

COMPARING ALTERNATIVE LANDSCAPE CLASSIFICATIONS

Gavin Stark and Timothy Moffat

Introduction

There are a number of zonation (or classification) systems that describe England at a landscape scale. These include the Institute of Terrestrial Ecology's Land Classification, English Nature's Natural Areas, and the Countryside Commission's Character Areas. Each recognises regional differences in the landscape of England and attempts to encapsulate these in a classification. Whilst there is some commonality in intention, each classification has its own specific objectives and has been prepared by different approaches.

The ITE Land Classification takes account of environmental parameters such as rainfall and altitude and attempts an objective statistical classification of 1 km grid squares. It has been used as a stratification for ecological survey and as a basis for modelling likely changes in land use. The "Character of England" (or Joint Character Map) published by English Nature and Countryside Commission, describes England in terms of both environmental and cultural aspects. Both organisations are concerned with natural heritage and find that this map makes more sense as a basis for developing conservation initiatives, such as tailoring agri-environment schemes to the needs of particular regions, than would political boundaries.

If information, particularly about the countryside, is to be widely used for policy making, then it would achieve greatest utility if it could be reported in frameworks that organisations were accustomed to using. The case study demonstrates the potential application of the Countryside Information System (CIS) for making exploratory comparisons between the Character of England and the ITE Land Classification.

The Policy Framework

In 1998 the UK Government undertook a major national audit of the habitats, plants, landscape features and land types of the British countryside to mark the end of the Millennium.

The Countryside Survey 2000 (CS2000) repeated and extended previous surveys undertaken at intervals over the last 20 years. It will provide measures of the current state of the countryside and indicators describing the changes that have taken place. CS2000 will provide information necessary for reporting on biodiversity in the wider countryside, measuring progress towards sustainable development and detecting the impacts of human activities and global environmental change. Plans on the possible ways by which the information could be reported, and the various classifications and "ecological" zonations that could be used, are being formulated.

Data Sources

Produced with the help of English Heritage and in consultation with a wide range of organisations “The Character of England; landscape, wildlife and natural features” represents a common framework that depicts the natural and cultural dimensions of the English landscape. The resultant map inter-links Character and Natural Areas. It was developed both for the needs of the Countryside Commission and English Nature, and with a view to making the framework a strategic tool for other organisations that have an interest in the English landscape, its wildlife and natural features. An example of the Character of England is shown in Figure 1, which shows the Natural Areas present in the Department of the Environment’s South East England Region and the extent (number of 1 km squares) of each Natural Area in that region.

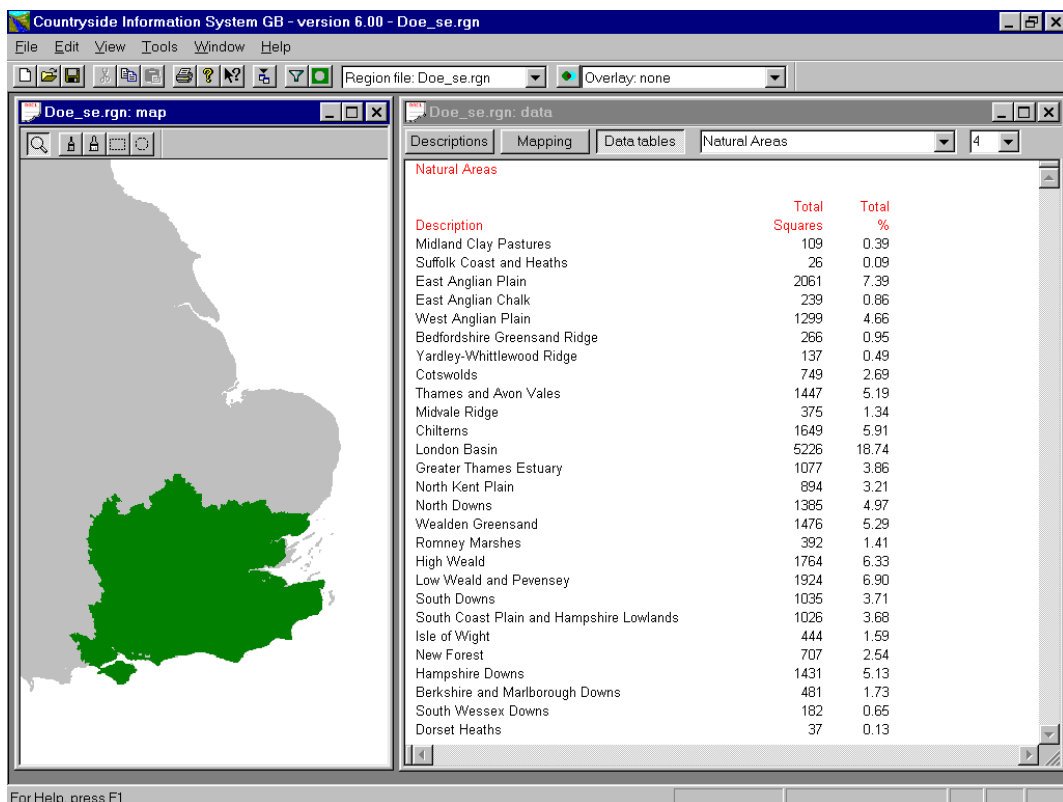


Figure 1. Natural Areas in the DoE South East England Region

The ITE Land Classification is based on classifying a systematic grid of some 240,000 1 km squares in Great Britain, using seven broad, map-derived land characteristics, including topography, climate, solid geology, drift geology, man-made features, island status and distance from coasts. Multivariate analysis allowed the reduction of all 1km squares within Great Britain into 32 land classes. It has been found that squares within the same land classes support similar types of agriculture and wildlife.

Inter-Comparison of Classifications

The CIS *Refine Region* command can be used to inter-compare classifications. Figure 2 shows those Character Areas that correspond to ITE Land Class 6. This class is found in SW England, S Wales, SW Midlands, with outliers in the Lleyn peninsula, Anglesey and the Isle of Man. It has a complex topography with many broad even slopes and the majority of land is at medium/low altitude. The landscape is intricate with small fields enclosed by hedges on banks with small woodlands and the land use is mainly grassland but with some barley.

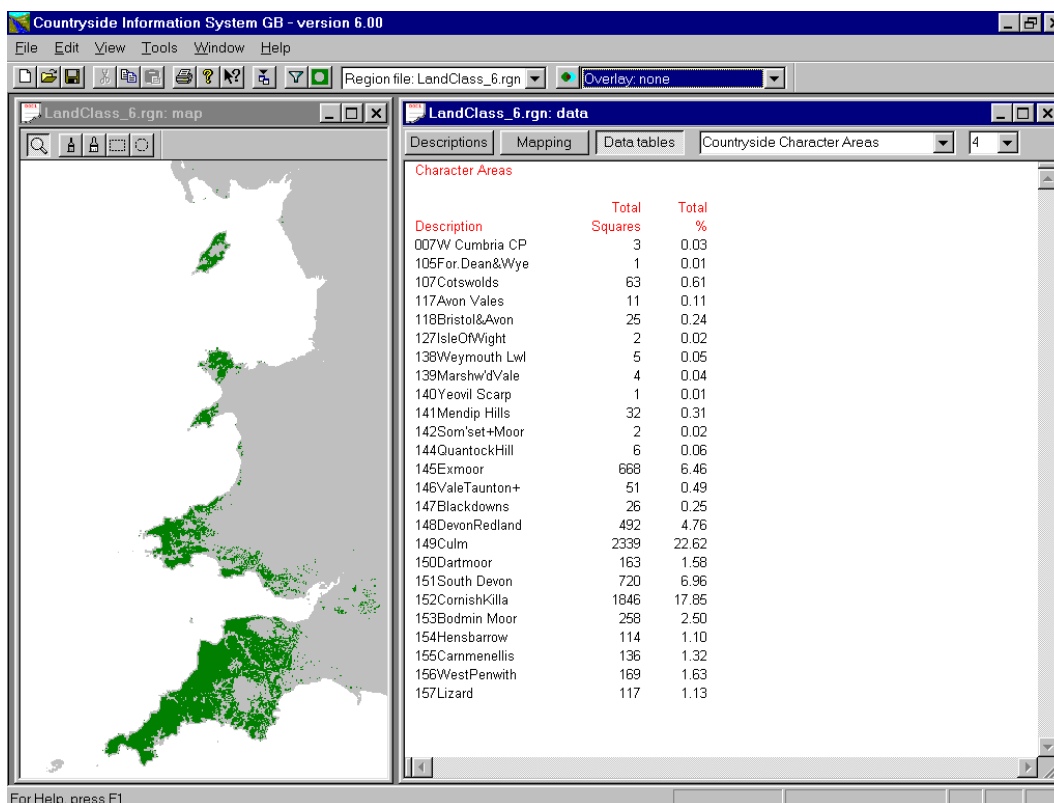


Figure 2. Correspondence between Character Areas and ITE Land Class 6.

User-defined combinations of classification units

The CIS can also be used to group and display different data sets as colour maps. The Character of England data provided in CIS format is an “attribute” data set; each 1 km square is associated with a single Natural or Character Area. Because the CIS is limited to ten display ranges, it is not possible to display, for example, all the 97 terrestrial Natural Areas at once. However, English Nature has aggregated the Natural Areas into six Focus Groups for their own internal administration and these can be displayed as a colour map (Figure 3).

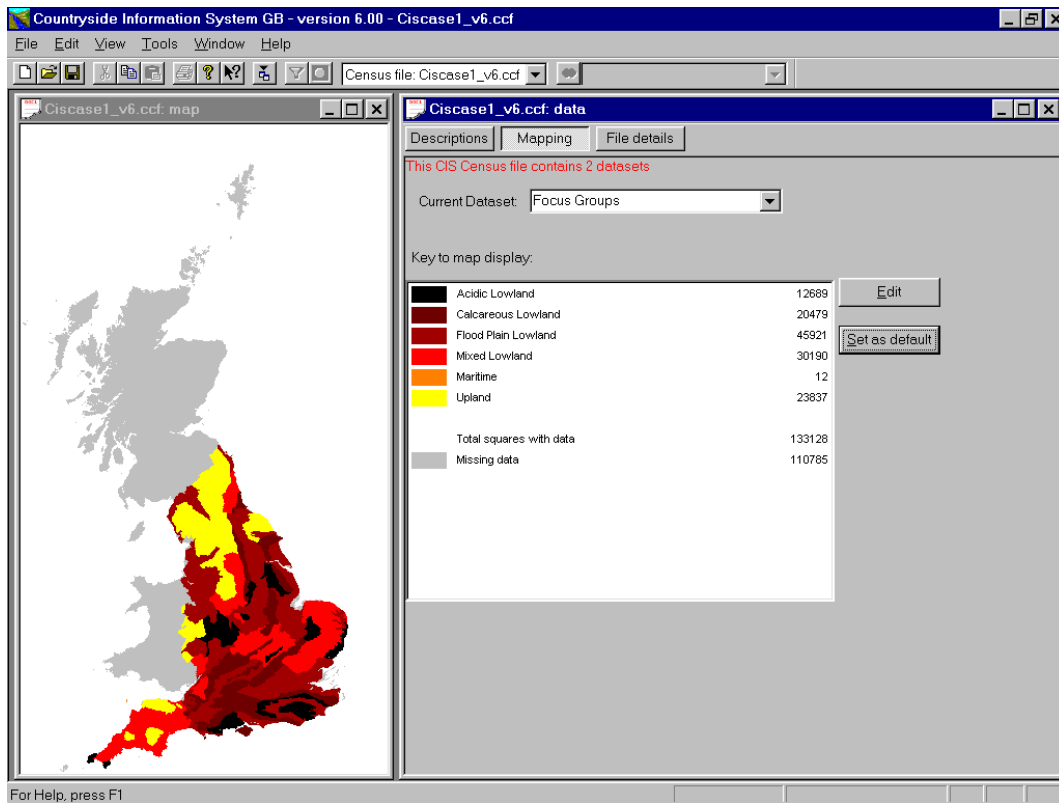


Figure 3. English Nature Focus Groups

Contingency Tables

Figure 2 provides an example of comparing Character Areas with ITE Land Class 6. By repeating a comparison for all the Land Classes in England, the resulting statistics could be used to produce a table of contingency, for example, between the ITE Land Classification and the English Nature Areas Focus Groups. An example of such a table for Acidic Lowland (ALO), Calcareous Lowland (CLO), Flood Plain Lowland (FPL), Mixed Lowland (MLO) and Upland (UPL) is shown in Table 1. The predominant Focus Group for each Land Class is shown in bold type. In this case correspondence is weak. No Land Class is identified with the Acid Lowland Focus Group and the majority of Land Classes are divided between two or more Focus Groups.

Grouping Countryside Commission Character Areas by their ITE Land Class composition

The Department of the Environment, Transport and the Regions (DETR) and the Conservation Agencies are interested in a means of reporting the results of CS2000 by units based on the Character of England. Individual Character and Natural Areas are too limited in extent for statistically reliable estimates based on the CS2000 field survey samples. The CIS can be used to explore whether aggregation of Character/Natural Area units could be made into units useful to the Agencies and which were of sufficient extent for robust estimates to be made.

Table 1. ITE Land Classification and EN Focus Groups

Land Class	ENGLISH NATURE FOCUS GROUPS					Total
	ALO	CLO	FPL	MLO	UPL	
1	1578	1581	7192	2563	193	13107
2	1356	9387	3386	324	5	14458
3	3285	1323	3460	7281	11	15360
4	1212	360	5970	1344	8	8894
5	32	224	402	1559	259	2476
6	286	97	26	5751	1094	7254
7	154	164	267	663	118	1366
8	242	194	2041	589	114	3180
9	1756	2085	4301	1524	1391	11057
10	1601	973	5833	3646	1598	13651
11	667	3220	2284	2715	9	8895
12	422	364	2061	695	0	3542
13	31	8	4423	95	251	4808
14	4	105	321	75	98	603
15	55	6	736	27	586	1410
16	3	84	1524	37	804	2452
17	5	137	34	201	3631	4008
18	0	2	144	154	1773	2073
19	0	0	144	105	2944	3193
20	0	0	37	29	1178	1244
21	0	0	0	0	9	9
22	0	0	19	24	3284	3327
23	0	0	0	0	850	850
24	0	0	0	0	197	197
25	0	6	281	252	1491	2030
26	0	27	542	210	417	1196
27	0	100	100	326	984	1510
28	0	32	393	1	540	966
TOTAL	12689	20479	45921	30190	23837	133116

Firstly, the composition of Character Areas in terms of the 28 ITE Land Classes occurring in England was determined. A cluster analysis was carried out using a statistical software package and the resulting groupings (Appendix 1) were re-imported into CIS using the *Import ASCII data* command (Edit Menu). Figure 4 shows the Character Areas grouped by their Land Class composition.

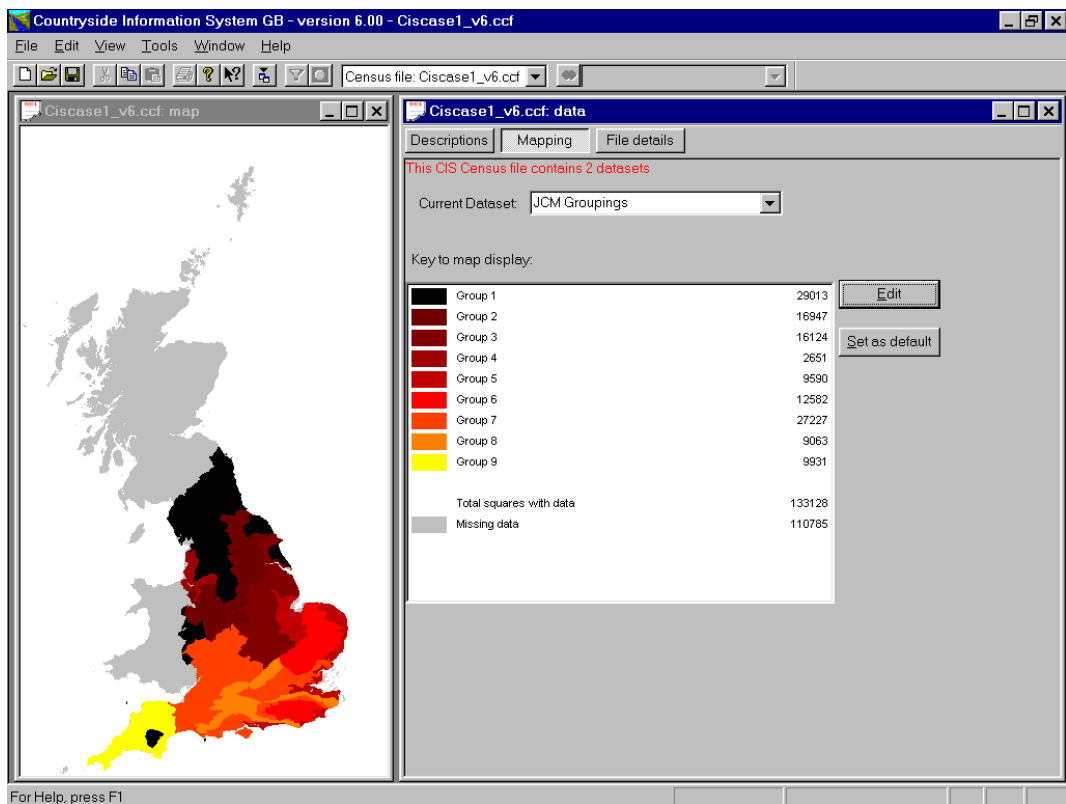


Figure 4. Character Areas grouped by their Land Class composition.

Display of CS1990 results by Character Area Groups

An example of using the groupings determined above is shown in Figure 5. The area shaded green represents Character Areas with, in this case, an upland character. The tabulated data show the CS1990 results for heathland and bogs calculated for this region.

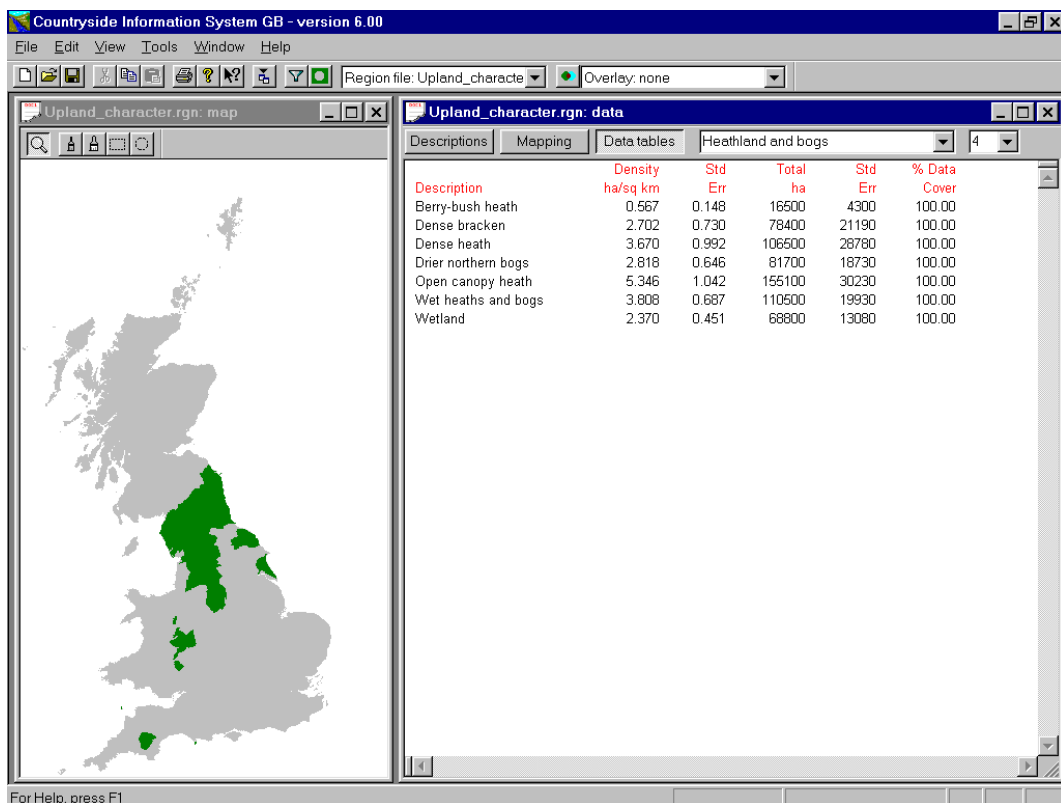


Figure 5. Countryside Survey 1990 results for Group 1

Conclusions

Regional zonations as ways of targeting thinking and policy initiatives are being used by many organisations, including the DETR and the Conservation Agencies. Environmental data are quite often collected and/or reported in ways specific to these zonations, such the Countryside Surveys of 1990 and 2000. The CIS is an appropriate tool inter-comparing and inter-linking different landscape classifications and for exploring data at regional scales.

Appendix 1

Multivariate Classification of the Character Areas by their Land Class Composition

Group	Character Area
1	1 NN'humber'
1	2 N'humber'Sst
1	3 CheviotFringe
1	4 Cheviots
1	5 Bord'Moors&F
1	6 SolwayBasin
1	7 WCumbria
1	8 CumbriaHiFells
1	9 EdenValley
1	10 NPennines
1	11 TyneGap&HadWal
1	12 MidN'humber'
1	13 SEN'humber'
1	14 Tyne&WearLwl
1	15 DhamMg
1	16 DhamCoal
1	17 OrtonFells
1	18 HowgillFells
1	19 SCumbriaLwFells
1	20 M/combeBay
1	21 Yorks.Dales
1	25 NYMoors&ClevH
1	31 M/cC.&Lune
1	33 B/lanFr&PendleH
1	34 BowlandFells
1	35 LancsValley
1	36 South'nPennines
1	37 YorkSPen.Fringe
1	40 Holderness
1	51 DarkPeak
1	52 WhitePeak
1	53 SouthWest
1	54 Man.Pen
1	56 Lancs.CoalMeas
1	63 OswestryUplands
1	65 ShropshireHills
1	98 Clun&NWHereH
1	99 BlkM'nts&GldVal
1	137 IsleofPortland
1	150 Dartmoor

1	159 Lundy
2	22 PenDalesFringe
2	23 TeesLowlands
2	24 Valeof
2	26 Vof
2	28 Valeof
2	29 Howardian.Hills
2	30 SMagnesian
2	38 NottDerbYorCoal
2	39 Hum'headLevels
2	50 DerbP'Fr&L'Der
2	61 Shrp,Chs&StfPla
2	64 Pott&ChurnVal
2	66 MSevern.SstPla
2	67 Can.Chs&C'kWd
2	68 N'dw'd&S.DerbCl
2	70 MelbournePkls
2	71 Leics&SDerbCoal
2	72 Mease/SenceLwl
2	73 Charnwood
3	27 Yorks.Wolds
3	41 Humber.Est
3	42 Lincs.Coa&Marsh
3	43 Lincs.Wolds
3	44 Cent.Lincs.Vale
3	45 NLincEdge/Cover
3	47 S.Lincs
3	48 Trent&BelvVales
3	49 Sherwood
3	69 TrentV.Wash'ds
3	74 Leic&Nott
3	75 KestevenUplands
3	88 Bd/shire&CamCl
3	89 NorthantsVales
3	90 BedsGrns
3	91 Y'd-W'lewoodRg
3	92 Rock/hamForest
3	93 HighLeics
3	94 LeicsVales
3	95 NorthantsUps
4	32 Lancs&Amound'P

4	55	Man.Conurbation
4	57	SeftonCoast
4	58	Mer/sideConurb
4	59	Wirral
4	60	MerseyValley
4	62	Ches.SstRidge
5	46	TheFens
5	77	NNorfolk
5	78	Cent.N.Norfolk
5	79	NEN'fik
5	80	TheBroads
5	81	G'terThamesEst
5	82	SuffolkC&Heath
5	113	N.Kent
5	123	RomneyMarshes
5	124	PevenseyLevels
5	126	SouthCoastPlain
6	76	NWNorfolk
6	83	S.Nfk&HiSfkCly
6	84	MidNorfolk
6	85	Breckland
6	86	S.S'fk&NEsxCly
6	87	EAnglian
6	121	LowWeald
6	122	HighWeald
7	96	Dunsmore&Feldon
7	97	Arden
7	100	HerefLowlands
7	101	HerefPlateau
7	102	TemeValley
7	103	MalvernHills
7	104	SHeref&Ov
7	105	Fof
7	106	Severn&AvonVale
7	107	Cotswolds
7	108	UThamesCI'Vale
7	109	MidvaleRidge
7	111	NthnThmesBasin
7	112	InnerLondon
7	114	ThamesBasinLwl
7	115	ThamesValley
7	117	AvonVales
7	118	BrisAvnVal&Ridg
7	120	WealdenGrnsand
7	127	Isleof
7	128	SHamps
7	129	ThmsBasin
7	131	NewForest
7	133	BikV&t'V.o'Ward
7	135	DorsetHeaths
7	136	SouthPurbeck
7	138	WeymouthLwl
7	139	Mar'wd&
7	140	YeovilScarpInds
7	141	MendipHills

7	142	SomLvls&Moors
7	143	MidSom
7	144	QuantockHills
7	146	V'Taunt'&Qt'kF
7	147	Blackdowns
8	110	Chilterns
8	116	Berks&MarlDwns
8	119	NorthDowns
8	125	SouthDowns
8	130	HampsDowns
8	132	SalisPI&WWiltDn
8	134	DorDwn&CranChs
9	145	Exmoor
9	148	DevonRedlands
9	149	TheCulm
9	151	SouthDevon
9	152	CornishKillas
9	153	BodminMoor
9	154	Hensbarrow
9	155	Carmenellis
9	156	WestPenwith
9	157	TheLizard