

## POPULATION & HOUSEHOLD PROJECTIONS BY COUNCIL AREAS

### 1. INTRODUCTION

The current and future needs of any area cannot be measured or met without knowledge of population size, population structure and population change. Understanding the dynamics of the underlying components of population change, the interplay of fertility, mortality and migration, is a prerequisite to inform the planning of any successful vision of the future of Highland. This paper explores insights that can be gained from examining population trends in Highland, primarily from demographic data published by the General Register Office for Scotland (GRO(S)) and work undertaken by the Wellbeing Alliance Intelligence and Monitoring Group.

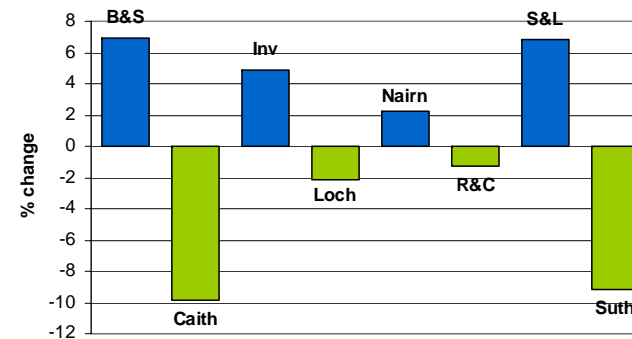
The main source of population data in Scotland is the GRO(S), who conduct the Census of Population, the only comprehensive count of population data in the UK. The Census is then used as the basis of annual Population Estimates, which are produced for Council Wards, Postcode Sectors, Local Authorities and Health Boards. Ward estimates can then be amalgamated to provide estimates for Council Areas and other sub-Highland boundaries.

These estimates are subsequently used as the basis of GRO(S) Population Projections which are published every 2 years for Local Authorities and Health Boards. Until 1998 projections were also produced by the GRO(S) for old District Councils, which could be used as an approximation of current Council Areas. However in 2000 the decision was made by GRO(S) to stop producing projections for old District Council boundaries, meaning that the only up-to-date population projection data we currently have is for the overall Highland Local Authority/Health Board area.

This leaves a critical gap in the information available for sub-Highland areas. Due to the size of Highland and the different factors influencing population in each area, a single, overarching figure is not sufficient to allow us to effectively plan for service provision in the individual Council Areas. For example, as can be seen in Figure 1, the GRO(S) 1998 projections suggested that while Inverness, Nairn, Badenoch & Strathspey and Skye & Lochalsh were likely to see an increase in

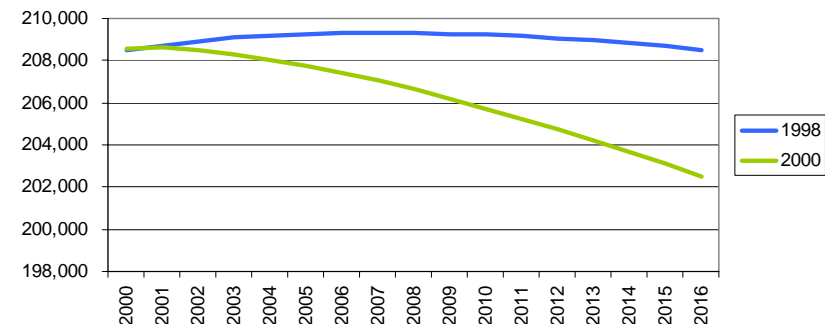
population by 2016, Caithness, Sutherland, Lochaber and Ross & Cromarty were expected to fall in population over the same period. It is important that these differences are understood and not hidden within a single overall Highland figure.

**Figure 1: Population change 1998-2016, Council Areas**



Furthermore, subsequent population projections available at Highland level suggest that the overall population is now expected to fall by 2016, not rise as was suggested by the 1998 figures (See Figure 2). This is in line with the national trend where population has already been falling for a number of years. Again, we need to identify the effect of this at the local level.

**Figure 2: Population change, Highland, 2000-2016 (1998 GRO(S) projections compared to 2000 GRO(S) projections)**



Therefore the decision was made by the Wellbeing Alliance Intelligence and Monitoring Group (I&M Group) to produce internal population projections for Council Areas. By taking a joint approach and involving all Wellbeing Alliance agencies (The Highland Council, NHS Highland, Highlands & Islands Enterprise, Communities Scotland, Northern Constabulary, Scottish Natural Heritage, Scottish Council for Voluntary Organisations and the UHI Millenium Institute) more robust assumptions can be made.

## 2. METHODOLOGY AND ASSUMPTIONS

### Methodology

The method chosen to project the Area population forward is the standard demographic component method which uses a single year age/sex cohort survival model (utilizing the NORPOP package). This involves:

1. taking the population of an area at a base date, split by single year of age (up to 90+) and sex;
2. ageing it forward on a year to year basis;
3. adding new births as 0 year olds, calculated by applying age specific fertility rates to the female population aged 15-44 (locally adjusted by Area);
4. subtracting the number of deaths by single year of age and sex, calculated by applying single year age/sex specific mortality rates to the population (locally adjusted by Area); and
5. adding/subtracting age/sex specific numbers of migrants to/from the area.

### Base Population

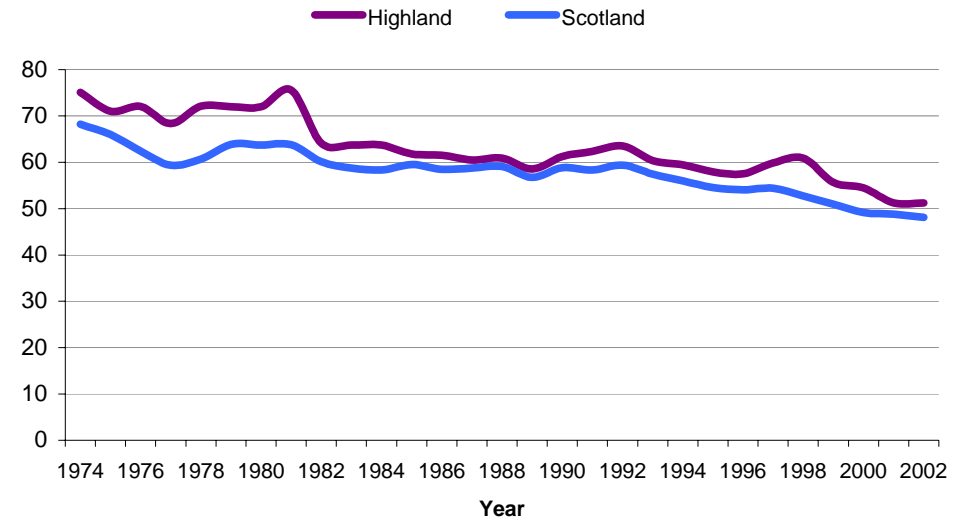
The base population was taken from the 2001 Census, and covers all persons usually resident in each area. Members of HM and non-UK Armed Forces stationed in each Area are included, as are people living in communal establishments.

### Fertility

The projected number of births was obtained by applying national fertility rates to the numbers of women at each childbearing age for every year of the projection period. Fertility rates for Scotland are calculated annually by the Government Actuary Department (GAD),

however, as shown by Figure 3, Highland has higher average fertility rates than the national average and so adjustments have to be made to compensate for these local differences.

**Figure 3: General Fertility Rate (live births per 1000 women aged 15-45) in Scotland and Highland**



Adjustments for each Council Area were calculated by exploring variations from the national average observed in the three-year period prior to the projection. These scaling factors are applied across all ages in the projection. Local variations in mortality and fertility are not a constant across all ages and this should be acknowledged as a potential source of error in any set of projections. However, a constant factor adjustment has been employed by GRO(S) in all previous sub-national population projections and this methodology has therefore been adopted for the new Highland Area projections.

Table 1 shows the local adjustment factors used in the 2001 I&M Group projections. Fertility has been adjusted upwards for each Area, with the greatest adjustment being seen in Skye & Lochalsh, where fertility rates are 25.2% higher than the national average, and the

smallest adjustment in Caithness where fertility rates are 10.5% higher than the national average.

**Table 1: Locally adjusted fertility rates, Council Areas**

Area	Fertility local adjustment factor
Badenoch & Strathspey	1.123
Caithness	1.105
Inverness	1.146
Lochaber	1.241
Nairn	1.237
Ross & Cromarty	1.251
Skye & Lochalsh	1.252
Sutherland	1.118
Highland	1.181

### Mortality

The projected number of deaths each year was calculated by applying mortality rates by age and sex to the Area populations. As with fertility rates, national mortality rates (as produced by GAD) were used and adjustments made to reflect local differences in mortality, based on a 3 year average. Figure 4 shows that mortality in Highland is lower than the national average; however this masks local variations in mortality.

**Figure 4: Directly standardised male and female mortality rates for all causes in Scotland and Highland**

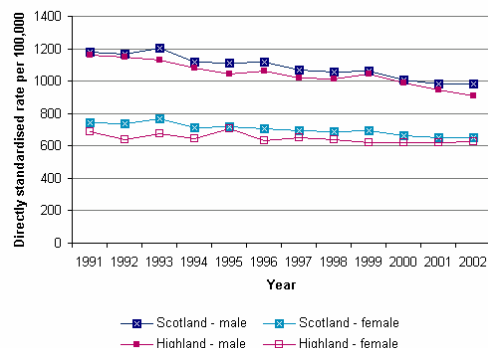


Table 2 shows the local adjustments made for males and females in the projections. Male mortality was adjusted downwards in all Areas other than Caithness and Lochaber, with the greatest adjustment in Sutherland where male mortality is only 79.8% that of the Scottish average. For females the national rates were adjusted downwards in all Areas other than Caithness. The greatest adjustment was in Badenoch & Strathspey (83.5% of the national average).

**Table 2: Locally adjusted mortality rates, Council Areas**

Area	Mortality local adjustment factor	
	Males	Females
Badenoch & Strathspey	0.832	0.835
Caithness	1.071	1.010
Inverness	0.889	0.944
Lochaber	1.009	0.920
Nairn	0.833	0.884
Ross & Cromarty	0.930	0.890
Skye & Lochalsh	0.986	0.941
Sutherland	0.798	0.859
Highland	0.922	0.919

### Migration

Unlike births and deaths which both have to be registered, there is no comprehensive way to estimate migration. Migration and the reasons for migrating are also more susceptible to short term changes in economic and social circumstances than births and deaths. These factors make it very difficult to make robust migration assumptions.

In order to provide consistency between the I&M Group projections and the GRO(S) projections, the net migration figure of +100, which was used for Highland in the GRO(S) 2000 Population Projections, was

retained in the I&M Group projections. The Area assumptions were then constrained to this overall Highland figure. Area assumptions were based on a combination of past GRO(S) assumptions; actual population change between 1991 and 2001 and local knowledge (see Table 3). It is accepted that migration assumptions are highly speculative, particularly in the long term.

**Table 3: Migration assumptions (2001 I&M Group Projections)**

Area	Annual net-migration assumptions
Badenoch & Strathspey	50
Caithness	-100
Inverness	150
Lochaber	-50
Nairn	50
Ross & Cromarty	0
Skye & Lochalsh	25
Sutherland	-25
Highland	<b>100</b>

### 3. RESULTS OF THE AREA PROJECTIONS

#### Highland

Scotland's population has been in gradual decline for a number of years, and is expected to continue to fall by 2.0% by 2016. Up until now Highland has been going against this trend with a steadily increasing population. However the I&M Group projections show that the future population in Highland is likely to change broadly in line with the national picture and by 2017 Highland's overall population will have fallen by 4.3% to 199,958. This trend corresponds well with the latest GRO(S) projections for the years 2002 to 2018 which suggests that the Highland population will fall by 4.0% (see Appendix 1).

There are a number of factors contributing to this slow but steady population decline. Fertility rates have been falling in Highland over the past 20 years or so, following a similar trend to Scotland. Despite

having higher fertility rates than the national average, and being adjusted upwards correspondingly, Highland's current population structure has relatively few women of childbearing age and so the number of births continues to fall.

At the other end of the scale mortality rates have been improving and the average Scottish male born in 2002 can expect to live until 73.3 years of age, compared to 64.4 years for those born in 1951. Similarly, female life expectancy has risen from 68.7 years in 1951 to 78.8 in 2002. However, despite these improvements in mortality, the number of deaths will almost certainly increase over the next 40 years as the large number of people born in the baby boom after the Second World War and the 1960s grow older. Highland's existing population is already comparatively old; therefore this trend is likely to be particularly marked here.

Migration, the third element affecting population change, is extremely difficult to measure, however assumptions used by GRO(S) in previous sets of projections suggest that net migration has fallen in Highland, from a net increase of 750 per annum in 1994 to a net increase of 100 per annum in 2000 (and 2002).

These factors combine to mean that the number of deaths now outnumber the number of births in Highland, leading to a natural population decline. The positive net-migration figure of 100 people per year is not enough to fully offset this decline. This trend is set to continue, and as can be seen in Table 4, by 2017 the Highland population will be falling by almost 800 people per annum.

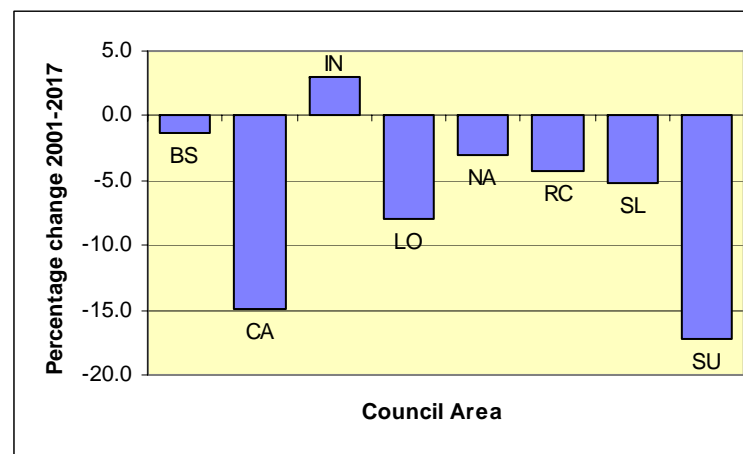
**Table 4: Components of population change, Highland, 2001-2017**

Year	Births	Deaths	Natural change	Net migration	Natural change + migration
2002	2,155	2,291	-136	100	-36
2003	2,161	2,412	-250	100	-150
2004	2,127	2,417	-290	100	-190
2005	2,080	2,422	-343	100	-243
2006	2,033	2,429	-396	100	-296
2007	1,988	2,441	-453	100	-353
2008	1,947	2,454	-506	100	-406
2009	1,910	2,455	-544	100	-444
2010	1,879	2,477	-598	100	-498
2011	1,851	2,485	-634	100	-534
2012	1,826	2,505	-679	100	-579
2013	1,802	2,526	-723	100	-623
2014	1,783	2,547	-764	100	-664
2015	1,766	2,568	-802	100	-702
2016	1,750	2,590	-841	100	-741
2017	1,734	2,614	-880	100	-780

**Council Areas**

Figure 5 shows that all Council Areas are expected to see a decline in overall population by 2017, other than Inverness, which is projected to increase by 4.3%. The smallest decline is likely to be seen in Badenoch & Strathspey (1.4%) and the greatest in Sutherland (17.2%).

**Figure 5: Pop change 2001-2017 (2001 I&M Group Pop Projections)**



**Age Structure**

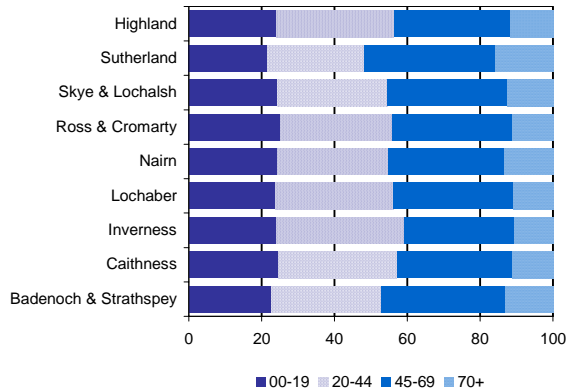
The general picture is of an ageing population. The 0-15 age group is projected to decline by 23.2% throughout Highland by 2017. The decline in this age group is particularly marked in Caithness (-37.8%) and Sutherland (-45.0%).

All Areas are also expected to see a fall in the 16-64 age group by 2017, again particularly in Caithness (20.4%) and Sutherland (24.0%). The population is likely to remain fairly stable in this age group in Inverness, falling by only 0.5% by 2017.

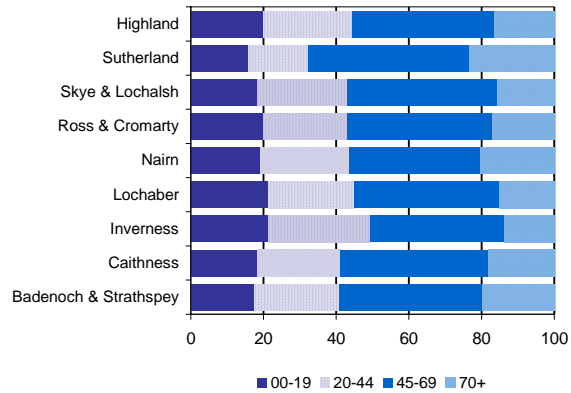
These declines are partly offset by large increases in the 65+ population. All Areas will see an increase in this age group. The greatest increases are expected in Badenoch & Strathspey (49.2%), and Ross & Cromarty (49.1%). While Sutherland is likely to see the smallest increase in this age group (24.2%), due to its existing older population, its population is still expected to be one of the oldest populations in Highland by 2017. The current and projected age structure of the Highland Areas is shown in Figure 6.

**Figure 6: Current and projected age structure**

**2001**

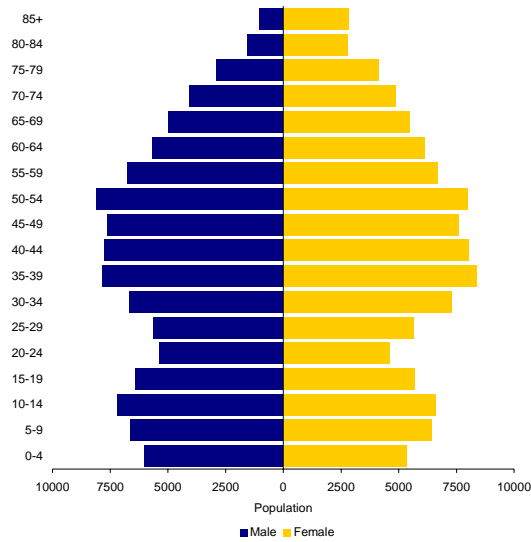


**2017**

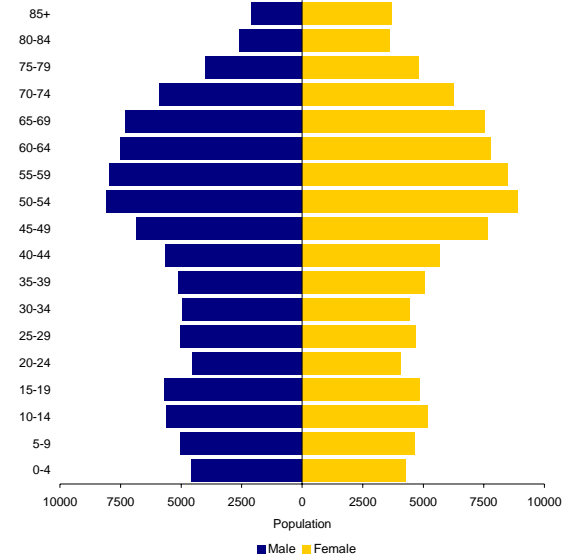


The following pages present the 2001 I&M Group population projections by Council Area and age group.

**Figure 7: Highland 2001**



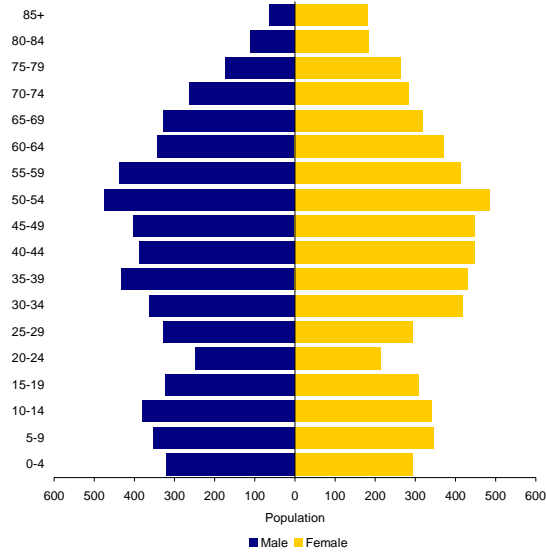
**Figure 8: Highland 2017**



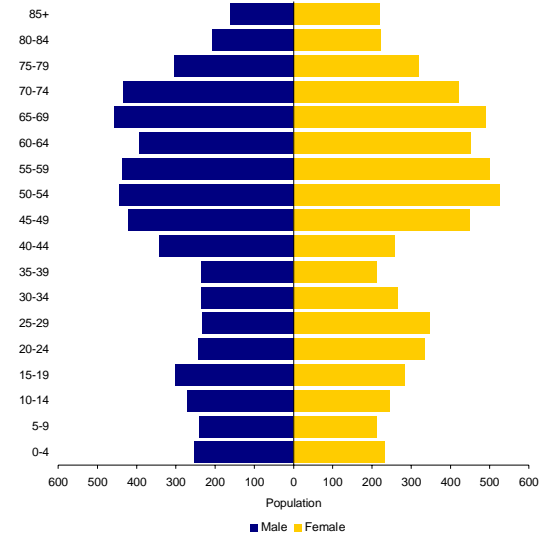
**Table 5: Highland population change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>208914</b>	<b>199958</b>	<b>-4.3</b>
00-15	40,986	31,493	<b>-23.2</b>
16-24	19,344	16,934	<b>-12.5</b>
25-44	57,289	40,531	<b>-29.3</b>
45-64	56,620	63,169	<b>11.6</b>
65-74	19,431	26,998	<b>38.9</b>
75+	15,244	20,833	<b>36.7</b>

**Figure 9: Badenoch & Strathspey 2001**



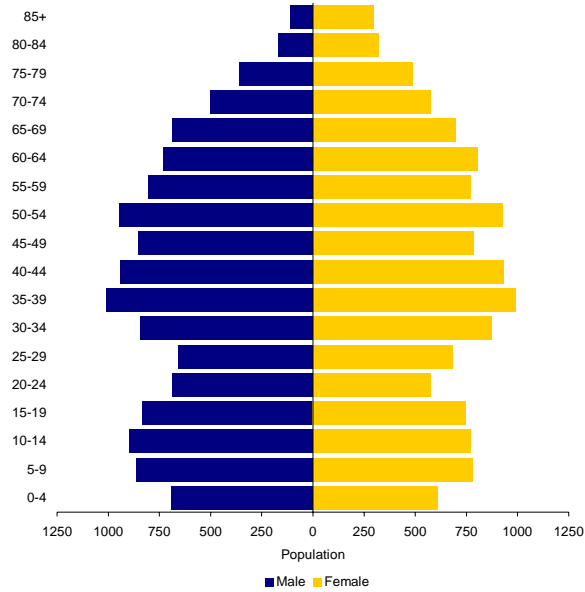
**Figure 10: Badenoch & Strathspey 2017**



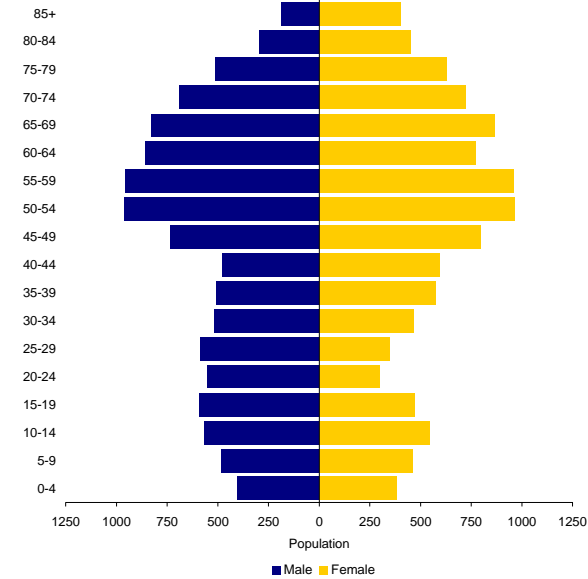
**Table 6: Badenoch & Strathspey pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>11763</b>	<b>11604</b>	<b>-1.4</b>
00-15	2,181	1,566	<b>-28.2</b>
16-24	944	1,051	<b>11.3</b>
25-44	3,098	2,130	<b>-31.2</b>
45-64	3,373	3,624	<b>7.4</b>
65-74	1,192	1,801	<b>51.1</b>
75+	975	1,432	<b>46.9</b>

**Figure 11: Caithness 2001**



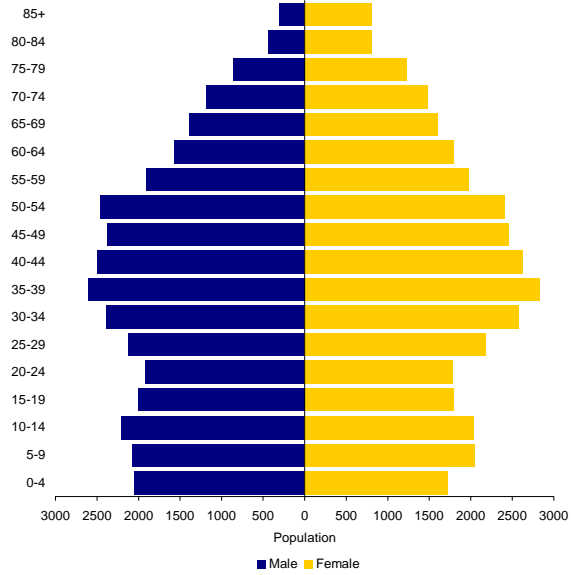
**Figure 12: Caithness 2017**



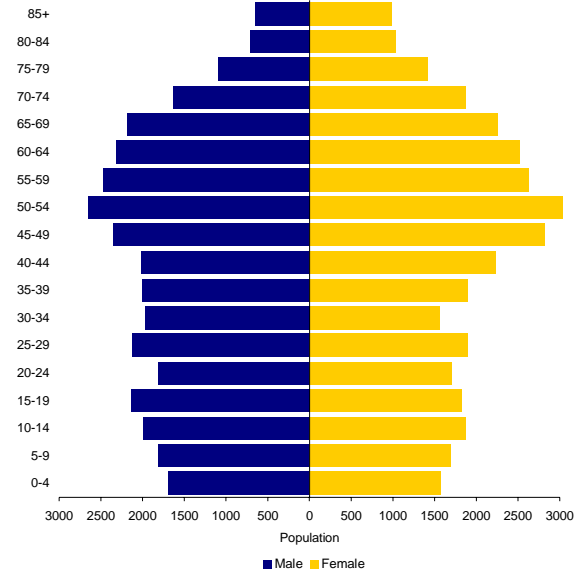
**Table 7: Caithness pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>25195</b>	<b>21443</b>	<b>-14.9</b>
00-15	4,951	3,079	-37.8
16-24	2,497	1,683	-32.6
25-44	6,927	4,076	-41.2
45-64	6,620	7,010	5.9
65-74	2,461	3,109	26.3
75+	1,739	2,486	43.0

**Figure 13: Inverness 2001**



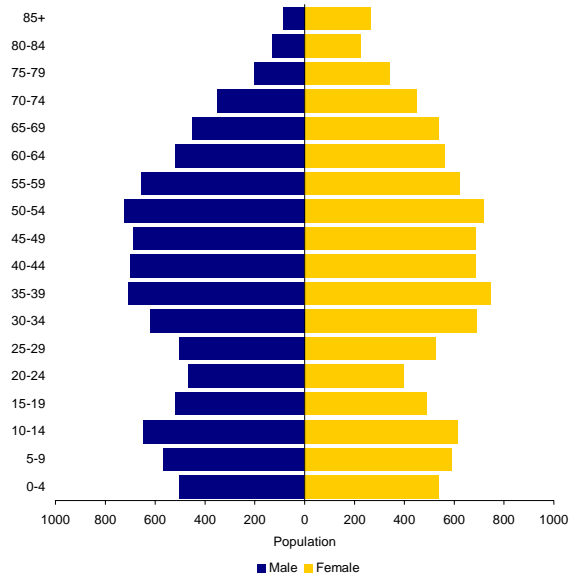
**Figure 14: Inverness 2017**



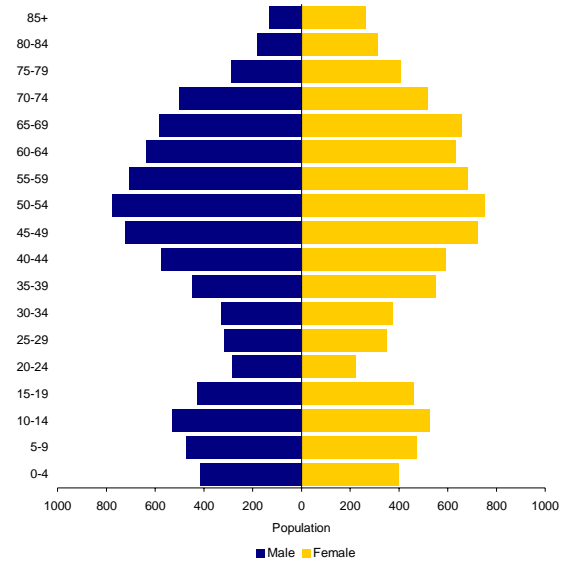
**Table 8: Inverness pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>66576</b>	<b>68528</b>	<b>2.9</b>
00-15	12,994	11,444	-11.9
16-24	6,665	6,671	0.1
25-44	19,832	15,718	-20.7
45-64	16,967	20,837	22.8
65-74	5,674	7,951	40.1
75+	4,444	5,907	32.9

**Figure 15: Lochaber 2001**



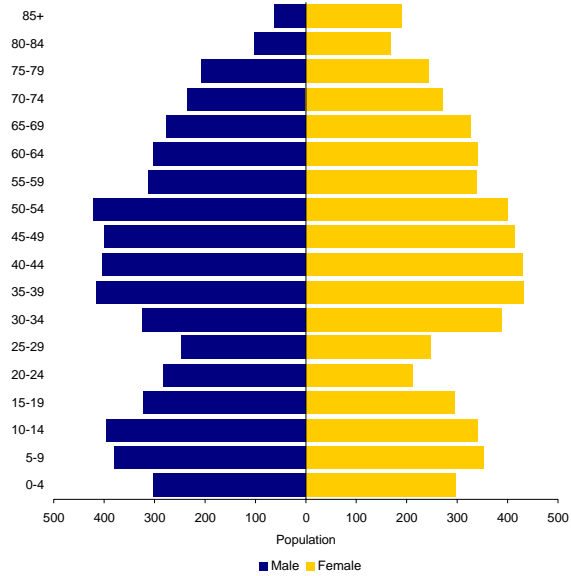
**Figure 16: Lochaber 2017**



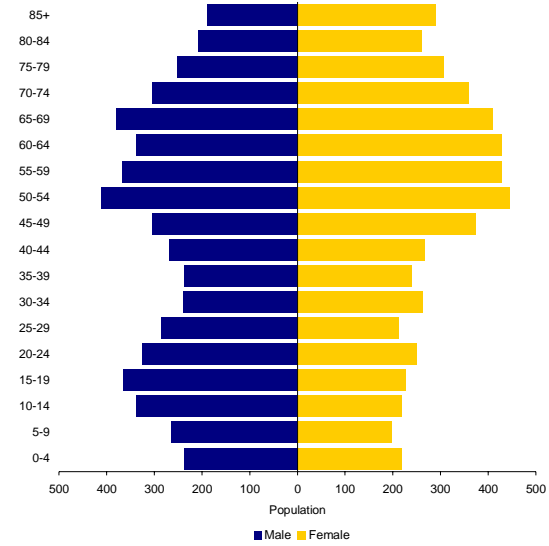
**Table 9: Lochaber pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>18740</b>	<b>17238</b>	<b>-8.0</b>
00-15	3,694	3,027	-18.1
16-24	1,648	1,186	-28.0
25-44	5,181	3,539	-31.7
45-64	5,176	5,638	8.9
65-74	1,790	2,260	26.3
75+	1,251	1,588	26.9

**Figure 17: Nairn 2001**



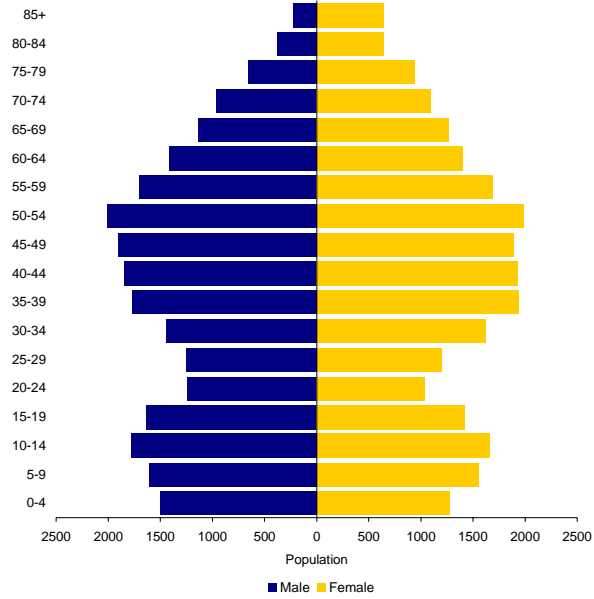
**Figure 18: Nairn 2017**



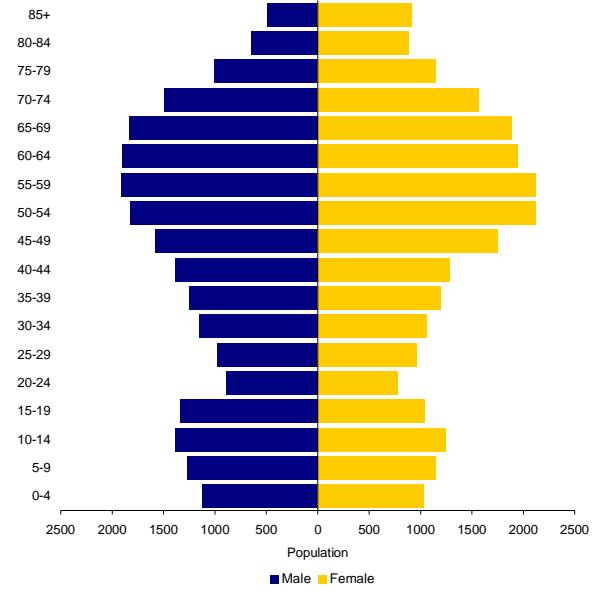
**Table 10: Nairn pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>11071</b>	<b>10728</b>	<b>-3.1</b>
00-15	2,212	1,597	-27.8
16-24	964	1,051	9.0
25-44	2,887	2,018	-30.1
45-64	2,926	3,099	5.9
65-74	1,110	1,456	31.2
75+	972	1,507	55.0

**Figure 19: Ross & Cromarty 2001**



**Figure 20: Ross & Cromarty 2017**



**Table 11: Ross & Cromarty pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>49655</b>	<b>47510</b>	<b>-4.3</b>
00-15	10,083	7,726	-23.4
16-24	4,623	3,518	-23.9
25-44	12,997	9,257	-28.8
45-64	13,999	15,155	8.3
65-74	4,472	6,769	51.4
75+	3,481	5,085	46.1

Figure 21: Skye & Lochalsh 2001

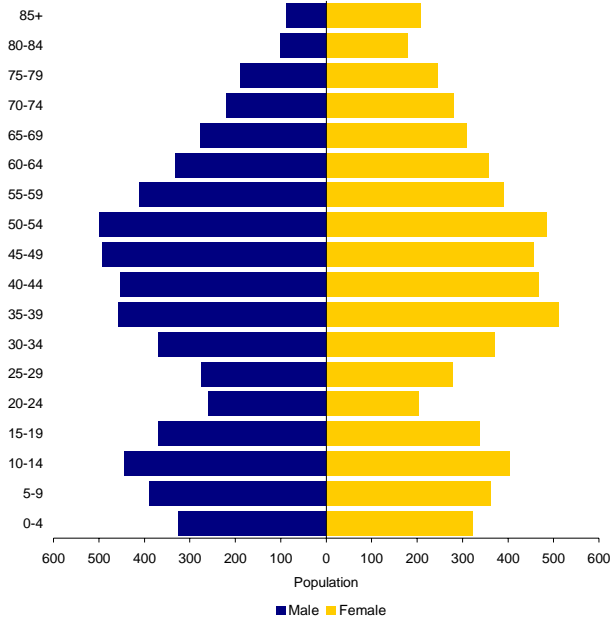


Figure 22: Skye & Lochalsh 2017

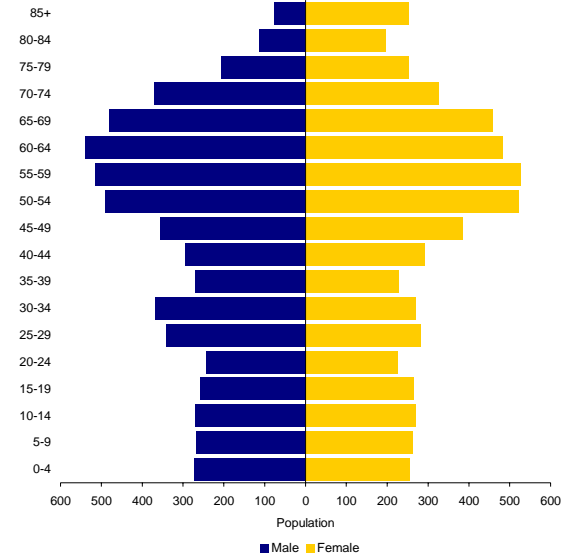
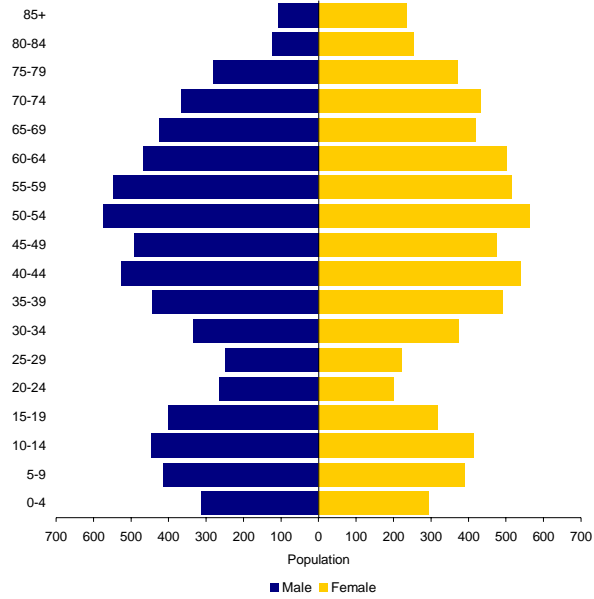


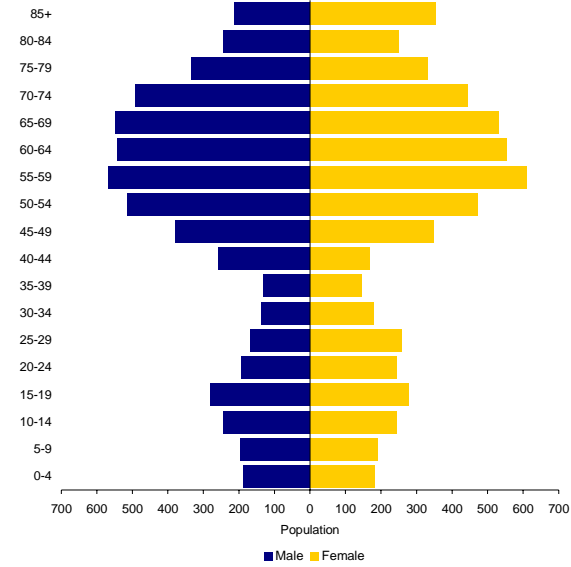
Table 12: Skye & Lochalsh pop change 2001-2017

	2001	2017	% change
<b>All persons</b>	<b>12136</b>	<b>11501</b>	<b>-5.2</b>
00-15	2,420	1,705	-29.5
16-24	998	884	-11.4
25-44	3,187	2,351	-26.2
45-64	3,429	3,822	11.5
65-74	1,089	1,638	50.4
75+	1,013	1,101	8.7

**Figure 23: Sutherland 2001**



**Figure 24: Sutherland 2017**



**Table 13: Sutherland pop change 2001-2017**

	2001	2017	% change
<b>All persons</b>	<b>13778</b>	<b>11406</b>	<b>-17.2</b>
00-15	2,451	1,349	-45.0
16-24	1,005	890	-11.4
25-44	3,180	1,442	-54.7
45-64	4,130	3,984	-3.5
65-74	1,643	2,014	22.6
75+	1,369	1,727	26.2



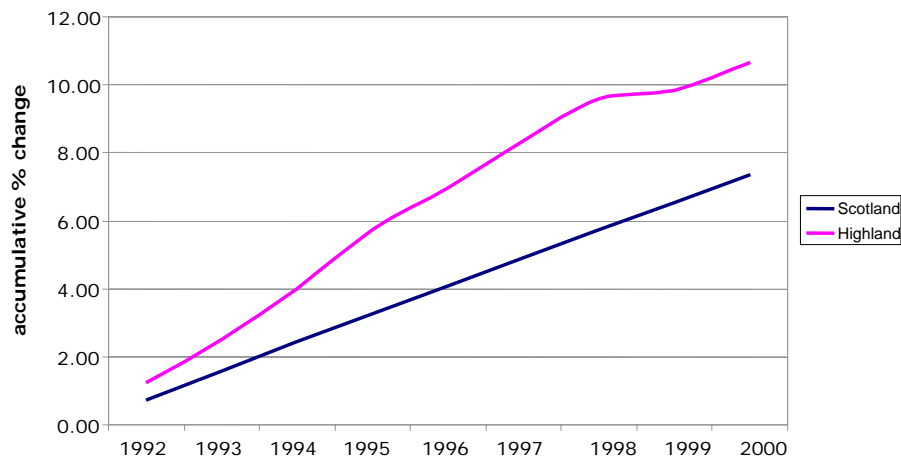
## 4. HOUSEHOLD PROJECTIONS FOR HIGHLAND

### Introduction

The size and age structure of the population has an impact on the number of households in an area. The main source of data on the number of households in Scotland is the Scottish Executive. Household projections are produced by the Executive every two years, based on population projections from the GRO(S) and on information from past population Censuses on household composition.

Scottish Executive mid year household estimates show that between 1991 and 2000, in line with population change, the rate of increase in the number of households in Highland has been higher than for Scotland as a whole (see Figure 25).

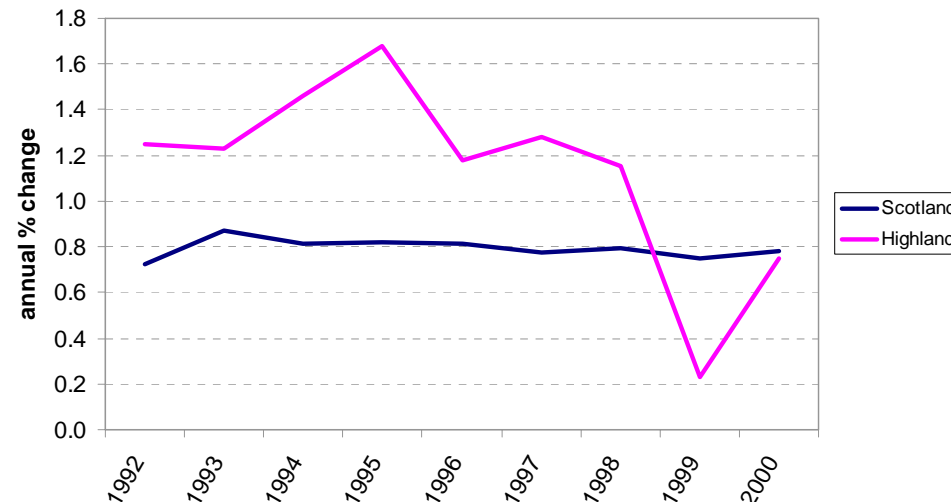
**Figure 25: Accumulative % change in the number of households, Highland, 1991 -2000**



*NB. Household figures for 2001 were adjusted in the light of the 2001 Census and are not consistent with historical data, they have, therefore been excluded from the graph.*

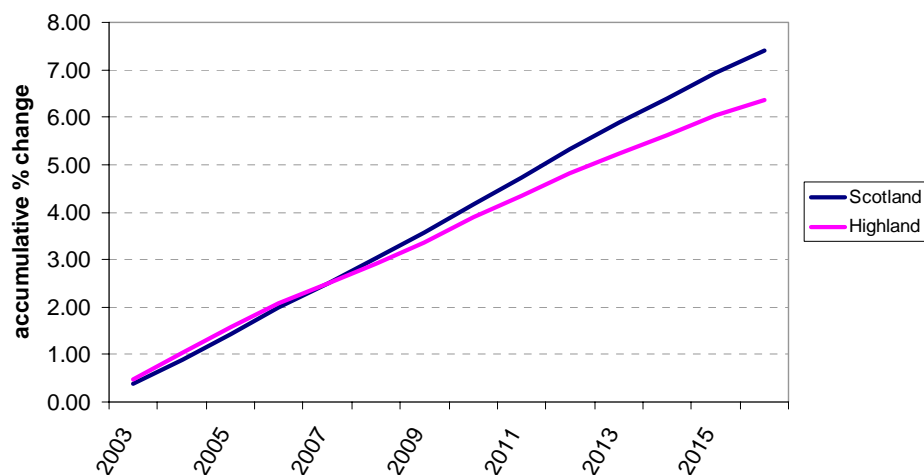
Figure 26, however, shows that, whilst the rate of change on a year by year basis has remained relatively steady across Scotland as a whole, the annual change within Highland has varied considerably. Although the trend has shown a continued growth in the number of households, the rate of increase has demonstrated a downwards trend over time.

**Figure 26: Year on year % change in the number of households, Highland, 1991-2000**

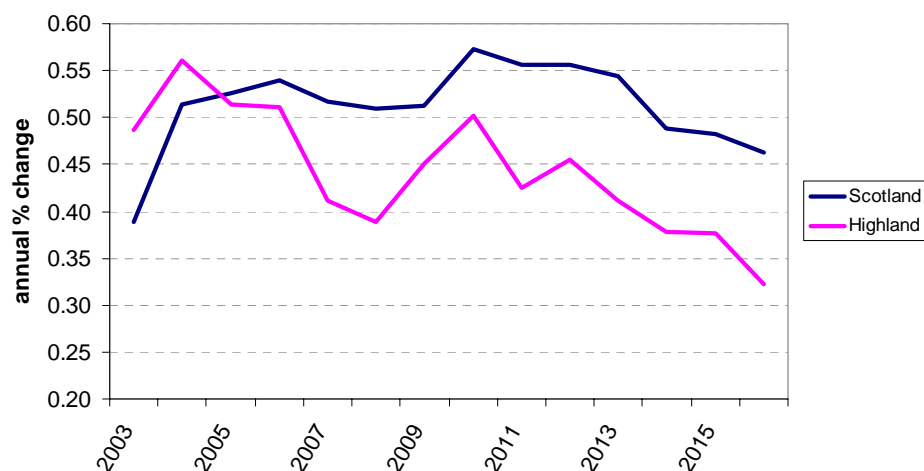


Scottish Executive projections show that the number of households will continue to increase in both Scotland and Highland, but in contrast to past trends, the rate of increase will be lower in Highland than Scotland. The rate of growth will also decline towards the end of the period to 2016 (see Figure 27 and 28).

**Figure 27: Accumulative projected % change in the number of households, Highland, 2002-2016**



**Figure 28: Year on year projected % change in the number of households, Highland, 2002-2016**



Like population projections, household projections are now produced by local authority area only and do not give us any information below Highland Council level. The I&M Group population projections for Council Areas have, therefore been used to provide a basis for our own household projections.

### Methodology

The method used to produce the household projections applies headship rates to the projected population. The headship rates are the proportion of persons who head particular household types (such as single person, married with two children etc.) within any particular age group. They are calculated by the Scottish Executive for each Council area. The rates for 2001 show a lower rate for the formation of single person households in nearly all age groups for Highland compared with Scotland, as well as lower rates for single parent households. Highland does, however, display higher formation rates for households with 2 adults and 1 or more children. There has been a trend in both Scotland and Highland towards an increase in the headship rates for single person households and a decrease in rates for households with 2 adults and 1 or more children.

Estimates of the numbers of persons living in communal establishments (hospitals, prisons and defence establishments) are derived from the 2001 Census (as shown in Table 14). These are subtracted from the total population figures to produce projections of the number of persons living in private households. Household projections are then calculated by applying the Scottish Executive projected trends in household formation (headship rates) for Highland to the projected number of people in private households in each Area within Highland.

**Table 14: Institutional population 2001, Council Areas**

Area	Institutional population		
	Male	Female	Total
Badenoch & Strathspey	7	13	20
Caithness	9	13	22
Inverness	316	65	381
Lochaber	3	12	15
Nairn	0	1	1
Ross & Cromarty	1	1	2
Skye & Lochalsh	0	0	0
Sutherland	5	19	24
Highland	341	124	465

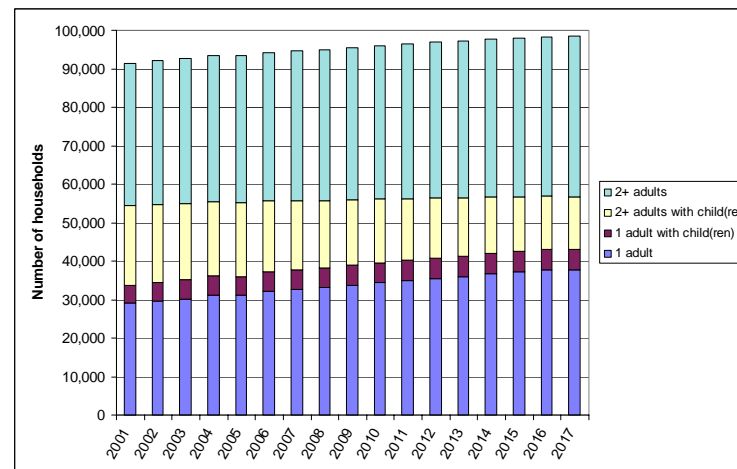
**Results**

The results of the household projections show that whilst the population is anticipated to decline by around 4% to 2017, the number of households is expected to increase by around 8% over the same period. This is broadly in line with the trend for Scotland, where the number of households is projected to grow by 12% despite an anticipated fall in the population.

**Household types**

The composition of households will, however, change. There is expected to be a decline of around one third in the number of households consisting of 2 or more adults with children, so that by 2017 such households will comprise only 14% of the total (compared with 23% in 2001). Single person households on the other hand demonstrate the greatest increase, of more than 30% over the same period, meaning that they will account for 38% of all households.

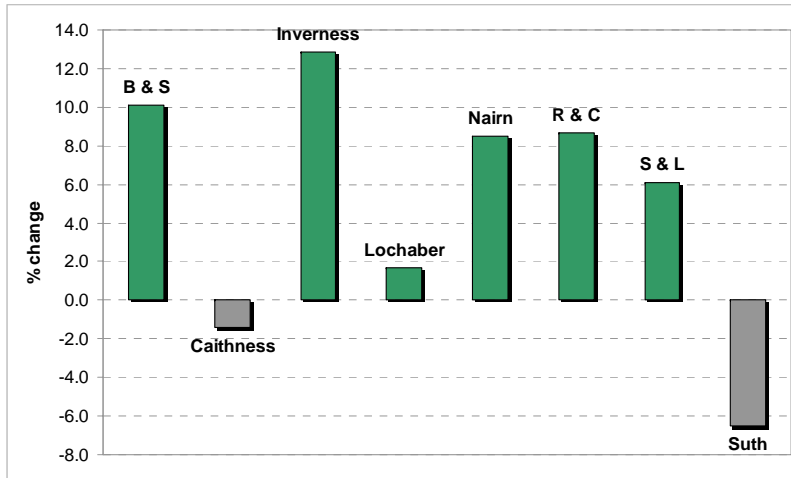
**Figure 29: Household change by type 2001-2017**



**Council Areas**

Like the population projections the rate of change varies considerably across Highland. The highest percentage increase is expected to be in Inverness (12.9%) whilst Sutherland (-6.5%) and to a lesser extent Caithness (-1.4%) will experience a decline in the number of households by 2017.

Figure 30: Projected household change by Council Area 2001 – 2017



## APPENDIX 1: THE REGISTRAR GENERAL FOR SCOTLAND'S 2002 BASED POPULATION PROJECTIONS

The latest set of population projections for Scottish administrative areas were published by the General Register Office on the 30 January 2004. These are the first projections to take full account of the 2001 Census data at sub-national level and are based upon revised assumptions about mortality, fertility and migration trends prepared by the Government Actuary's Department.

The 2002-based projections show the total population of Scotland continuing to fall slowly from 5.05 million in 2002 to 4.94 million by 2018 (the psychological barrier of less than 5 million people is reached in 2009). This slow but steady population decline continues the national trend of the late 1990s and is the result of an excess of deaths over births, and continued modest net migration loss.

The Highland population is also projected to fall - by 4 percent over the period to just less than 200,000 residents in 2018. The current demographic situation in Highland is a population with below-replacement level fertility, gradually decreasing mortality and near balance net migration.

In common with the rest of Scotland, the general pattern in Highland is that of an ageing population. Population ageing is the redistribution of relative population share towards older age groups. The effects of the component assumptions about future fertility, mortality and migration trends on this ageing process are largely dependent on the inertia of population change already existent in the structure of the base population. For this reason, change is likely to affect populations across Scotland at different times. A summary of the 2002 projections is set out in the tables opposite.

The I&M Group projections set out in the main text of this document are broadly in agreement with the new GRO(S) sub-national projections both in terms of the population decline and proportionate ageing of the Highland population. This suggests that the underlying assumptions made about fertility, mortality and migration at small area level in Highland are not unreasonable. However, readers of the

report should recognise that small area projections are more exposed to the vagaries of the component method and are likely to be less reliable than those for larger populations.

**Table 15: Highland - percentage of population in age groups at selected years and percentage change from 2002**

	% change				
	2002	2008	2018	2002-08	2002-18
<b>All Ages</b>	<b>208140</b>	<b>205952</b>	<b>199887</b>	<b>-1.1</b>	<b>-4.0</b>
	Percentage of population				
00-04	5.3	4.6	4.3	-12.6	-22.1
05-14	12.7	11.5	9.7	-10.1	-26.5
15-29	15.5	15.5	14.6	-1.3	-9.8
30-44	21.9	19.1	15.1	-13.7	-33.9
45-59	21.9	23.2	23.6	4.7	3.5
60-74	15.3	17.5	21.5	13.7	35.6
75 & over	7.5	8.6	11.2	13.1	44.0

**Table 16: Scotland - percentage of population in age groups at selected years and percentage change from 2002**

	% change				
	2002	2008	2018	2002-08	2002-18
<b>All Ages</b>	<b>5054800</b>	<b>5006674</b>	<b>4935272</b>	<b>-1.0</b>	<b>-2.4</b>
	Percentage of population				
00-04	5.3	4.9	4.9	-8.2	-9.5
05-14	12.3	11.1	9.9	-10.5	-21.6
15-29	18.6	19.3	18.0	2.8	-5.5
30-44	22.9	20.5	17.9	-11.3	-23.7
45-59	19.7	21.0	22.1	5.8	9.9
60-74	14.1	15.4	17.7	8.3	23.0
75 & over	7.2	7.8	9.5	7.6	28.7

## APPENDIX 2: HIGH AND LOW POPULATION PROJECTION SCENARIOS FOR HIGHLAND

Alternative population projections have been created for Highland, by the I&M Group, based upon different assumptions about future mortality, fertility and migration, all of which are thought to be reasonable. Data for these alternative assumptions on fertility and mortality were derived from the Government Actuary for the most recent national population projections. The alternative migration assumptions are based on past experience and possible future trends. These new assumptions are applied to a 2002 base population.

This summary reports special high and low population scenarios that represent two extremes of the possible interplay of demographic trends derived from different combinations of the assumptions.

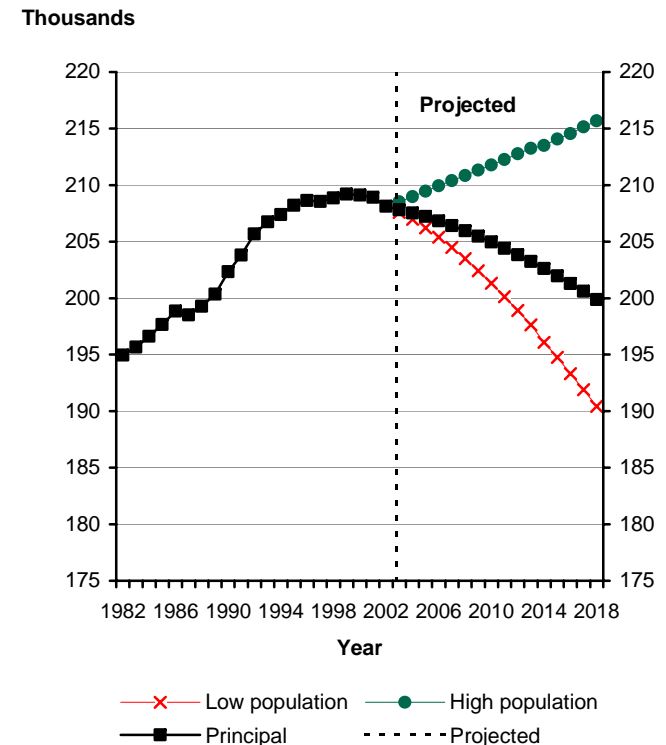
The high population scenario is based upon the assumptions of higher fertility, higher life expectancy and higher migration levels. The low population scenario combines assumptions of future lower fertility, lower life expectancy and lower migration.

Compared with the principal projection assumptions, the high and low fertility scenarios assume long-term family size of +/- 0.2 children per woman. In the high and low mortality assumptions, projected life expectancy at birth by 2018 differs by +/- 1.1 years for males and +/- 0.6 years for females from the principal projection. Under the high migration scenario a net gain of 700 people per year reflects a return to the migration gains of the early 1990s. The low migration scenario, projecting a possible net loss of 200 a year, is presented as a possible alternative given more recent evidence of near balance net migration.

These extreme case scenarios have obvious implications compared to the principal projection for the size of any future population. Under the high combination the population would be expected to increase over the period. Primarily this results from projecting migration gain at a level that more than offsets the impact of negative natural population change. The lower population combination would result in further and quite dramatic reduction in population size. Population decline would be accelerated by net out migration and a widening of

the gap between those dying and new births. This is illustrated in Figure 31 where the difference between the extremes of the projection is in the order of 25,000 people.

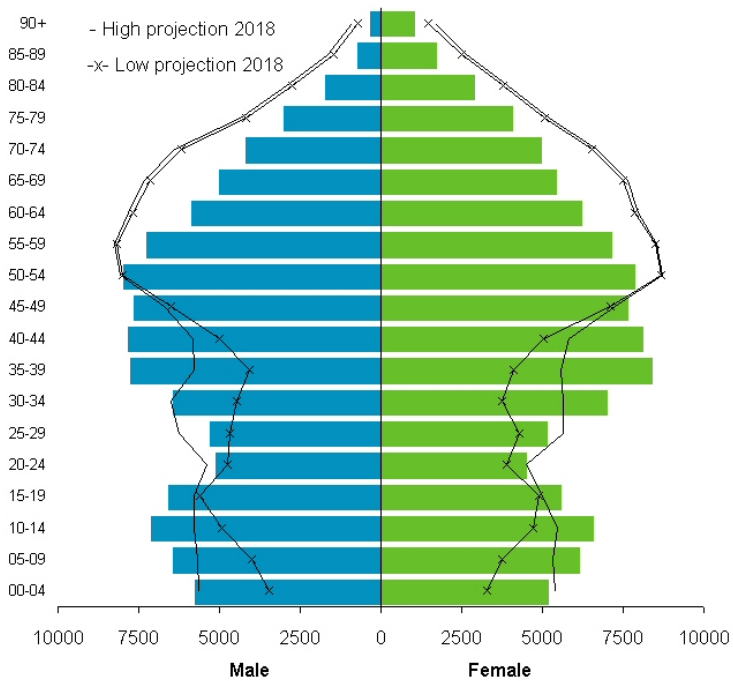
**Figure 31: Population according to principal and high and low assumptions 2002-based projections, 1982-2018**



Examining the high and low population scenarios, the shape of the future population structure is apparent. In the population pyramid (Figure 32) the two extreme scenarios are compared with the population structure of the current mid-year population estimate for Highland in 2002 (column series). There is little difference in the projections at older ages and the inevitability of population ageing is apparent as smaller generations at older ages are replaced at older ages by the larger numbers of people born after the second world war

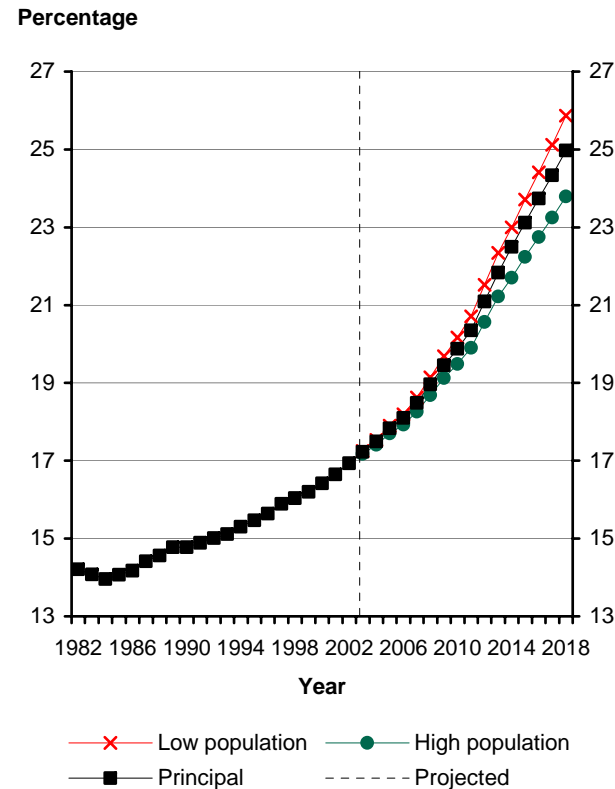
and during the 1960s. In the high population scenario, the assumed higher fertility pattern and net migration gain at younger ages would still result in smaller numbers of individuals at younger ages by 2018.

**Figure 32: Change in population structure from base by 2018 according to high and low population special combination projections**



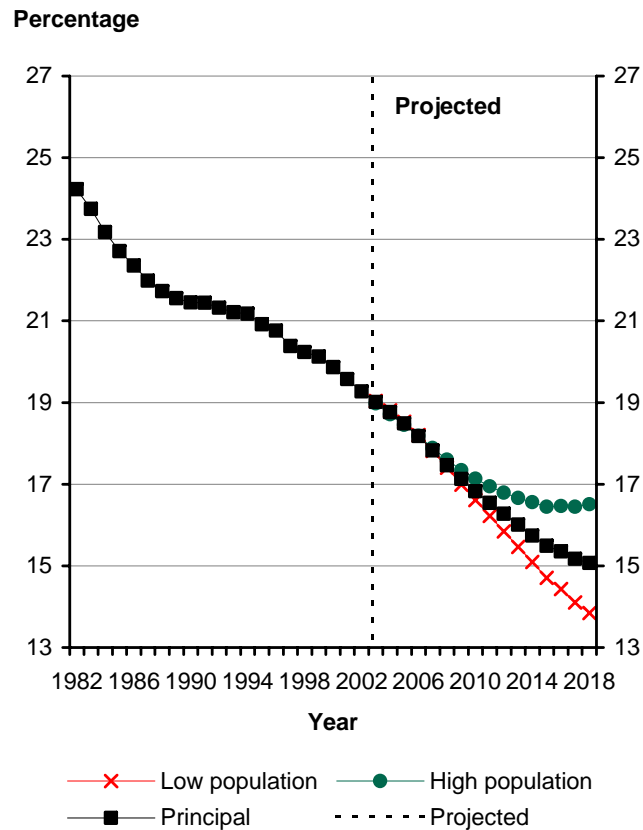
Although there is some uncertainty about the future size of the Highland population the principal message of analysing the alternative projections is that continued population ageing is a reality under any scenario. Figures 33 and 34 illustrate that even the very positive assumptions about the future size of the population will have little influence on the ageing of the population structure.

**Figure 33: Proportion of the population aged 65 or over according to principal and high and low population projections, 1982-2018**



In 2002 nearly 17 percent of the Highland population were aged 65 or over and this age group has been increasing as a proportion of the population since the mid 1980s. Under both alternative scenarios this group can be expected to increase to between 23 and 26 percent of the population.

**Figure 34: Proportion of the population aged 15 or under according to principal and high and low population projections, 1982-2018**



The population aged 15 or under has been steadily declining since before 1982 and this trend is set to continue under all the component scenarios. By 2018 this group will number between 26,000 and 36,000 individuals. As a proportion of the population, children aged less than 16 years will be exceeded by those aged over 65 years in all scenarios by 2008. The variation between the alternative projections in the younger age range is largely the result of the alternative fertility component assumptions. Fertility behaviour is primarily the result of human choice, and is therefore subject to influences from many

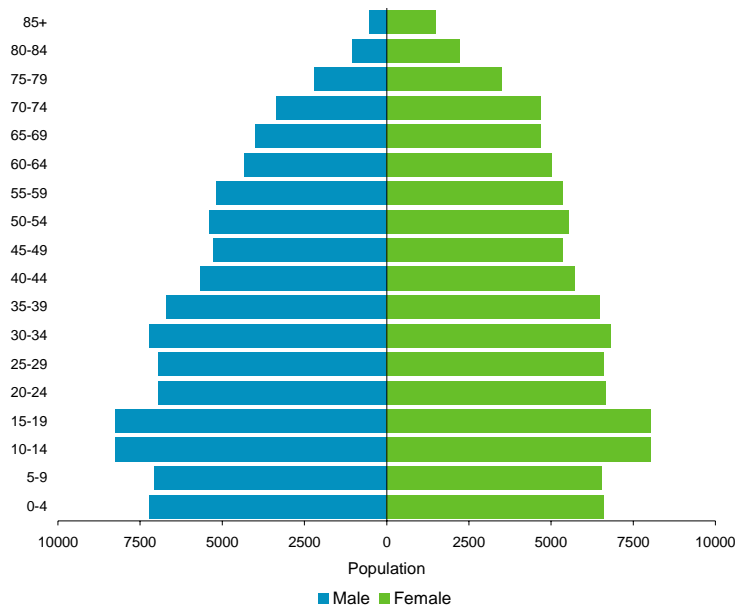
factors. Fertility rates, through their effect on the number of births, introduce greater uncertainty into any projections and have greater influence on population numbers and age distributions than mortality assumptions.

Whilst ground for debate about the future impact of migration on population size exists, the demographic transition to a population with a much older age structure is a reality. This is the legacy of long-term population trends that have primarily resulted from past birth events and a period of sustained below replacement level fertility. This situation has been exacerbated in Highland by population loss of those at younger ages primarily seeking economic and educational opportunity in other areas. This demographic pattern is not new and is evident in the examination of previous population structures (see Appendix 3).

### APPENDIX 3: HIGHLAND POPULATION CHANGE 1982-2002

The changing age and sex composition of a population is the key to understanding the different social and economic impacts and needs of a society. The Figures below show the population of Highland in 1982, 1992 and 2002 and reveal a picture of a population that, although growing in terms of absolute numbers, has experienced rapid population ageing. This is primarily the result of the low and declining birth rate and has also been influenced by a reduction in mortality rates and net out-migration at younger ages.

**Figure 35: Highland population structure 1982**

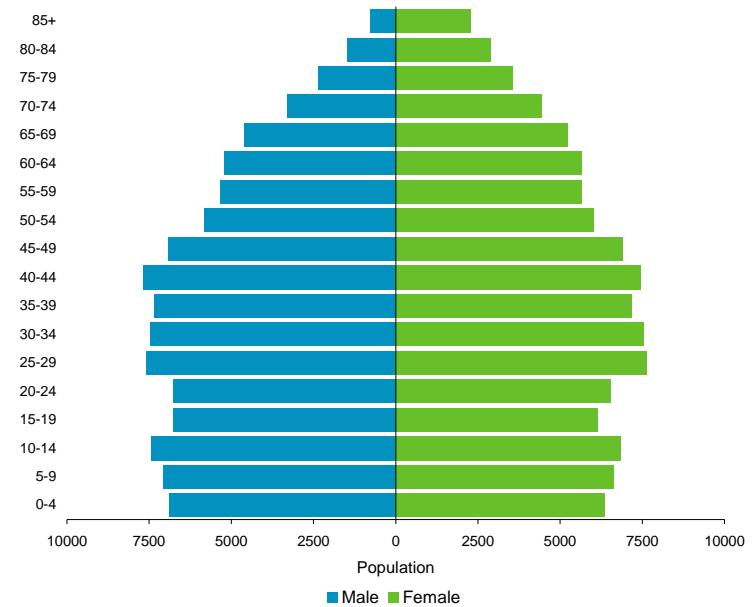


Source: GRO(S) Mid Year Estimates 1981-2001 revised series

**Table 17: Components of Highland population change 1982-1992**

Estimated population 1982	Births	Deaths	Natural change	Net migration	Estimated population 1992	Population change	
						Number	%
194,970	26094	23989	2105	8595	205,670	10,700	5.5

**Figure 36: Highland population structure 1992**

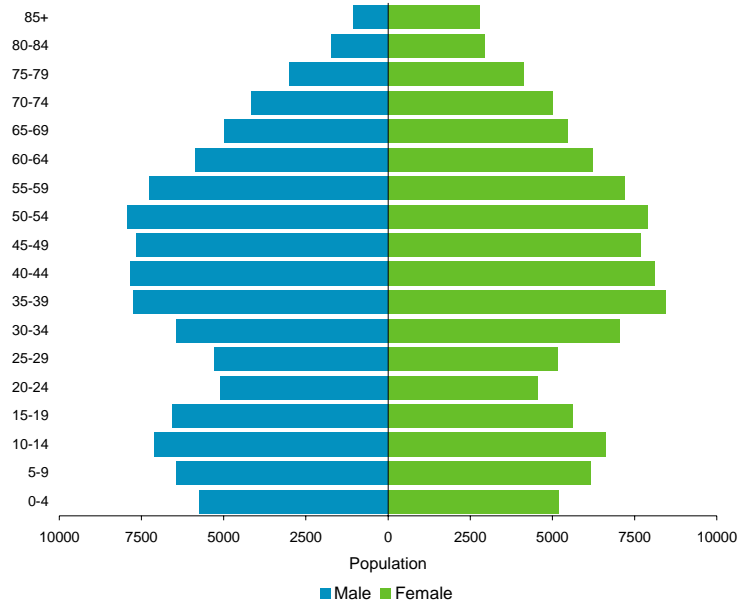


Source: GRO(S) Mid Year Estimates 1981-2001 revised series

**Table 18: Components of Highland population change 1992-2002**

Estimated population 1992	Births	Deaths	Natural change	Net migration	Estimated population 2002	Population change	
						Number	%
205670	23462	23946	-484	2954	208140	2470	1.2

**Figure 37: Highland population structure 2002**



Source: GRO(S) Mid Year Estimates 1981-2001 revised series

Figure 37 shows the age structure of the population for both males and females in 2002. Exploring the peaks and troughs of the graph is possible with reference to past trends in mortality, fertility and migration. Peaks in population around the mid-50s and mid-30s age groups represent the 'baby boom' periods that followed the Second World War and occurred in the 1960s. Declining births in recent years are evident in the narrowing of the base of the pyramid. The slightly larger numbers of 10-19 year olds is a result of women of the 1960s baby boom passing through the childbearing years. In the older age ranges, particularly over 75, the higher number of females reflects the longer expectation of life for women.

The changing age structure of the Highland population since 1992 is illustrated in Figure 38 below. There are notable decreases in the number of children under 15 and an increase of 17.4 percent in those aged 75 and over.

**Figure 38: The changing age structure of Highland's population 1992-2002**

