Kent Habitat Survey

2012

6

Change Analysis and Results

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6.1 Introduction

The change analysis has been carried out to find trends of changes in broad habitats, to highlight loss of important habitats and to indicate where those changes have taken place. This section explains the method applied to obtain change data, its subsequent analysis and presents the results in tables, graphs and maps.

Change analysis can be approached in several ways. Gross change can be analysed, by comparing totals of categories between two periods. Such a change analysis could be carried out on the overall statistics produced for this report and that of the 2003 habitat survey.
A more detailed method takes into account how categories have changed and where that change took place. These are important considerations for planning and policy making.

6.2 Method

6.2.1 Data Preparation

The 2003 habitat data was based on Ordnance Survey 1:10,000 mapping base data, whereas the 2012 data used OS MasterMap at 1:1,250 as the base data. Considerable positional shifts occurred between the data, partly due to the difference in scale, but also due to positional changes in the OS base data since 2003, causing the habitat datasets to line up incorrectly in many places. This lateral shift varied from 0.1m to about 7m in severe cases. Because of the change in geometry in both datasets a direct comparison in the GIS through a UNION or INTERSECT procedure was not feasible. Too many sliver polygons would occur, indicating change, which was in fact only a change due to position, not a real change of habitat.

For this reason the 2010 OS MasterMap base data used for the Habitat 2012 data was also used for the 2003 data. In the 2012 data a column with Habitat 2003 data had been included from the start. Data from this column formed the basis of the comparison between 2003 and 2012 habitat values, largely through database queries.

Re-creating the Habitat 2003 data used the final 2012 survey data as the basis. The advantage of using the final habitat survey is that an immediate change analysis can be made, by comparing the values of the column 'Habitat2003' and column 'Habitat2012'. The field survey values give the best possible classification of a polygon and can aid the (re-)interpretation of the 2003 data set.

The comparison in this change analysis only takes into account the habitat code and ignores matrix and management codes. During the analysis, a number of polygons greater than 250m^2 were marked for manual checking. In the next stage, gardens and houses smaller than 250m^2 were also marked if their habitat was different from 2003.
Where the 2003 data had been field surveyed this data was considered correct and, if different from 2012, classed as real change.

There were several issues with this method:

- Not all polygons had the original 2003 habitat codes. OS MasterMap details were used to update polygons to the current IHS codes (e.g. gardens, road verges, paths and tracks), but this only classified polygons that existed in 2010. For polygons that did not exist in 2003, these values are incorrect and where possible have been reverted to actual 2003 values

- Changes observed between 2003 and 2012 may be due to classification issues. Where the habitat code for 2003 was found to be different from 2012, it was changed to that of 2012 depending on additional information available. If the polygon was field surveyed in 2003, then the value was changed to that found in the field survey. If the polygon was also field surveyed in 2012 with a different value, then a decision on the 2003 value was based on the likelihood of the 2003 classification being correct. For example, if it was recorded as 'Improved grassland' (GI0) in 2003 but classed as 'Other semi-improved grassland of importance' in 2012 (for example, GN1Z Other Lowland Meadow), then a check of 1990 data was undertaken to see if the area had been previously classed as semi-improved (SNG). In these situations, the 2003 data was changed to the 'Other semi-improved grassland of importance' classification, even though it was surveyed in 2003 as improved grassland. The reason for this is that the criteria for classification in the earlier survey differed from those used in 2012, requiring greater species-richness for the habitat to be recorded as semi-improved in 2003. This had resulted in an apparent 'loss' of semi-improved grassland from that recorded in the 1990 survey

6.2.2 Data Checking

Manual checking
All polygons where it appeared that a change had occurred between 2003 and 2012, based on the above method were checked manually. If a change was real then the habitat code was retained. If the change was not real the habitat code was updated with the correct value.

A check was also made to ensure that no polygons that existed in 2003 had disappeared in 2012, thus producing a 'no change', which was in fact a change. Where necessary those polygons were reinstated and the habitat confirmed.
Polygons not selected for checking were ignored in the manual checking procedure, although on occasion the checker would find such polygons and perform a manual check if it appeared that a change had occurred.

A few exceptions to the procedure:

- Areas smaller than 250m^2 were ignored due to time limitations, except for houses/buildings
- It was assumed that changes from improved grassland to crop were likely to be real and therefore these changes were not checked manually, but included in the automated changes. The reverse, from crop to improved or other grassland was checked manually

Manually checked polygons were classed with CHANGE = 'Y' (Confirmed change).

Automated checking
Automated checking was carried out in the database, by comparing the habitat codes for both periods through database queries.
All polygons that had changed, but not been checked manually were classed with CHANGE = 'L' (Likely changed), to indicate that the change was not yet confirmed. Any polygons where either 2003 or 2012 had no data were excluded from the analysis.

Additional checking was necessary to find change caused by polygons that were introduced to OS Mastermap since 2003. This check looked at polygons that existed in 2012, but not in 2003 and compared the 2012 habitat with that found in the original 2003 habitat data. Because of the partial incompleteness of some 2003 habitat codes this is a crude process: for example, gardens were classed as Built area in 2003 but garden in 2012. In most cases, the incomplete codes of 2003 were excluded from analysis to avoid reporting false change From the codes it could not be determined if the 2003 code also represented a garden and this polygon was excluded from the analysis. Manual checking again may reveal that actual change has occurred, but in the current project no time was available to carry out these additional checks.

The following codes were used to indicate the different levels of confidence of the change:

Y = confirmed change
N = confirmed not changed
L = likely changed, habitat_cd not adjusted
X = likely changed, habitat_cd adjusted to previous Hab2003, except where the classification is roads
U = one period has no habitat code to compare
O = OS new polygon, likely change, based on habitat in the original habitat 2003 data via spatial join of the polygon centroid

Values that were excluded through incompleteness, or confusion with codes in 2012:

- if LF271/2 in 2012 and UR0 in 2003 (roads/paths)
- if LT4 in 2012 and UR0 in 2003 (road verge)
- if UA32 in 2012 and UR0 in 2003 (garden, see above)
- if UA41 in 2012 and UR0 in 2003 (cemetery)
- if SUMMARY in 2003 had only CR0 or UR0, but lacked management and/or matrix codes

As mentioned above, in 2003, domestic gardens were classed as Built Areas UR0, without a specific code to indicate the area as a garden. It is therefore not possible to distinguish change in gardens, unless a polygon has been checked manually.

6.2.3 Compiling the Change Data

The manually and automatically checked polygons were loaded into a new personal geodatabase and further columns were added to hold information on habitats for each period.

Some final data cleaning was carried out manually to filter out sliver polygons and overlapping polygons introduced by the integration with EA coastal data. Also all polygons <10m^2 were removed as these are slivers caused by positional changes and geometric differences in the source datasets and are not considered real change.

6.3 Analysis Results and Discussion

The results of the change analysis were summarised in the geodatabase. Queries were used to compile tables by period, by habitat and by broad habitat, each with total area. Resulting tables were exported to spreadsheets and further analysed.

6.3.1 Total Change Since 2003

Total change of broad habitats since 2003 is listed in Table 6.1. The change from habitats in 2003 to other habitats in 2012 totals an area of 37,870ha, of which 23,313ha was confirmed (62%) and 10,830ha likely change (29%).

Table 6.1 presents in descending order the 2003 categories that saw the most change. The most change (95%) occurred in: Arable and Horticulture (CR), Improved Grassland (GI), Neutral Grassland (GN), Broadleaved Woodland (WB), Inland Rock and Quarry (RE) and Built-up Areas (UR).

The dark section in the table represents 98% of the total change since 2003, as also shown in Figure 6.1. The light section in the table represents the remaining 2% of total change and is represented in Figure 6.2.

6.3.2 Detailed Change Results for Broad Habitats

Based on the summary by period and by broad habitat a cross tabulation was made (see table 6.2). The table reads from left, with broad habitats of 2003 in the first blue column, to right with the current habitats of 2012 along the top row in orange. For example 'BR' (Bracken) in 2003 has changed to 'EM'(Fen, Marsh and Swamp; 0.02ha), 'GA' (Acid Grassland; 0.97ha), 'GI' (Improved Grassland; 1.14ha) and so on in 2012. The table shows exactly how the broad habitats of 2003 have changed to other broad habitats in 2012. Equally, we can see how changes in the broad habitats of 2012 are made up from the various habitat categories in 2003. For example, the 2012 Traditional Orchard class (FT) has changes to the habitat, of which 103.4ha were previously recorded as Crop (CR), 52.9ha that were Improved Grassland (GI), and so on. Some of the important changes recorded for the broad habitats will be discussed in the following sections.

Table 6.1 Distribution of total change in Broad Habitats

% of total change	Code	Broad Habitat
61.76	CR	Arable and horticulture
21.41	GI	Improved grassland
5.28	GN	Neutral grassland
2.67	WB	Broadleaved, mixed, and yew woodland
2.25	RE	Inland rock
1.91	UR	Built-up areas
0.97	AS	Standing open water and canals
0.85	GC	Calcareous grassland
0.84	FT	Traditional Orchard
0.68	LS	Littoral Sediment
0.37	SS	Supralittoral Sediment
0.26	LF	Boundary and linear features
0.19	EM	Fen, marsh and swamp
0.19	WC	Coniferous woodland
0.15	GA	Acid grassland
0.10	BR	Bracken
0.05	SR	Supralittoral Rock
0.04	AR	Rivers and streams
0.03	LR	Littoral Rock
0.01	HE	Dwarf shrub heath

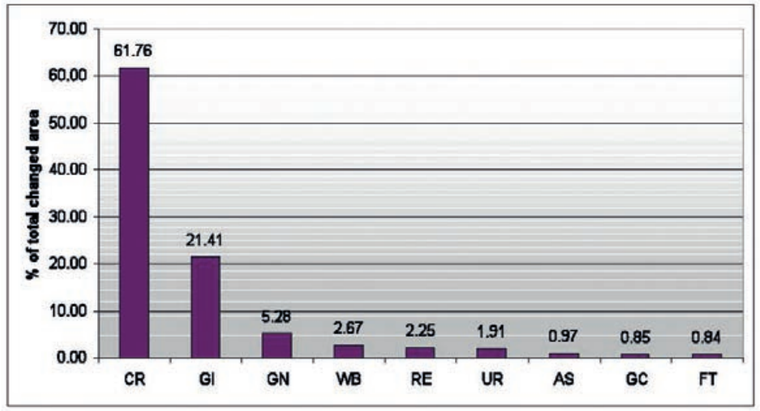

Figure 6.1 Area changed by broad habitat as % of total area changed (2003). Figure represents 98% of total area changed (37870ha)

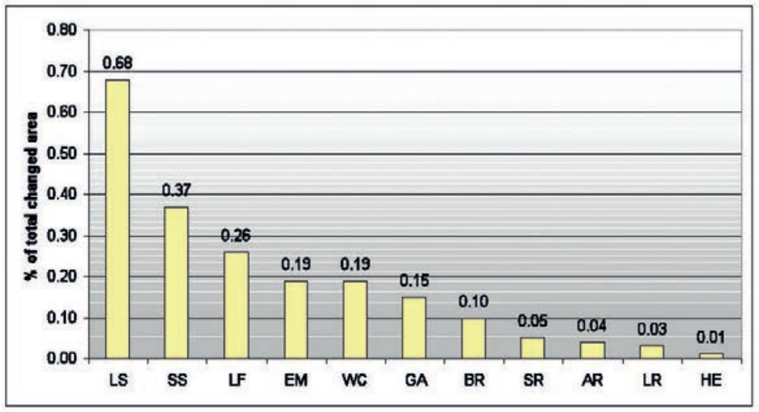

Figure 6.2 Area changed by broad habitat as % of total area changed (2003). Figure represents 2% of total area changed (37870ha)

6.3.2.1 Agriculture

Improved grasslands and agricultural land used for crops have significant losses and gains between the years, which reflect changing agricultural economics. The change from Crop (agriculture; CR) in 2003 to Improved Grassland (GI) in 2012 covers 17,089.3ha, while the reverse, improved grassland that has become cultivated land is 4556.6ha. An examination of Landcover change since the 1960's, undertaken as part of this project, showed that such changes occur in a periodic fashion, with land use being switched between cultivation and grassland as crop or livestock production become more profitable.
Land used for crops has been lost through development; 277.7ha is now Built-up Areas (UR), 114.2ha is Boundary and Linear Features (roads, railways, verges), and 119.6ha to Inland Rock (quarries, waste tips), although there is also the reverse change for the latter class where 67ha of Inland Rock are now under cultivation.

There were 103.4ha of land classed as Crop (CR) in 2003 that have been recorded as Traditional Orchard (FT) in 2012, an apparent gain of this habitat type. These areas were classed as Intensive Orchard (CR 31) in the earlier survey and, since they were not field surveyed, it is possible that they were traditional orchards at that time. However, it is also possible that some areas that were classed as agriculture have had traditional orchards planted since 2003.
Traditional Orchards have also been lost from areas recorded in 2003, with 83.7ha now recorded as Crop (CR), 160ha now being Improved Grassland (GI) and 50.1ha being recorded as Neutral Grassland (GN), resulting in an overall loss of 134.8ha of between the surveys. This reflects the situation observed during the field survey, with many traditional orchards no longer being managed and becoming derelict, being grubbed up or being incorporated within gardens as part of development.

Table 6.2 Cross tabulation of broad habitats of 2003 and 2012

		2012 Habitat (ha)																					
		AR	AS	BR	CR	EM	FT	GA	GC	GI	GN	HE	LF	LR	LS	OV	RE	SR	SS	UR	WB	WC	Total 2003 changed	Net change
2003 Habitat (ha)	AR				0.14	0.02				0.83	0.36		0.76	0.07	6.13				0.41	1.09	0.86		10.67	2.67
	AS	5.34		0.34	7.79	29.86		0.11		112.09	55.91		2.34		3.92		20.26		0.41	10.21	72.19	0.42	321.19	79.79
	BR					0.02		1.87		1.14	1.98					6.42				0.07	18.18	7.26	36.94	364.04
	CR	0.69	134.23			4.53	103.45	0.97	44.63	17089.27	1227.34	0.03	114.17		1.15	47.46	119.59	0.05	5.33	277.66	247.80	11.00	19429.35	-14490.38
	EM		29.51	0.02						2.32	17.21		0.64		0.05		0.56		0.04	2.54	12.78		65.67	72.98
	FT		2.09		83.70	0.26				160.07	50.15		1.50							10.50	7.22		315.49	-134.78
	GA		0.12	11.72	2.56					2.50	14.06	0.23	1.39				1.98		0.39	0.38	8.41	1.22	44.96	-17.97
	GC		0.10	0.04	4.76					19.74	59.14		1.59	0.01	0.01		3.93		0.01	1.33	73.44		164.10	43.09
	GI	0.80	66.66	2.79	4556.59	41.83	52.89	3.71	104.67		1415.46	0.08	222.53	0.21	2.41	3.58	62.29	1.00	4.82	752.50	774.16	11.63	8080.61	10904.82
	GN	0.60	68.14	4.22	164.34	50.15	6.71	7.68	30.31	337.00		0.22	94.53	0.03	2.91	5.26	56.19	0.37	4.54	158.78	288.56	2.21	1282.75	1888.75
	HE			0.09				0.14		0.27	0.11									0.02	2.67		3.30	17.25
	LF		0.68		2.50	0.03	0.04	0.02	0.02	54.60	8.84				0.02		0.44		0.05	9.23	7.26	0.01	83.74	533.99
	LR										0.02		0.01		2.00			4.18	0.04	2.78			9.03	1.77
	LS	4.81	3.47		12.45	2.29				2.01	3.87		0.83	2.59					34.18	2.18			68.68	-13.20
	OV									0.24	0.01		0.18								0.82		1.25	64.30
	RE		66.97		72.06	3.52		1.29	0.45	295.14	160.02	0.27	81.74		0.72	0.63			9.03	84.85	61.79	0.04	838.52	-526.86
	SR								0.34	0.17	0.07			3.68	4.05				0.22	2.74	0.51		11.78	-4.06
	SS	0.21	3.12			1.41				3.26	4.99			1.23	30.41			0.11		3.81	2.65	0.49	51.69	9.29
	UR	0.72	5.27	0.03	12.52	0.36	1.27	0.06	0.55	536.64	42.62		36.36	2.98	1.70	0.24	26.29	0.12	1.07		34.80	0.35	703.95	689.47
	WB	0.05	20.39	39.40	17.81	4.37	16.35	11.10	26.22	358.57	108.77	15.02	58.85			0.37	20.13	1.89	0.44	70.57		16.30	786.60	874.39
	WC	0.12	0.23	4.19	1.75			0.04		9.57	0.57	4.70	0.31			1.59				2.18	46.89		72.14	-21.21
Total 2012 changed		13.34	400.98	62.84	4938.97	138.65	180.71	26.99	207.19	18985.43	3171.50	20.55	617.73	10.80	55.48	65.55	311.66	7.72	60.98	1393.42	1660.99	50.93		

Cross tab between broad habitats ignores changes within the broad habitats itself.

ROWS	Changes from a habitat in 2003 to all other habitats in 2012
COLUMNS	What 2003 habitat has changed into in 2012

6.3.2.2 Calcareous Grassland

Calcareous grassland (GC) is an important habitat in Kent that supports a diverse range of plant and animal species that are restricted to this habitat type (see section 5.2.1.7). Much of this habitat is of high quality. These grasslands are mainly found associated with the chalk of the North Downs, forming an important part of the landscape and natural heritage of the area. It is important to maintain these calcareous grasslands, most commonly through grazing, to prevent loss to other habitat types, and to retain the specialist wildlife communities that are dependent on them.

The change analysis has recorded some gains of Calcareous Grassland habitat. An interesting conversion from land classed as Crop (CR) in 2003, is the generation of 44.6ha of Calcareous Grassland (GC).

While this may seem unlikely, there have been restoration projects in several areas, where previously arable land has been re-seeded or allowed to develop its own chalk flora from the soil seed bank. There is also a recorded change of 104.7ha from Improved Grassland (GI) in 2003 to Calcareous Grassland in 2012, and a further 30.3ha from Neutral Grassland (GN) in 2003, which is likely to reflect similar restoration efforts. Many areas being managed for calcareous grassland have had scrub removal, and this will have contributed to the apparent gain of 26.2ha in Calcareous Grassland in 2012 from Woodland (WB) in 2003.

While there have been gains of calcareous grassland in 2012, with an overall gain of 207.2ha, there are also areas of loss, as can be seen in table 6.2. The greatest loss has been to the Broadleaved Woodland broad habitat (WB), which contains scrub woodland. This habitat change is frequently seen in areas of grassland where management has ceased (see section 6.3.2.6). Since 2003, 73.4ha of Calcareous Grassland has become Broadleaved Woodland, with a further 59.1ha recorded as neutral grassland and 19.7ha as improved grassland in 2012. The change to Neutral or Improved Grassland (GN, GI) classes may also reflect a reduction or absence of management, resulting in the development of rank grassland. Alternatively, some areas may have been intensively managed, through addition of fertilisers and/or herbicides, which would negatively affect calcareous grassland species, promoting more species-poor vegetation that thrive under such grassland management schemes.

While there has been conversion of arable land to calcareous grassland, the reverse is also true, with a change of 4.76ha of Calcareous Grassland into cultivated land.

6.3.2.3 Acid Grassland

Acid Grassland (GA), a large proportion of which is priority habitat, is a rare habitat within Kent. The total cover for both unimproved and semi-improved Acid Grassland is 511.6ha in 2012. In the same way that Calcareous Grassland species are restricted to their specific habitat, an important group of specialist plant and animal species are dependent on the acid grassland habitat for their survival (see section 5.2.1.6). These species are unable to thrive in alternative habitats, so the retention, maintenance and restoration of Acid Grasslands is of great importance for the diversity of Kent's natural habitats. Although the figures of habitat change described below appear small, the resource covers one of the smallest areas of all of the broad habitats, and any loss or gain is of great significance.

It is important to note that there was an overall net loss of this habitat of 18ha, a reduction of around 3.4% since 2003. This figure disguises significant losses at a local level, with 11.7ha lost to Bracken (BR), 14.1ha that has become neutral grassland, and a further 8.4ha lost to Broadleaved Woodland (WB) in 2012. Around 2.6ha of Acid Grassland have been lost to cultivation (Crop, CR) and 2.5ha have become Improved Grassland (GI). Other smaller areas have changed to habitats not noted for their wildlife value: 1.4ha has become part of the Boundary and linear feature broad habitat (LF), which includes roads, railway infrastructure and verges. A further 2ha has been converted to Inland Rock (RE), a broad habitat class that covers quarries and waste tips. In contrast, this latter class has contributed 1.3ha to the Acid Grassland recorded in 2012, possibly as a result of restoration of land after quarrying activities have ceased.

Some gains of Acid Grassland were noted, with 3.7ha from Improved Grassland (GI), 7.7ha from Neutral Grassland (GN) and 11.1ha from Broadleaved Woodland (WB). These figures, particularly those of woodland change, are likely to be the result of habitat restoration at various sites in the county. However, there is the possibility that, with the current field survey targeting grassland habitats, some changes could reflect areas that were not surveyed and recorded in 2003 but have been detected in this survey through increased survey effort.

6.3.2.4 Neutral Grassland

There has been a significant increase in the Neutral Grassland broad habitat resource (GN) in 2012 from that of 2003. Large changes have been recorded from both Crop (CR; 1,227.3ha) and Improved Grassland (GI; 1,414.8ha). This has resulted in an overall increase in neutral grassland of 1888.7ha. Some of this will be due to changes in management, where cultivated land has been set aside or restored, or where grassland management has become less intensive, allowing more semi-natural grassland swards to develop.

This class also includes areas of rank grassland that develop where management, such as grazing, is relaxed or ceases to be applied. The rank neutral grassland classification as part of the Neutral Grassland broad habitat class is new to the 2012 survey and would have been called improved grassland in the 2003 survey. As a result, the figures for the change from Improved to Neutral Grassland may in part be a result of this difference in the way Neutral Grasslands have been classified between the surveys.

Neutral Grassland has also gained from changes in some habitats that are of importance to the biodiversity of Kent. There has been a gain of 50.2ha of Neutral Grassland from Traditional Orchards (FT), 14.1ha from Acid Grassland (GA) and 59.1ha from Calcareous Grassland (GC). The changes in both Acid and Calcareous grassland habitats in 2003 to Neutral Grassland in 2012 could reflect loss of management and the development of a neutral rank grassland, or may be the result of an increase in nitrification of the grassland swards, resulting in the loss of specialist species.

Interestingly 337ha of Neutral Grassland recorded in the 2003 survey has now been classed as Improved Grassland (GI), and a further 164ha lost to Crop (CR). This reflects a real loss of habitat that, while most is not of priority habitat quality, is nevertheless of real value to a range of wildlife. There has also been loss of this habitat type to Broadleaved Woodland (WB), with a 288.6ha change between the two surveys. Planting of new woodlands may be responsible for some change (described below). Much of the change from Neutral Grassland to Broadleaved Woodland is likely to be due to the semi-natural development of woodland in unmanaged areas, where scrub woodland can rapidly invade grassland sites, altering the vegetation and leading to a loss of grassland species.
Additional losses of Neutral Grassland have come from the change of 94.5ha to Boundary and Linear Features (roads, railways, verges; LF) and 158.8ha to Built-up Areas (UR).

6.3.2.5 Heathland

Heathland is another rare and valuable habitat within Kent. There are only 73.4ha within the county, and as for Acid and Calcareous Grasslands, a diverse range of rare and specialist plant and animal species are dependent on this habitat (see sections 5.2.4.1 and 5.3.6.1). Most Heathland areas are very small, and exist in a fragmented landscape, with large distances between distinct heathland areas. For this reason, there has been a focus on restoration of this habitat type within the county.

It is important to note that there has been an overall increase in Heathland habitat, with almost 17ha being added to the total recorded in 2003. As a proportion of the overall habitat area, this equates to approximately a 30% increase of Heathland since 2003.

The broad habitats contributing the largest areas of change to Heathland are Broadleaved Woodland (WB), with 15ha, and Coniferous Woodland, with 4.7ha. Some of these changes will be as a direct result of habitat restoration, where trees and scrub have been removed to enable Heathland to establish or re-establish. Extensive Heathland restoration has been undertaken in many areas, including around Tunbridge Wells, Pembury, Mereworth, Bitchet Green and the Blean near Canterbury.

It should be noted that there is a small possibility that the change analysis for Heathland has recorded only apparent gain of habitat in some (small) areas. An initial survey of habitats using aerial photography interpretation (API) was the basis for both 2003 and 2012 surveys, with important habitats then confirmed by field survey. Detection of heathland by API depends on several factors and is not straightforward, most notably being able to distinguish heath shrub from low scrub or where heathland is present under tree canopies. These figures may include a small proportion of heathland habitat that has been identified and field surveyed in 2012, which was present in 2003, but went undetected both during the earlier survey and in the analysis and checks for this report.

Despite the overall figures showing a gain in Heathland habitat since 2003, there have been some areas of habitat loss between the surveys. Although the value is small, a total of 3.3ha (representing 6.3% of the habitat extent in 2003) has been changed to other broad habitats. The greatest of these changes has been to Broadleaved Woodland (WB), where 2.7ha of Heathland has been lost. Where heathland is not managed, scrub and tree invasion is a natural progression of the vegetation, leading to woodland development over time. These areas could be identified and targeted for restoration.

Most other areas of Heathland loss are under 0.5ha, with changes to Bracken (BR; 0.09ha) and Acid Grassland (GA; 0.14ha) habitats possibly reflecting some differences in boundary mapping, or habitat classification. Heathland is often found in a mosaic with Acid Grassland, and the boundary between the two can be difficult to map, particularly during field survey. Bracken is invasive, and although this may also be a mapping issue, it may reflect an increase in bracken cover in some heathland areas. As for woodland, a closer examination of these areas would reveal if they were a suitable target for Heathland restoration.

6.3.2.6 Woodlands

Broadleaved Woodlands (WB) have expanded between 2003 and 2012, with an overall 874.4ha increase mostly at the expense of arable land (CR, 247.8ha), Improved Grassland (GI, 774.2ha), Neutral Grassland (GN, 288.6ha), Calcareous Grassland (73.4ha) and Heathland (2.7ha; as mentioned above). Some of this will be due to new plantations of woodland, but scrub and woodland development on unmanaged land is likely to have contributed significantly to this value. Plantations of new woodlands have been established in many areas across the county and it is likely that a proportion of change to Broadleaved Woodland (WB) is due to the creation of new woodlands. This can be seen in the change of Inland Rock (RE) broad habitat to Broadleaved Woodland (62ha), which is likely to be the result of habitat creation following the cessation of quarrying or waste tipping activities.

The Broadleaved Woodland class includes scrub woodland, where scrub cover is greater than 90%. Where grazing or mowing ceases or cultivation is abandoned, there can be rapid scrub invasion, followed by the development of young woodlands. Certain habitat changes seen in this analysis are more likely to be due to this semi-natural woodland development. For example, 16.4ha of Traditional Orchard (FT) in 2003 are now recorded as Broadleaved Woodland. Not only are Traditional Orchards being grubbed up, in many areas these older orchards are no longer managed, with the result that scrub develops to the point where the habitat can only be described as scrub woodland. This natural succession of habitats to woodland will also account for most of the change of important habitats such as Calcareous Grassland (GC) and Acid Grassland (GA) to the Broadleaved Woodland (WB) habitat class in 2012.

In contrast to Broadleaved Woodland, Coniferous Woodland habitat has decreased since 2003. Coniferous Woodlands in Kent are mostly non-native plantations, often within Ancient Woodland Sites (PAWS), that have been created for timber production. There is currently a desire to return woodlands to a more natural state, and it is not surprising that overall, there has been a loss of 21.2ha of Coniferous Woodland.

The analysis has recorded a loss of 72.1ha of Coniferous Woodland to other habitat types since 2003, with the largest change being to Broadleaved Woodland (46.9ha). This will be largely due to extraction of coniferous woodland timber within broadleaved woodland sites. There will, however, be some areas where the change is only an apparent change. Some woodlands are hard to classify from aerial photographs, with accurate classification requiring images that clearly show the distinction between the two woodland types (such as images taken in very early spring before full leaf production). The surveys did not always have access to such images, and therefore there will have been some misclassification within both surveys.

Some increases in Coniferous Woodland have been recorded by the change analysis. There have been 11ha of Crop (CR) and 11.6ha of Improved Grassland (GI) which are now recorded as this habitat type. It may be that these are truly new areas of coniferous woodland planting, but they may also be misclassified plantations of various Christmas trees grown as a crop, which should have been recorded within the Crop (CR) broad habitat.

6.3.2.7 Standing Water and Canals (AS)

The broad habitat class of Standing Water and Canals (AS) covers natural features, such as ponds, lakes and pools, as well as man-made features including ponds, gravel pits, reservoirs, ditches, and canals. The overall change in this broad habitat class shows an increase of 79.8ha between 2003 and 2012.

There has been a total change to Standing Water and Canals of 401ha from various habitats in 2003. During the survey, it was observed that a substantial number of fishing lakes have been created in many areas, particularly within farmland. This would account for part of the change from Crops (CR, 134.2ha), Improved Grassland (GI, 66.7ha) and Neutral Grassland (GN, 68.1ha). Some of the grassland change is also down to the creation of many smaller ponds throughout the county. Change from Inland Rock (RE, 67ha) is likely to reflect creation of flooded areas from previously active quarries, waste tips and gravel pits.

There has also been habitat loss, with 168ha changing to a grassland broad habitat type (GI, 112.1ha and GN, 55.9ha). Other larger losses of this habitat are to Wetland habitats (EM, 29.9ha) and Broadleaved Woodland (WB, 72.2ha). These changes are likely to reflect changes in management, with development of wetland or wet woodland vegetation in unmanaged areas. There may also be some change in habitat classification in this category. Reedbeds are UKBAP priority habitat, and as such were mapped and targeted for field survey. However, in the previous survey, some extensive areas of reedbeds were not mapped separately from the water body, but were noted through the addition of a matrix code added to the Standing Water and Canals habitat type. The current change analysis did not analyse matrices, resulting in an apparent change from the water habitat to one of simply wetland.

6.3.2.8 Built-up Areas (UR) and Boundary and Linear Features (LF)

Two broad habitats that show significant overall habitat gain between 2003 and 2012 are Built-up areas (UR) and Boundary and Linear Features (LF). The net change for Built-up Areas is a gain of 689.5ha, while Boundary and Linear Features shows a gain of 534ha. These areas relate to development of the built environment and transport infrastructure.

Most of the gain for Built-up Areas is at the expense of Improved Grassland (GI, 752,4ha) and Crops (CR, 277.7ha), although there is also an important loss of the semi-natural habitats of 158.8ha of Neutral Grassland and 70.8ha of Broadleaved Woodland. Some of the change to Built-up Areas is from the Inland Rock (RE) class, suggesting a change of use, with development in areas previously used for resource extraction. Considerable areas of house-building have taken place around towns such as Ashford.

Kent has been (and continues to be) subject to pressures for increased housing and commercial development, which are associated with increased requirements for transport infrastructure. The increase in the Boundary and Linear Features broad habitat cover observed in the change analysis reflects these changes. Since 2003, this includes creation of the high speed train link between Ashford and London, new road building for the A2 and the roads created for areas of new housing development.

As for Built-up Areas, Crops and Improved Grassland have lost most habitat to Boundaries and Linear Features, with 114.2ha and 222.5ha respectively showing change. Also lost to this broad habitat type are 94.5ha of Neutral Grassland and 58.8ha of Broadleaved Woodland.

Notable is the loss of a small proportion of important habitats to both Built-up Areas and Boundary and Linear Features: a total of 12ha of Traditional Orchards, 1.77ha of Acid Grassland and 2.9ha of Calcareous Grassland are now classed within these broad habitat types.

6.3.2.9 Coastal Habitats

Within this analysis, overall changes have been observed of the coastal habitats Supralittoral Rock (SR), Supralittoral Sediment (SS), Littoral Rock (LR) and Littoral Sediment (LS). Many of the apparent changes are due to changes in mapping and survey intensity between 2003 and 2012. Since the earlier survey, the EA has carried out two detailed surveys of Kent's coastline, while the 2003 survey did not have such information. As a result, it is not possible to determine the true extent of any changes in habitats since 2003.

6.3.3 Further Analysis of the Data

The survey data contains much detail that requires further in-depth analysis to reveal features of Kent's most important habitats. Accurate information on the state of the UKBAP priority habitats present within the county is needed for their protection and management. Further studies are underway to determine the true status of some of Kent's priority habitats.