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Sustainable Rural Communities: The case of two UK National Park areas

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Appl. Spatial Analysis

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Keywords projections, rural population, sustainability, National Parks

1. Introduction

The sustainability of rural populations has become an important social policy issue in recent years (Best and Shucksmith 2006; Champion 2007). Those concerned with economic development in urban areas welcome signs of 'urban revival' (Champion 2007) as young populations are attracted to urban centres. In rural areas, however, out-migration of young adults remains a dominant force, raising questions about the future viability of some rural communities (ARHC 2006). This paper discusses projections of population and households for the Peak District National Park (PDNP) and the Cairngorms National Park (CNP) in the UK and aims to contribute to these debates in three ways.

First, this paper provides a demographic contribution to debates on population sustainability in rural areas in the UK. Projections are not intended to provide solutions to these issues but they do help to highlight the challenge for policymakers by revealing the consequences of current trends. They also allow targets to be developed, by quantifying the consequences of a variety of practical scenarios such as the provision of additional housing. Second, the paper contributes to academic debate on the study of population change in rural areas by testing the hypothesis that National Parks are 'special' areas experiencing unique population change compared to other rural areas. Third, it makes a methodological contribution by developing an innovative technique using new data sources to produce projections for small areas that are non standard in government statistical output. The methods are relevant outside National Parks as emphasis on direct government and regional funding of area-based initiatives require more localised planning information.

The paper will first review debates about sustainable rural communities and then outline the demographic features which distinguish national parks from other rural areas and the country as a whole. The data and methods used to estimate and project demographic characteristics are outlined and then the results of the projections are presented. Finally the discussion considers the implications of the projections in relation to the three key themes of the paper.

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2. Sustainable Rural Communities

A lack of affordable housing is a threat to sustainability. One concern is that if key workers are not able to afford accommodation then local communities will suffer economic decline. The lack of rural affordable housing also leads to issues of social justice and inequality as 'local people' are unable to afford homes as a result of the demand from more wealthy 'outsiders' (Richards 2004). This has led to tension in some rural areas with attacks on holiday homes and businesses (Bathurst 2007; Morris 2007). Not only are locals supposedly forced out of many rural areas but there are also concerns for frustrated in-migrants unable to find any affordable accommodation in these locations.

The lack of affordable housing is particularly severe in National Parks because of the desirability of these areas as places to live and the restrictive policies on new housing developments for landscape preservation reasons. These factors compound the reduction of social housing as a result of the 1980 right to buy policy which affects all areas (Cairncross, Downing et al. 2004).

The current concerns of rural population sustainability are set in the context of over fifty years of migration that has served to reduce population concentration. The movement of people from the largest urban settlements to more rural areas has been a characteristic of population change in the UK and in most of the other advanced Western countries. In Britain this process of counterurbanisation has shown a cyclic pattern beginning in the 1950's and becoming most prominent during the 1960s and 1980s with slower levels of population deconcentration in between (Champion 1989).

Best and Shucksmith (2006) report ONS findings that flows of migration into rural areas may have increased since 2001 (compared with 1991-2001). Those moving into rural areas tend to be older, wealthier and owner occupiers while those who move to urban areas are younger, poorer and more likely to be involved in skilled and unskilled working occupations (Best and Shucksmith 2006).

Migration to rural areas is often a lifestyle choice favouring physical attractions such as the open, less crowded, quieter and tranquil environment, as well as social features including a slower pace of life, escaping from the rat race, and an increased sense of community and identity (Boyle, Halfacree et al. 1998). Many migrants to rural areas continue to work in urban centres and consequently counter-urbanisation has tended to boost rural populations that are most accessible from urban centres (Champion 1989).

3. National Parks in the UK

National Parks can be distinguished from rural areas generally in a number of ways that heighten issues of sustainable populations. National Parks in England and Wales were first set up in 1949 by the National Parks and Access to Countryside Act. There are now eleven designated parks in England and Wales with a total population of just under 300,000.

National Parks authorities are the statutory planning authorities for the Park areas but all other local authority duties (e.g. housing, education) remain with the constituent local authority (Richards 2004). The two main statutory purposes of National Parks in England and Wales are to conserve the natural landscape and environment and to promote public understanding and enjoyment of the special qualities of National Parks. The 1995 Environment Act added an additional duty, to seek to foster the economic and social well being of their local communities. However, national parks were not granted any new powers or resources to achieve this new duty (Cairncross, Downing et al. 2004).

In Scotland the National Park situation is very different for two key reasons. First, National Parks were much more recently set up following the National Parks in Scotland Act (2000). Second, alongside the primary conservation aims is the promotion of "sustainable economic and social development of the area's communities" (Richards 2004). There are now 2 National Parks in Scotland with a total population of 32,000.

The potential for tension between the primary conservation aims of National Park authorities and their recreational, economic and social roles is well known and documented. For example, in 1974 the promotion of recreational uses of National Parks was qualified by the condition that this should not be to the detriment

of the natural beauty of the landscapes. This became known as the Sandford principal that gave conservation precedence over recreation.

The tension between social and economic duties and landscape conservation responsibilities is well illustrated through the affordable housing issue. It is argued that a lack of affordable housing is causing economic and social decline; however, the building of more housing is at odds with landscape preservation aims. Although the more prominent role for social responsibilities in Scottish National Parks gives scope for differences in policy on affordable housing, research suggests that in Scotland landscape preservation also continues to take priority (Richards 2004).

Table 1 gives a range of demographic statistics for National Parks, Scotland and England and Wales. National Park populations tend to have more elderly and predominantly white populations with higher proportions of married couples compared with England, Wales and Scotland as a whole. Industry in National Parks tends to be dominated by tourism and farming hence there are usually large proportions who are either self employed or small employers. The average household size is smaller in National Parks than nationally and there are a higher proportion of second or holiday homes, although this proportion varies a great deal between Parks. National Parks tend to have higher proportions of people who own their properties outright and lower levels of renting from the local authority or housing associations.

The Cairngorms National Park in Scotland (CNP) and the Peak District National Park in England (PDNP) are selected for this research because they share many of the features typical to National parks that are described above. However, in the CNP levels of home ownership are similar to those observed in Scotland and the proportion in local authority housing is higher than in the English and Welsh National Parks. In the PDNP the proportion of the population involved in manufacturing is similar to the England and Wales average. CNP is in a remote area of northern Scotland, noted for its natural beauty but also its skiing at Aviemore. PDNP is within fifty miles of the major conurbations of Manchester and Sheffield and has been home to mining and textile industries. The choice of CNP and PDNP as case study areas is useful to assess the impact of the differing history and policy roles in England and Scotland on future demographic change and population sustainability.

Table 1: National Park demographic and socio-economic characteristics

	Peak District National Park	Cairngorms National Park	England and Wales National Parks	England and Wales	Scotland
All people	37,937	16,024	256,231	52,041,916	5,062,011
All households	15,949	6,969	109,291	21,660,475	2,192,246
% aged 60+	25.8	25.7	27.5	20.9	21.1
% White	99.3	99.5	99.2	91.3	98.0
% working in: Agriculture; hunting; forestry	7.1	5.7	8.8	1.5	2.1
% working in: Manufacturing	14.8	7.2	10.6	15.0	13.2
% working in: Hotels/catering	7.3	19.4	11.2	4.8	5.7
% owner occupiers	75.6	62.7	71.9	68.9	62.6
% living in social rented	10.1	16.3	11.1	19.2	27.1
% living in private rented or other	14.3	20.9	17.1	11.9	10.2
% Second residence / holiday accommodation	4.1	18.4	10.7	0.7	3.8

Source: Census 2001

4. Data and Methods

Demographic projections for small sub-national areas are vulnerable to criticism both because small populations are relatively unstable and because standard age-specific data for projections are rarely available. Small populations are unstable because they are open to substantial influence by government policy and private investment decisions. Projection forward of recent trends tends to be conservative in that it assumes implicitly that the impacts of past policy and investment will continue, and is open to the false interpretation that population change is resistant to new policy and investment decisions ((Bate 1999) provides a critique of population and housing projections in the context of UK planning). Data availability is a function of statistical and administrative systems which rarely cater for small and standard areas such as the National Parks of the UK which are not included in the regular projections exercises of the national statistics agencies. We counter these concerns as follows for this specific case of the National Parks, although the same arguments may also be used in many other settings.

Our projections for the National Park areas are indeed simply scenarios of what will happen if current policies and their demographic impacts continue. It is helpful to know the outcome of current trends especially when the outcome can be seen as undesirable – a severely ageing population with reduced numbers at working age. The projections show not only the outcome but the migration flows that cause it. Discussion of new policies can focus on altering these flows, precisely to avoid the undesired outcome.

We consider methods among those in the literature, classified into mathematical extrapolation from a time series, sometimes including the relationship of population to economic indicators when these can themselves be forecast, methods that share projections made for larger reference areas to each smaller territory, methods that are guided by planned housing capacity, and the age-specific cohort component models that carry forward the age/sex structure of a base population using a set of assumptions about age/sex specific fertility, survival and migration (Smith, Tayman et al. 2001; Rowland 2003; George, Smith et al. 2004)

Age-specific schedules of the components of population change (fertility, mortality and migration) are usually unknown for smaller areas, and this is the case for the National Park areas of the UK. But although this consideration leads towards extrapolation and share methods, the National Park authorities' concern with the age structure of their areas and the potential impact of new housing polices drives us to find new ways of implementing the cohort component model and the impact of housing capacity.

The cohort component methodology is the most appropriate technique for three key reasons. First, in order to understand what is causing population change and to comment on population sustainability issues, local information on the components of change, particularly migration, are essential. Second, projections of the population age structure are required to then calculate the consequences for the changing labour force and household composition, since these are each highly dependent on the age structure of the population. Finally, the cohort component methodology is standard in government population projections for districts in the UK. The consistency of the projection methodologies enables the National Park population change to be compared with projections produced by government for larger areas.

The cohort component technique requires detail of single year of age and sex for rates of fertility, mortality, migration and household formation. These data demands lead to two key challenges that complicate implementation of the cohort component methodology. First, National Park boundaries are non standard in government statistical output. This challenge is overcome by allocating data for smaller areas that are available from the national census or administrative sources. Overlaps of the small census and administrative areas with National Park boundaries were apportioned on the basis of postcode residential address files to derive National Park estimates. This technique using geographical conversion tables is well documented in the literature (Norman 2003; Simpson and Yu 2003).

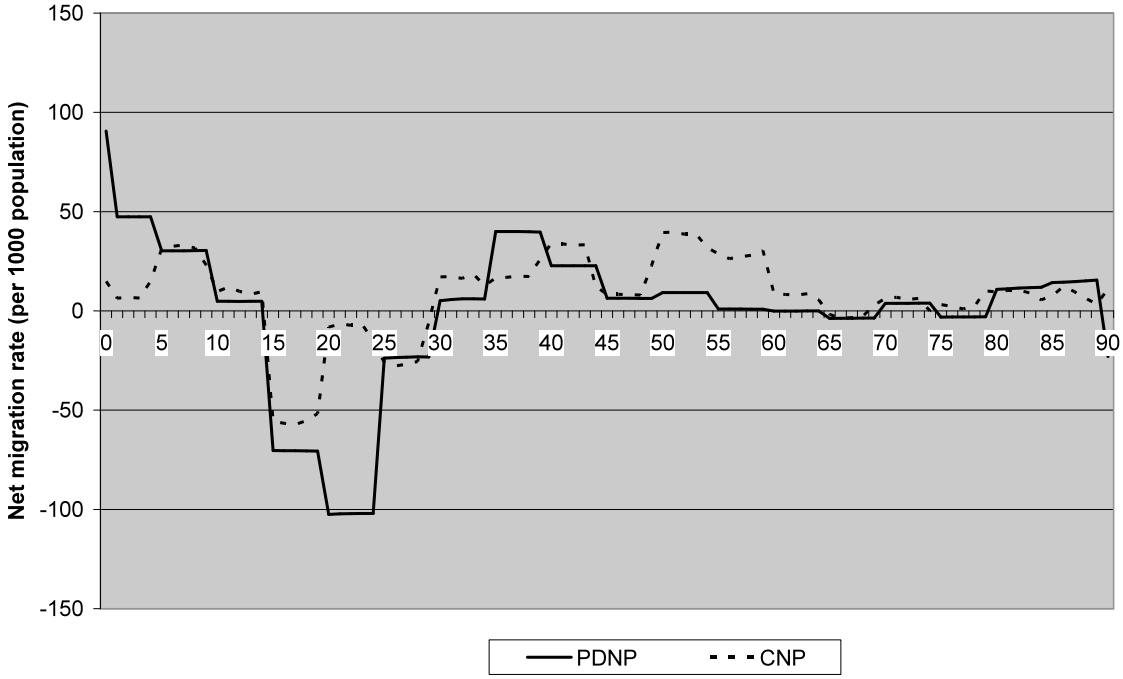
The second challenge is that the small areas involved in the estimation procedures either lack data (or sufficiently detailed data) and rates tend not to be robust when disaggregated to age/sex groups due to small sample sizes. In order to overcome this challenge a proration technique is employed with the framework of the cohort component methodology. Local data for the total population is used to calibrate detailed age-

specific schedules from relevant reference populations. The reference populations were ward, district, or national, the smallest for which the relevant schedule was available.

These strategies were implemented using three key data sources: government projections for local authority districts, the 2001 Census and Vital Statistics reported for output areas. Table 2 summarises the data sources used in the projections for each National Park, and the methods are briefly summarised in the next paragraphs. For full details see Marshall and Simpson (2005) and Marshall and Simpson (2006).

The 2001 census was used to calculate a base population with detailed age and sex structure for each national Park. Migration estimates for the PDNP were derived from census data indicating moves into and out of output areas in the year preceding the 2001 census. The CNP migration is estimated using postcode moves recorded on the community health index between 2001 and 2004. In the PDNP and the CNP migration rates were assumed to be constant in each year of the projection and on the advice of the Park authorities overseas migration was assumed to have no net effect. Graph 1 shows the migration profile for PDNP (2001) and CNP (2001-4).

Graph 1: Net migration rates in the PDNP (2001) and CNP (2001-4)



Migration is usually the weakest component of any projection (Wilson and Rees 2005) and it is also crucially important for the findings described in this paper. It is important to consider whether our observation of out-migration of young adults and in-migration at the older ages (see graph 1) is typical of recent migration patterns. The top heavy age structure in 2001 in both parks (see graphs 2 and 3) indicates that this is the case providing strong evidence to suggest that the migration profile we have assumed has been in place for some time and that the migration data we observed is not unusual. Although different data sources are used for migration for the two National Parks they both give a good indication of recent trends.

Government's projected rates of fertility, mortality and household headship were used to give only the shape of current and future age schedules of local demographic rates; their level was determined by the characteristics of each National Park, known or estimated for the total population.

The census provided the detailed geographical data necessary to calculate local estimates of the total numbers of each household type. These estimates were used to adjust government age schedules of national headship to reflect local levels.

The recent release of vital statistics for census output areas (datazones in Scotland) provides a valuable new source of data for projections of small areas that are non standard in statistical output. These data were apportioned to estimate the number of births and death in each of the National Parks between 2001 and 2004. The ratio of these recorded births (for example) to the number of births projected when national schedules of rates were used, gave a local fertility adjustment that was applied to the projected national fertility rates in each year of the projection. A local mortality adjustment was calculated in similar way using a ratio of local and national Standard Mortality Rates. The fertility and mortality adjustments are shown for the CNP in table 3.

Table 3: Total Fertility Rate and Standardised Mortality Rate adjustments for CNP

	Total Fertility Rate (average 2001-4)	Standardised Mortality Rate (average 2001-4)
GAD national age-sex rates (Scotland)	1.60	100.3
Projection constrained to local births/deaths	1.52	96.3
Local adjustment to GAD national rates	0.95	0.96

The larger population of the PDNP enabled us to calculate estimates and projections for three sub-areas based on overlaps with the districts of Derbyshire Dales, High Peak and Staffordshire Moorlands. The local fertility adjustments made to the national rates for these areas range between 0.96 and 1.06 and the local mortality adjustments range between 0.76 and 1.00.

The results in this paper relate to the sum of the three sub areas as their population is sufficiently large (93% of the population of PDNP) to support the production of reliable projections that distinguish age and household type. Marshall and Simpson (2006) report projections of total population and households for the remainder PDNP areas.

The PDNP authority provided information on numbers of future dwelling completions under different scenarios of housing development. This enabled the creation of a set of (geodemographic) dwelling led projections that use the cohort component methodology to fill the expected future housing developments through adjustments to levels of migration. These projections are useful as they allow the impact of different levels of housing development on population change and population sustainability to be assessed.

Table 4: Data used in projections

Component	**PDNP**		**CNP**	
	Reference schedule of age-specific rates	**Local information**	**Reference schedule of age-specific rates**	**Local information**
Base population	None	Census	None	Census
Births and fertility rates	GAD England fertility rates (2004)	ONS Vital statistics – total births	GAD Scotland fertility rates (2004)	GRO-s vital statistics – total births
Deaths and mortality rates	GAD England mortality rates (2004)	ONS Vital statistics – total deaths	GAD Scotland mortality rates (2004)	GRO-s vital statistics – total deaths
Migrants and migration rates	None	Census – age-sex rates	None	GRO-s patient age-sex registrations
Households and headship rates	DCLG projected headship rates for England	Census – total households PDNP housing expectations	GRO-s projected headship rates	Census total households

The projection methodology attempts to quantify the outcome of the continuation of recent trends. This aim is invalidated if the trends have not been accurately measured. The reliability of the projection assumptions in continuing recent trends can be assessed by comparing the CNP projection results in 2002, 2003 and 2004 with mid-year estimates of the Park population calculated by GROS. Our projections for the CNP differ from the GROS mid year estimates by 6 between 2001 and 2004 indicating that the projection assumptions and data closely match those produced by GROS for those first three years. This implies that these population projections are consistent in methodology with those used officially elsewhere in Scotland.

In reality, future population change may be influenced by a number of external factors (e.g. local policy decisions, economy, housing market) that could disrupt these trends. These external factors are very hard to predict and these projections make no attempt to do so. What we can be confident about is that the projections give an accurate picture of what will happen if recent trends continue into the future.

The projections of population, households and labour force were implemented using the POPGROUP suite of software (Simpson, 2005; www.ccsr.ac.uk/popgroup). It is commonly used in the UK by local planning authorities, implementing standard methods for population, housing and labour force projections in Excel VBA routines. It allows national rates and local counts to be integrated, easing the estimation of local differentials described above.

5. Results

This section presents the projection results for each National Park and is divided into four parts. First, the key demographic changes resulting from the continuation of recent trends of fertility, mortality and migration are presented. Second, the characteristics of the migration age profile in each Park are explored and the role of migration in determining the projected population change is demonstrated. Third, the extent to which the projected demographic changes are unique to the PDNP and the CNP is assessed using government projections for neighbouring areas. Finally, the consequences of different levels of future housing developments in the PDNP are explored through a range of dwelling led projections.

5.1 Key demographic changes

Table 5 shows the per cent change in population and households if recent levels of fertility, mortality and migration continue over the projection period. The population of the PDNP is projected to decline by 14% from 35,157 in 2001 to 30,124 by 2025, a loss of around 210 people per year and just over 5000 in total. In contrast, the CNP population is projected to increase in population from 15,835 in 2001 to 17,238 by 2025. This represents a 9% increase and a gain in population of 1403 or 56 additional people each year.

Despite the differences in the direction of change for the total population in the CNP and the PDNP, the age structure of the population shifts similarly, becoming increasingly elderly with a smaller proportion at working ages. In the PDNP the decline in the working age population is greater than the fall in total population and in the CNP it occurs despite the increases projected for the total population. The population aged over 60 is projected to increase by 59% in the PDNP (despite the declines in total population) and to nearly double (92% increase) in the CNP by 2025.

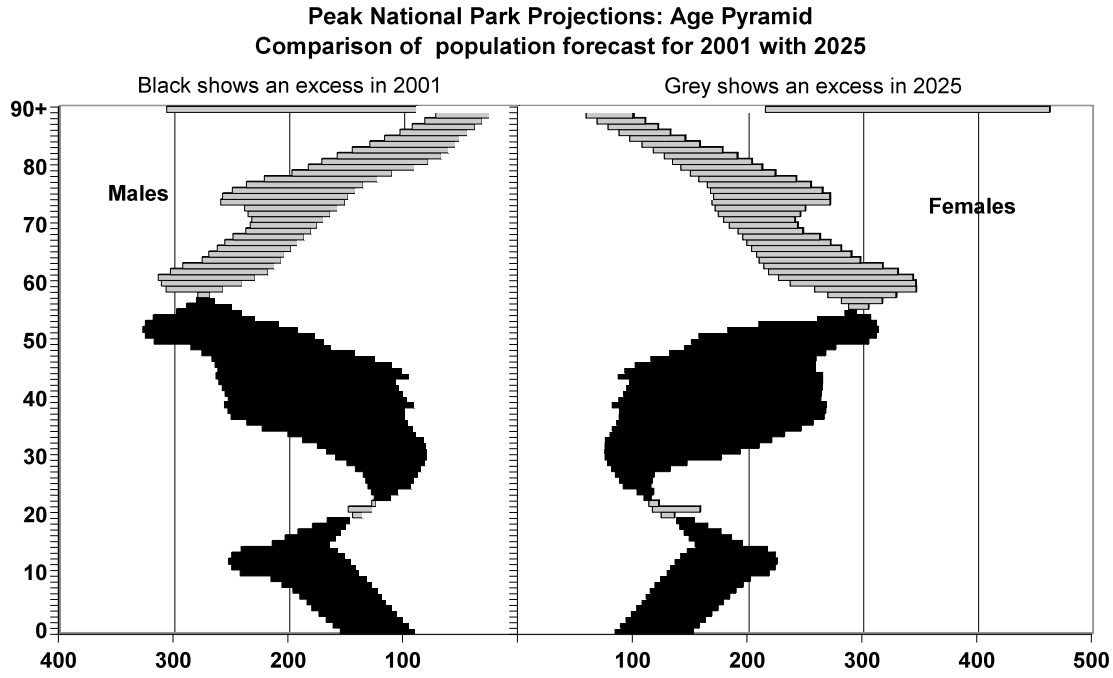
Table 5: Projected demographic change assuming continuation of recent trends

	Pop change 2001-25 (%)	Working age population change 2001-25 (%)	65+ population change 2001-25 (%)	Household change 2001-16 (%)
PDNP	-14%	-35%	+59%	+2%
CNP	+9%	-10%	+92%	+20%

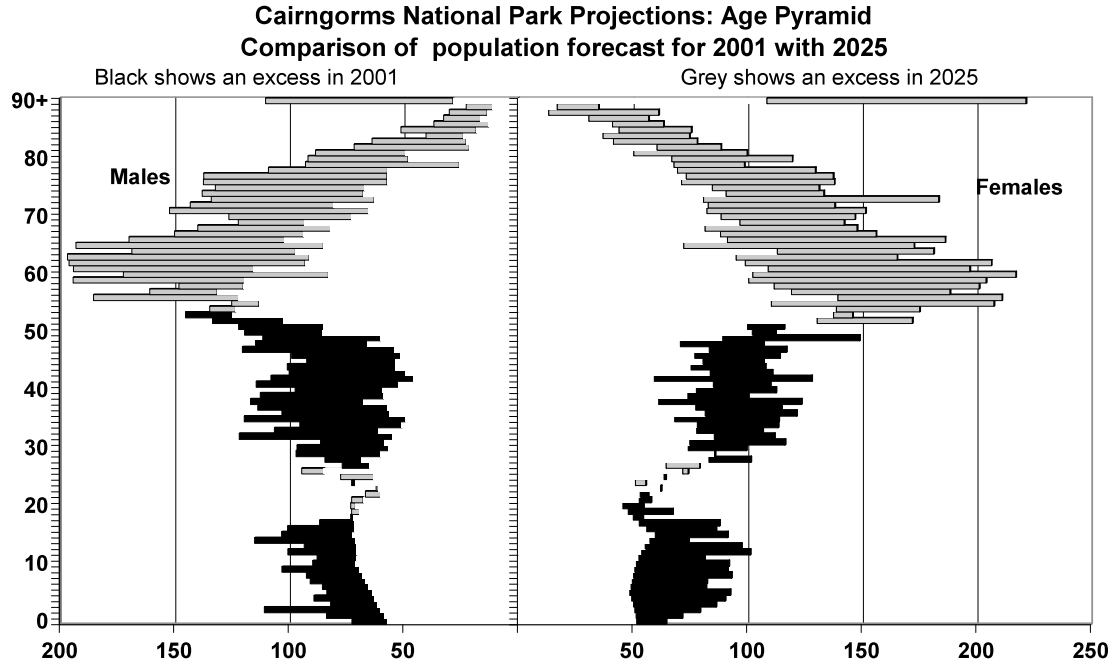
The aging of the population is a key result of the projections in both National Parks. The population pyramids in graphs 2 and 3 show the population age structure in the first and final years of the projections and illustrate the extent of this aging process. The black bars indicate an excess of population in the first year of the projection compared with the last year and the grey bars indicate an excess of population in the last year of the projection compared with the first year. The population pyramids show that the population

is projected to increase at every age from 60, and to decrease at almost every younger age, in each National Park. The 2025 pyramids are extremely top heavy and mushroom shaped with almost half the population aged over 60 in the final year of the projection compared with around a quarter in 2001.

Graph 2: PDNP Population age pyramid – comparison of population forecast for 2001 with 2025



Graph 3: CNP Population age pyramid – comparison of population forecast for 2001 with 2025



In the PDNP the number of households remains almost static (14,835 in 2001 and 15,137 in 2016) despite declines in population. For the CNP the numbers of households increase from 6,931 to 8,290 between 2001 and 2016, a greater percentage increase than the population change despite the shorter duration of household projections (reflecting the length of the headship rates projections available from national statistical agencies).

Tables 6 and 7 add further detail to this finding showing the changes in household composition between 2001 and 2016. In both National Parks the household type that increases most is one person households, by nearly 30% in the PDNP and just over 40% in the CNP. The aging of the population increases the number of one person households because the growing numbers of elderly are the age group most likely to live in such households. The increase in one person households is a key factor in the declining average household size which falls from 2.21 to 1.97 in the CNP and from 2.33 to 1.99 in the PDNP.

Direct comparison of the other household categories is complicated by differences in their definitions. However, it is interesting to note the projected increase in 2 person (all adult) households in the CNP compared with the decline in couple households (married and cohabiting combined) in the PDNP. This result will be returned to in the discussion, part of which considers the effects of the differing age pattern of migration in each Park.

Table 6: PDNP – Household type, population and average household size

Household types	**2001**	**2016**	**% Change 2001-16**
One person	4115	5,299	28.8
Lone parent	617	479	-22.4
2+ adults	10,103	9,359	-7.4
All households	**14,835**	**15,137**	2.0
Private household population	34,592	32,502	-6.0
Average household size	2.33	2.15	-7.7

Table 7: CNP – Household type, population and average household size

Household types	**2001**	**2016**	**% change 2001-16**
1 person	2,148	3,066	42.7
Lone parent	305	351	15.1
2+ adults	4,478	4,873	8.8
All households	**6,931**	**8,290**	**19.6**
Private household population	15,292	16,346	6.9
Average household size	2.21	1.97	-10.9

Table 8 disaggregates the change in number of households into three components: those due to the change in total population size, the change in age structure and the change in headship rates. These calculations area made by projecting the number of households separately under scenarios of the same population size but no change in age structure and no change in headship rates. The changing population age structure is the main cause for the increase in number of number of households in both National Parks and is sufficient to counter the decline in households in the PDNP caused by the decline in total population between 2001 and 2016.

Table 8: Decomposition of household change 2001-2016

	Population size	Population age structure	Headship	Total change
PDNP	-896	1090	109	303
CNP	478	732	149	1359

5.2 Migration profile

The net effect of migration over all ages is negligible in the PDNP (a gain of 451 people or 16 additional people per year) but it is more significant in the CNP (a gain of 4168 people or 167 additional people per

year, see Table 9). However, each park displays a similar migration age pattern that is central to understanding the projected demographic changes.

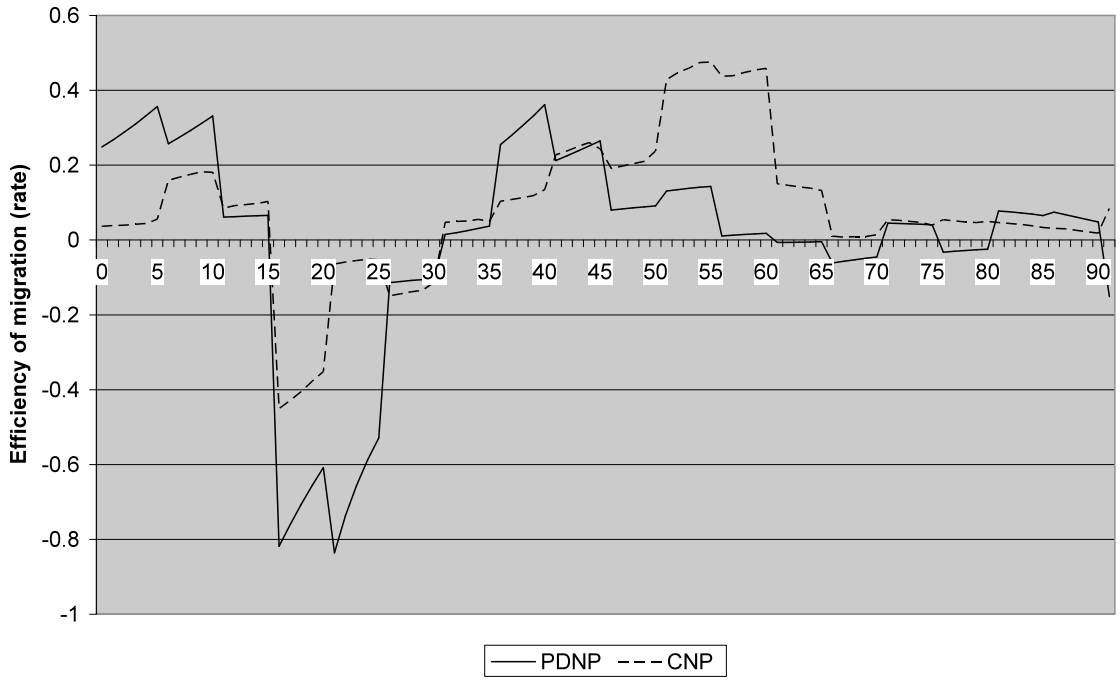
Table 9: Decomposition of population change 2001-2025

	Births	Deaths	Natural Change	In migration	Out migration	Net migration	Total Change
PDNP	4,765	10,249	-5,484	46,584	46,133	451	-5,033
CNP	2,647	5,413	-2,766	28,472	24,304	4,168	1,403

Graph 4 shows the projected age specific efficiency of migration over the projection period (2001-25). This is the net migration at each age expressed as a percentage of the gross migration over all ages. The higher the ratio the more effective is migration at a particular age as a process of population redistribution (Rowland 2003). The two profiles display a similar pattern with out-migration of young adults and in-migration at older ages. In the PDNP the in–migration is composed mainly of middle aged people (30-45) whilst in the CNP it occurs predominantly in the pre-retirement years (50-65). In both Parks, but particularly the PDNP, there is in-migration of children suggesting family migration.

In both National Parks the effect of migration is negligible at the oldest ages, once people have moved to the National Parks at middle or pre-retirement ages they then remain there.

Graph 4: age specific net migration (2001-24) as a percentage of gross migration (2001-24)



The migration profiles of Figure 3 explain why the populations are projected to become increasingly elderly; the age pattern of migration serves to remove young adults and adds those at older ages who then remain in the population. The working age population declines in each National Park, but for slightly different reasons. In the PDNP the loss of young adults is greater than the gains at middle ages resulting in working age population decline. In the CNP although the gain in the pre-retirement population through migration outnumbers the losses at the younger ages, the older pre-retirement in-migrants are only briefly contributors to the working age population.

Population aging, caused by the age structure of migration, drives the changes in overall population in the two National Parks. The key determinant here is the effect that the changing age structure (through migration) has on natural change (births-deaths). In 2001 the population structure is already sufficiently top heavy in both National Parks to result in an excess of deaths over births between 2001 and 2002 (a loss of 56 in the CNP and 110 in the PDNP). However, the continued population aging through migration serves to increase the population loss due to natural change throughout the projection period. In the PDNP the net migration over all ages is small and is not sufficient to halt the population loss due to natural change and so the PDNP population declines. In the CNP the population is projected to increase but at a declining rate; although natural decrease is accelerating there is always a sufficient level of net in-migration to compensate and increase the population.

The effect of migration on projected population aging can be demonstrated by comparing a zero net migration (ZNM) and natural change projection (NC). In a zero net migration projection there is no change to the total population as a result of migration but migration is allowed to alter the population age structure. The ZNM projection uses identical input data as the main trend projection except that the out-migration age profile is shifted upwards to ensure that net migration (over all ages) equals zero in each year. In the NC projection migration has no effect on population at any age. Both projections use the same fertility and mortality information as the main trend projection.

Table 10 shows that the population decline under a ZNM projection is greater than for the NC projection. The age structure of migration creates a population decline of 17 per cent even when total migration is in balance, compared with a projected population decline of 8% if there is no migration effect. This provides clear evidence that the migration age pattern in the PDNP contributes to population decline through its influence on population age structure and natural change. Similarly in CNP the declines in population between 2001 and 2025 are greater under a ZNM projection (-21%) than a NC projection (-12%). It is important also to note the population decline that results in the CNP when migration has no net effect.

Table 10: PDNP - Zero net migration and Natural change projections

Projection	2001 population	2025 population	% Change	% change in Population 65 and over
Zero net migration	35,157	29,323	-17 %	+59%
Natural change	35,157	32,331	-8%	+50%

5.3 National Parks compared with surrounding areas

If there is a unique 'national Park' effect then we would expect to see differences between the results of projections for the Parks and projections for the local authority districts that include these areas. Two thirds of the PDNP population is found in Derbyshire Dales and nearly three quarters of the population in the CNP live in the Highlands district. In each case, the Park is a minor part of the district's total population. The district projections produced by ONS and GRO-S use similar data and methodology to the National Park projections (ONS, 2007; GROS, 2008) and so it is reasonable to compare the district and Park projections.

Table11 suggests that the aging of the population projected for the two National Parks is not uncommon to district, regional and national projections but that it is more severe in the National Parks. This implies that in terms of population aging there is a National Park effect: whilst similar processes are occurring in the areas around the CNP and the PDNP if recent trends continue National Parks will age to a greater extent than their surroundings.

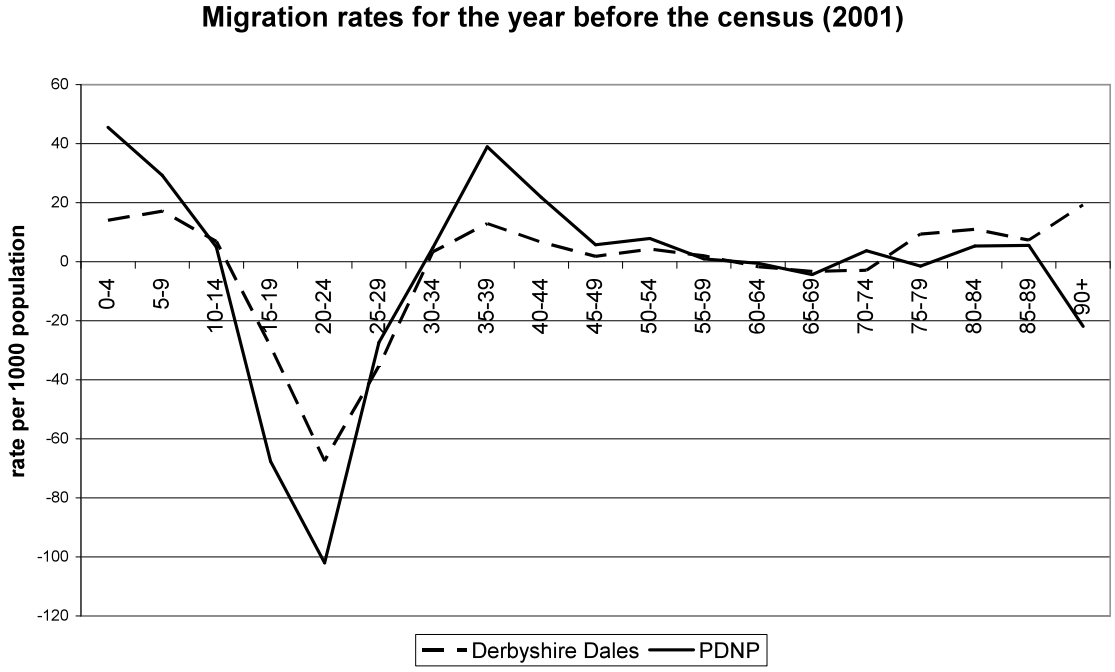
Table 11: Projected population proportions aged 60+

Area	Projection	2001 % 65+	2026 % 65+
PDNP	Recent trend	18	38
Derbyshire Dales district	ONS 2004 based projections	19	30
England	ONS 2004 based projections	16	21
CNP	Recent trend	19	34
Highlands district	GRO-s 2006 based projections	17	27
Scotland	GRO-s 2006 based projections	16	23

Graph 5 shows the net migration rates (per 1000 population) in the Derbyshire Dales district and the PDNP in the year preceding the 2001 census. It demonstrates that the same pattern of migration in PDNP is also experienced in Derbyshire Dales, however, the out migration of young adults and in migration at older ages is less extreme compared with the PDNP.

Similar processes of population change and migration appear to be occurring in the rural areas that surround the CNP and the PDNP but not to the same extent as with the National Park boundaries.

Graph 5: Migration rates in the year before the census: Derbyshire Dales district and the PDNP



5.4 Dwelling led projections

The projections discussed up to this point are based on the continuation of recent levels of migration. We turn now to a set of projections for the PDNP based on alternative target levels of house-building, such that the migration age profile is maintained but its level is altered in order to fill the housing target. These are usually termed 'dwelling-led projections'. We focus on the PDNP because its population is projected to decrease if recent levels of migration continue, to assess whether more housing would arrest the population decline.

Table 12 presents the results of population projections constrained to dwelling assumptions specified by the PDNP authority. 48 dwelling completions per annum projection is the level of development anticipated in future years whilst the 95, and in particular 150 dwelling completions per annum, are intended to give an indication of the consequences of less restrictive planning policies.

Although 95 and 150 dwelling completions are sufficient to halt the population decline they do not prevent the decrease in working age population. This finding has important implications for National Park housing policies that seek to ensure population sustainability and these shall be considered further in the discussion.

Table 12: Population change – Dwelling led projections (2001-25)

Projection	% Population change	% Working age pop change
Recent migration continues	-14%	-35%
48 dwellings p/a	-6.3%	-29%
95 dwellings p/a	1.1%	-22%
150 dwellings p/a	9.9%	-13%

6. Discussion

The extent of the projected decline in working age populations and growth of the elderly population provide strong evidence that both National Parks cannot sustain their population if recent trends of births, deaths and migration continue. This was confirmed during a workshop that discussed implications of the projections for the PDNP attended by key local policy makers. Participants expressed their surprise at the extent of the projected demographic changes and concern over the effects that these would have on the sustainability and vibrancy of local communities (Cooper 2007).

The age pattern of migration is the key driver of population aging and the projections give valuable evidence to support the pursuit of policies to influence the migration profile and in particular the extent of the out-migration of young adults. As the dwelling-led projections show, simply building more houses is not a solution to working age population decline if the current migration age pattern remains in place. In order to tackle these demographic changes the migration profile must be altered.

Housing affordability is certainly a key factor that forces some young people out of the National Parks who wish to stay, and prevents others moving in (Cairncross, Downing et al. 2004; Champion 2007). Policies that were suggested during the PDNP workshop included identification of sites suitable for affordable housing development, the safeguarding of existing social housing, the possibility of buying back properties from the private market and to address issues of under occupancy by providing suitable accommodation for the elderly (Cooper 2007).

However, the price of housing is not likely to be the only reason for the out migration of young adults (Champion 2007). Young people are attracted to cities for social, services and employment quality of life factors as well as perceived benefits of personal freedom, individualism and non conformity of metropolitan destinations (Boyle, Halfacree et al. 1998; Best and Shucksmith 2006).

The need for further research on the rural migration decisions and preferences of young adults was identified during the PDNP workshop. Several policies were suggested to make the park more attractive to young adults. These included developing employment opportunities by highlighting the attractiveness of the area to businesses and adapting to wider changes in the economy such as IT and communications employment developments. The development of local communities was also considered important; focussing services on key settlements and reducing the impact of second homes on communities were suggested as ways to make parts of the Park more attractive to young people.

The projections demonstrate that for the PDNP and the CNP there is a ‘National Park’ effect that should be considered when researching rural population change. Whilst it is true that the projected demographic changes and migration age patterns in the PDNP and the CNP are also found in the surrounding rural areas they are more extreme within the Park boundaries than outside.

The unique characteristics of National Parks discussed in section 2 are likely to play a key role in the more extreme demographic changes projected to occur in these areas. National Parks are highly desirable places to live because of the natural beauty of the landscape and this demand is exacerbated because of the

restrictive planning policies in these areas (Cairncross, Downing et al. 2004). These factors serve to amplify the characteristic rural migration profile and the subsequent population aging observed in the PDNP and the CNP.

As well as providing evidence of a National Park effect this paper also finds important differences between National Parks. The migration profiles in the CNP and the PDNP drive a similar process of population aging but they are subtly different in their age patterns. In the PDNP the main in-migration is of middle aged people and their families whilst in the CNP in-migration occurs predominantly at older pre-retirement ages. In the PDNP the out-migration of young adults is more extreme compared with the CNP.

The migration age patterns in the PDNP and the CNP lead to differing projections of household types. The growth of adult couple households in the CNP and the decline in 2+ adult with children households is likely to be the result of the pre retirement in-migration involving couples whose children are likely to have left (or about to leave) home. In the PDNP the decline in couple households (cohabiting and married) is caused by the in migration of middle aged couples who are likely to have children.

A number of factors are likely to be responsible for the different migration patterns described above. The PDNP is extremely accessible to the large urban centres of Sheffield, Manchester, Nottingham and Derby, and this may make it particularly attractive for family in-migrants who wish to live in a National Park but who want to be close to cities for work, services and entertainment. The more remote situation of the CNP combined with its relatively recent National Park status and the equality of landscape preservation and social duties may contribute to the less extreme young adult out-migration observed in the CNP.

The differences in migration patterns and population change are important for planners if appropriate services are to be provided. In both National Parks services will be required to cater for the needs of an elderly population but in the PDNP the family in-migration will demand different service provision. The proximity of the PDNP to large urban centres and the associated high demand for housing make policies that promote affordable housing both challenging and important.

The methodology developed in this paper is innovative in that it enables robust projections of population and households to be produced for small areas that are non standard in government statistical output. These projections are consistent with government projections for sub-national areas and give a reliable indication of the future assuming recent trends continue. The use of key local indicators to constrain detailed demographic age-schedules estimated for larger areas was able to reveal unique features of National Park population change. In a wider sense the methods are widely applicable and useful as local neighbourhood initiatives demand small area population projections in both rural and urban areas. Nonetheless, the driving character of the local age-structure of migration could only be known from direct estimation for areas as small as the Parks themselves.

Population sustainability is set to become a key issue in National Parks if recent trends of birth, deaths and migration continue. The population aging in National parks is more severe than in surrounding areas and has severe consequences for the vibrancy and sustainability of local communities. Local planners must respond to the needs of the growing elderly populations within National Parks but also pursue policies to increase the housing affordability and the attractiveness of these areas if the out migration of young people is to be countered. Simply building more houses will not prevent the declines in the working age population if the age profile of migration is not tackled.

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