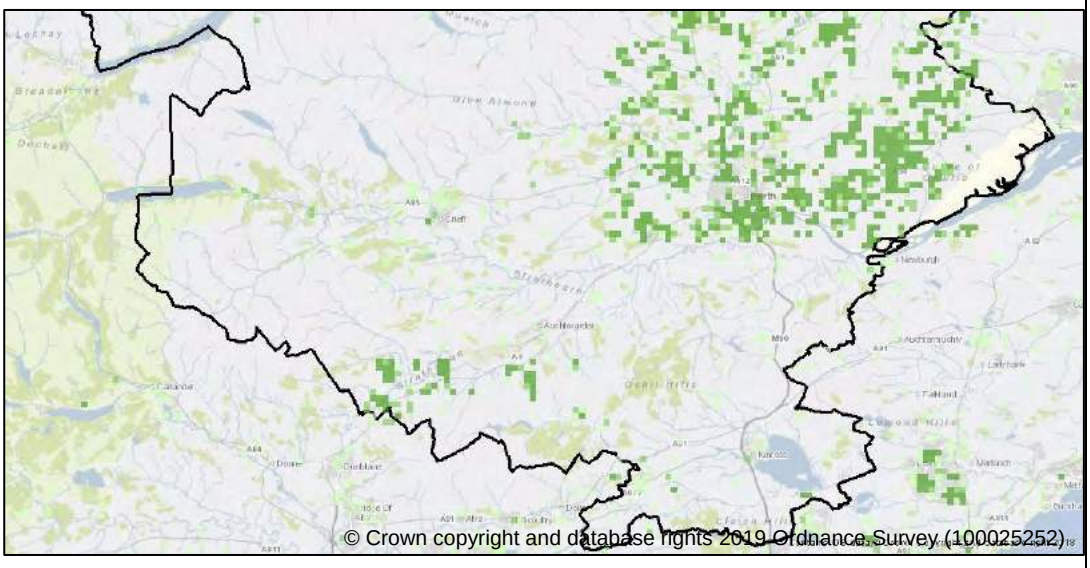
Woodland gain in Perth and Kinross (2016 to 2017)



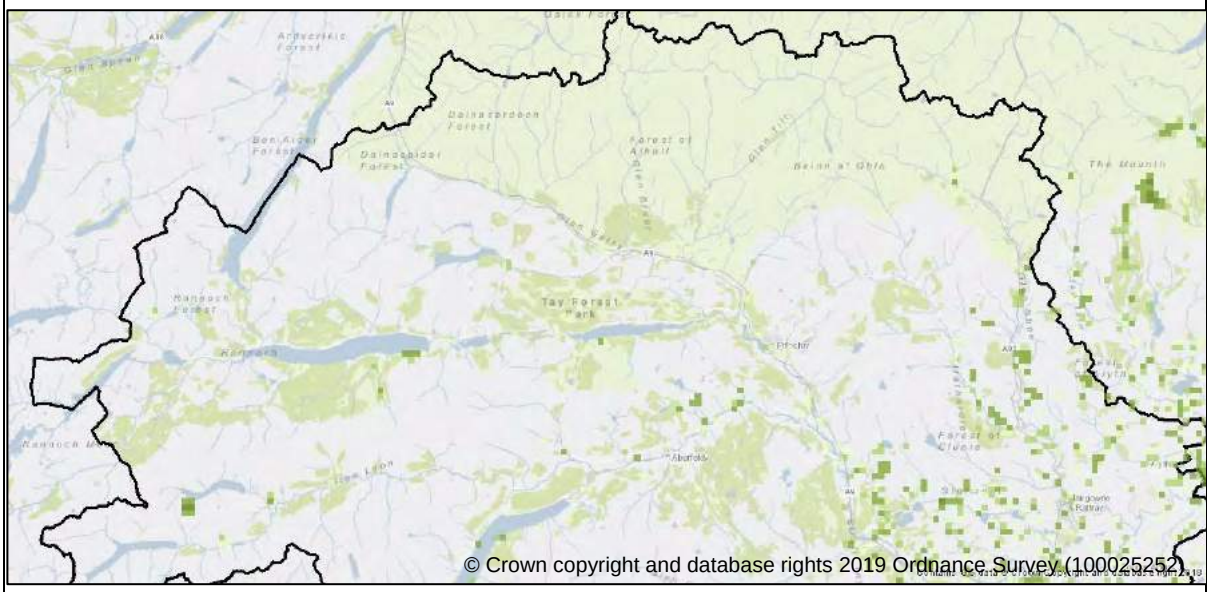


Of 11783 cells that contained woodland within 2016 and/or 2017:-

- **13.4% (n=1583) gained woodland, of which:-**
  - **377 gained <100m²**
  - **335 gained 100 to 999m²**
  - **871 gained 1000m²+**

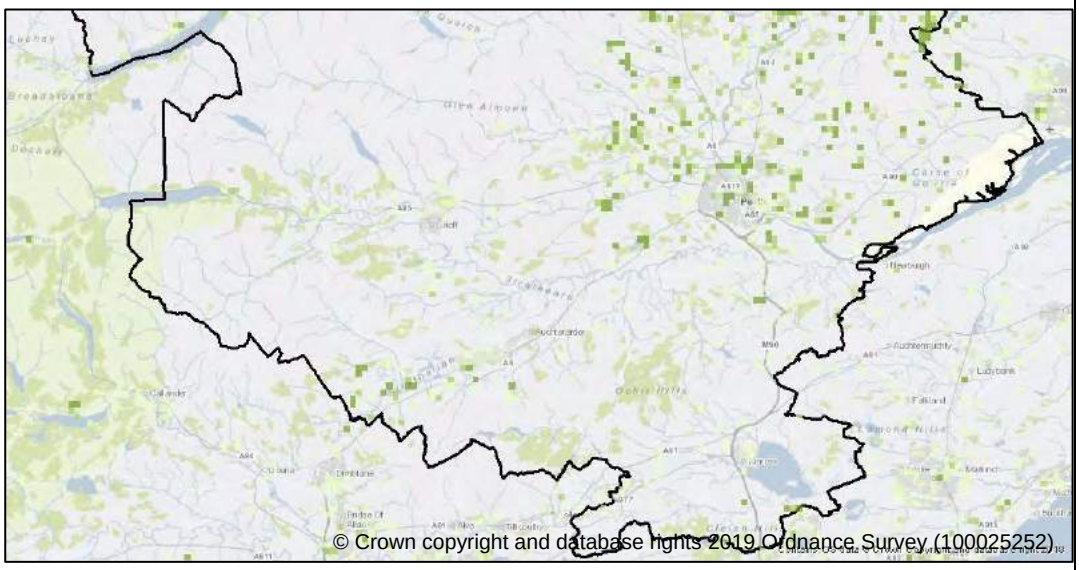


Woodland loss in Perth and Kinross (2016 to 2017)

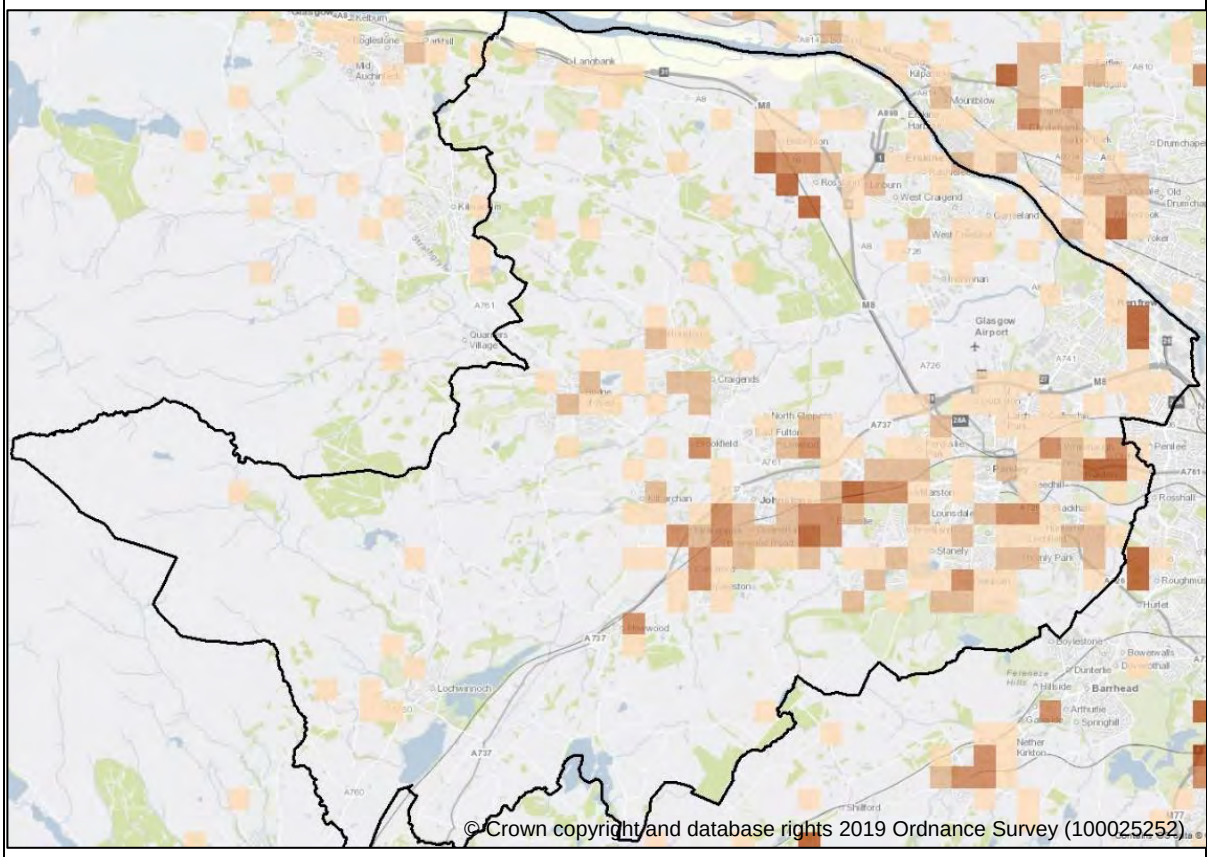


Of 11783 cells that contained woodland within 2016 and/or 2017:-

- **7.3% (n=859) lost woodland, of which:-**
  - **372 lost <100m²**
  - **214 lost 100 to 999m²**
  - **273 lost 1000m²+**



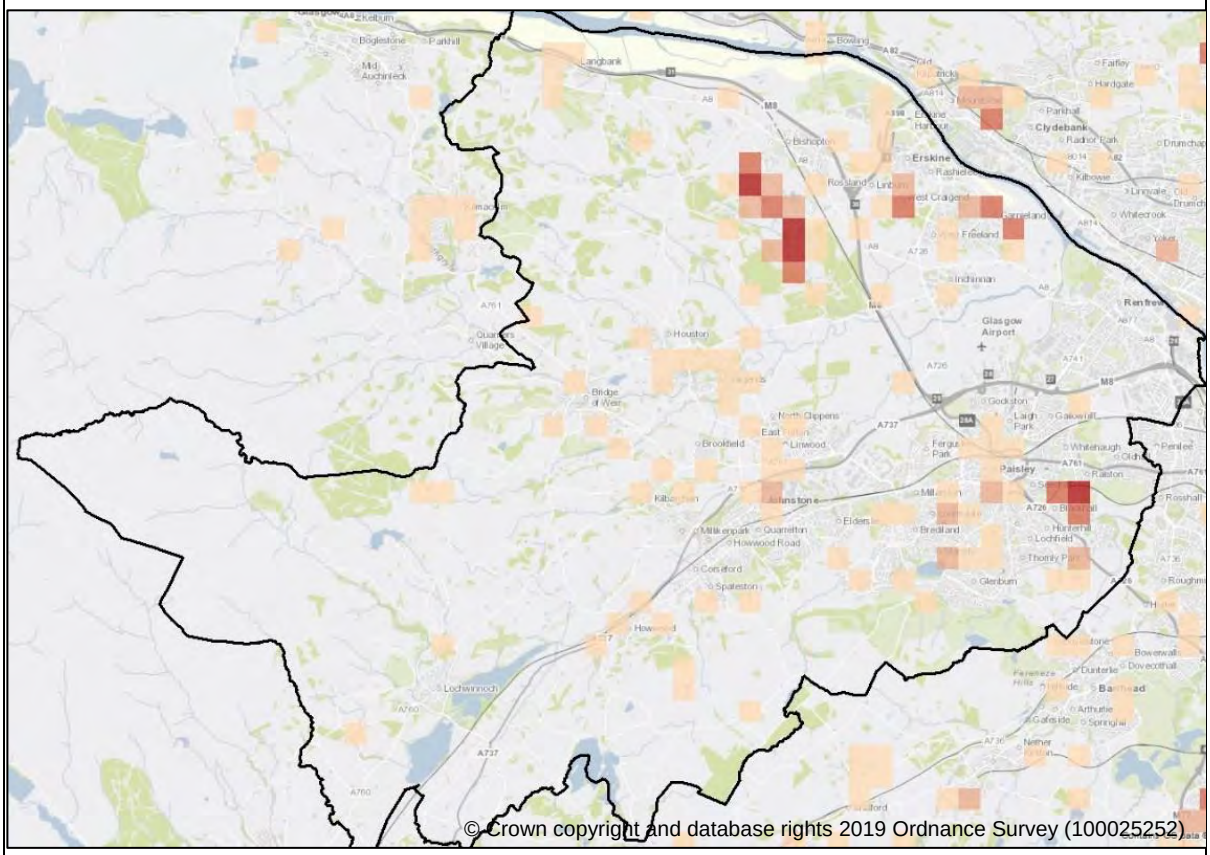
Building gain in Renfrewshire (2016 to 2017)



Of 710 cells that contained buildings within 2016 and/or 2017:-

- **30.0% (n=213) gained buildings, of which:-**
  - **141 gained 1 to 4 buildings**
  - **43 gained 5 to 9 buildings**
  - **20 gained 10 to 19 buildings**
  - **9 gained >19 buildings**

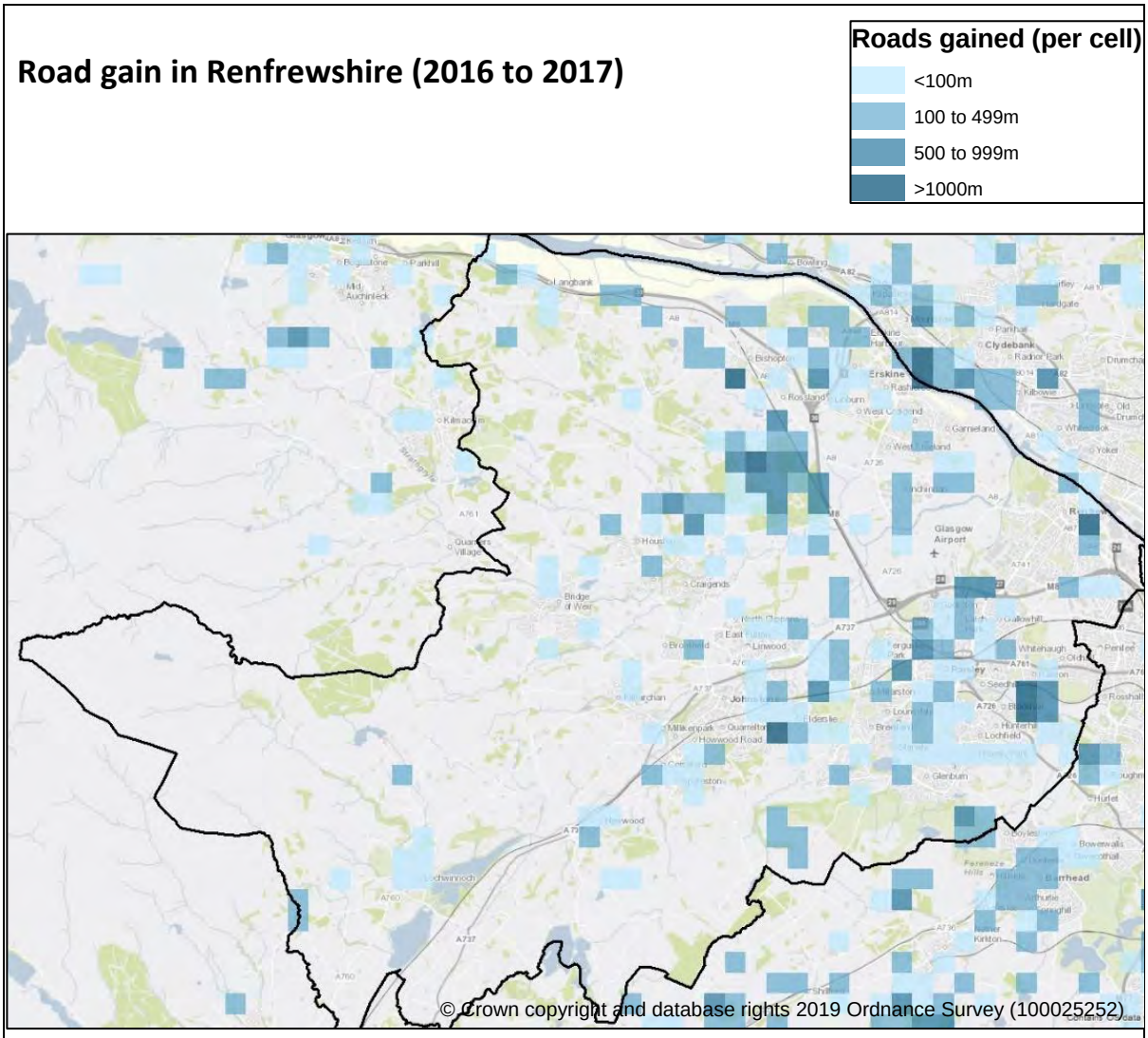
Building loss in Renfrewshire (2016 to 2017)



Of 710 cells that contained buildings within 2016 and/or 2017:-

- **15.4% (n=109) lost buildings, of which:-**
  - **86 lost 1 to 4 buildings**
  - **11 lost 5 to 9 buildings**
  - **8 lost 10 to 19 buildings**
  - **4 lost >19 buildings**

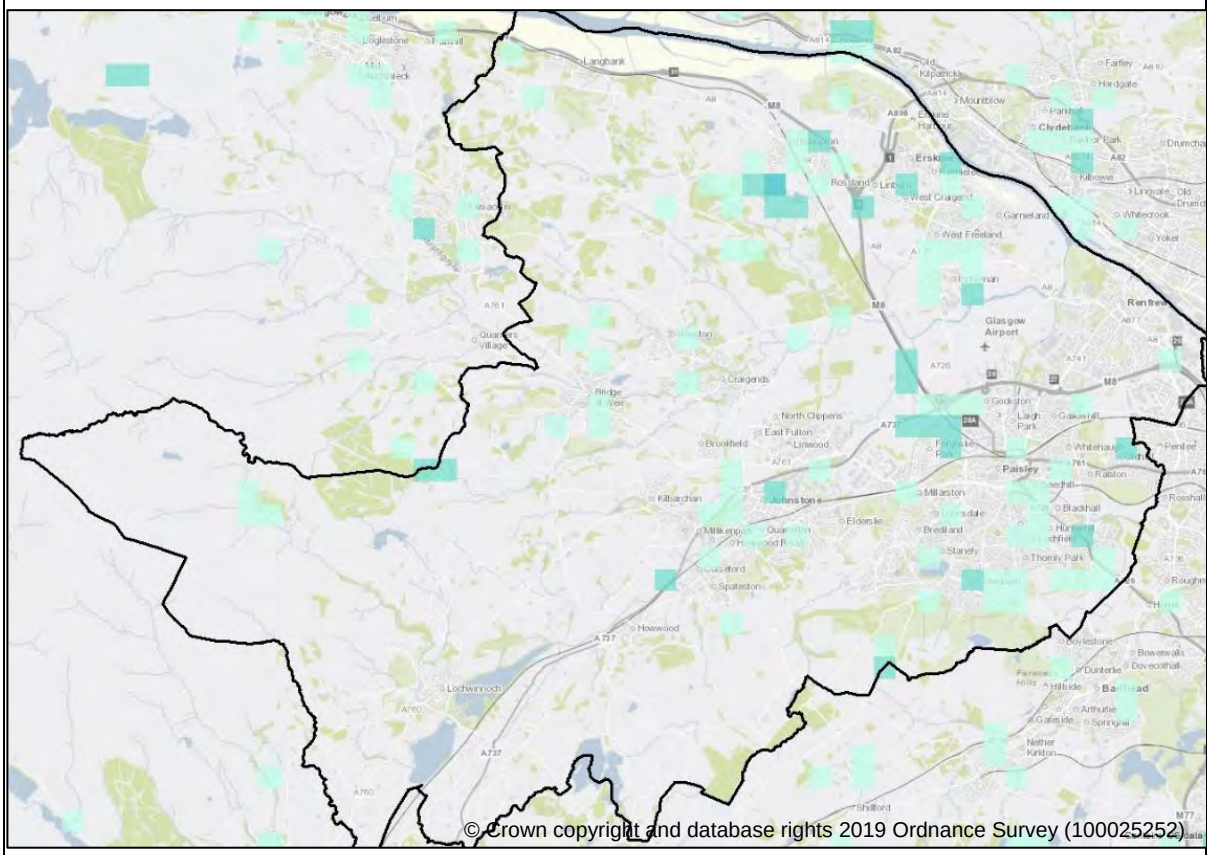
Road gain in Renfrewshire (2016 to 2017)



Of 851 cells that contained roads within 2016 and/or 2017:-

- **22.4% (n=191) gained roads, of which:-**
  - **98 gained 1 to 100m**
  - **67 gained 100 to 499m**
  - **20 gained 500 to 999m**
  - **6 gained 1000m+**

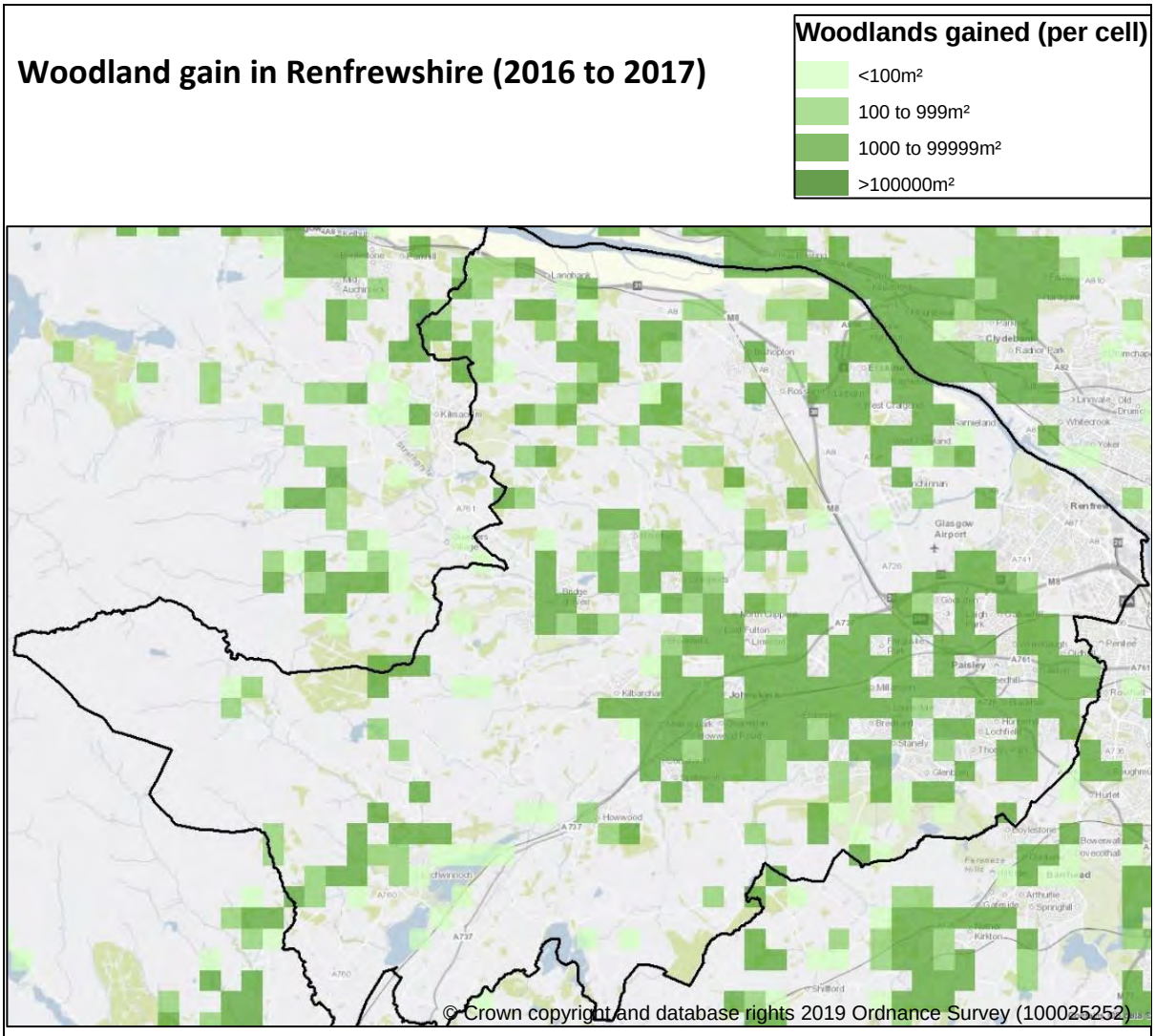
Road loss in Renfrewshire (2016 to 2017)



Of 851 cells that contained roads within 2016 and/or 2017:-

- **10.8% (n=92) lost roads, of which:-**
  - **70 lost 1 to 100m**
  - **21 lost 100 to 499m**
  - **1 lost 500 to 999m**

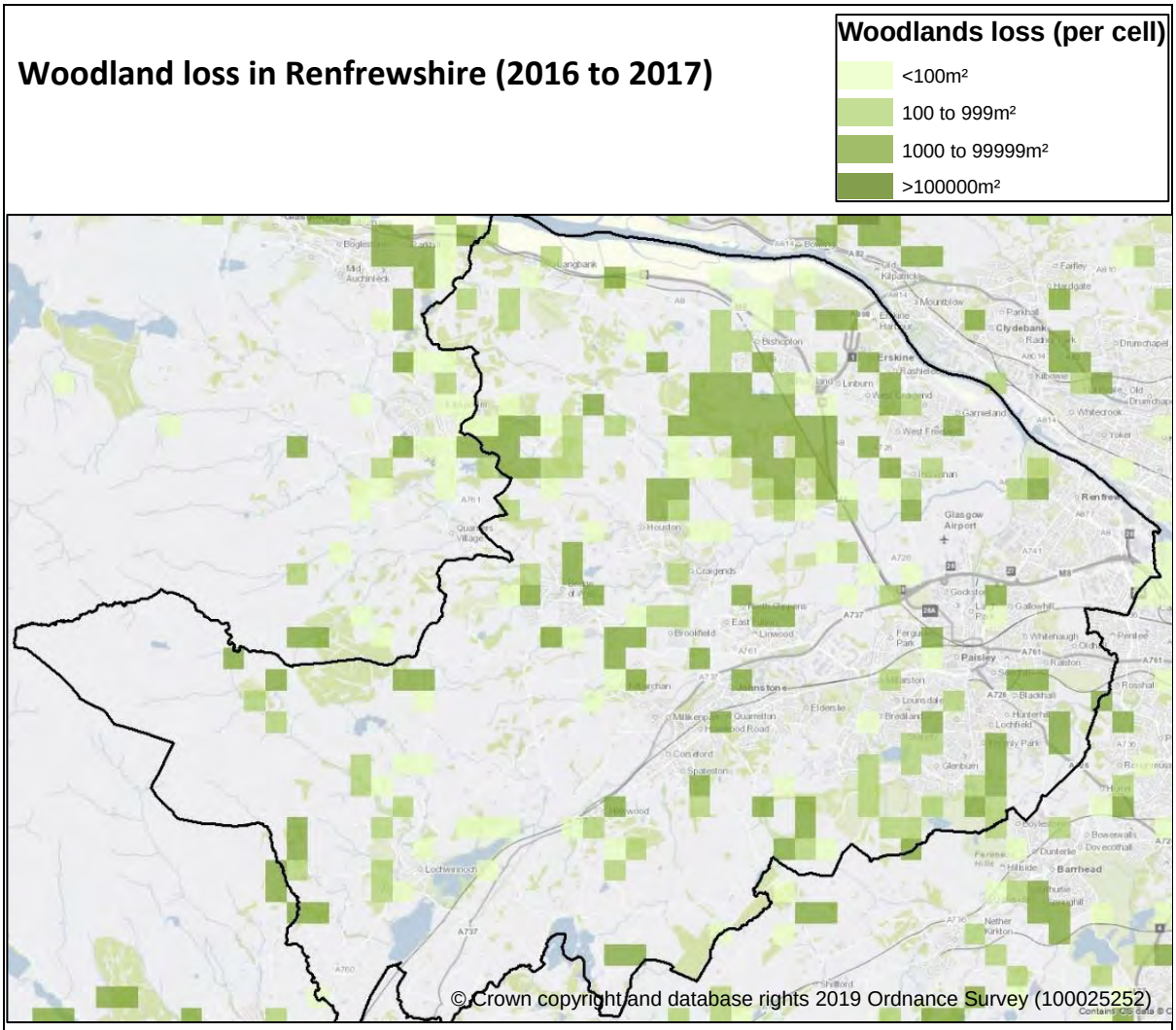
Woodland gain in Renfrewshire (2016 to 2017)



Of 889 cells that contained woodland within 2016 and/or 2017:-

- **36.1% (n=321) gained woodland, of which:-**
  - **37 gained <100m²**
  - **70 gained 100 to 999m²**
  - **214 gained 1000m²+**

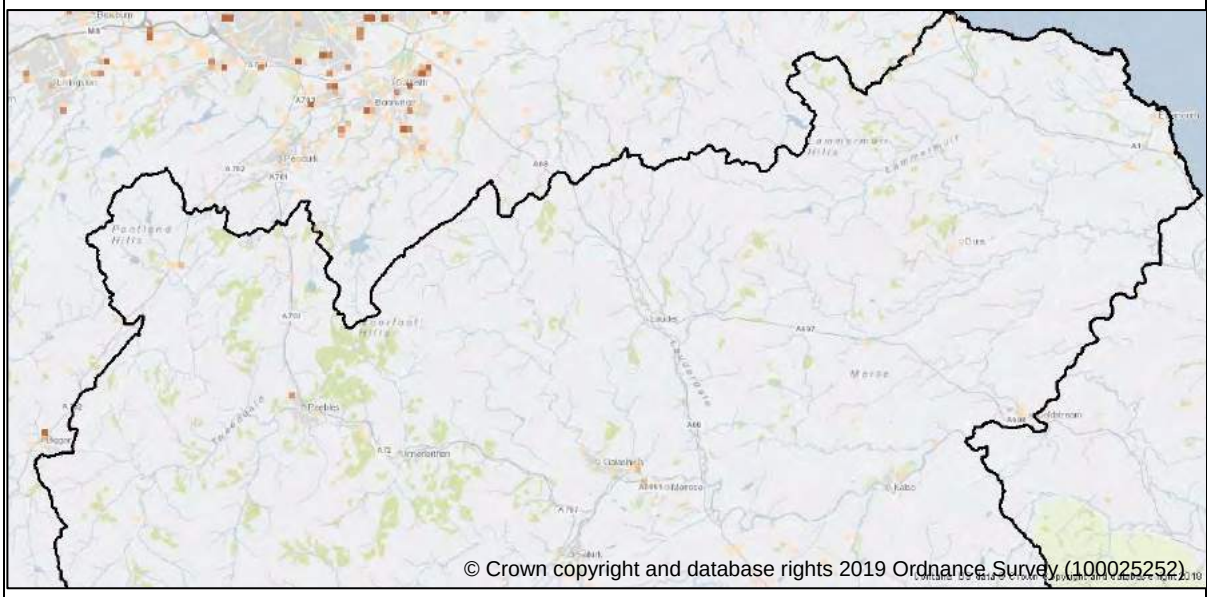
Woodland loss in Renfrewshire (2016 to 2017)



Of 889 cells that contained woodland within 2016 and/or 2017:-

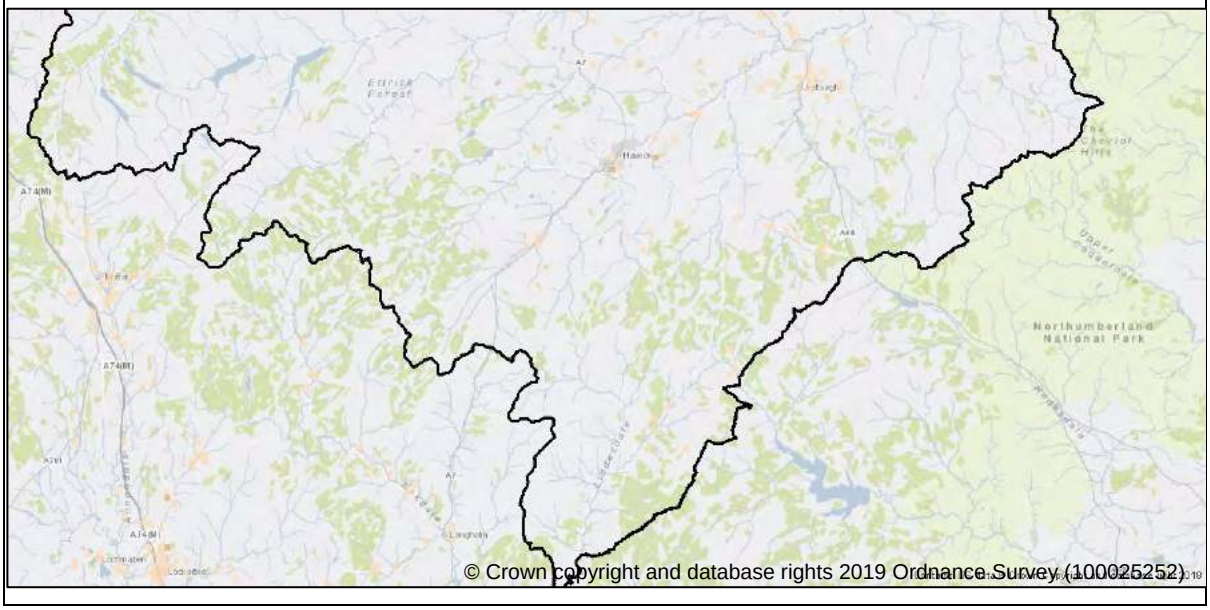
- **23.1% (n=205) lost woodland, of which:-**
  - **53 lost <100m²**
  - **61 lost 100 to 999m²**
  - **91 lost 1000m²+**

Building gain in Scottish Borders (2016 to 2017)

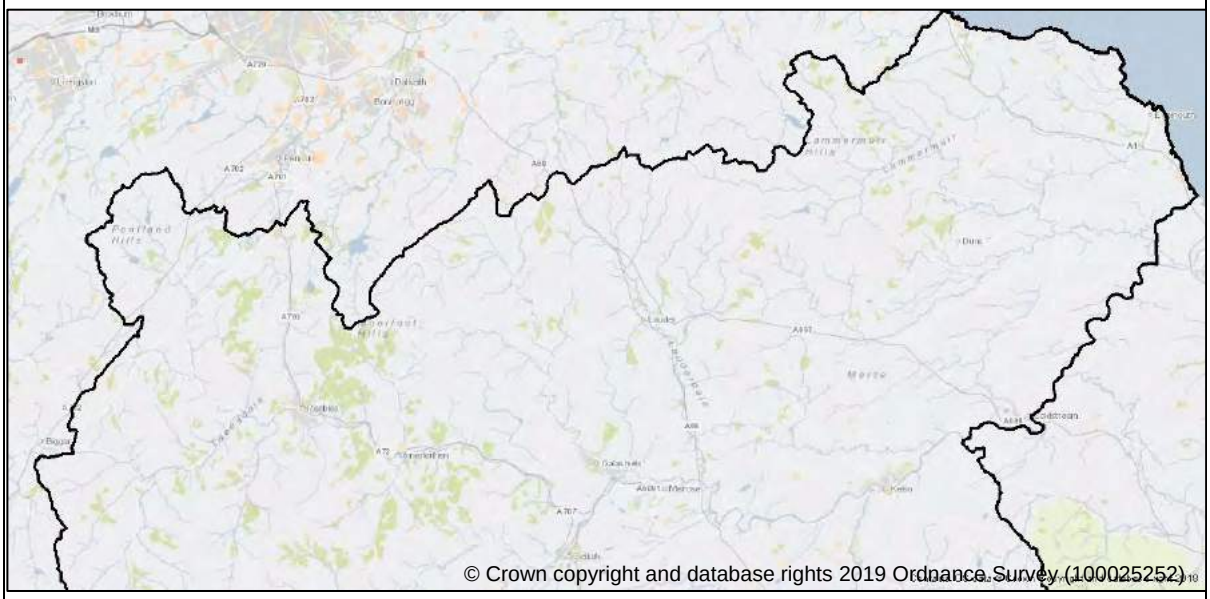


Of 4977 cells that contained buildings within 2016 and/or 2017:-

- **2.3% (n=112) gained buildings, of which:-**
  - **106 gained 1 to 4 buildings**
  - **5 gained 5 to 9 buildings**
  - **1 gained 10 to 19 buildings**

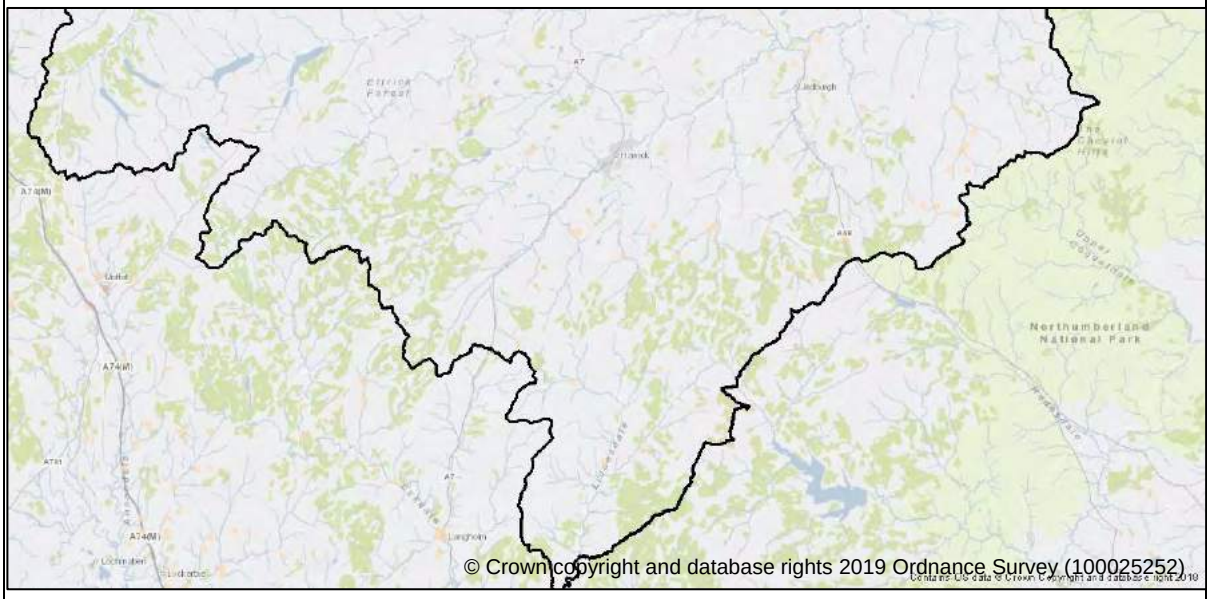


Building loss in Scottish Borders (2016 to 2017)

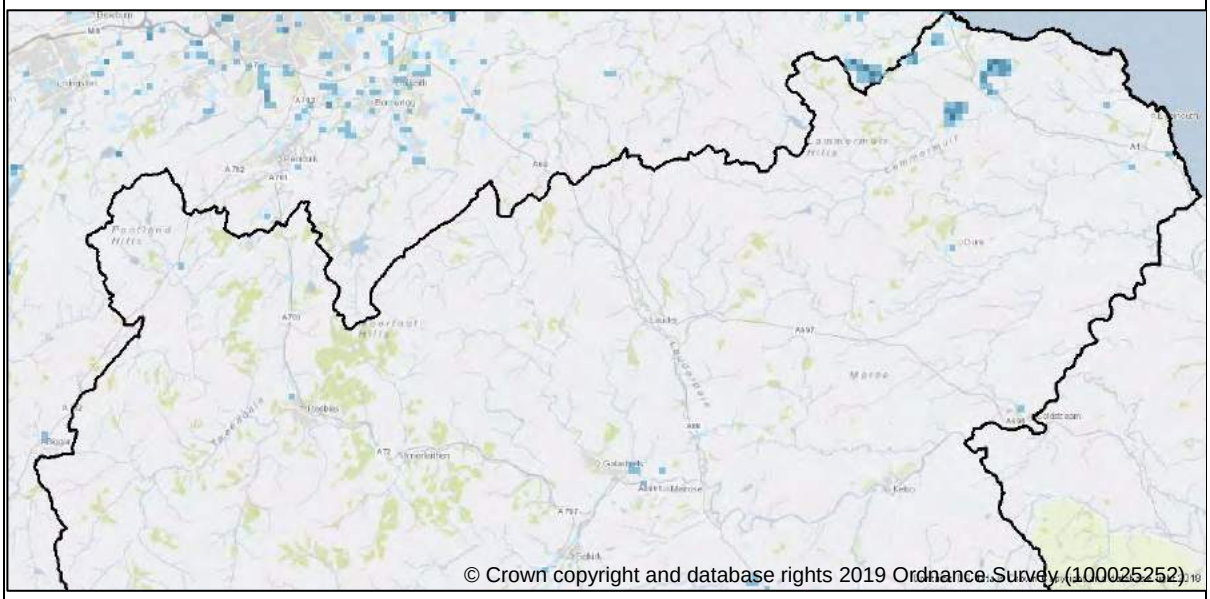


Of 4977 cells that contained buildings within 2016 and/or 2017:-

- **0.9% (n=45) lost buildings, of which:-**
  - **45 lost 1 to 4 buildings**

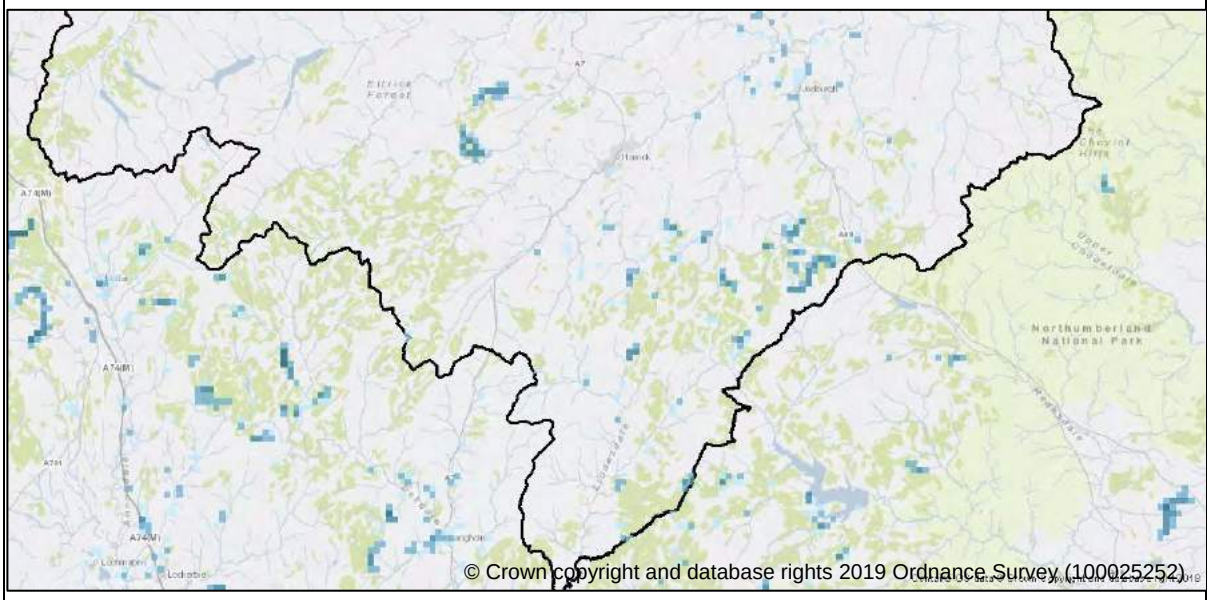


Road gain in Scottish Borders (2016 to 2017)

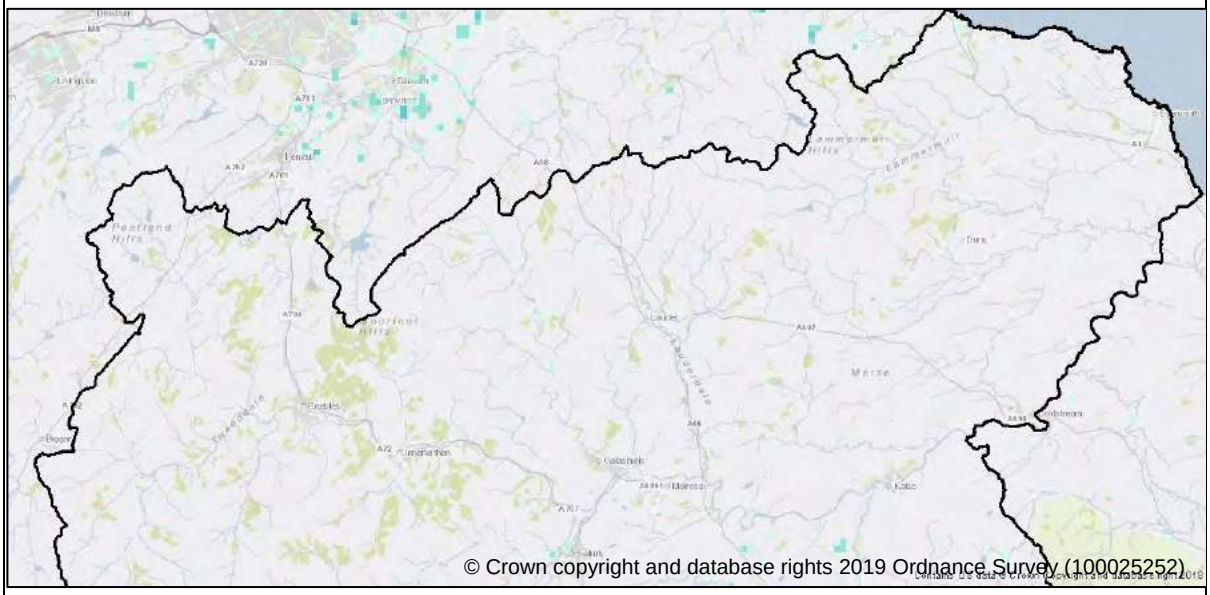


Of 9503 cells that contained roads within 2016 and/or 2017:-

- **2.9% (n=276) gained roads, of which:-**
  - **105 gained 1 to 100m**
  - **115 gained 100 to 499m**
  - **53 gained 500 to 999m**
  - **3 gained 1000m+**

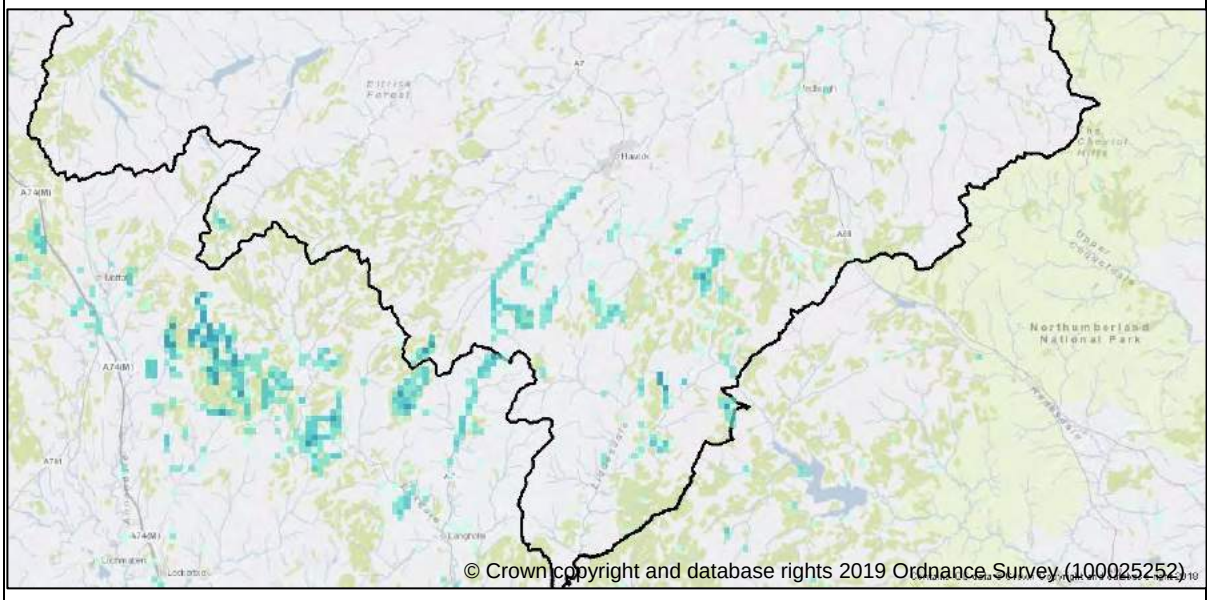


Road loss in Scottish Borders (2016 to 2017)

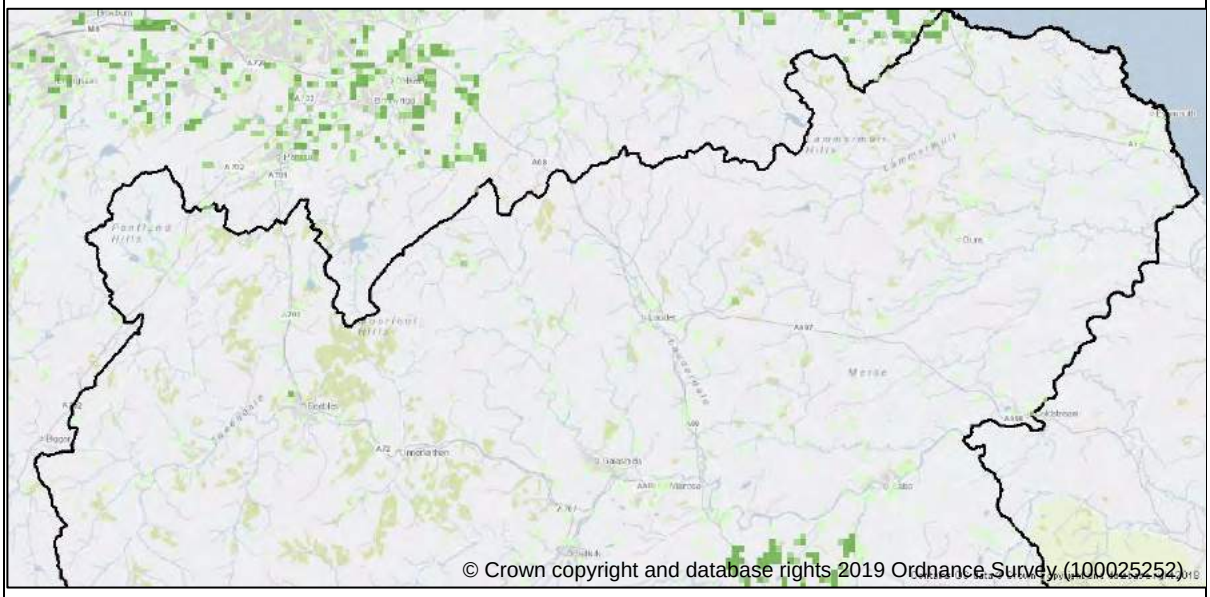


Of 9503 cells that contained roads within 2016 and/or 2017:-

- **3.1% (n=290) lost roads, of which:-**
  - **107 lost 1 to 100m**
  - **128 lost 100 to 499m**
  - **48 lost 500 to 999m**
  - **7 lost 1000m+**

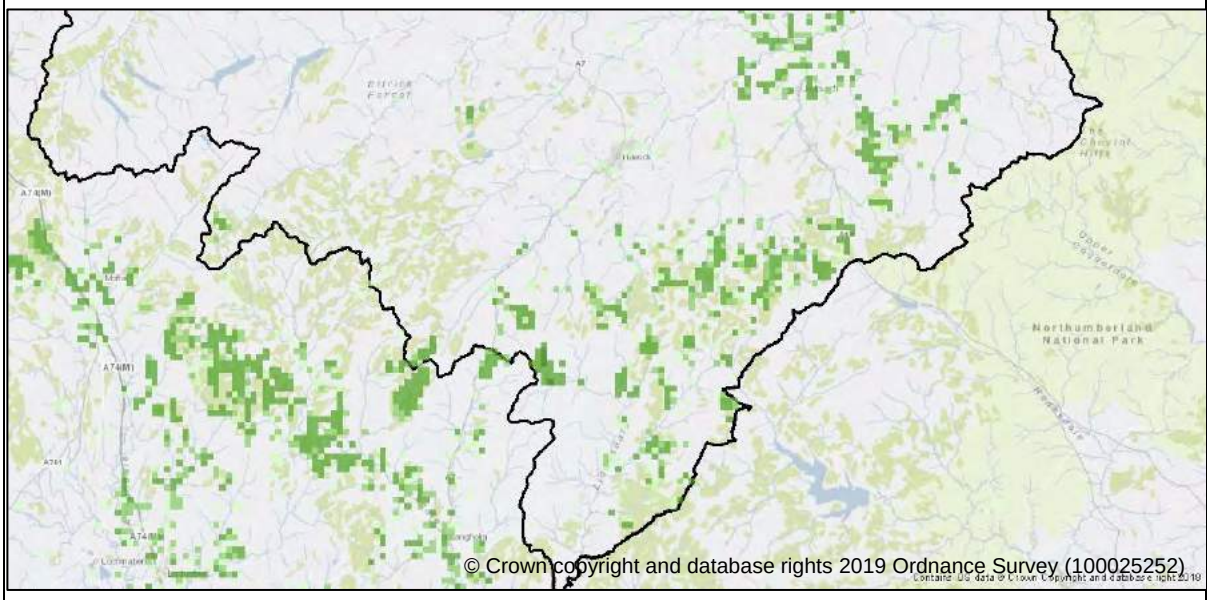


Woodland gain in Scottish Borders (2016 to 2017)

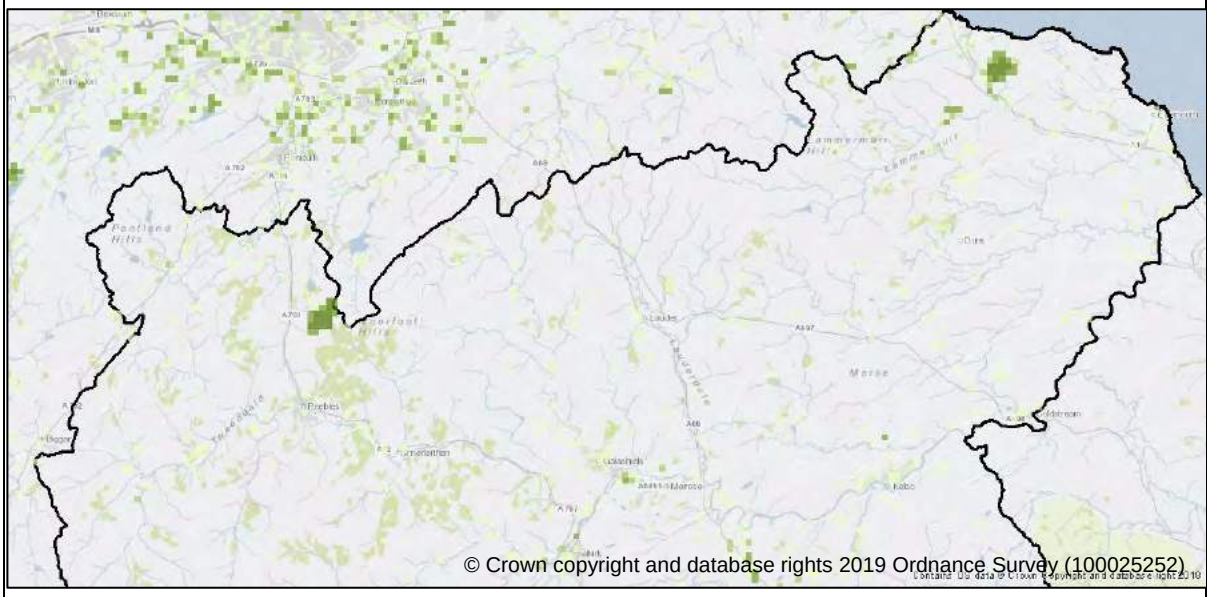


Of 13717 cells that contained woodland within 2016 and/or 2017:-

- **6.8% (n=936) gained woodland, of which:-**
  - **423 gained <100m²**
  - **141 gained 100 to 999m²**
  - **372 gained 1000m²+**

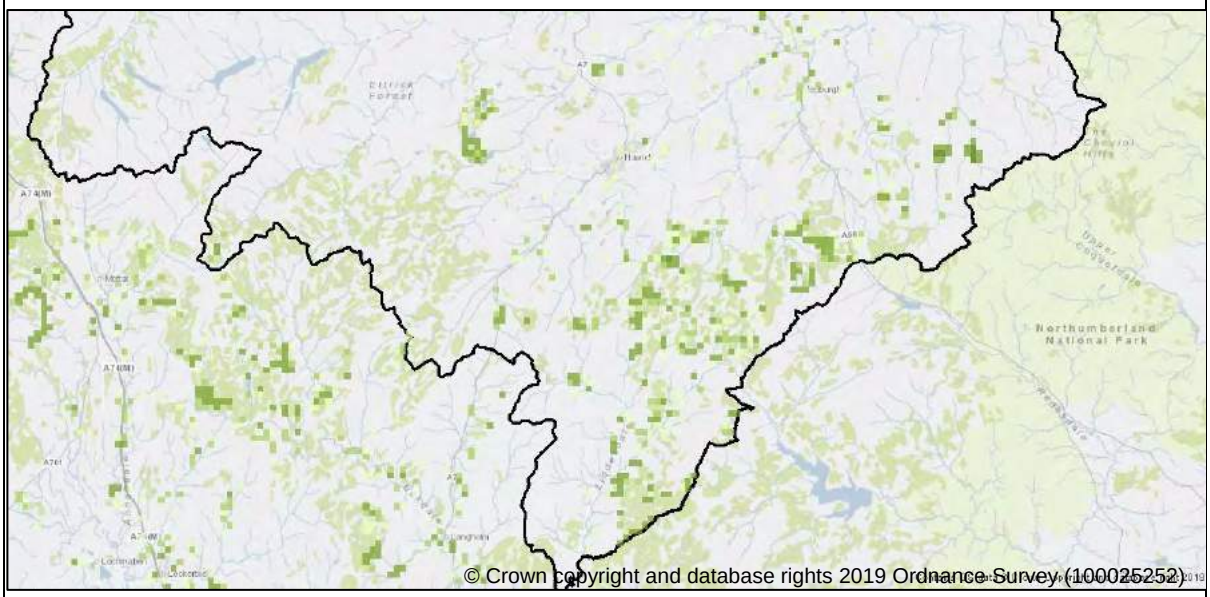


Woodland loss in Scottish Borders (2016 to 2017)

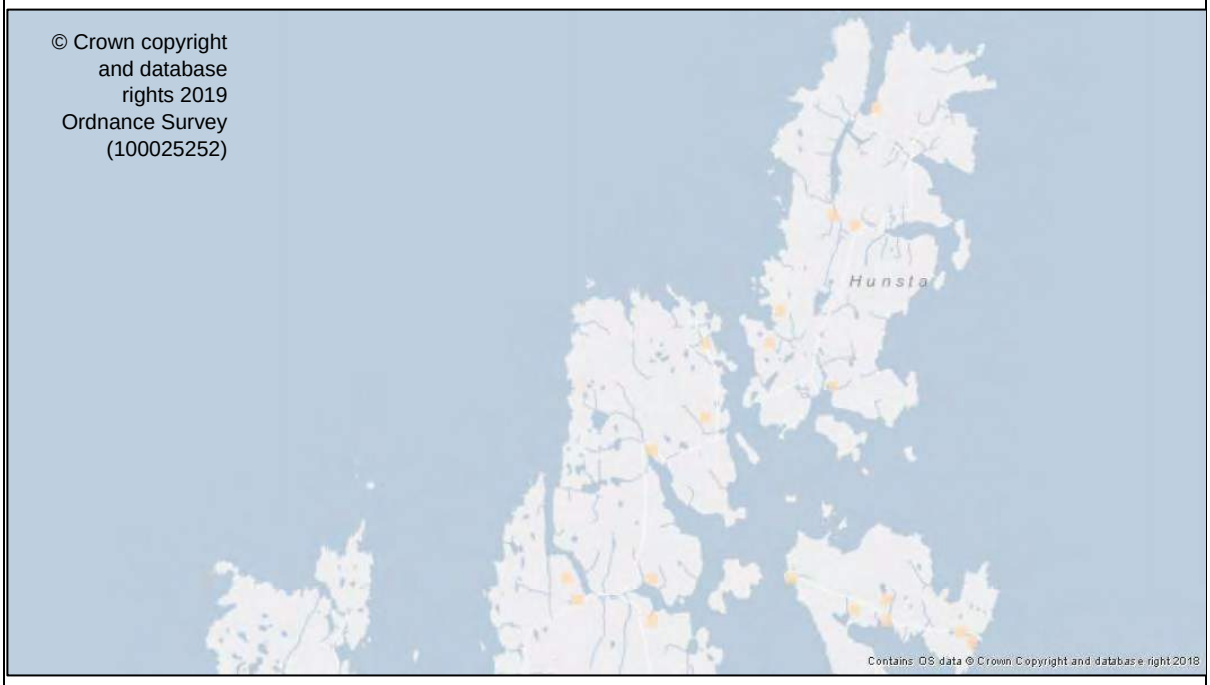


Of 13717 cells that contained woodland within 2016 and/or 2017:-

- **5.9% (n=814) lost woodland, of which:-**
  - **445 lost <100m²**
  - **139 lost 100 to 999m²**
  - **230 lost 1000m²+**

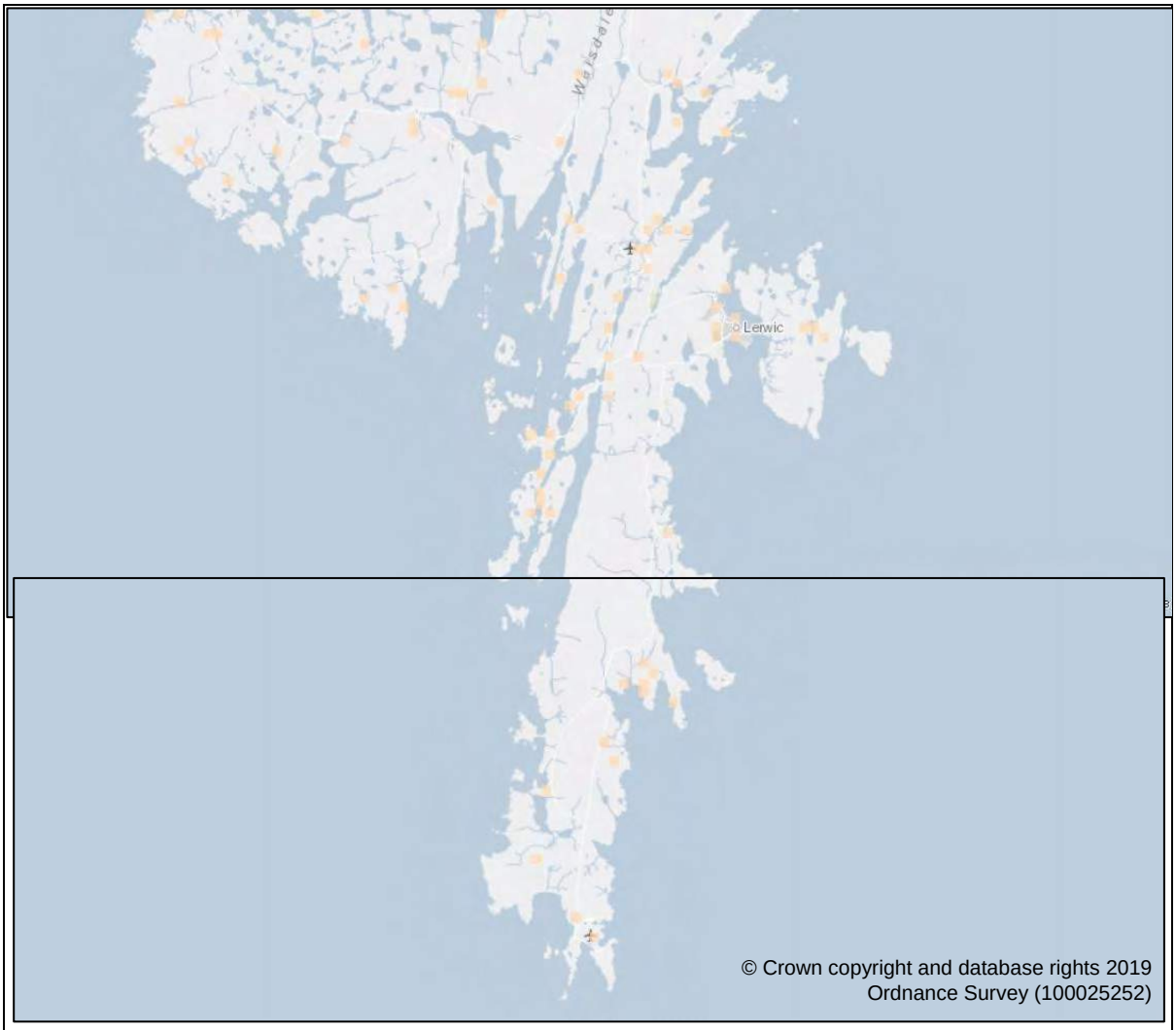


Building gain in Shetland Islands (2016 to 2017)



Of 1574 cells that contained buildings within 2016 and/or 2017:-

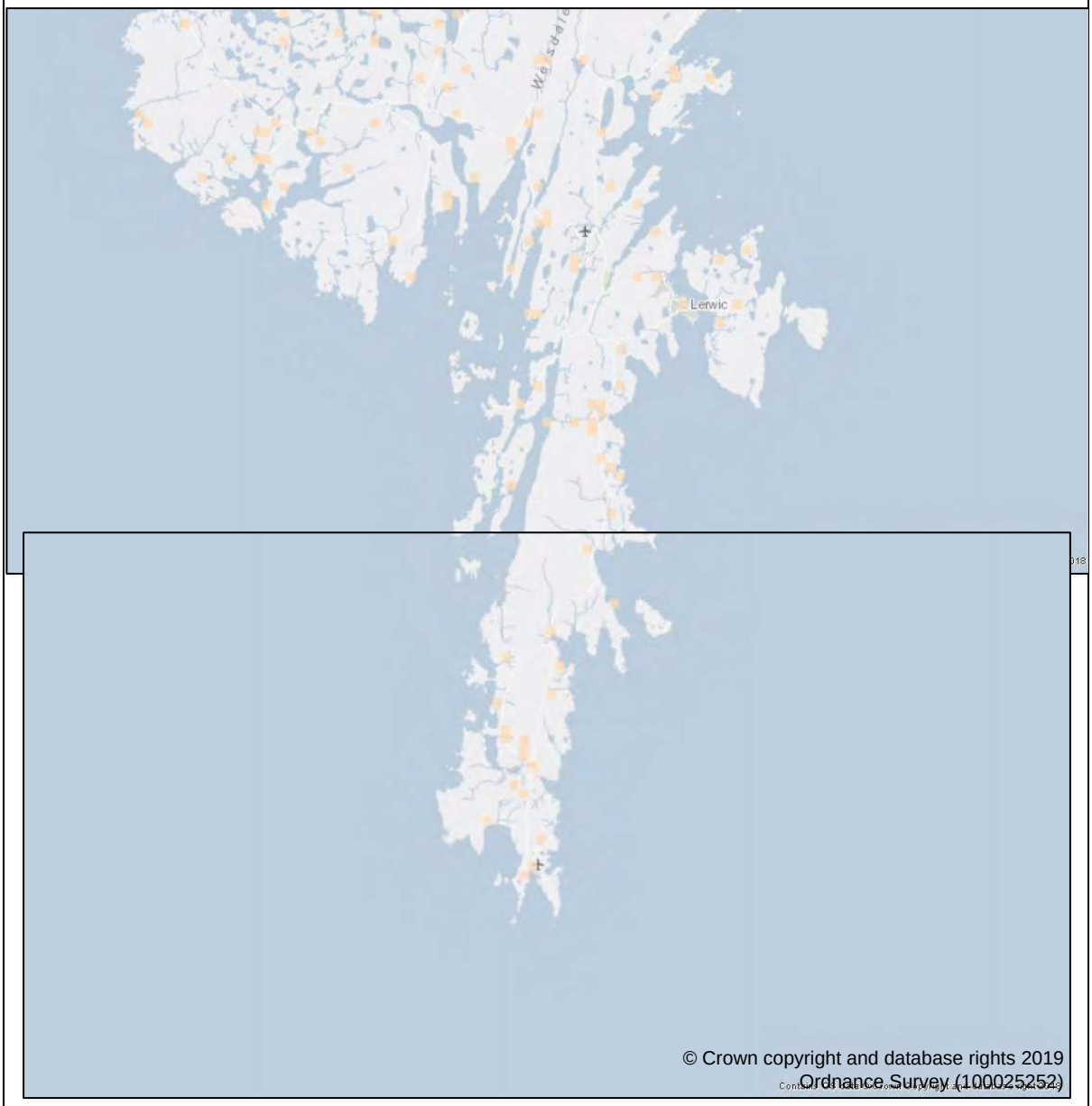
- **8.8% (n=138) gained buildings, of which:-**
  - **134 gained 1 to 4 buildings**
  - **1 gained 5 to 9 buildings**
  - **3 gained 10 to 19 buildings**



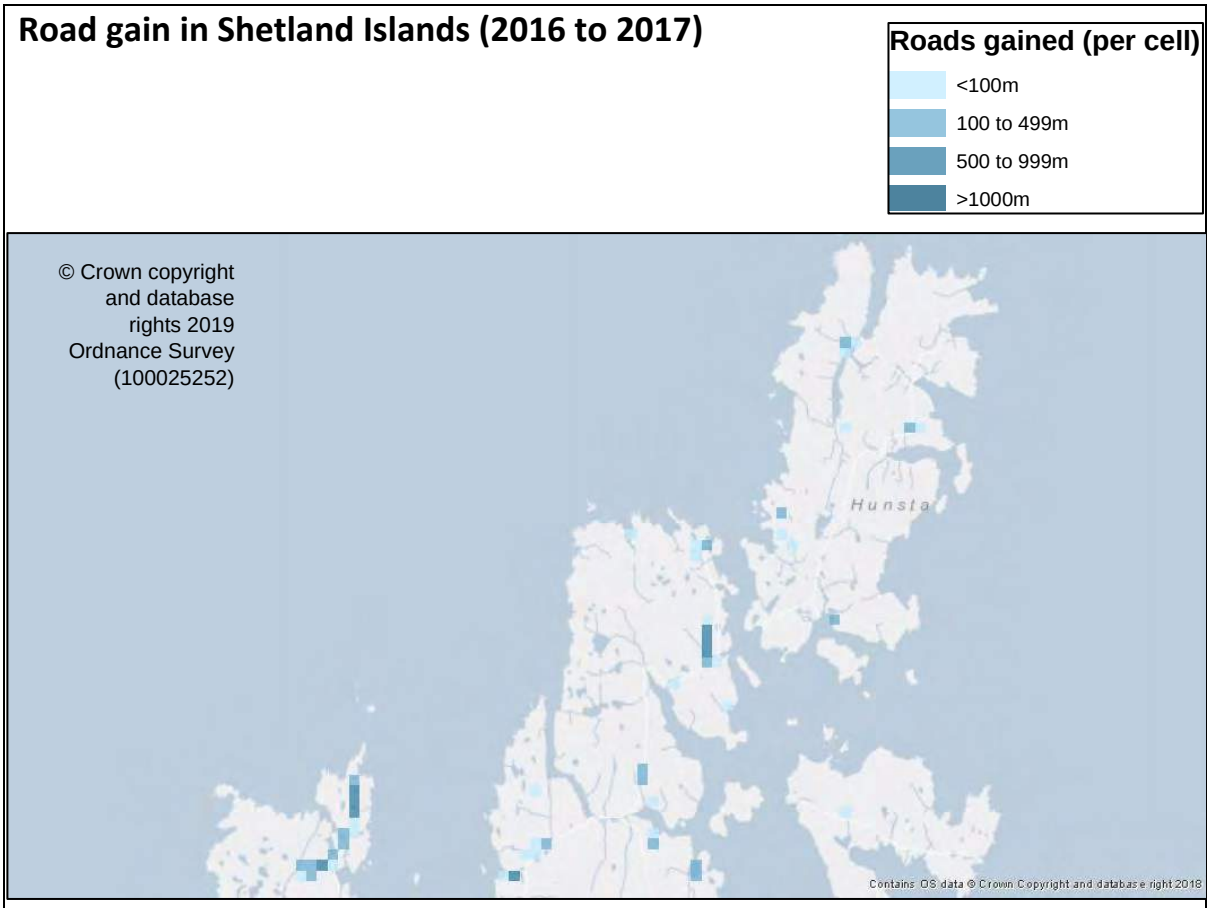
Building loss in Shetland Islands (2016 to 2017)

Of 1574 cells that contained buildings within 2016 and/or 2017:-

- **13.3% (n=211) lost buildings, of which:-**
  - **210 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**

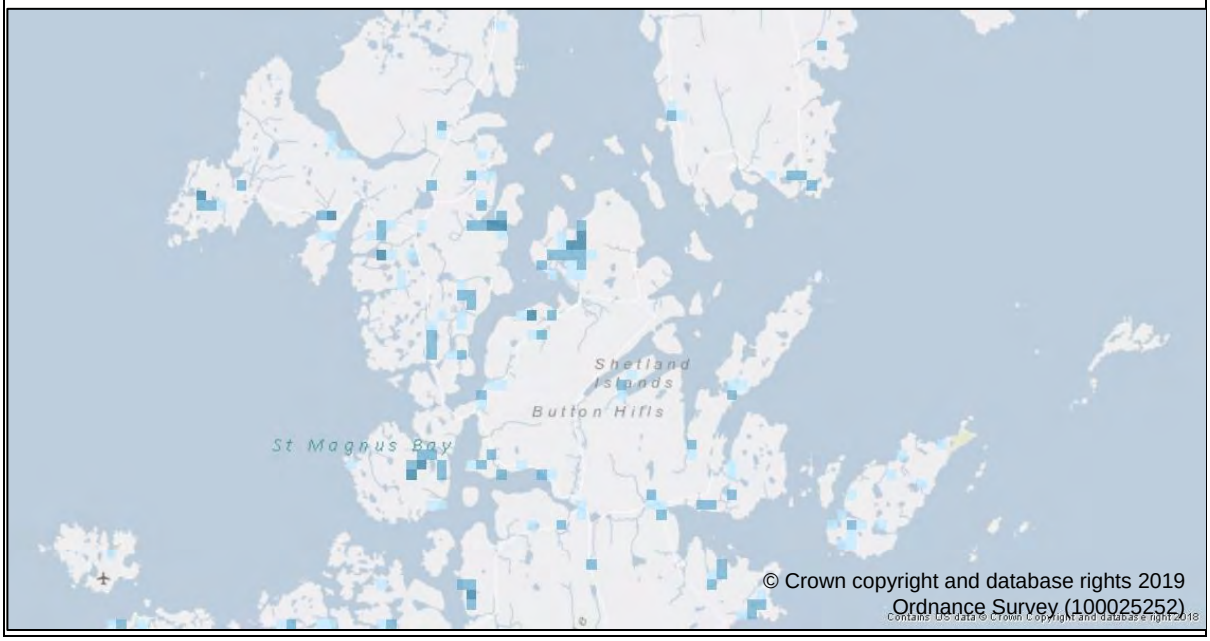


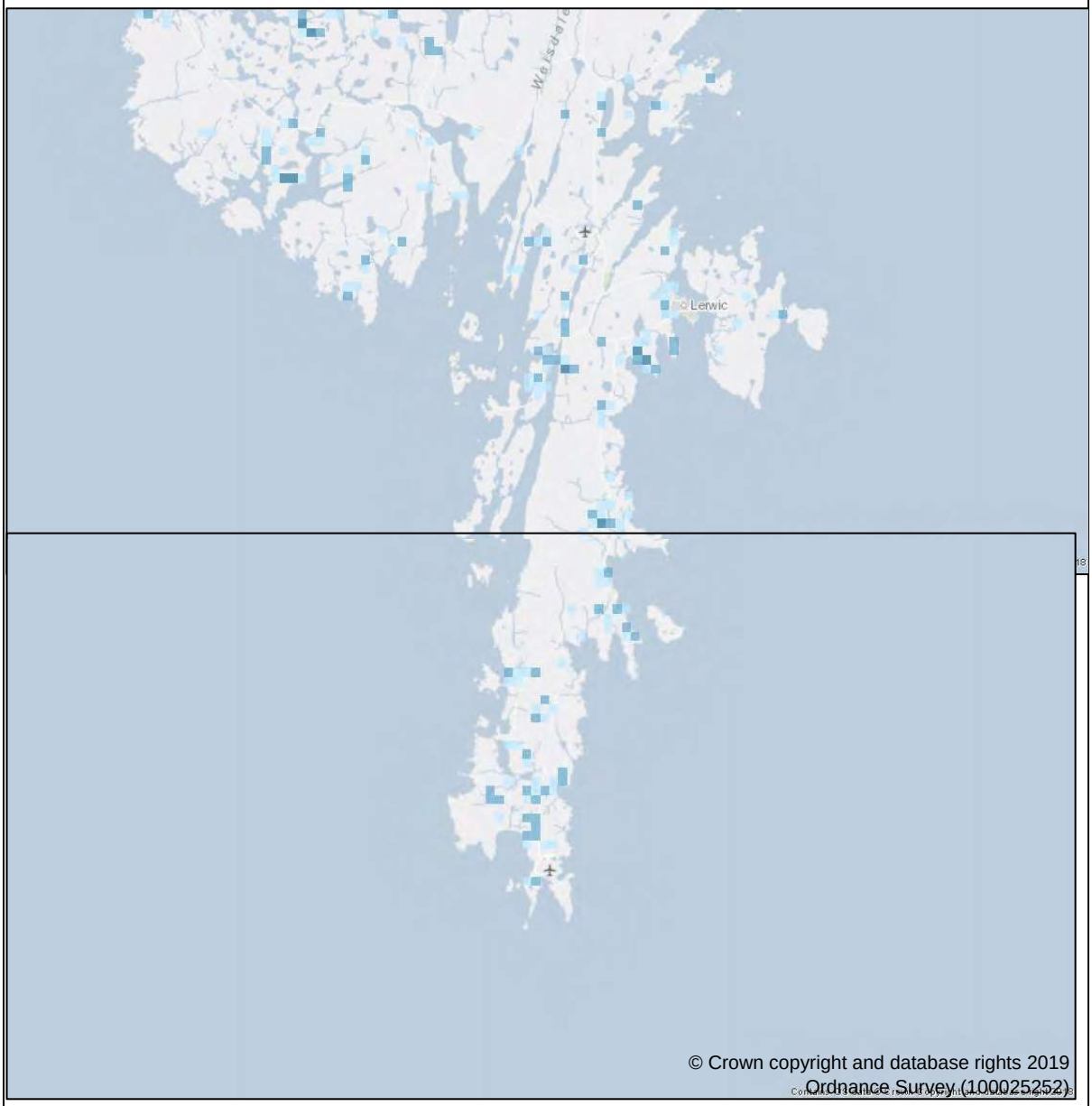
Road gain in Shetland Islands (2016 to 2017)



Of 2270 cells that contained roads within 2016 and/or 2017:-

- **16.1% (n=365) gained roads, of which:-**
  - **193 gained 1 to 100m**
  - **144 gained 100 to 499m**
  - **28 gained 500 to 999m**

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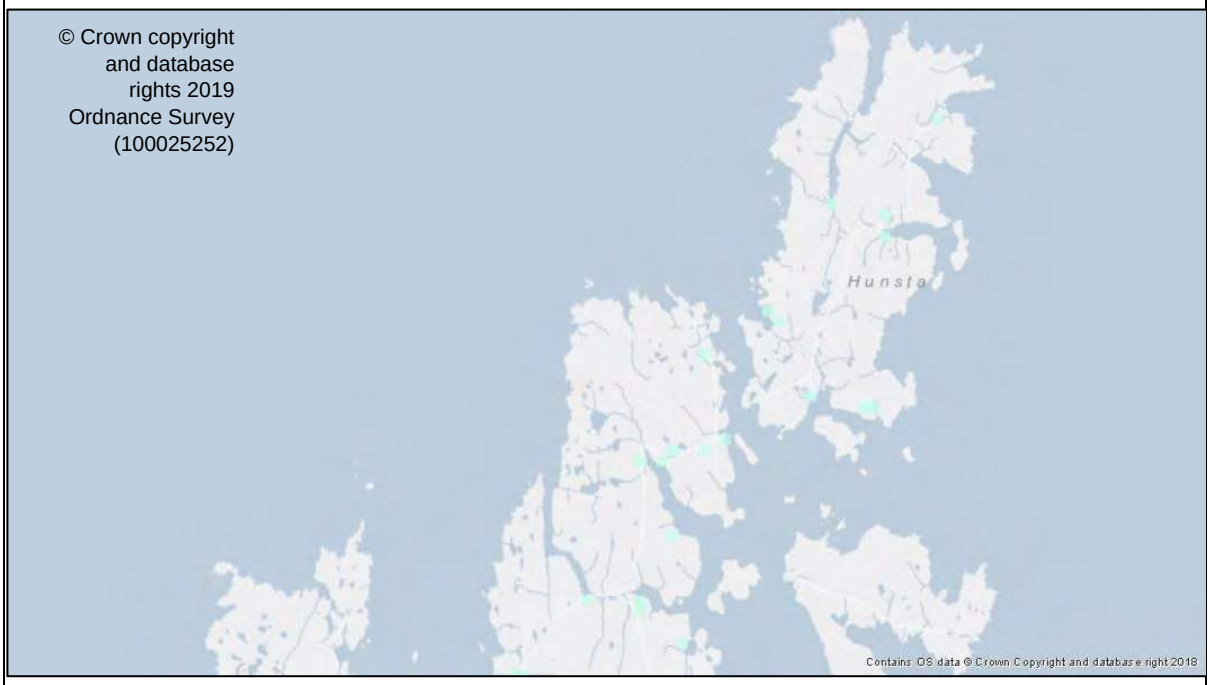
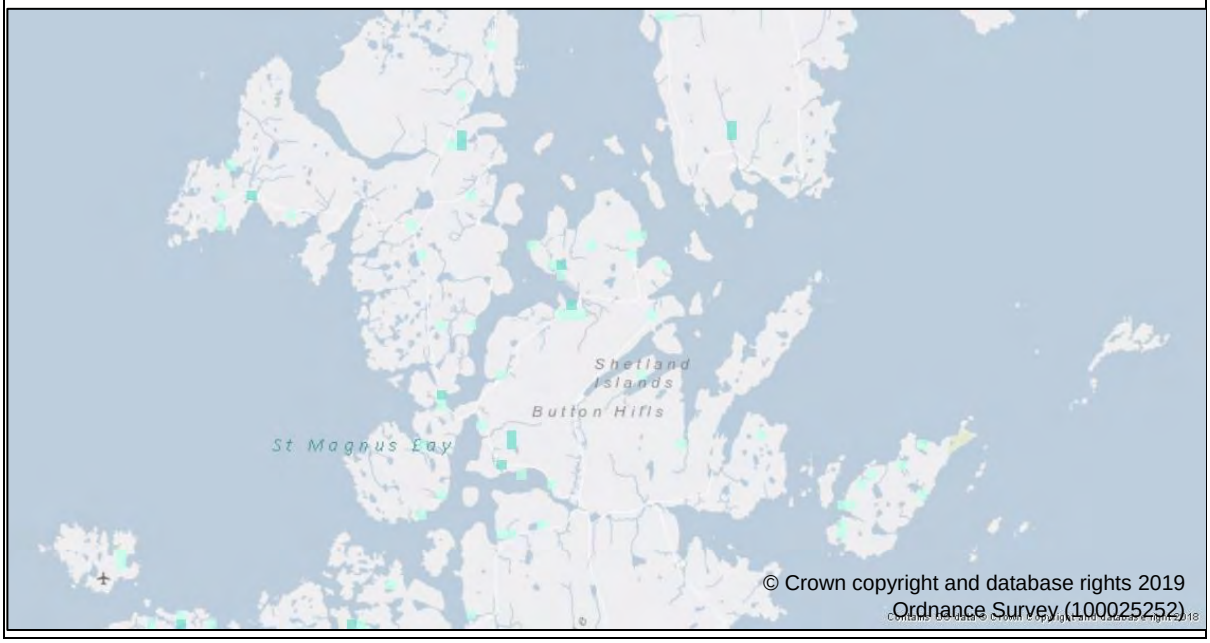
Ordnance Survey (100025252)

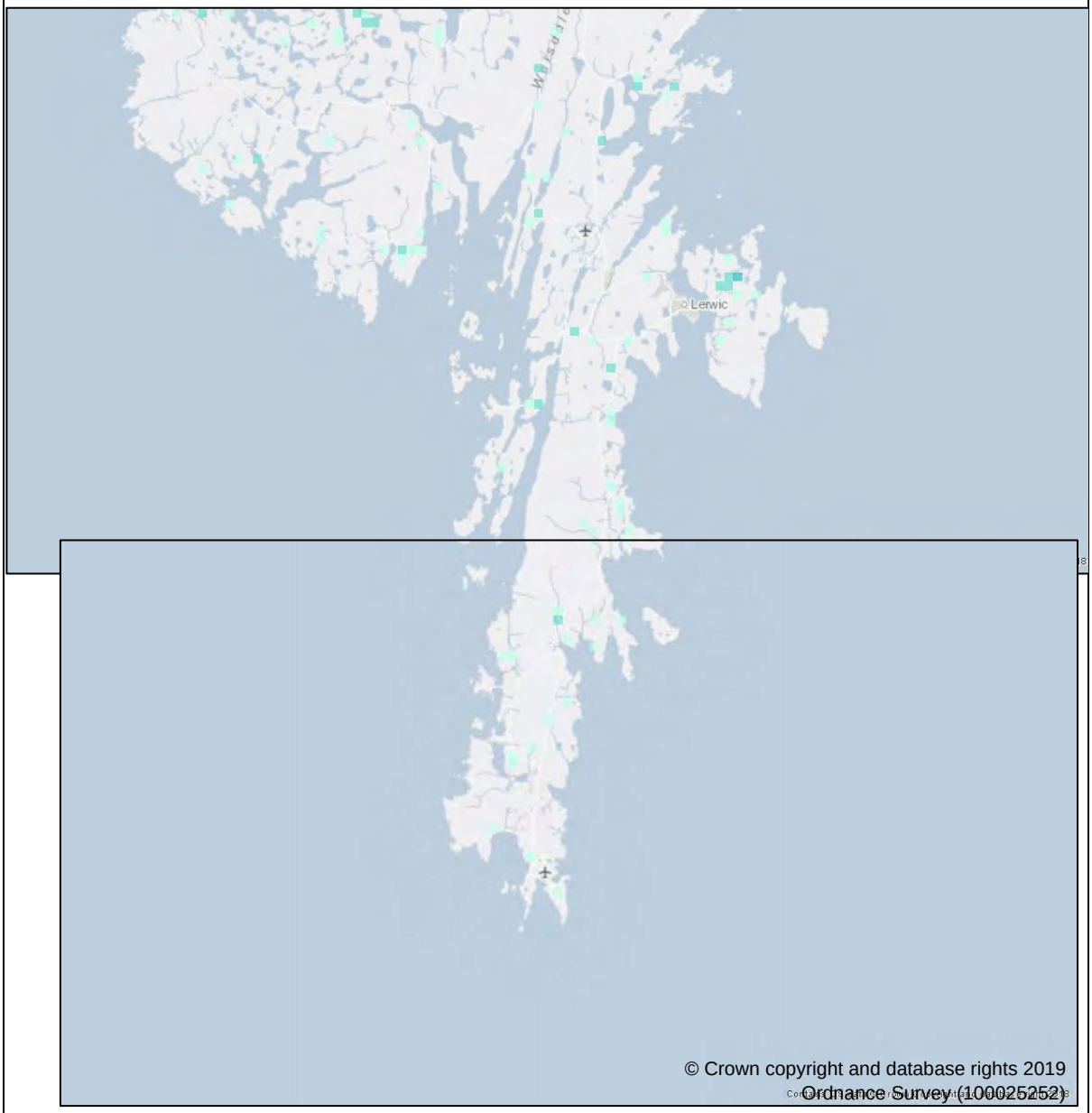
Road loss in Shetland Islands (2016 to 2017)



Of 2270 cells that contained roads within 2016 and/or 2017:-

- **7.4% (n=168) lost roads, of which:-**
  - **136 lost 1 to 100m**
  - **31 lost 100 to 499m**
  - **1 lost 500 to 999m**

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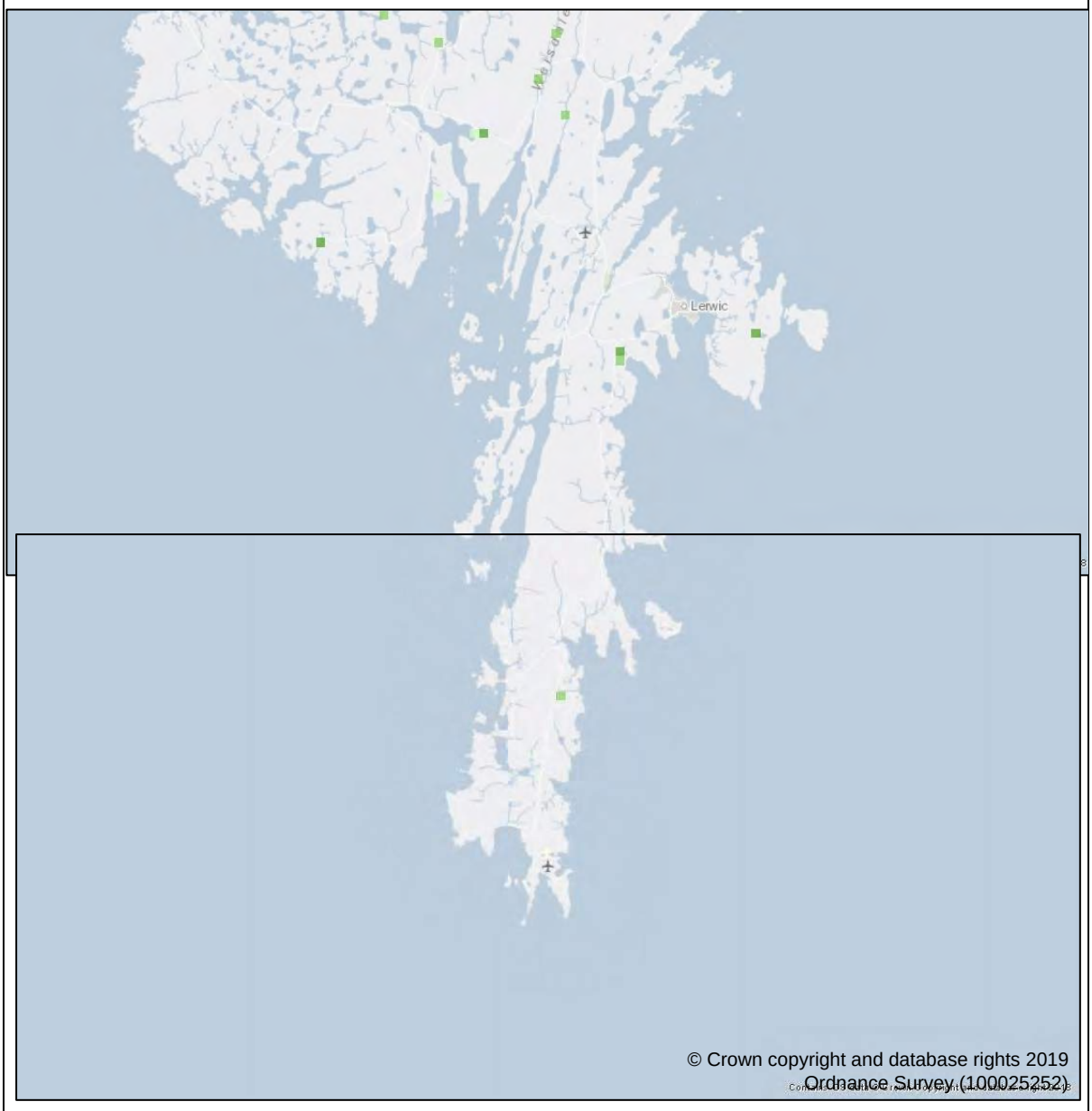
Ordnance Survey (100025252)

Woodland gain in Shetland Islands (2016 to 2017)

Of 124 cells that contained woodland within 2016 and/or 2017:-

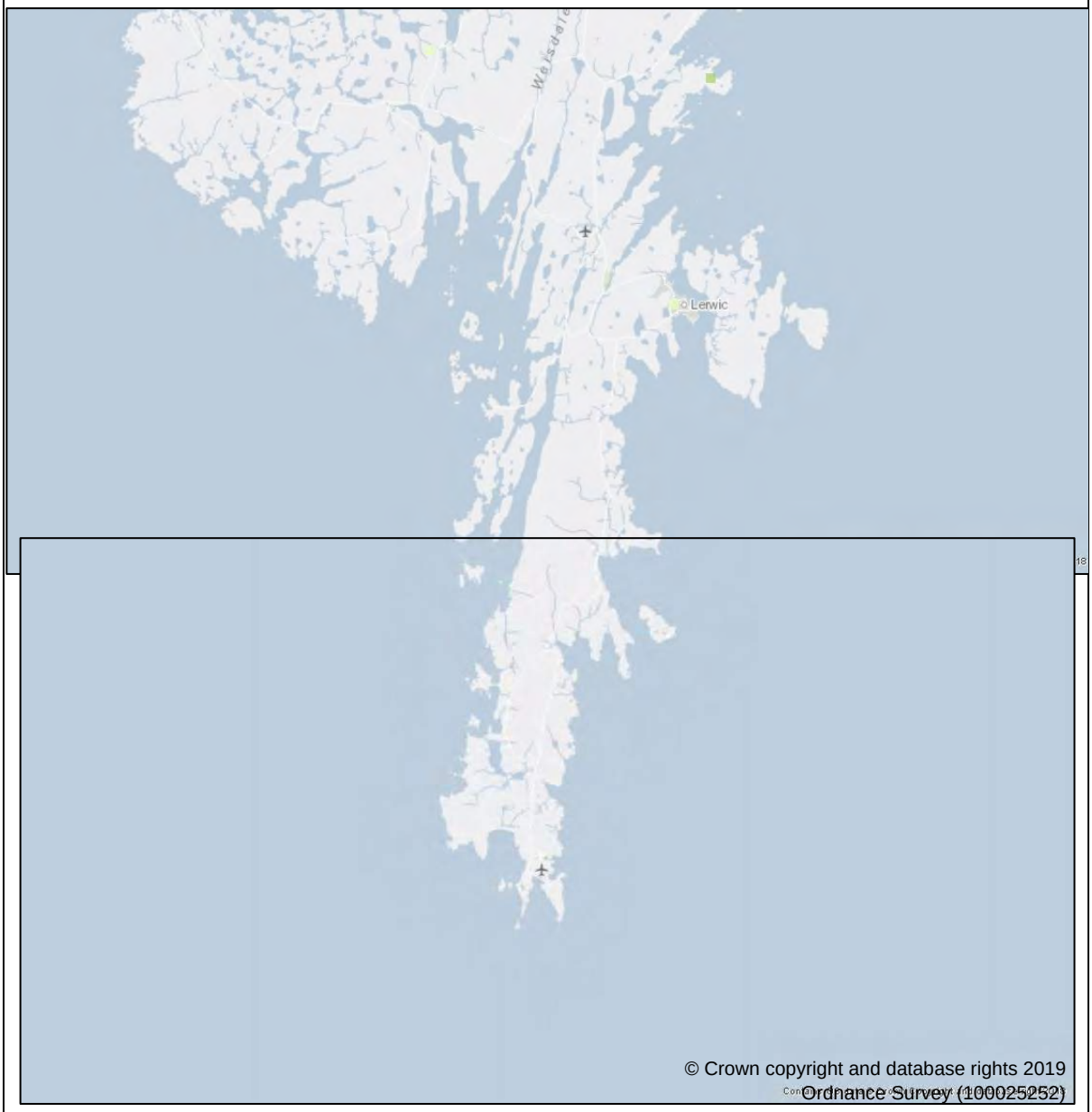
- **17.7% (n=22) gained woodland, of which:-**
  - **4 gained <100m²**
  - **11 gained 100 to 999m²**
  - **7 gained 1000m²+**



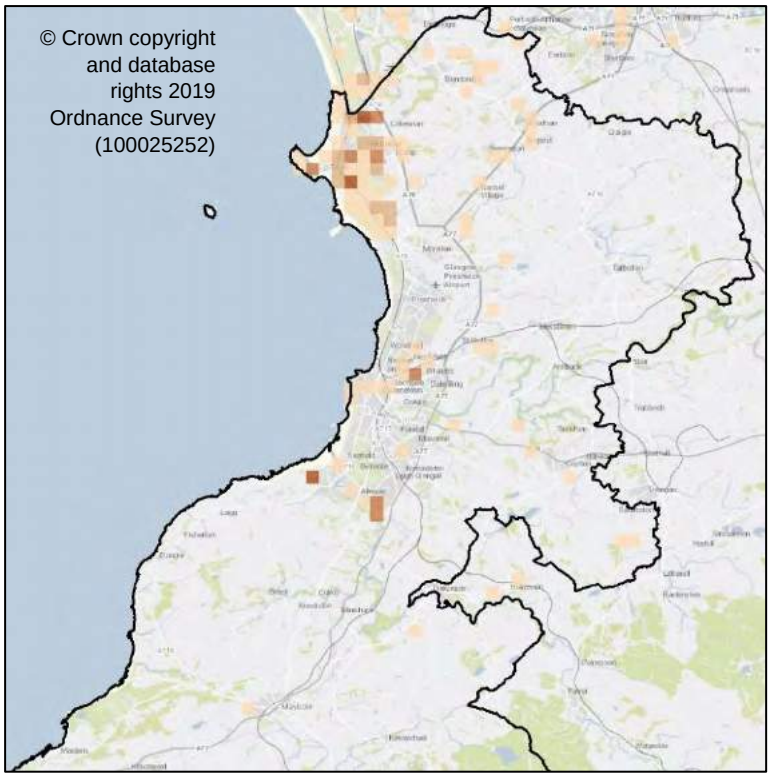
Woodland loss in Shetland Islands (2016 to 2017)

Of 124 cells that contained woodland within 2016 and/or 2017:-

- **8.9% (n=11) lost woodland, of which:-**
  - **6 lost <100m²**
  - **5 lost 100 to 999m²**

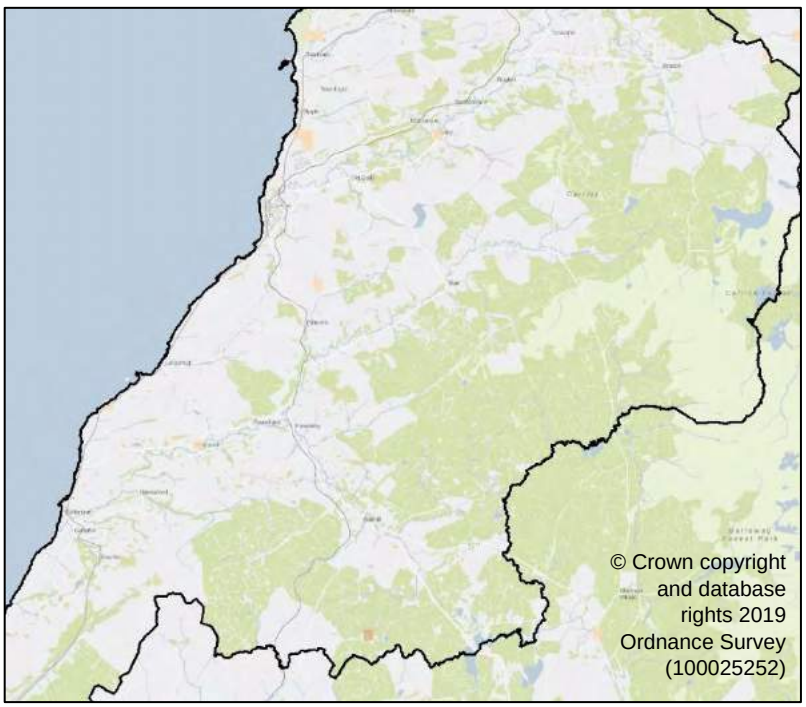


Building gain in South Ayrshire (2016 to 2017)

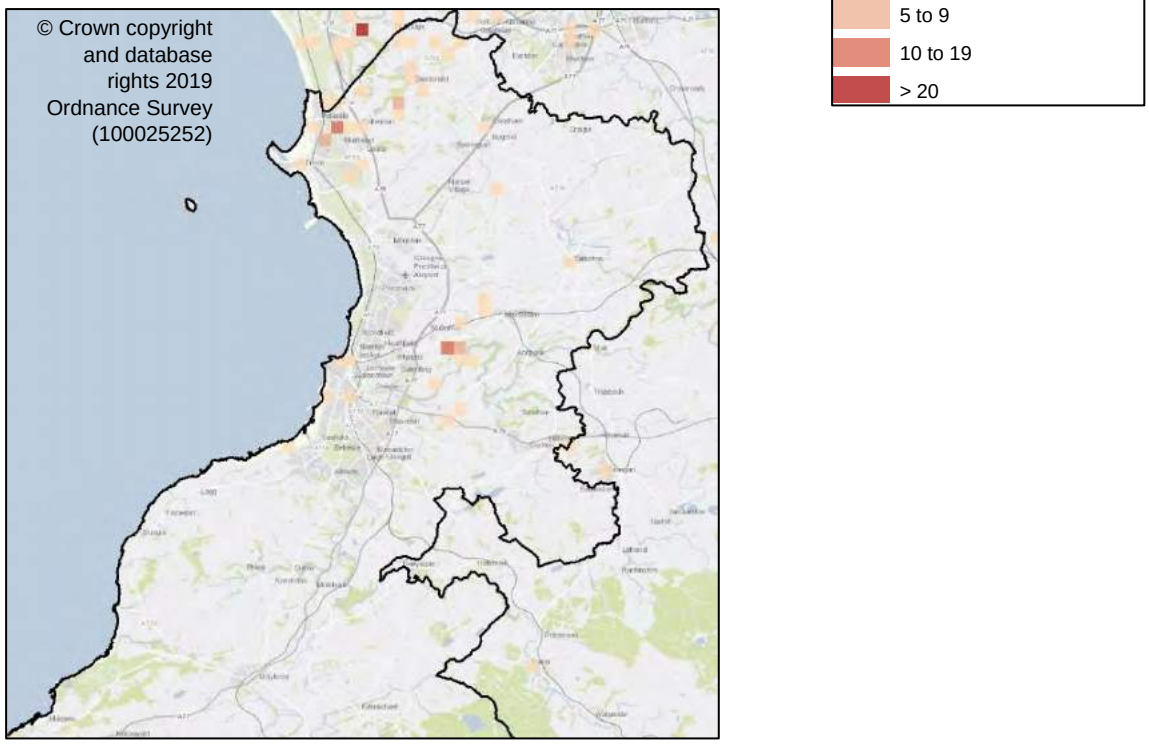


Of 1731 cells that contained buildings within 2016 and/or 2017:-

- **5.8% (n=100) gained buildings, of which:-**
  - **79 gained 1 to 4 buildings**
  - **11 gained 5 to 9**
  - **7 gained 10 to 19**
  - **3 gained >19 buildings**

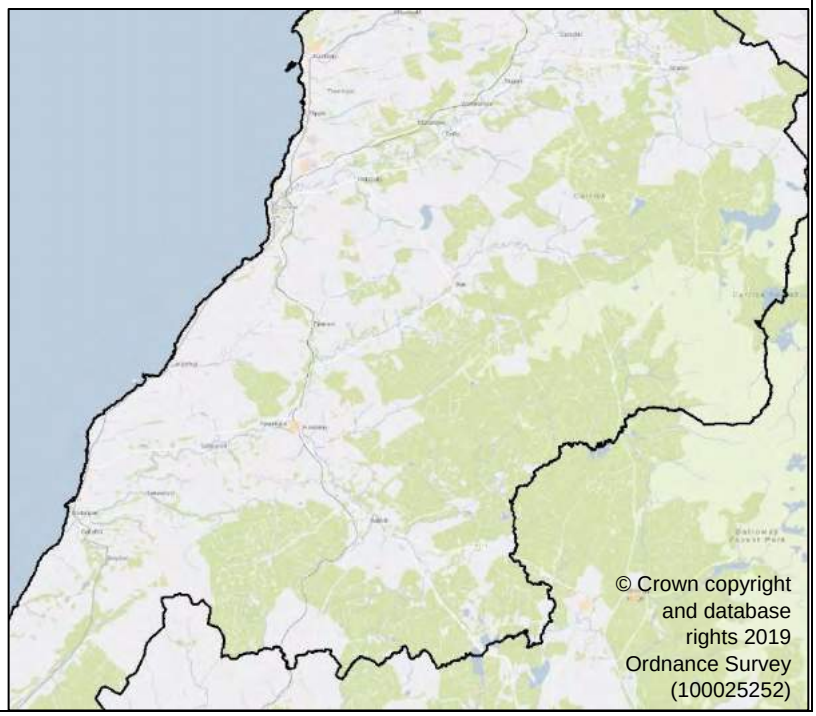


Building loss in South Ayrshire (2016 to 2017)

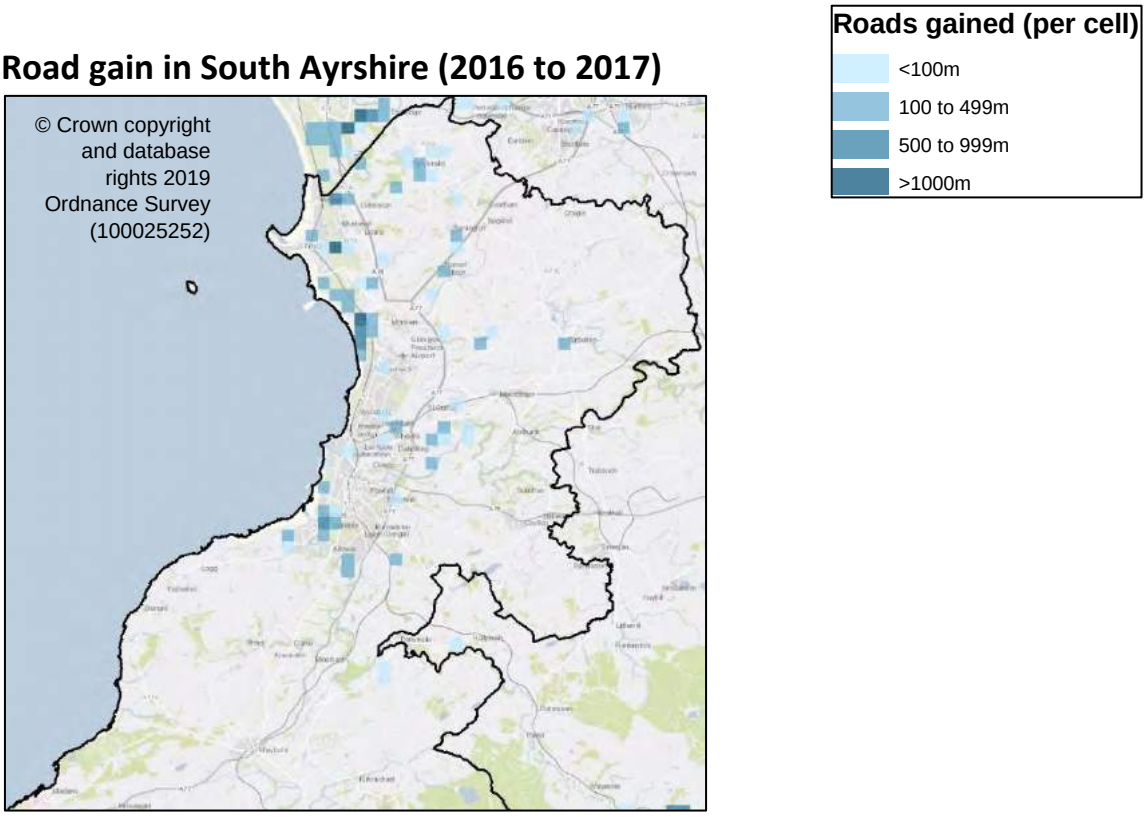


Of 1731 cells that contained buildings within 2016 and/or 2017:-

- **2.4% (n=41) lost buildings, of which:-**
  - **36 lost 1 to 4 buildings**
  - **3 lost 5 to 9 buildings**
  - **2 lost 10 to 19 buildings**

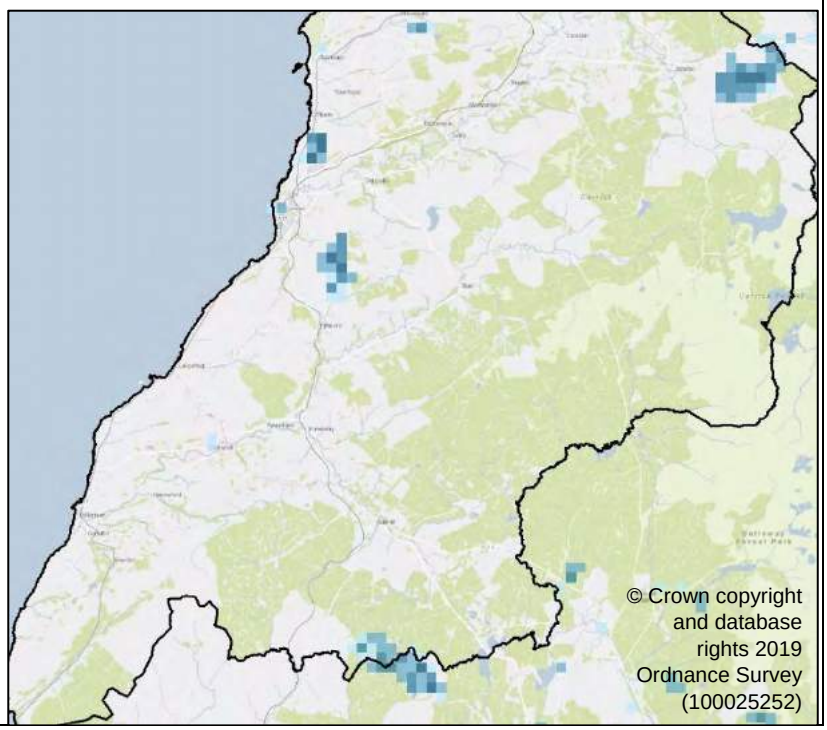


Road gain in South Ayrshire (2016 to 2017)

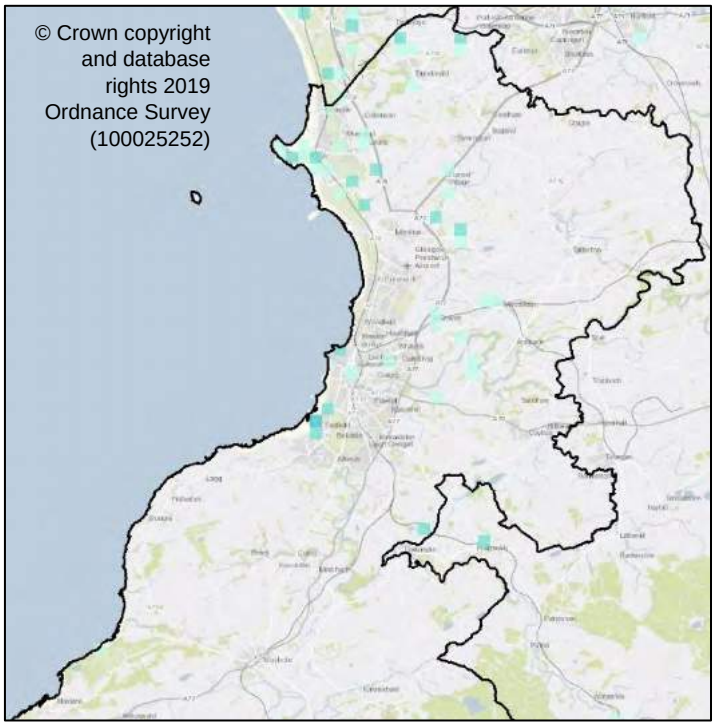


Of 3094 cells that contained roads within 2016 and/or 2017:-

- **4.3% (n=134) gained roads, of which:-**
  - **45 gained 1 to 100m**
  - **53 gained 100 to 499m**
  - **26 gained 500 to 999m**
  - **10 gained 1000m+**



Road loss in South Ayrshire (2016 to 2017)

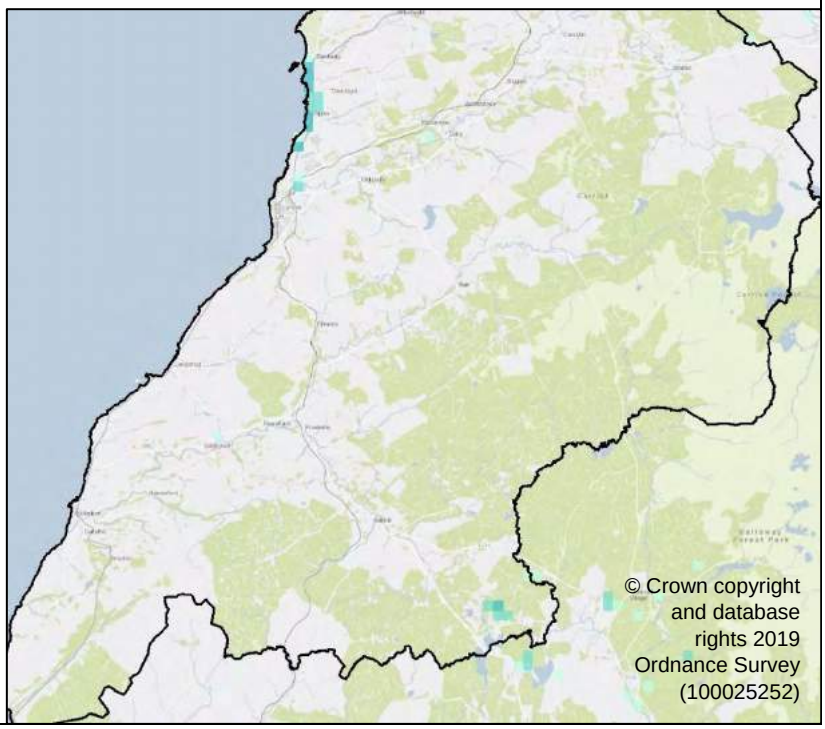


Roads lost (per cell)

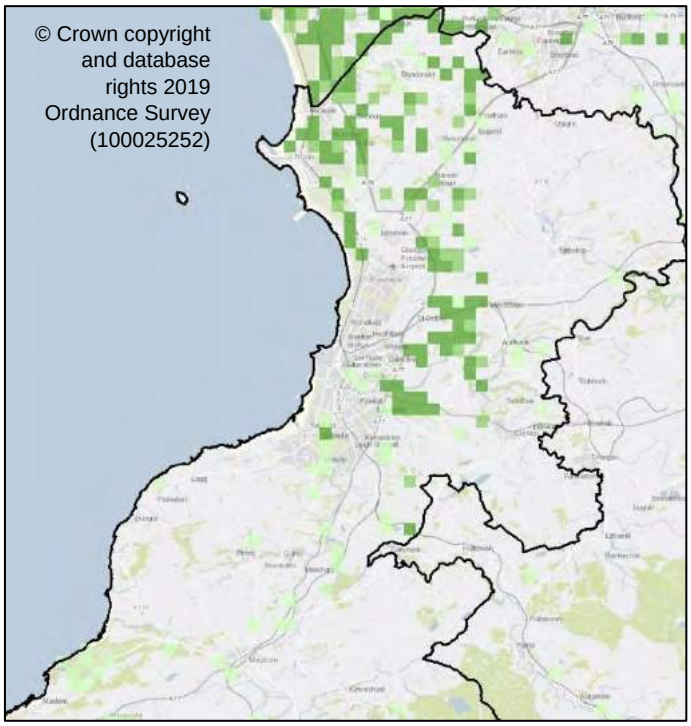
- <100m
- 100 to 499m
- 500 to 999m
- >1000m

Of 3094 cells that contained roads within 2016 and/or 2017:-

- **2.1% (n=65) lost roads, of which:-**
  - **36 lost 1 to 100m**
  - **21 lost 100 to 499m**
  - **8 lost 500 to 999m**

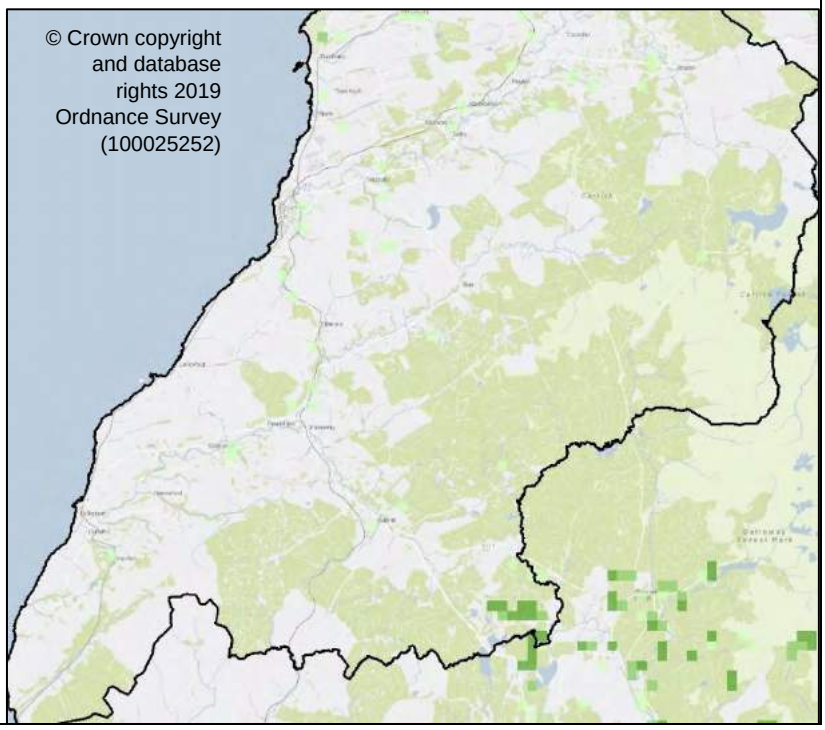


Woodland gain in South Ayrshire (2016 to 2017)

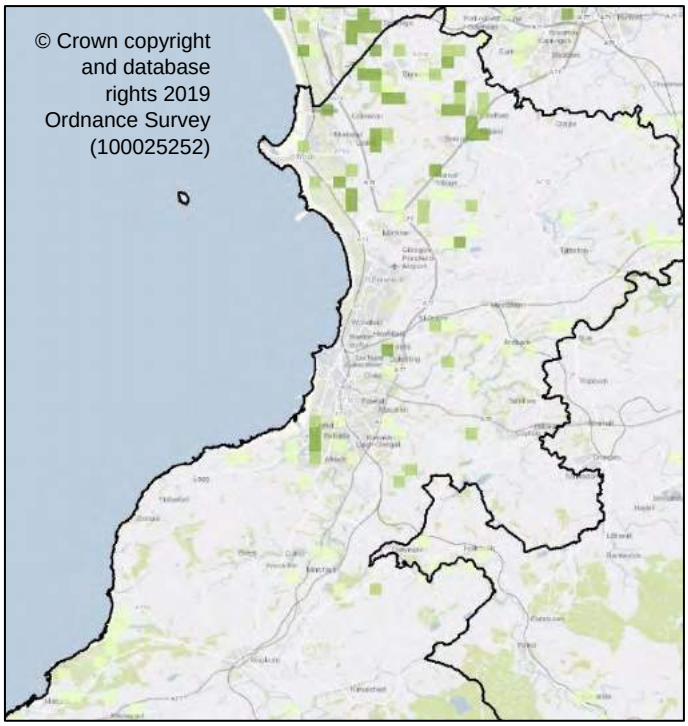


Of 3785 cells that contained woodland within 2016 and/or 2017:-

- **5.7% (n=217) gained woodland, of which:-**
  - **98 gained <100m²**
  - **30 gained 100 to 999m²**
  - **89 gained 1000m²+**



Woodland loss in South Ayrshire (2016 to 2017)

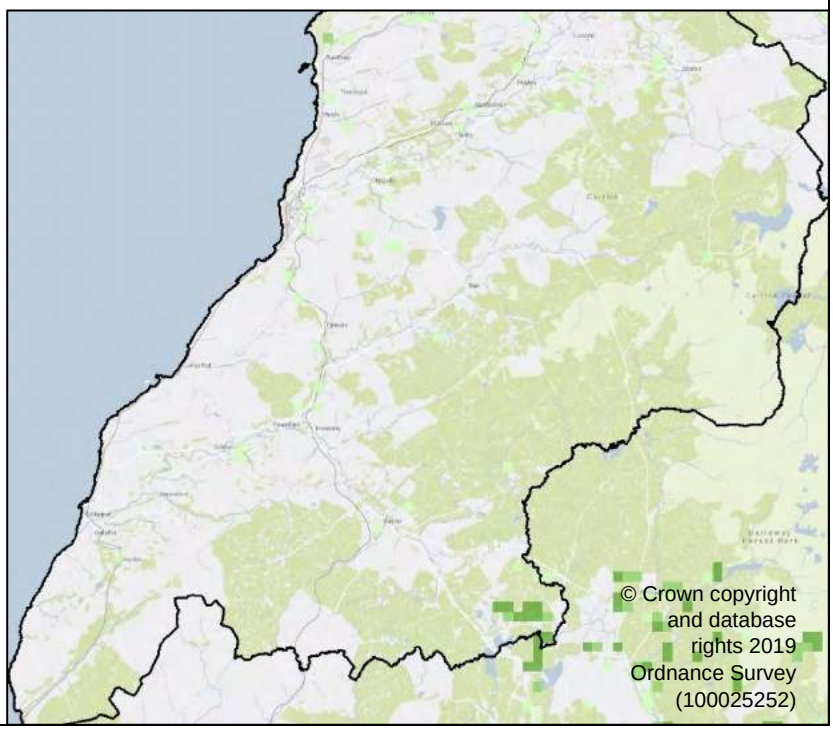


Woodlands loss (per cell)

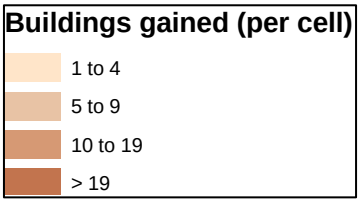
- <100m²
- 100 to 999m²
- 1000 to 99999m²
- >100000m²

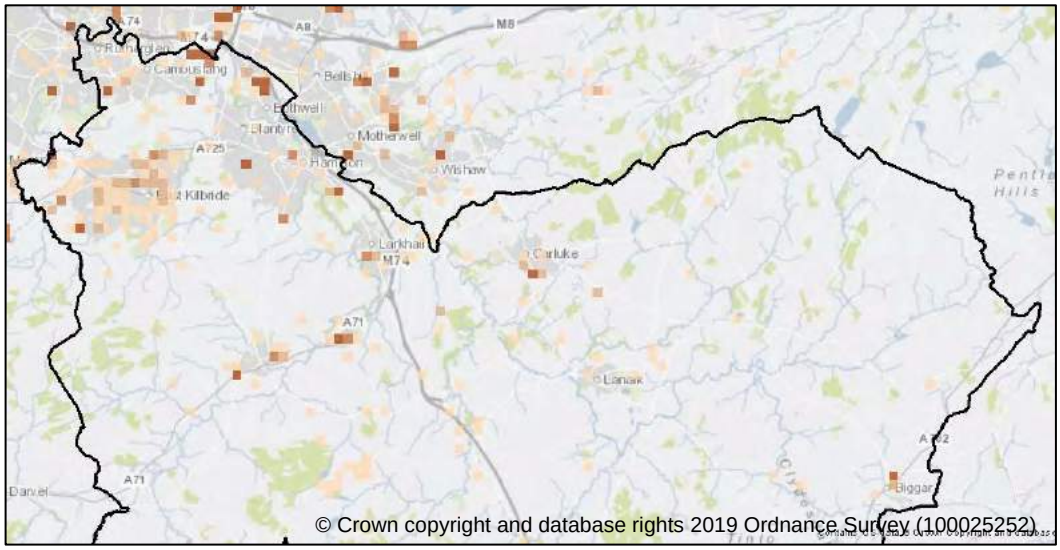
Of 3785 cells that contained woodland within 2016 and/or 2017:-

- **4.4% (n=165) lost woodland, of which:-**
  - **101 lost <100m²**
  - **26 lost 100 to 999m²**
  - **38 lost 1000m²+**



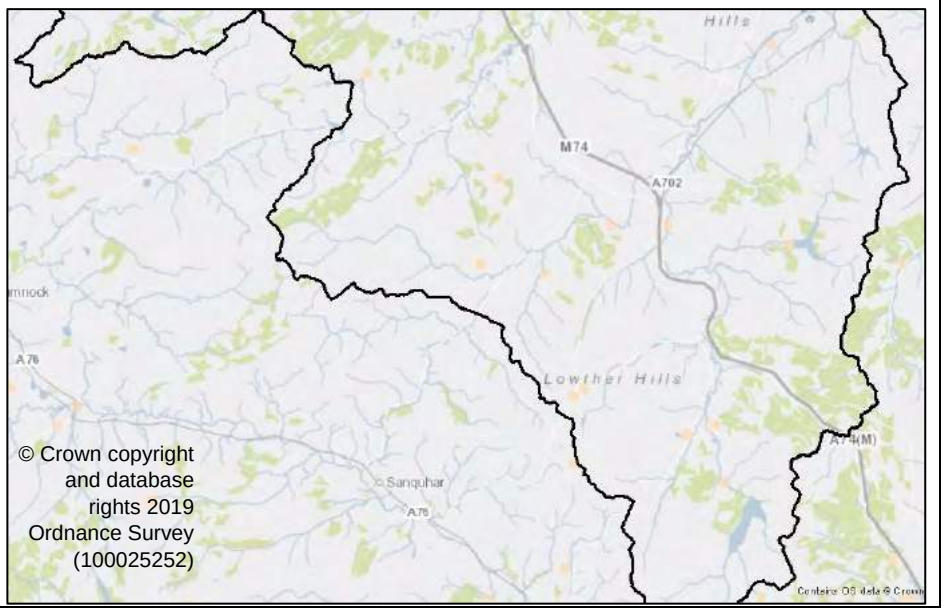
Building gain in South Lanarkshire (2016 to 2017)



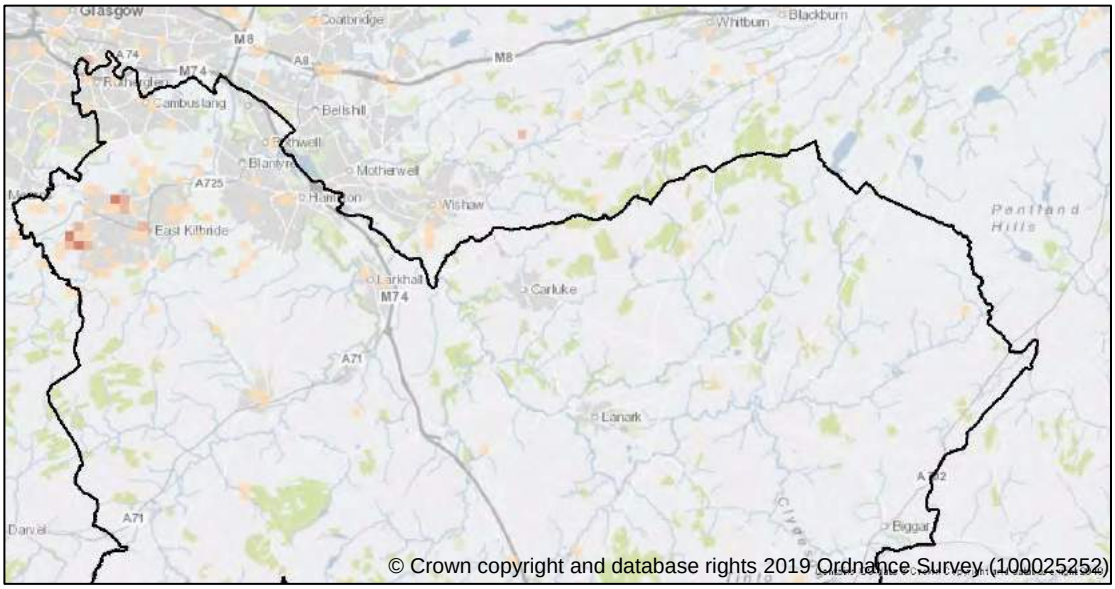


Of 2621 cells that contained buildings within 2016 and/or 2017:-

- **8.4% (n=219) gained buildings, of which:-**
  - **167 gained 1 to 4 buildings**
  - **27 gained 5 to 9 buildings**
  - **10 gained 10 to 19 buildings**
  - **15 gained >19 buildings**

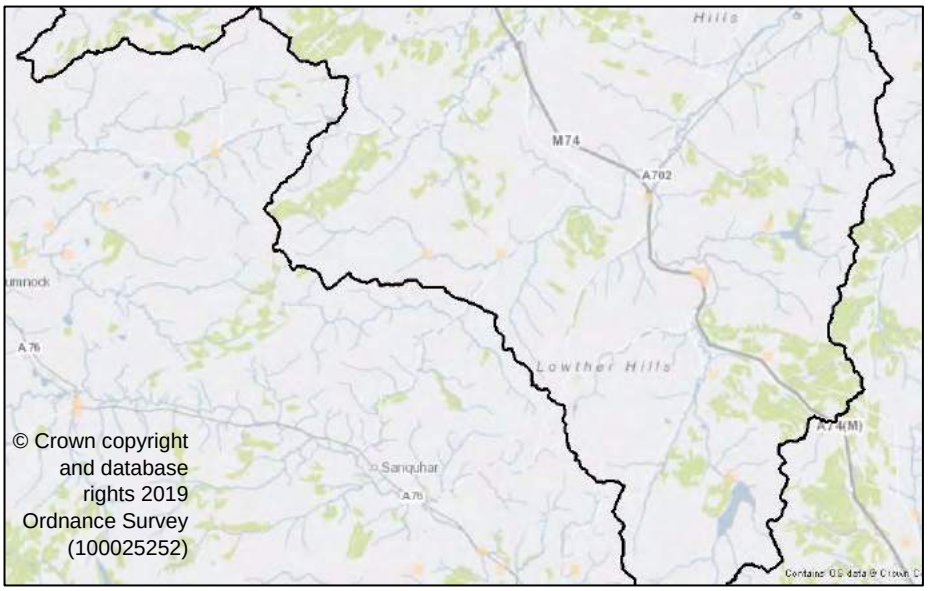


Building loss in South Lanarkshire (2016 to 2017)

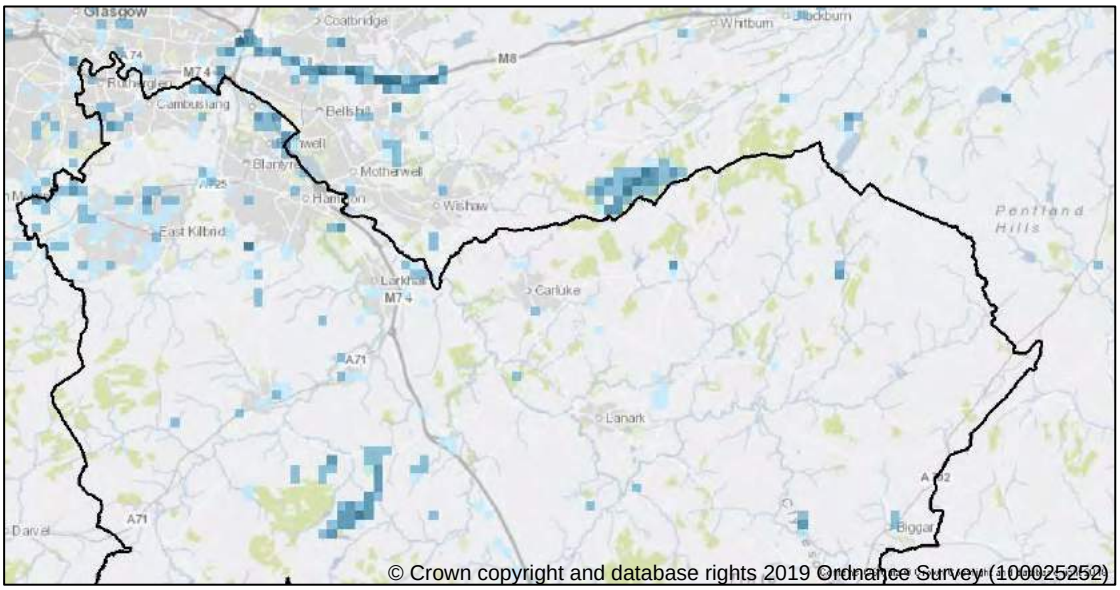


Of 2621 cells that contained buildings within 2016 and/or 2017:-

- **2.5% (n=91) lost buildings, of which:-**
  - **82 lost 1 to 4 buildings**
  - **6 lost 5 to 9 buildings**
  - **3 lost 10 to 19 buildings**

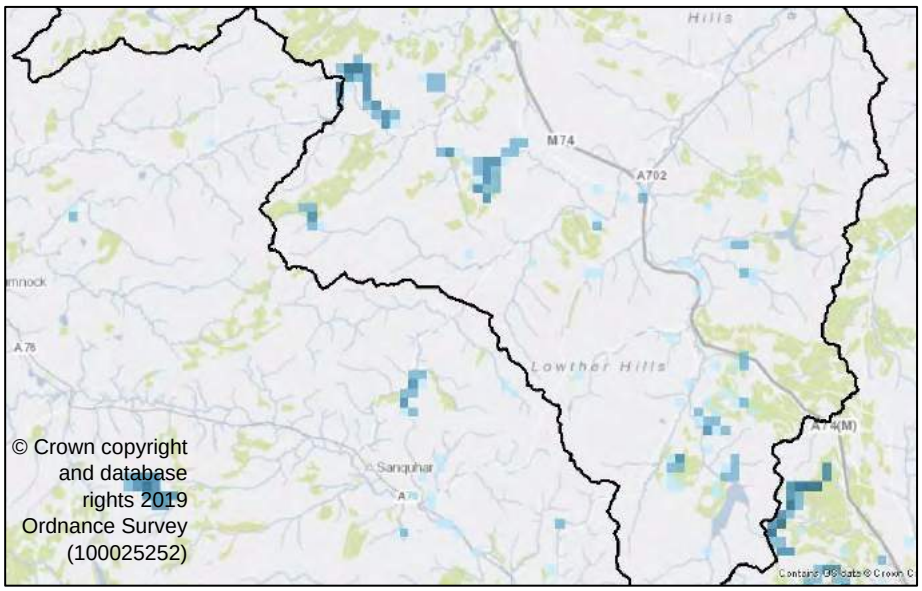


Road gain in South Lanarkshire (2016 to 2017)

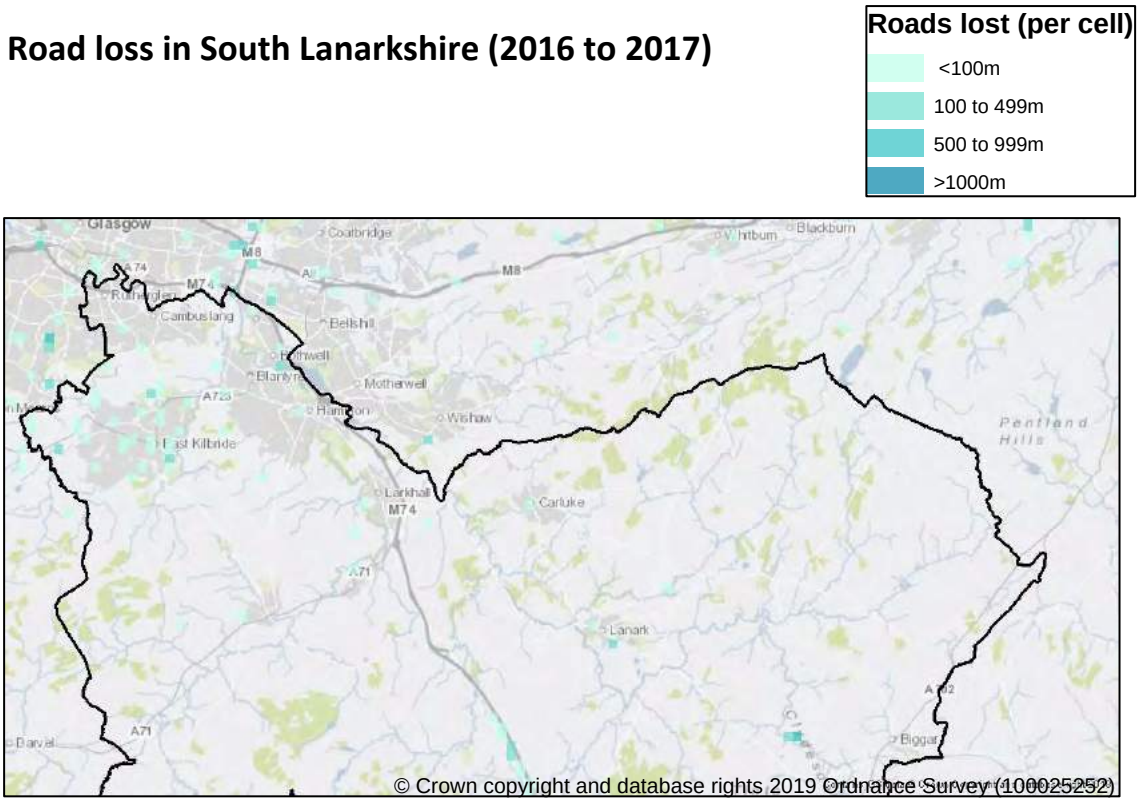


Of 4259 cells that contained roads within 2016 and/or 2017:-

- **7.5% (n=320) gained roads, of which:-**
  - **147 gained 1 to 100m**
  - **125 gained 100 to 499m**
  - **44 gained 500 to 999m**
  - **4 gained 1000m+**

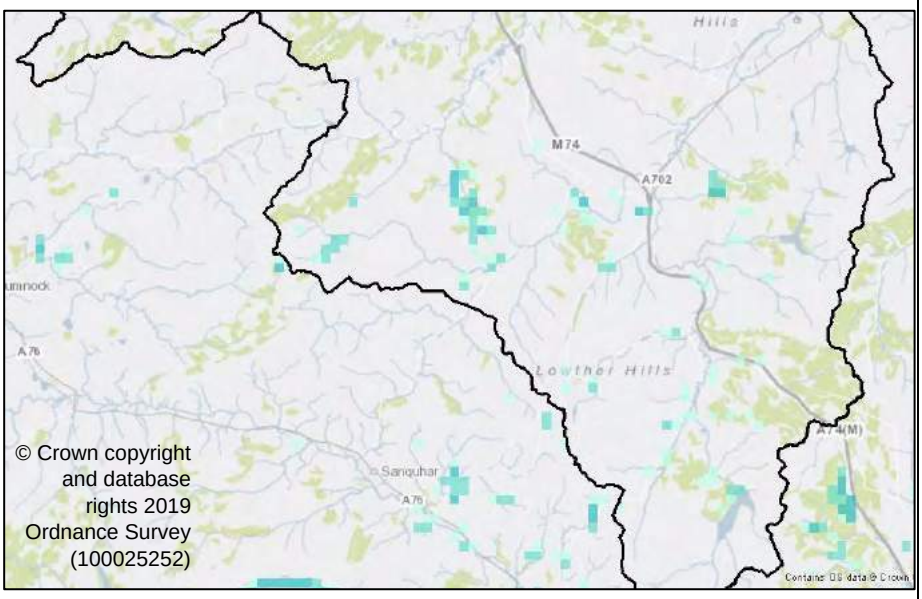


Road loss in South Lanarkshire (2016 to 2017)

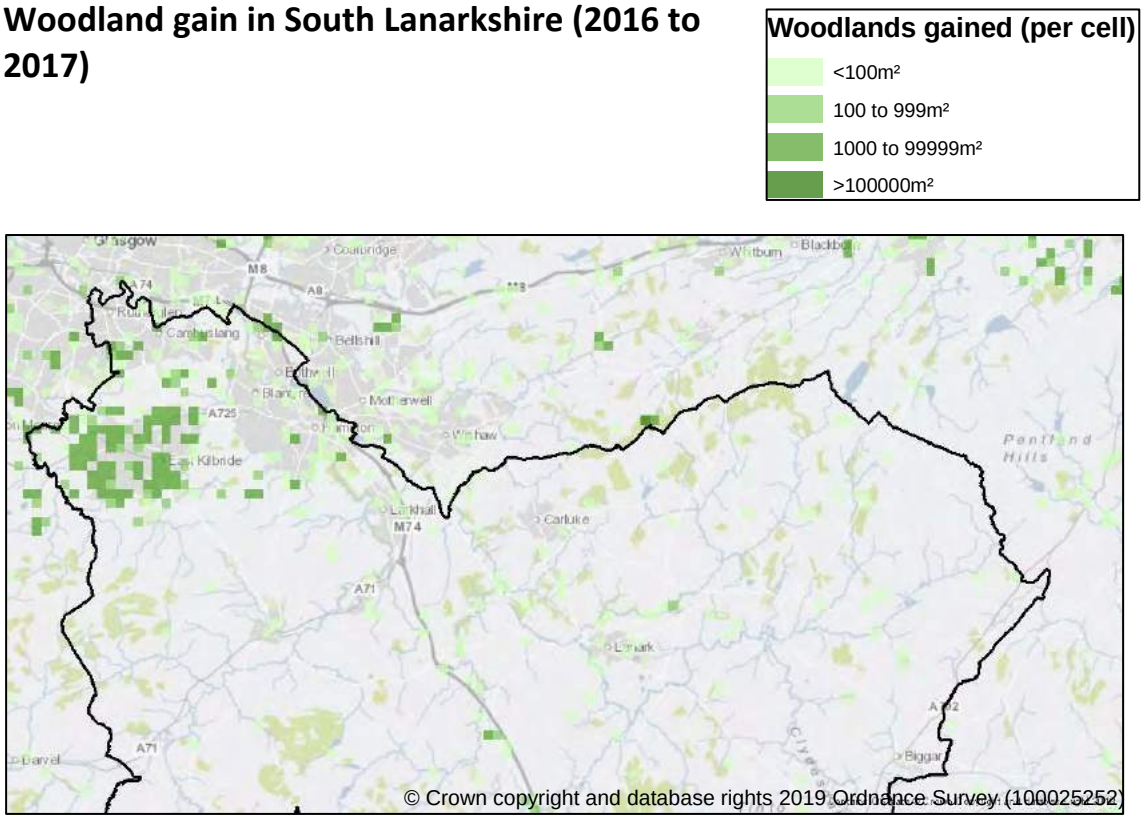


Of 4259 cells that contained roads within 2016 and/or 2017:-

- **3.7% (n=159) lost roads, of which:-**
  - **107 lost 1 to 100m**
  - **41 lost 100 to 499m**
  - **11 lost 500 to 999m**

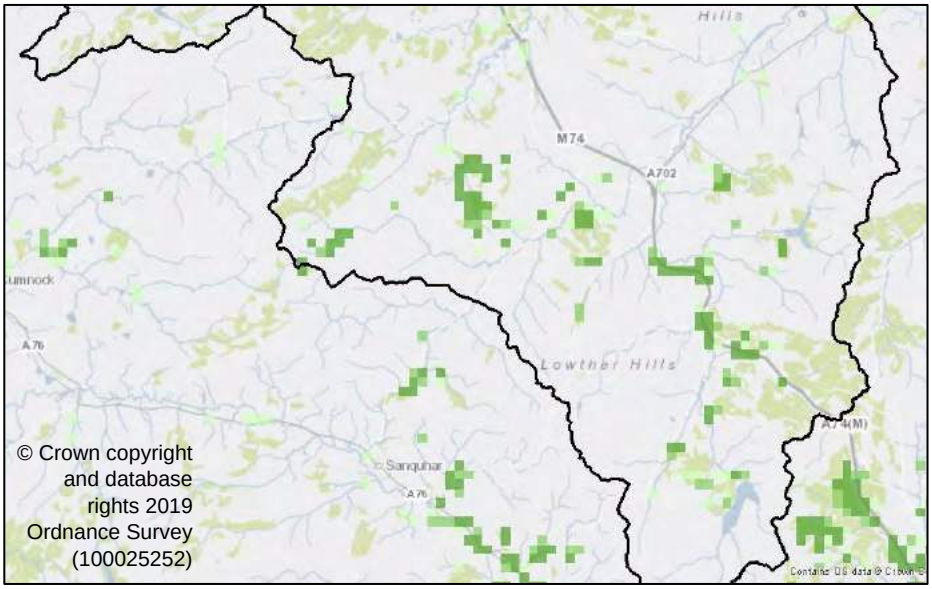


Woodland gain in South Lanarkshire (2016 to 2017)

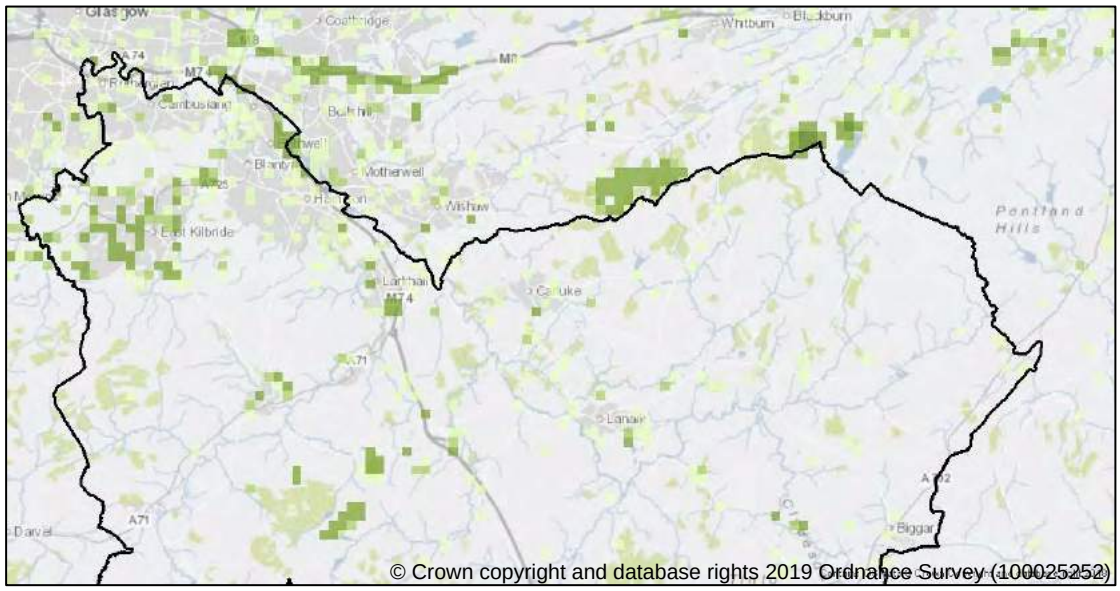


Of 4703 cells that contained woodland within 2016 and/or 2017:-

- **8.6% (n=404) gained woodland, of which:-**
  - **191 gained <100m²**
  - **57 gained 100 to 999m²**
  - **156 gained 1000m²+**

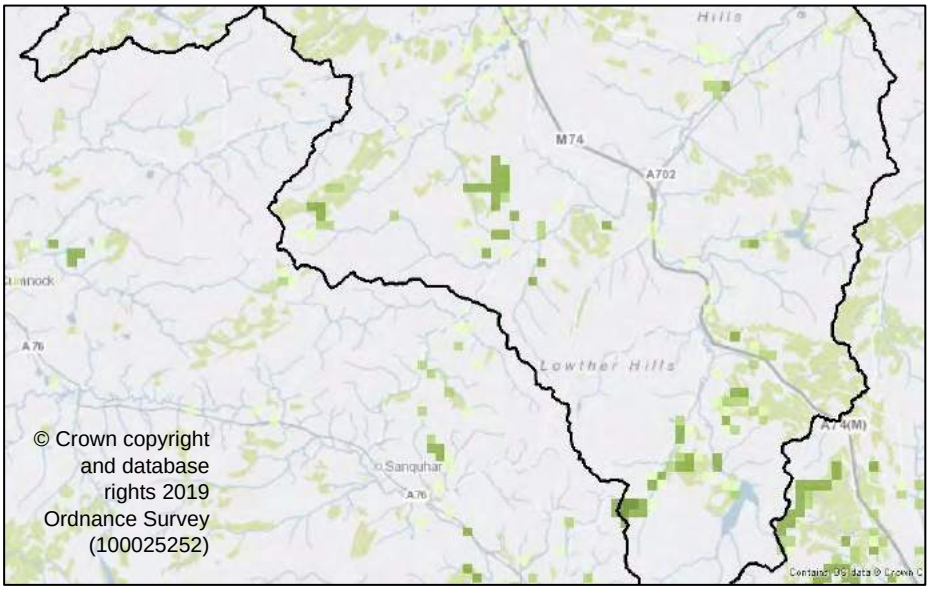


Woodland loss in South Lanarkshire (2016 to 2017)

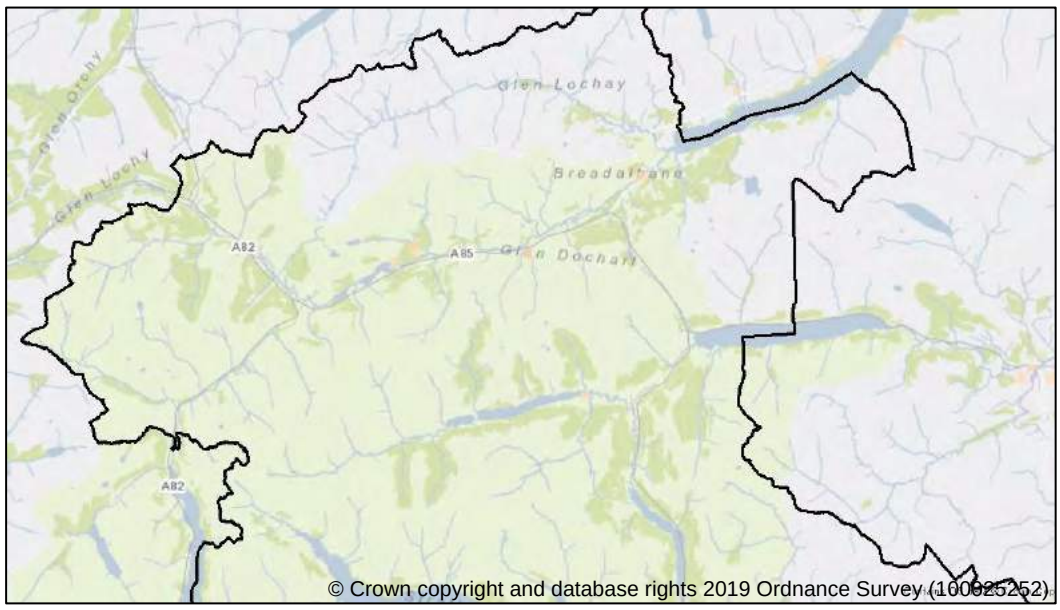


Of 4703 cells that contained woodland within 2016 and/or 2017:-

- **8.8% (n=414) lost woodland, of which:-**
  - **215 lost <100m²**
  - **70 lost 100 to 999m²**
  - **129 lost 1000m²+**

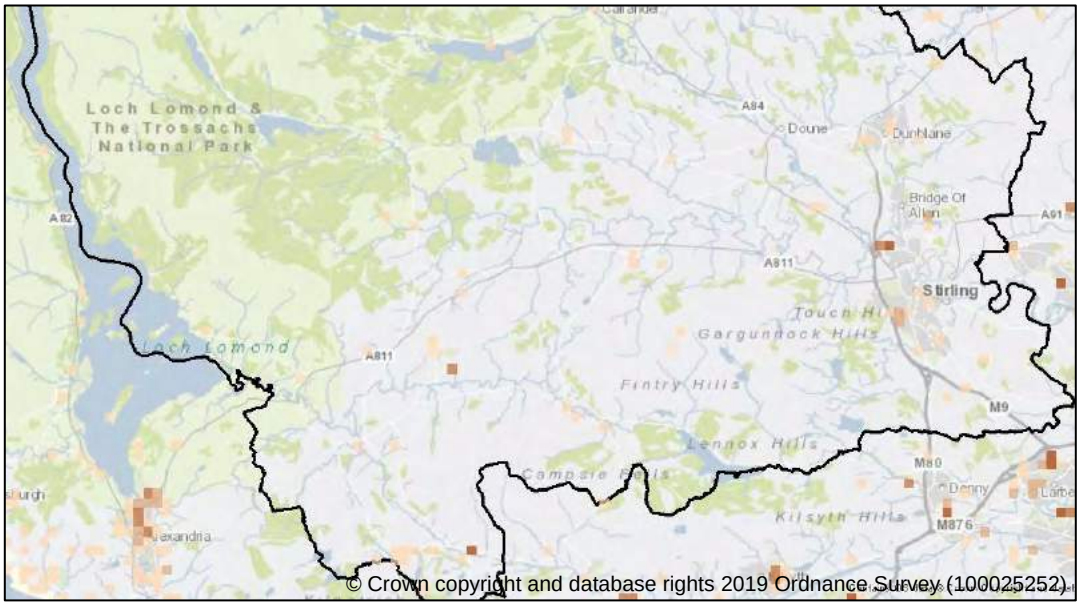


Building gain in Stirling (2016 to 2017)

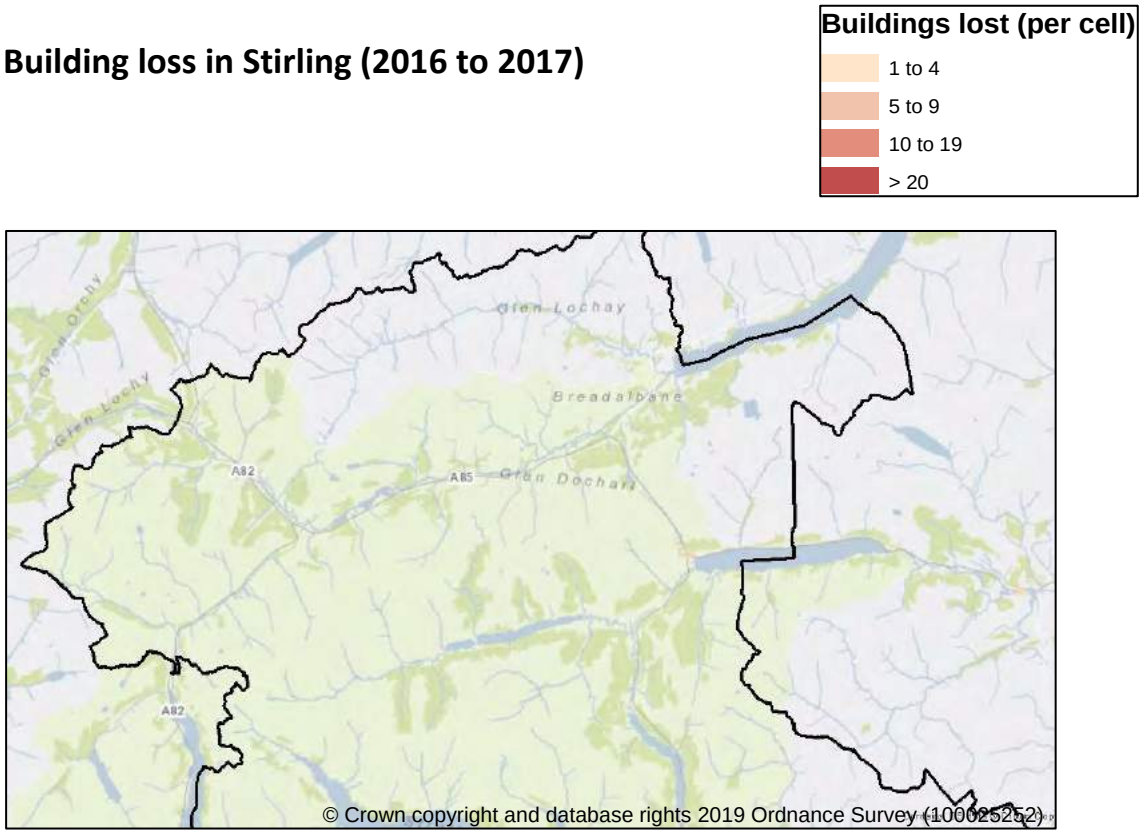


Of 1965 cells that contained buildings within 2016 and/or 2017:-

- **3.5% (n=68) gained buildings, of which:-**
  - **61 gained 1 to 4 buildings**
  - **3 gained 5 to 9 buildings**
  - **2 gained 10 to 19 buildings**
  - **2 gained >19 buildings**

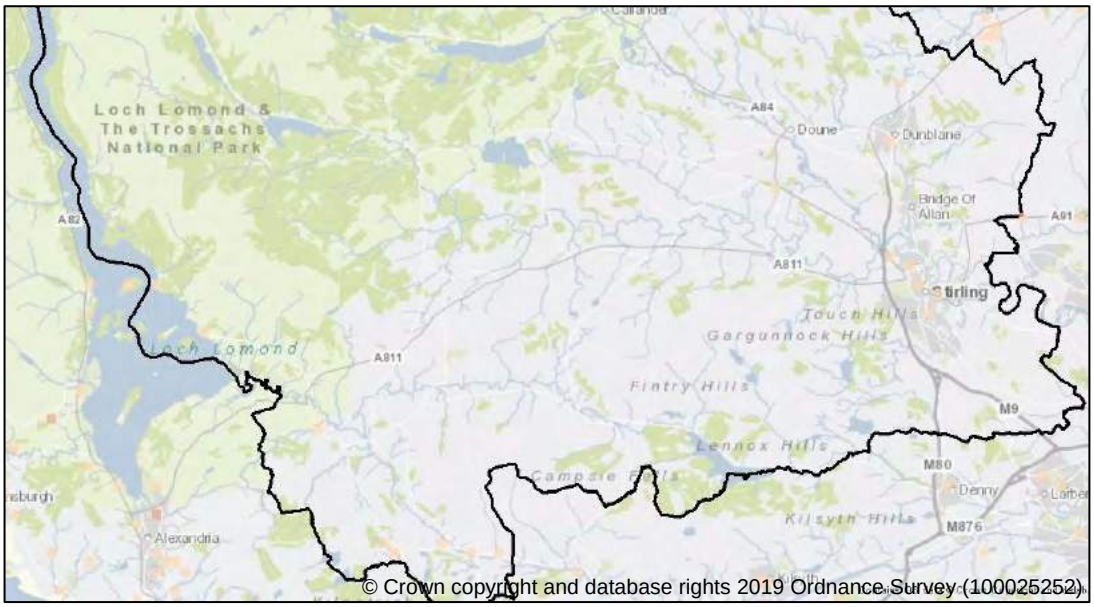


Building loss in Stirling (2016 to 2017)

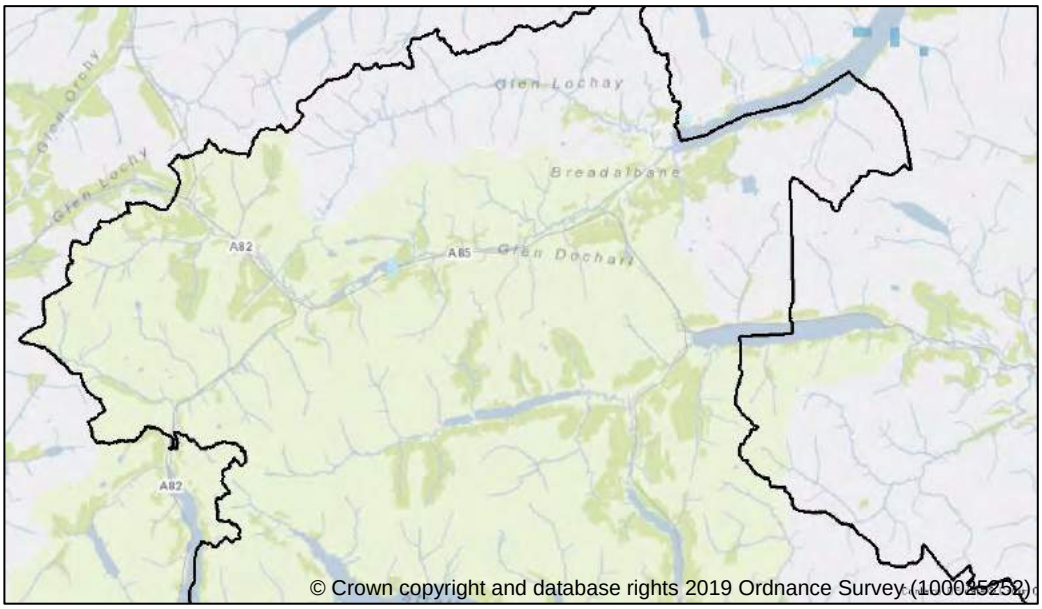


Of 1965 cells that contained buildings within 2016 and/or 2017:-

- **0.9% (n=17) lost buildings, of which:-**
  - **17 lost 1 to 4 buildings**

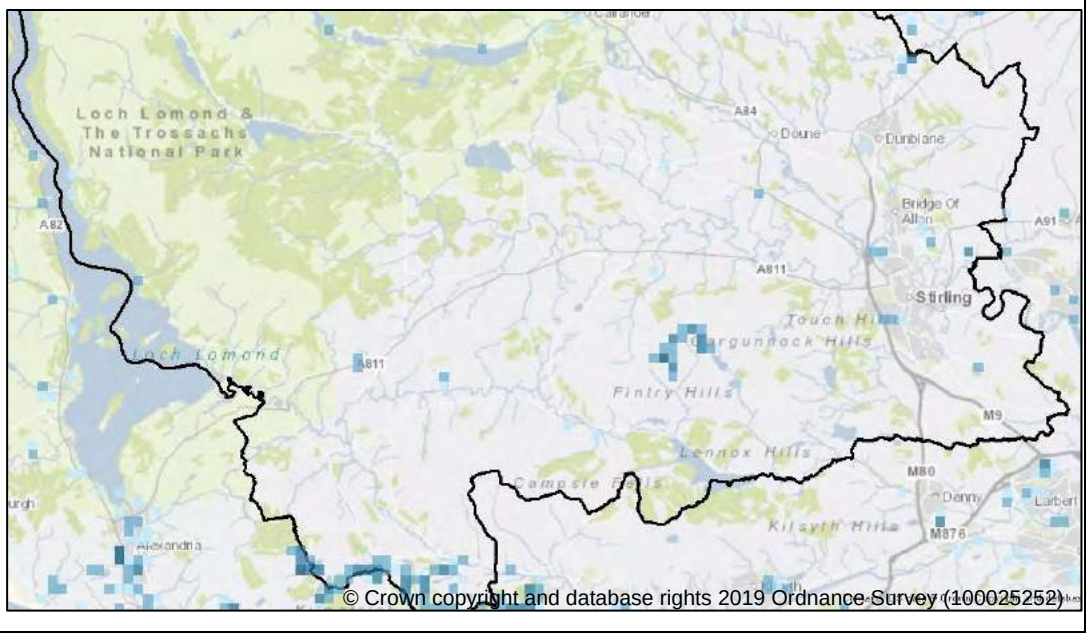


Road gain in Stirling (2016 to 2017)

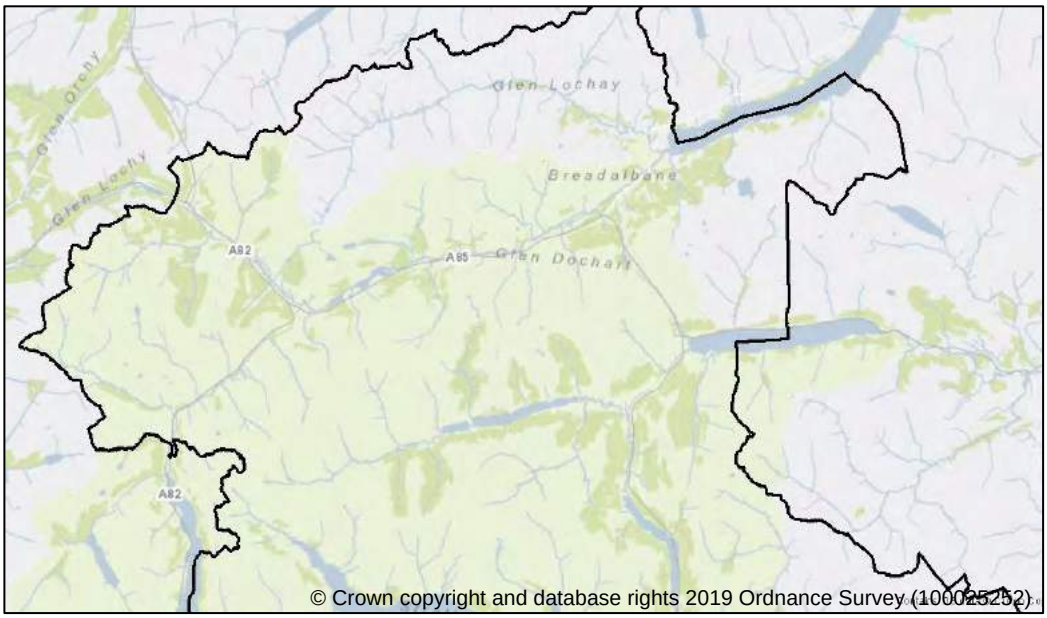


Of 3633 cells that contained roads within 2016 and/or 2017:-

- **2.2% (n=79) gained roads, of which:-**
  - **22 gained 1 to 100m**
  - **41 gained 100 to 499m**
  - **15 gained 500 to 999m**
  - **1 gained 1000m+**

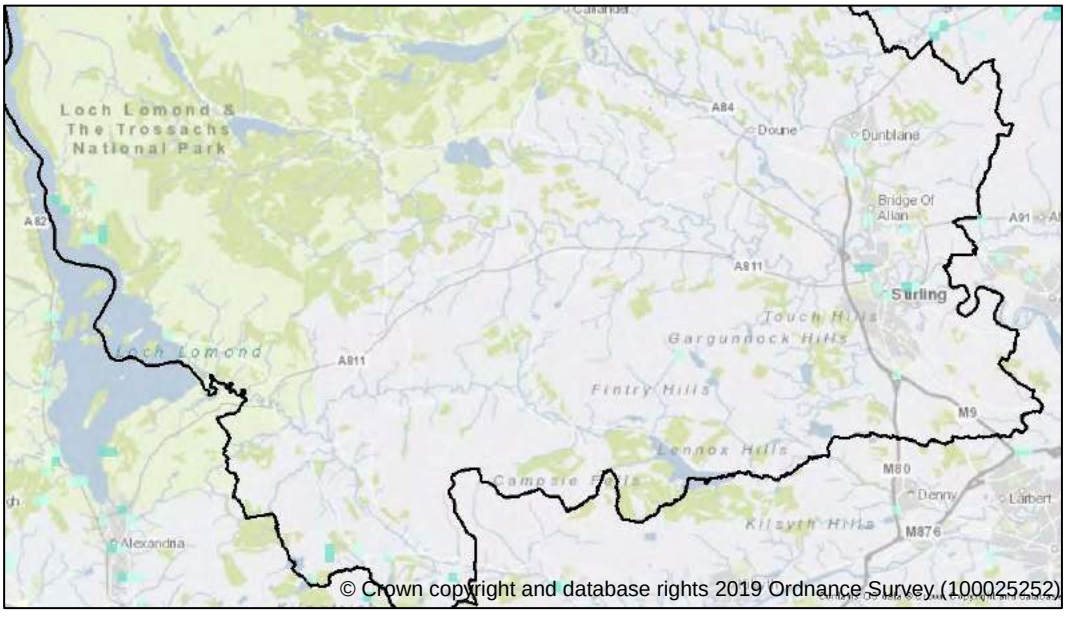


Road loss in Stirling (2016 to 2017)

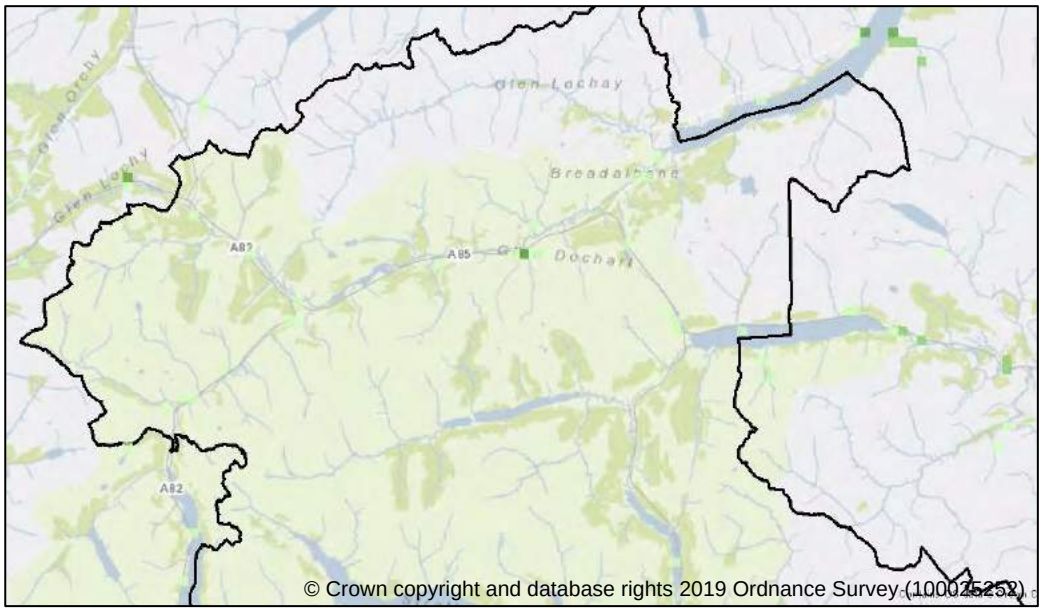


Of 3633 cells that contained roads within 2016 and/or 2017:-

- **0.8% (n=29) lost roads, of which:-**
  - **18 lost 1 to 100m**
  - **10 lost 100 to 499m**
  - **1 lost 500 to 999m**

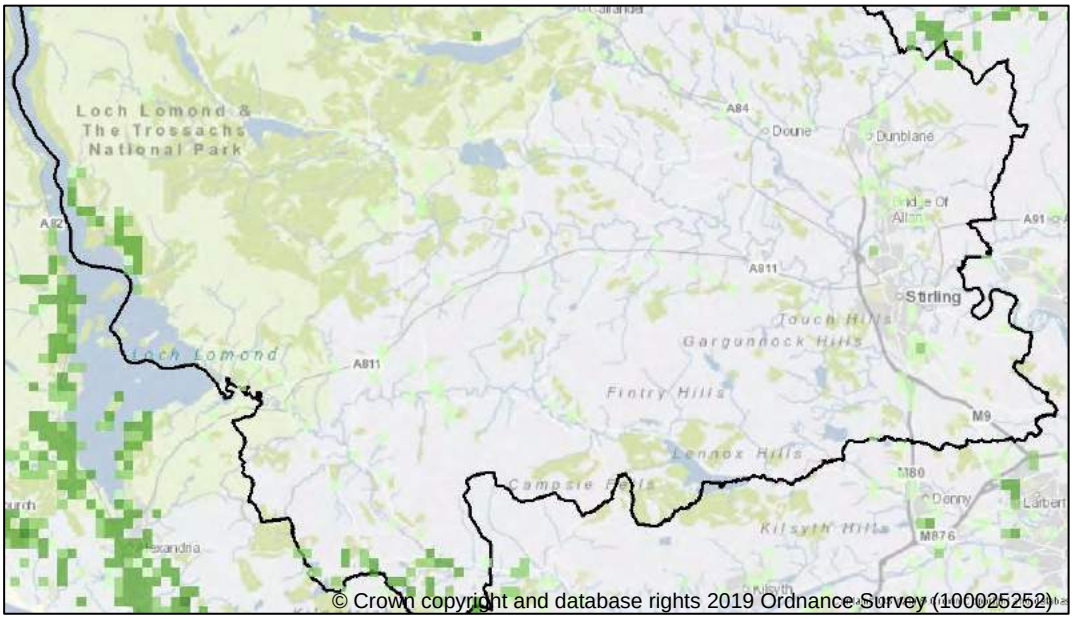


Woodland gain in Stirling (2016 to 2017)

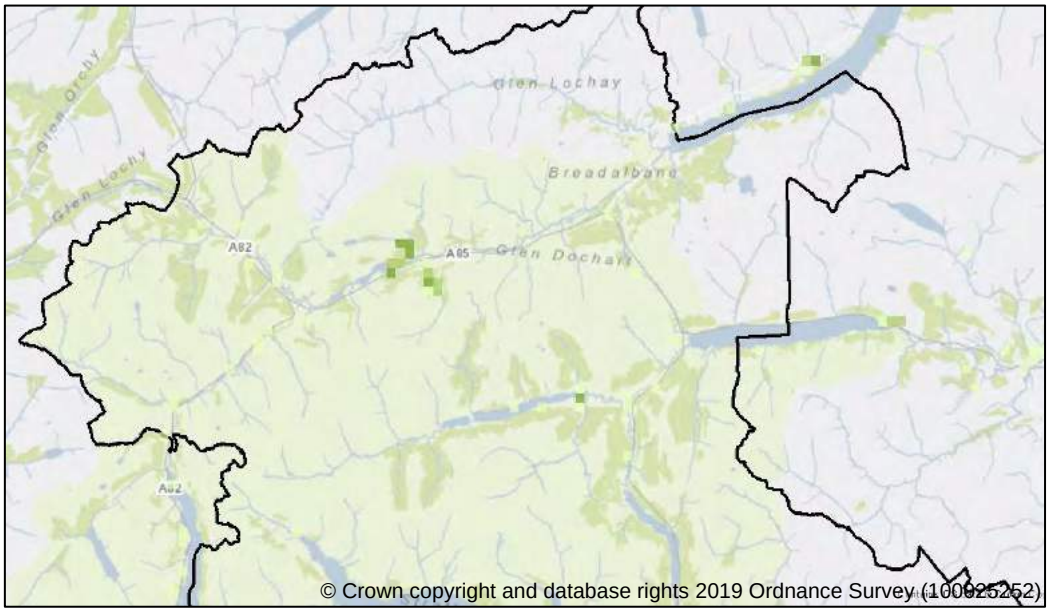


Of 5584 cells that contained woodland within 2016 and/or 2017:-

- **3.4% (n=189) gained woodland, of which:-**
  - **134 gained <100m²**
  - **23 gained 100 to 999m²**
  - **32 gained 1000m²+**

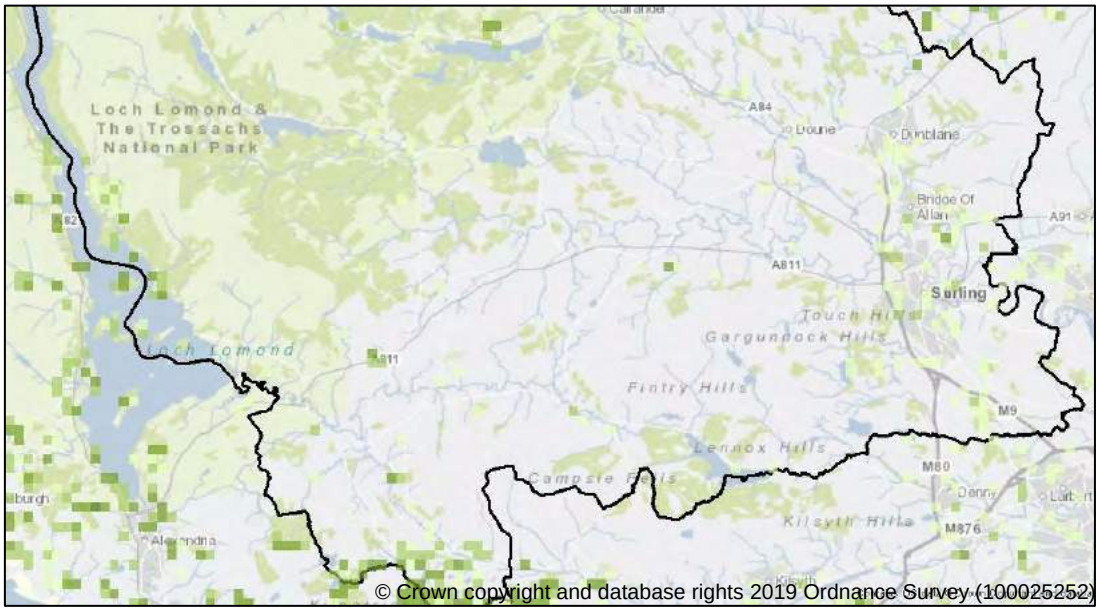


Woodland loss in Stirling (2016 to 2017)

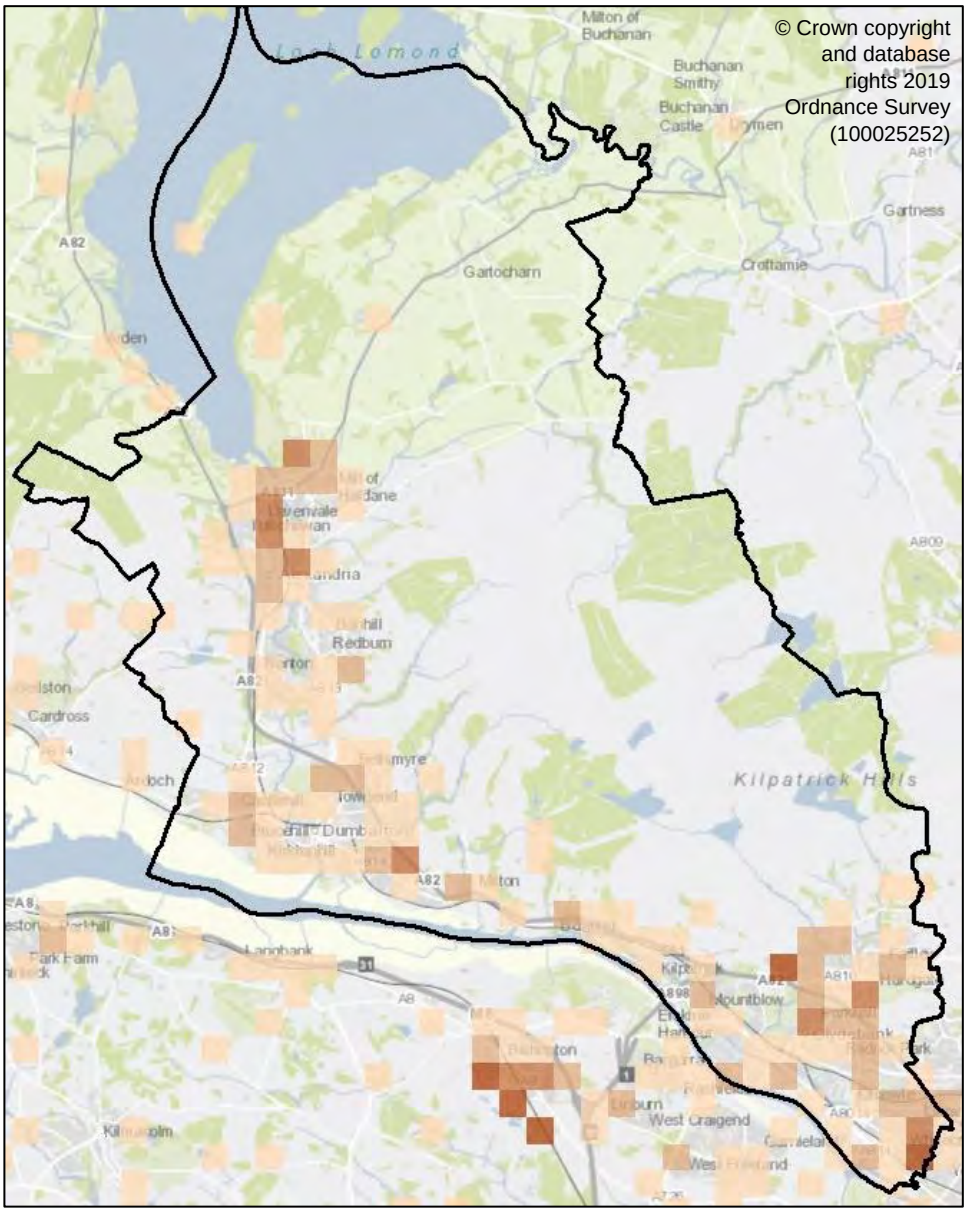


Of 5584 cells that contained woodland within 2016 and/or 2017:-

- **4.2% (n=234) lost woodland, of which:-**
  - **153 lost <100m²**
  - **49 lost 100 to 999m²**
  - **32 lost 1000m²+**



Building gain in West Dunbartonshire (2016 to 2017)



Of 319 cells that contained buildings within 2016 and/or 2017:-

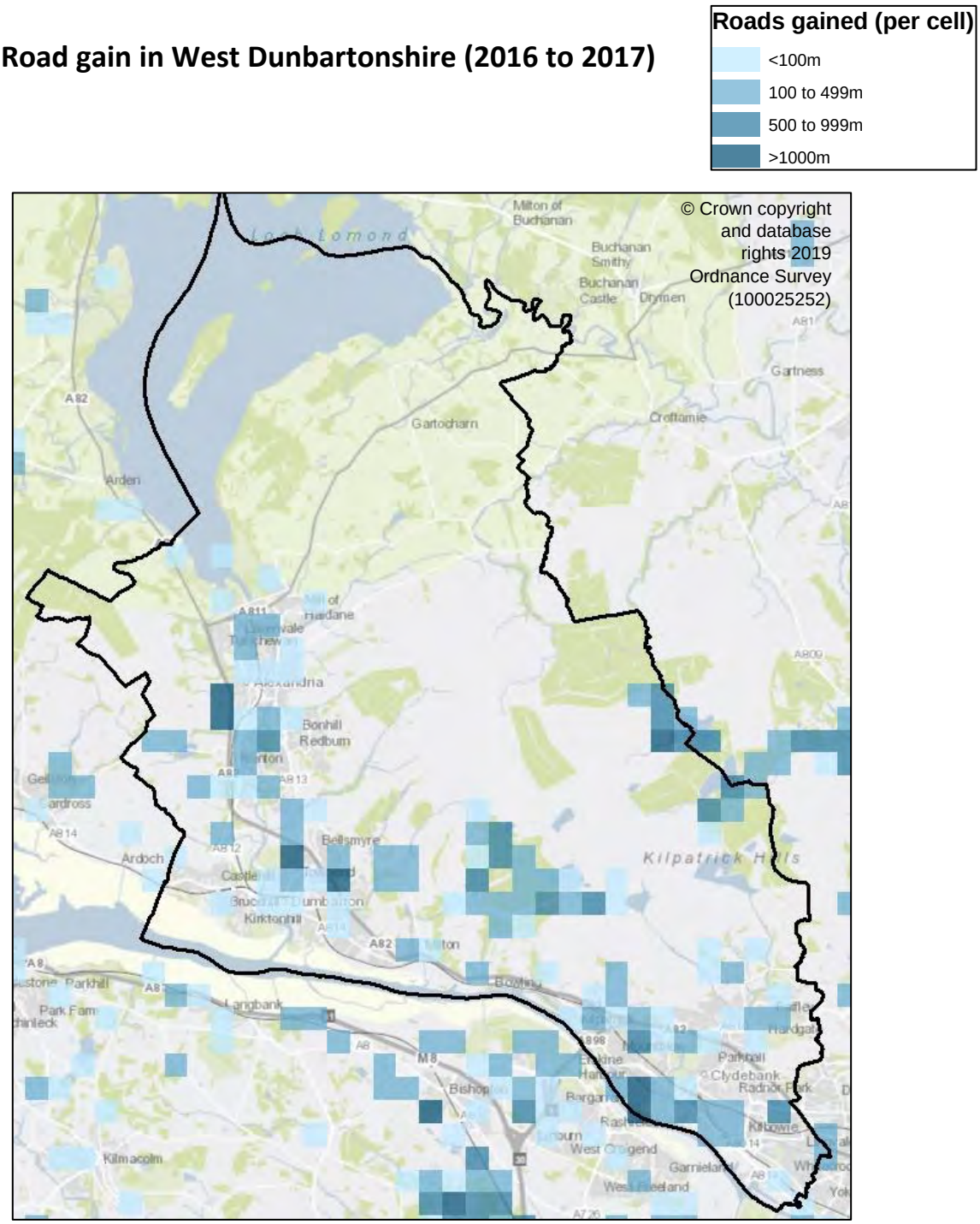
- **37.0% (n=118) gained buildings, of which:-**
  - **79 gained 1 to 4 buildings**
  - **29 gained 5 to 9 buildings**
  - **8 gained 10 to 19 buildings**
  - **2 gained >19 buildings**

Building loss in West Dunbartonshire (2016 to 2017)

Of 319 cells that contained buildings within 2016 and/or 2017:-

- **8.5% (n=27) lost buildings, of which:-**
  - **23 lost 1 to 4 buildings**
  - **3 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

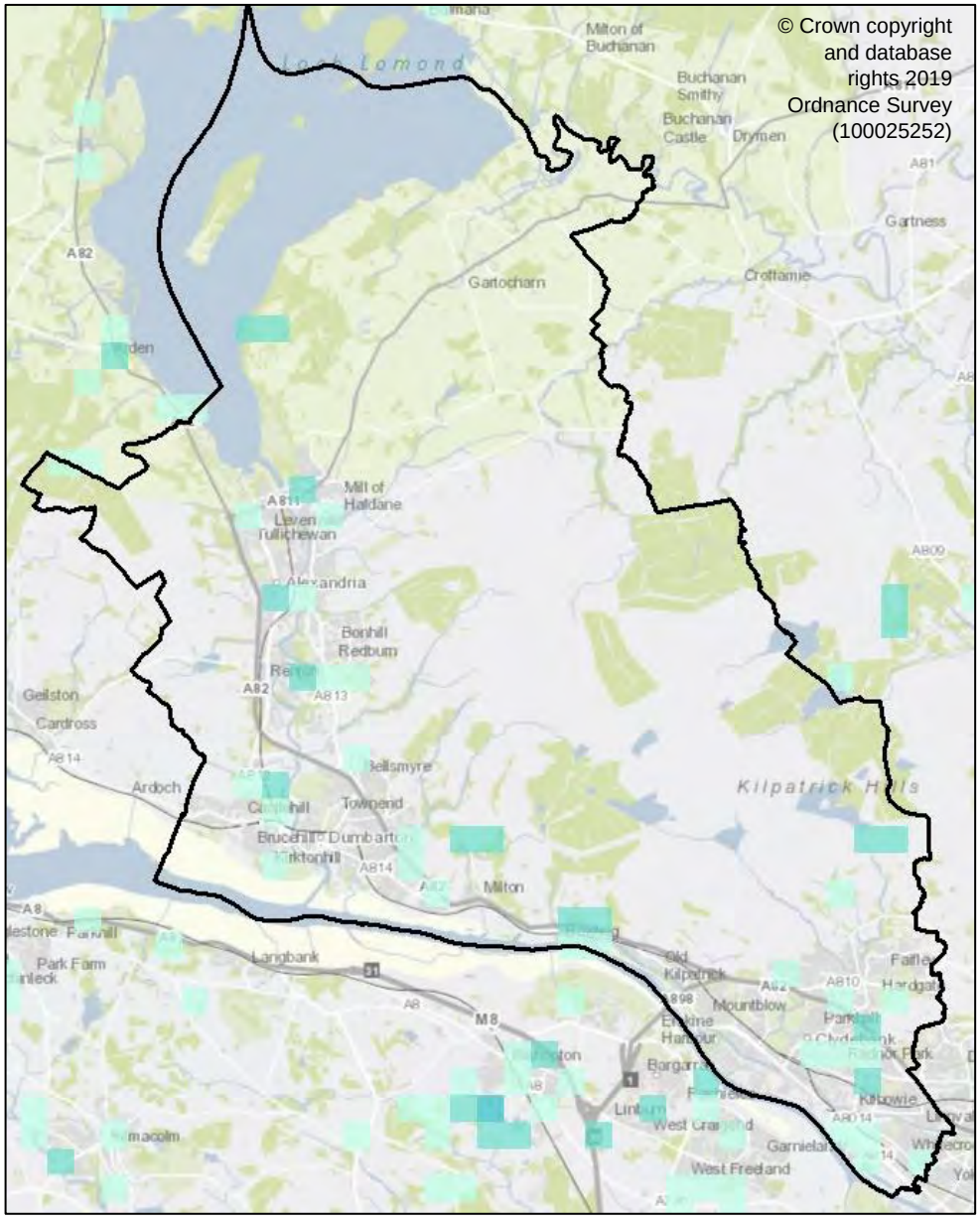
Road gain in West Dunbartonshire (2016 to 2017)



Of 401 cells that contained roads within 2016 and/or 2017:-

- **28.7% (n=115) gained roads, of which:-**
  - **46 gained 1 to 100m**
  - **48 gained 100 to 499m**
  - **14 gained 500 to 999m**
  - **7 gained 1000m+**

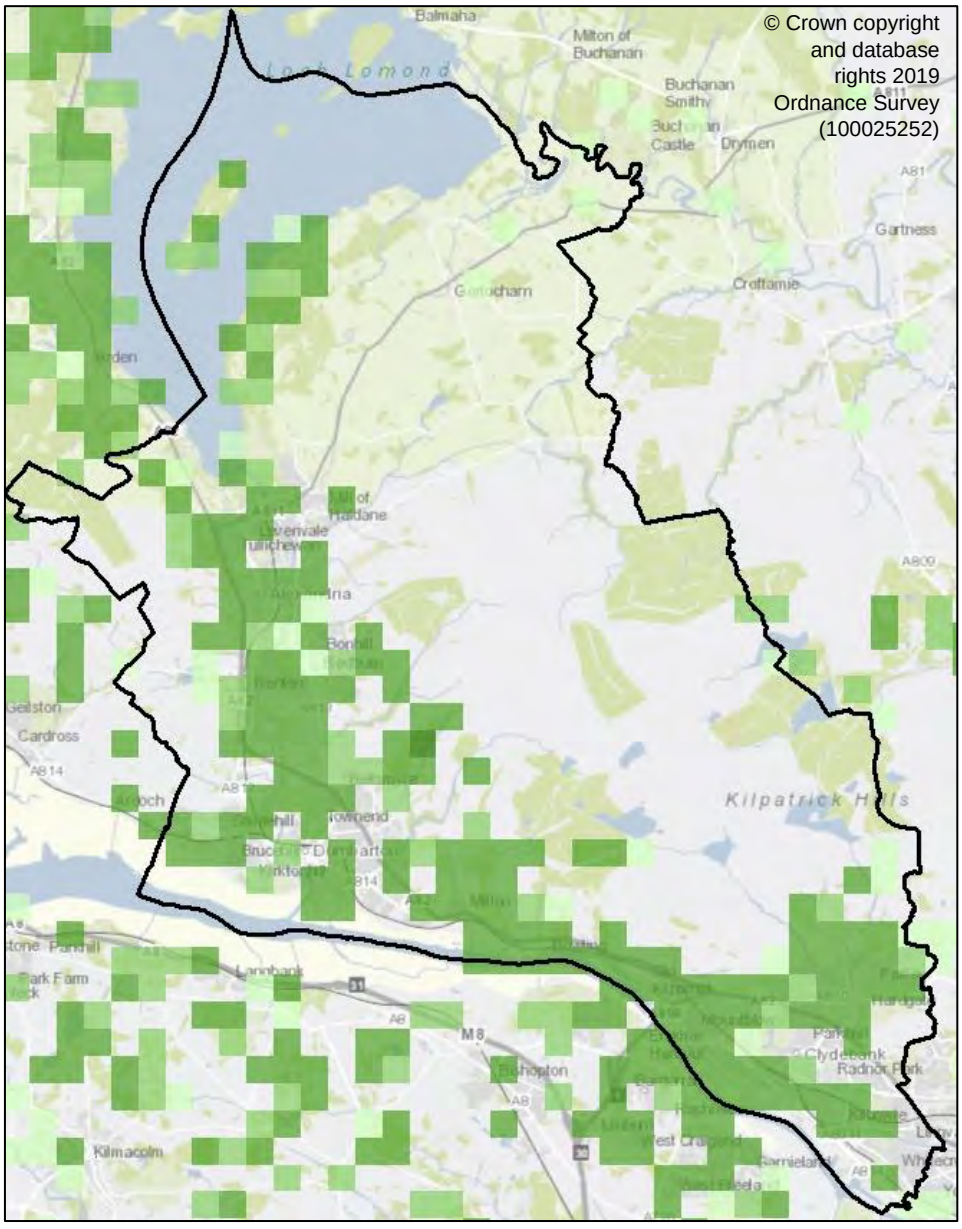
Road loss in West Dunbartonshire (2016 to 2017)



Of 401 cells that contained roads within 2016 and/or 2017:-

- **9.7% (n=39) lost roads, of which:-**
  - **25 lost 1 to 100m**
  - **14 lost 100 to 499m**

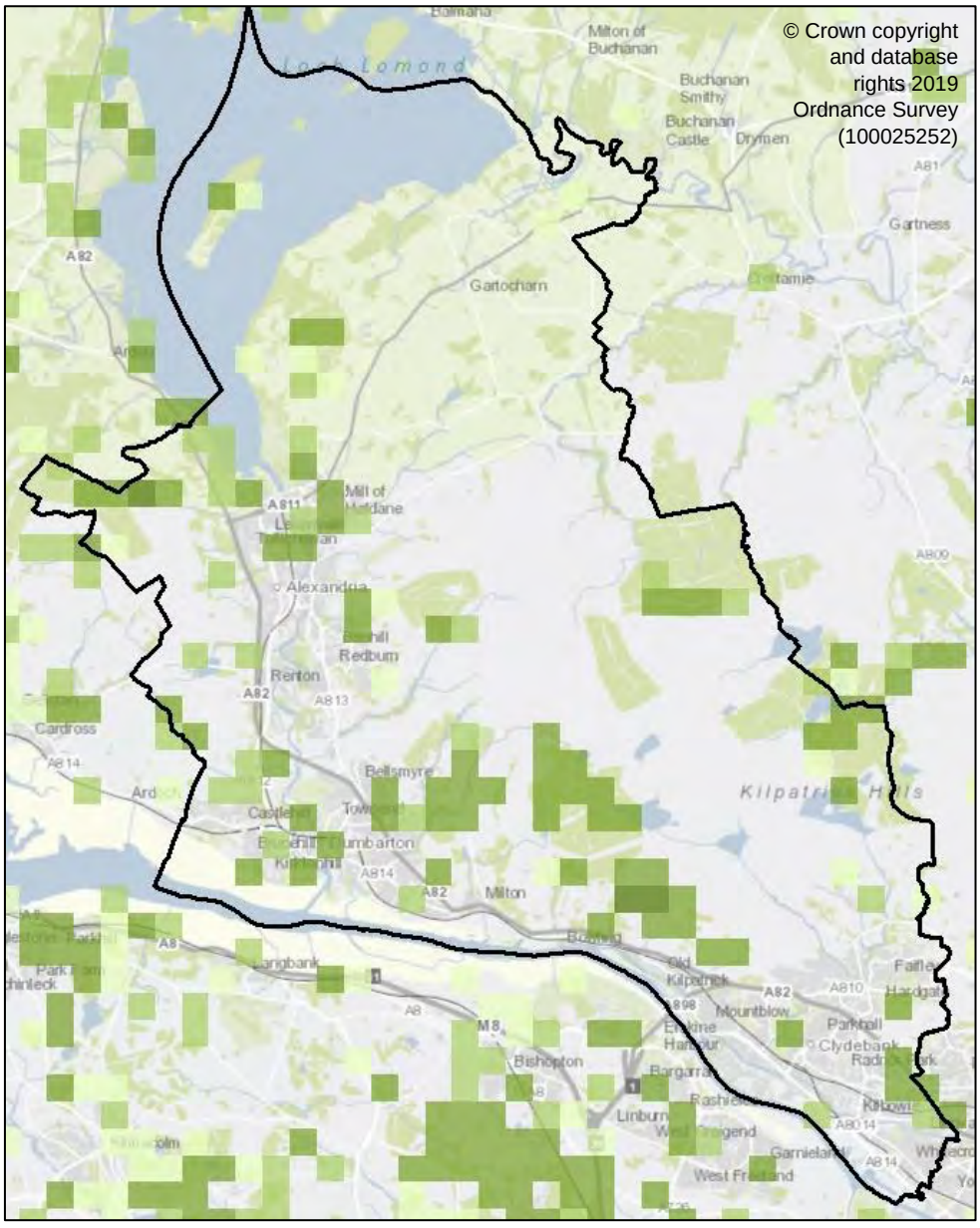
Woodland gain in West Dunbartonshire (2016 to 2017)



Of 570 cells that contained woodland within 2016 and/or 2017:-

- **33.9% (n=193) gained woodland, of which:-**
  - **18 gained <100m²**
  - **30 gained 100 to 999m²**
  - **145 gained 1000m²+**

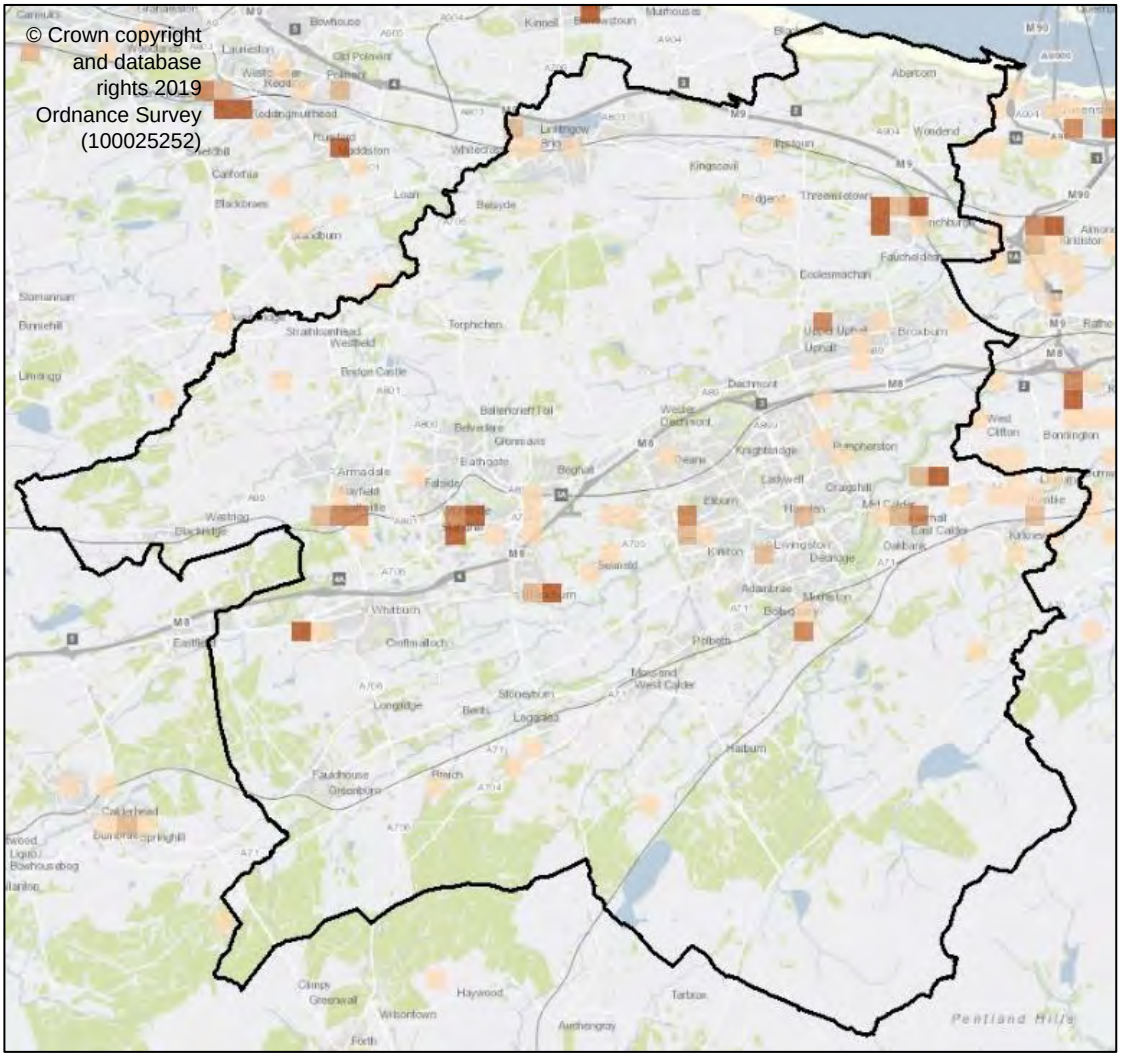
Woodland loss in West Dunbartonshire (2016 to 2017)



Of 570 cells that contained woodland within 2016 and/or 2017:-

- **18.2% (n=104) lost woodland, of which:-**
  - **13 lost <100m²**
  - **26 lost 100 to 999m²**
  - **65 lost 1000m²+**

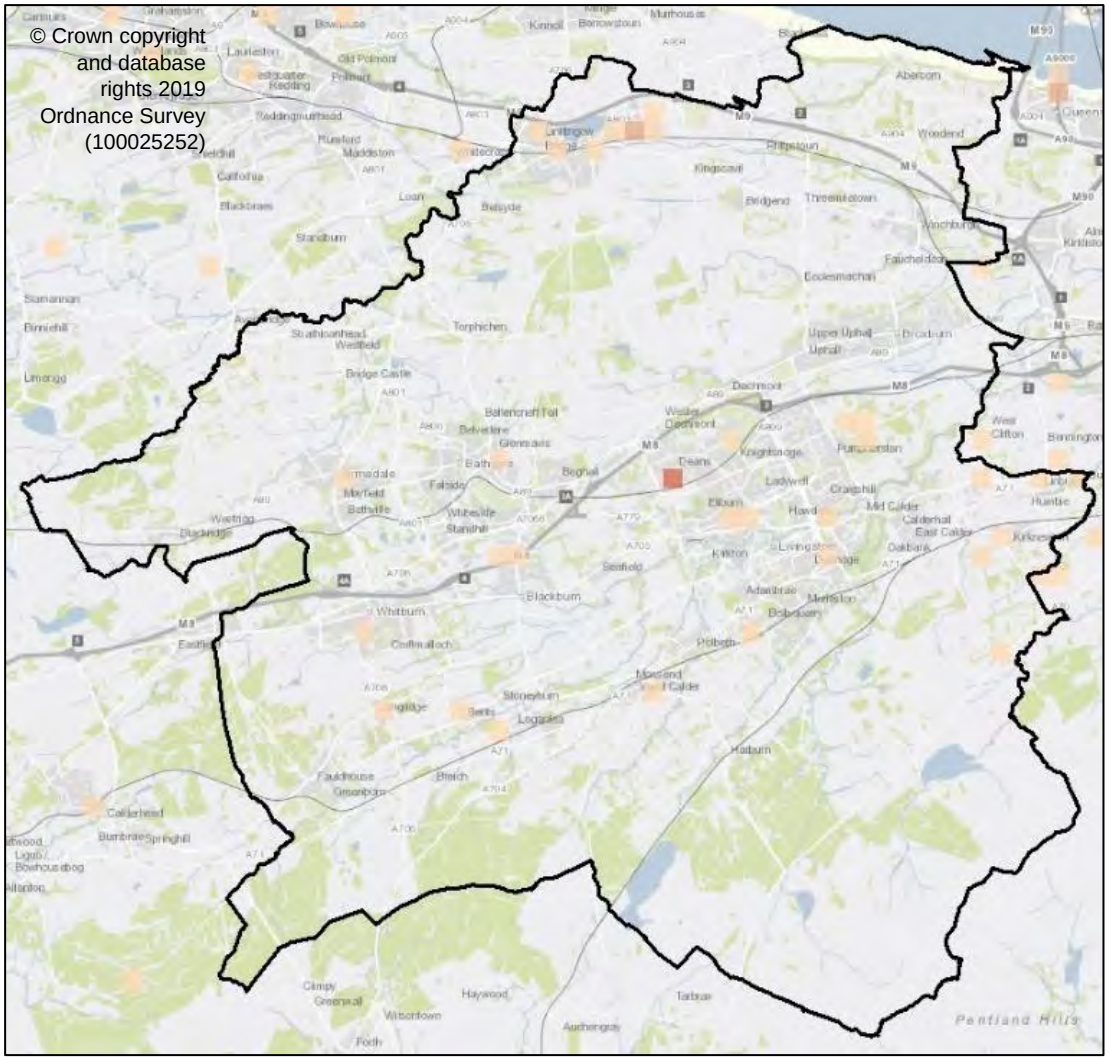
Building gain in West Lothian (2016 to 2017)



Of 1026 cells that contained buildings within 2016 and/or 2017:-

- **6.9% (n=71) gained buildings, of which:-**
  - **46 gained 1 to 4 buildings**
  - **10 gained 5 to 9 buildings**
  - **7 gained 10 to 19 buildings**
  - **8 gained >19 buildings**

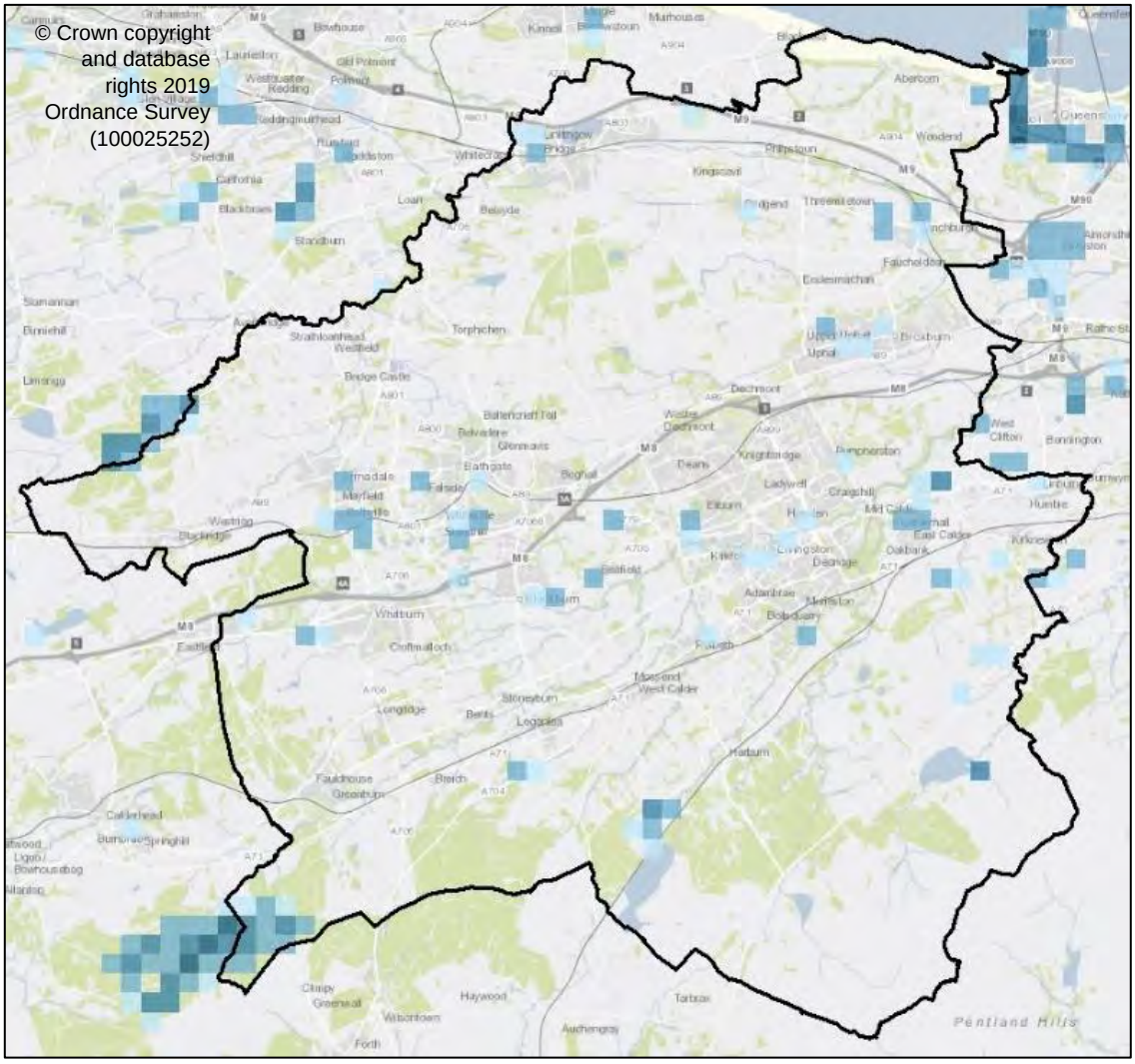
Building loss in West Lothian (2016 to 2017)



Of 1026 cells that contained buildings within 2016 and/or 2017:-

- **3.1% (n=32) lost buildings, of which:-**
  - **30 lost 1 to 4 buildings**
  - **1 lost 5 to 9 buildings**
  - **1 lost 10 to 19 buildings**

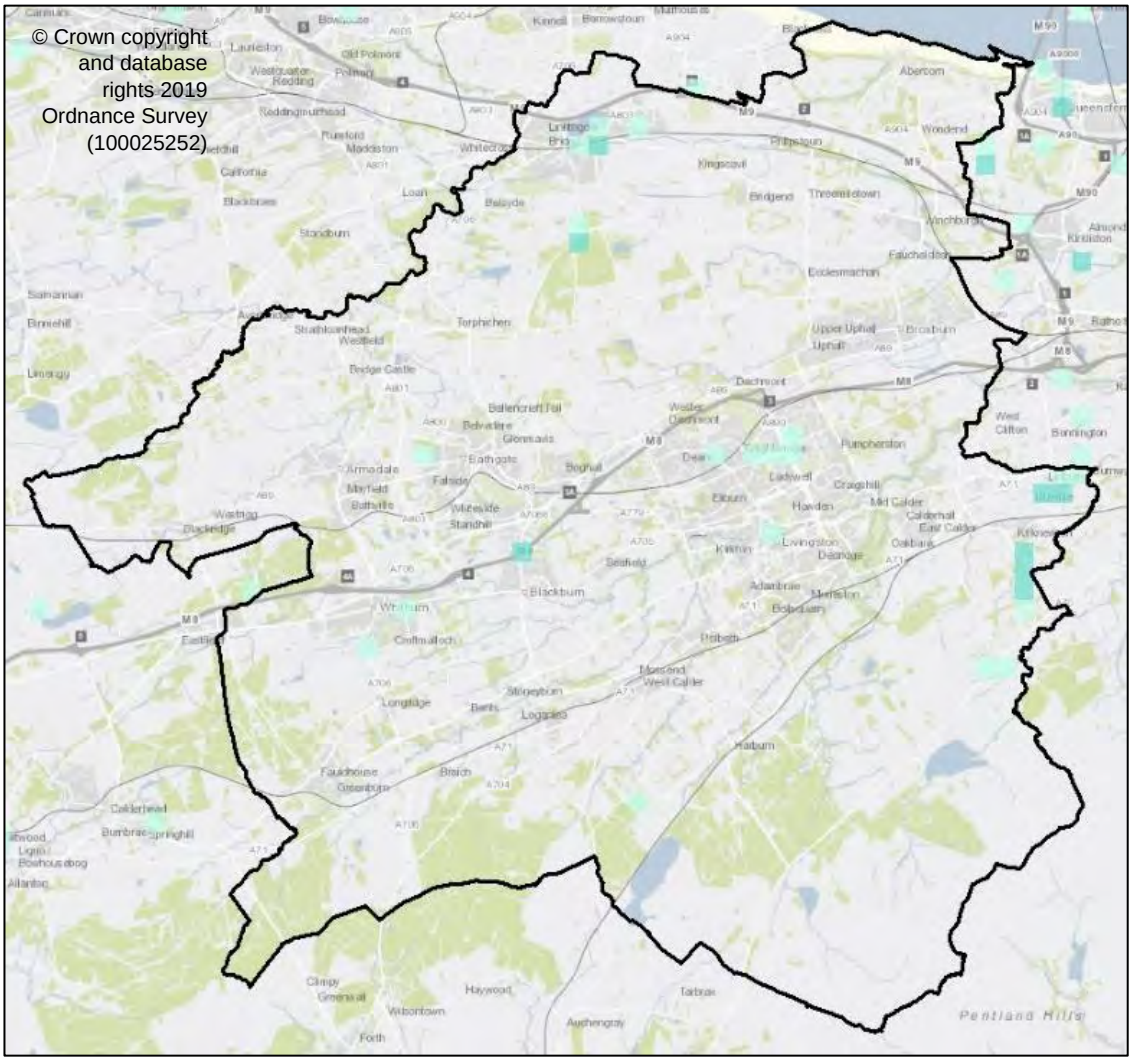
Road gain in West Lothian (2016 to 2017)



Of 1263 cells that contained roads within 2016 and/or 2017:-

- **6.0% (n=76) gained roads, of which:-**
  - **36 gained 1 to 100m**
  - **34 gained 100 to 499m**
  - **6 gained 500 to 999m**

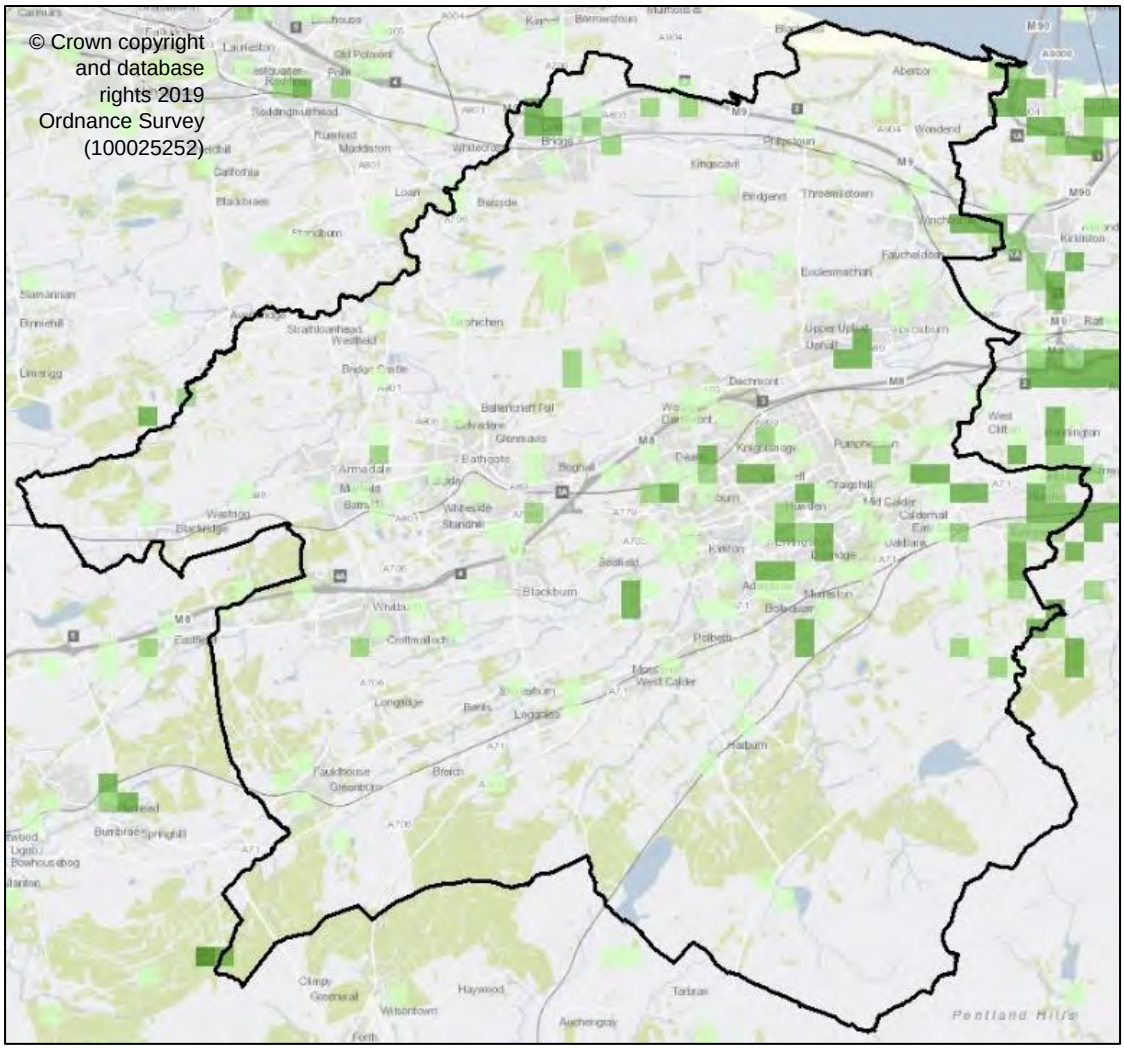
Road loss in West Lothian (2016 to 2017)



Of 1263 cells that contained roads within 2016 and/or 2017:-

- **2.1% (n=27) lost roads, of which:-**
  - **19 lost 1 to 100m**
  - **8 lost 100 to 499m**

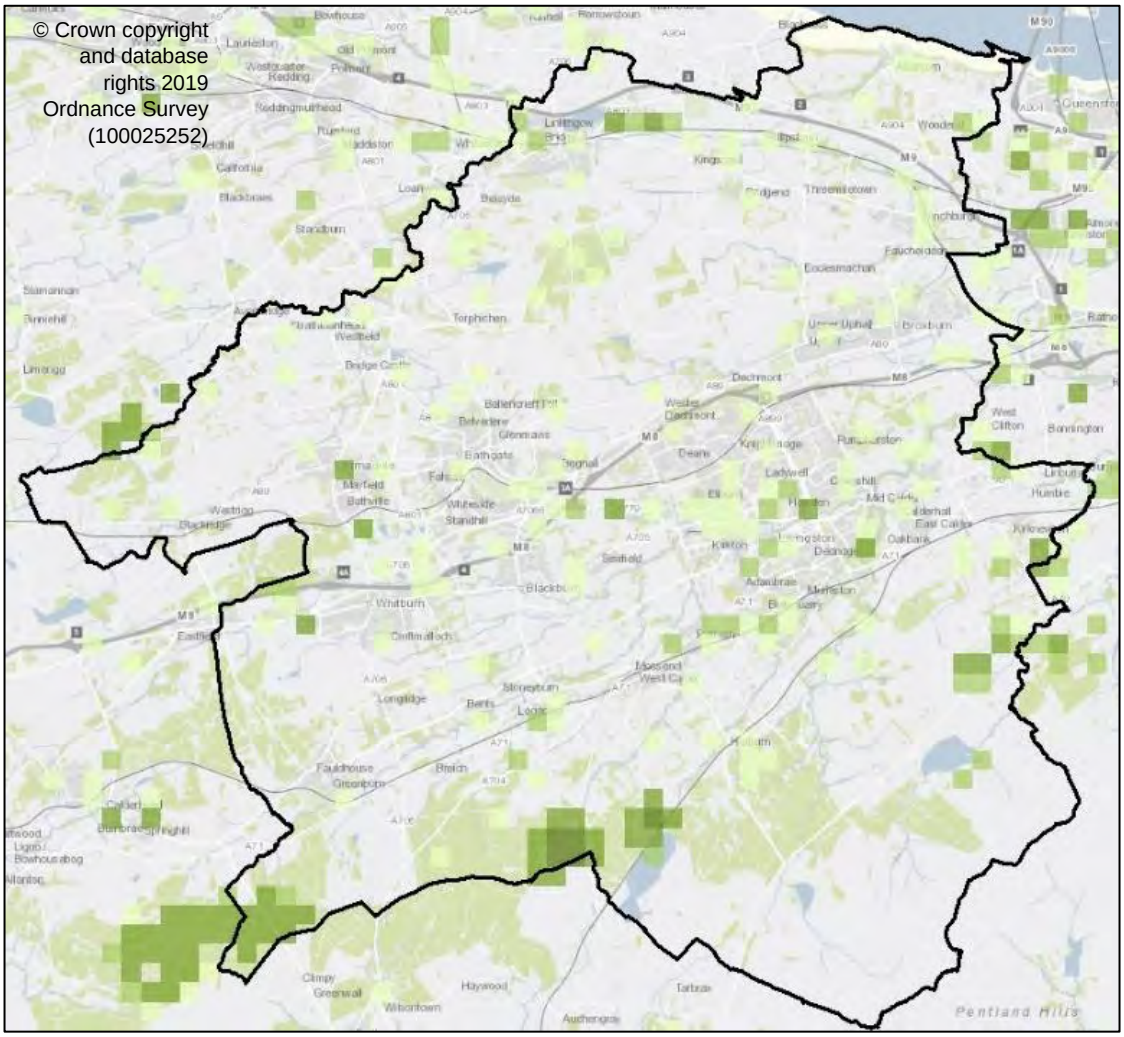
Woodland gain in West Lothian (2016 to 2017)



Of 1551 cells that contained woodland within 2016 and/or 2017:-

- **11.5% (n=179) gained woodland, of which:-**
  - **117 gained <100m²**
  - **27 gained 100 to 999m²**
  - **35 gained 1000m²+**

Woodland loss in West Lothian (2016 to 2017)



Of 1551 cells that contained woodland within 2016 and/or 2017:-

- **12.4% (n=193) lost woodland, of which:-**
  - **127 lost <100m²**
  - **29 lost 100 to 999m²**
  - **37 lost 1000m²+**