Pembrokeshire Coast

National Park

Demographic Forecasts

January 2018

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Introduction

Context & Requirements

1.1 Pembrokeshire Coast National Park is one of three national parks in Wales; covering approximately 610 km² of the Pembrokeshire Unitary Authority. Pembrokeshire Coast National Park Authority has commissioned Edge Analytics to develop a range of demographic and housing-led forecasts, for comparison with the official 2014-based population and household projections, published by the Welsh Government. Population, migration, household and housing growth forecasts are required for a 2015–2031 plan period.

Approach

1.2 A range of demographic and housing-led scenarios have been developed for the Pembrokeshire Coast National Park using POPGROUP v4.0 technology. This includes the 2014-based official population projection for the National Park, alongside three trend scenarios based on variant assumptions on migration.

1.3 Also included are four 'dwelling-led' scenarios, in which future population change is determined by the growth in the number of new houses, as defined by the Pembrokeshire Coast National Park Authority.

1.4 Historical demographic statistics for the National Park have been derived from Unitary Authority level (i.e. Pembrokeshire as a whole) Census Output Area statistics. Output Areas (OAs) are the smallest geographical unit, to which Census data are published, nesting directly into the Pembrokeshire Unitary Authority administrative boundary. A proportional split of the OAs has been calculated to estimate the extent to which each OA falls inside or outside the Pembrokeshire Coast National Park boundary. The resultant OA definition has been used as the basis for generating historical demographic statistics, used to developed forecasts for the Pembrokeshire Coast National Park.

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1.5   We are grateful for the cooperation of the Welsh Government in the development of this project. The WG has provided population and household projections as a benchmark for the forecasts presented here, together with historical estimates of the National Park population from ONS. The POPGROUP forecasting analysis has ensured comparability and alignment with the Welsh Government & ONS evidence, although some minor differences in historical population do exist due to the micro-estimation from OA data.

1.6   Excluding the 2014-based official projection for the National Park, all scenarios are based on historical evidence for the period 2001–2016. The scenarios use household growth assumptions from the Welsh Government's 2014-based and 2008-based household projection model.

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2 Area Profile

Geography

2.1   Pembrokeshire Coast National Park is located wholly within Pembrokeshire Unitary Authority (Figure 1), accounting for 18% of its population in 2016.

Figure 1: Pembrokeshire Coast National Park

Population Change 2001–2016

2.2   Over the 2001–2016 historical period, the population of Pembrokeshire Coast National Park has increased from an estimated total of 22,122 in 2001 to 22,573 in 2016.

Figure 2: Population change 2001–2016

2.3   Compared to Pembrokeshire UA as a whole, the National Park is estimated to have experienced a lower rate of population change; with growth in the population experienced up to 2009, followed by an annual decline in all years excluding 2012 (Figure 3).

Figure 3: Population growth index 2001–2016

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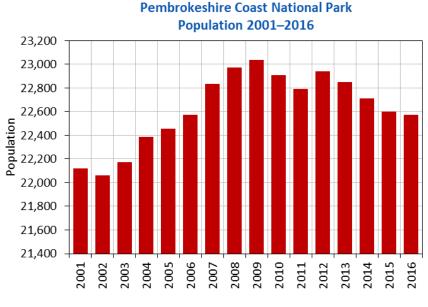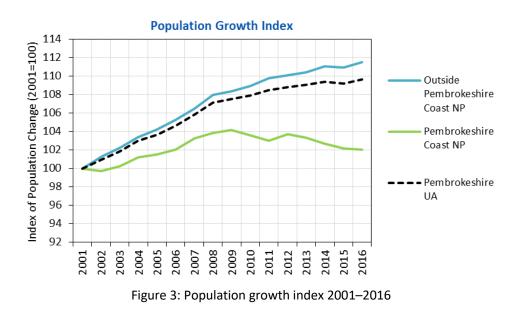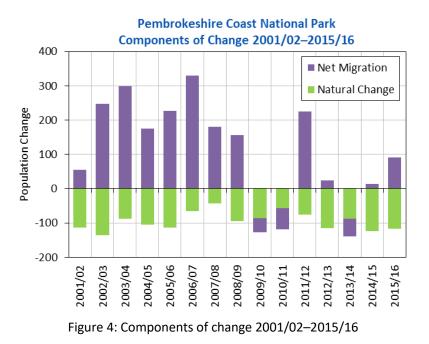2.4   The growth and decline of the population of Pembrokeshire Coast National Park is reflected in the 'components of change' profile for the 2001/02–2015/16 period (Figure 4). Natural change is the annual balance between births and deaths; net migration is the balance between the inflow and outflow of population moving to and from the National Park.

Figure 4: Components of change 2001/02–2015/16

2.5   The dominant driver of population change has been net migration which contributed to population growth in all years to 2008/09. Since 2009 net migration has fallen (notwithstanding a spike in estimated migration growth in 2011/12), contributing to a modest decline in population over the latter years of the historical period.

2.6   Natural change has remained negative in all years of the historical period (i.e. a greater number of deaths than births), reflective of the older population age structure in the National Park. The annual negative impact of natural change, coupled with reduced net migration flows to the Park has resulted in population decline in later years of the historical period.

Population Age Profile

2.7   In the consideration of future housing needs for the Pembrokeshire Coast National Park, the ageing structure of the resident population is an important factor. Over the 2001–2016 period, the profile of the National Park's population has aged, with the proportion of the older age groups increasing relative to the population in the younger age groups (Figure 5). Between 2001 and 2016, the proportion of the population aged 65+ living in Pembrokeshire National Park

increased from 22% to 30%. This compares to an increase from 19% to 25% for Pembrokeshire UA as a whole and 17% to 20% for Wales.
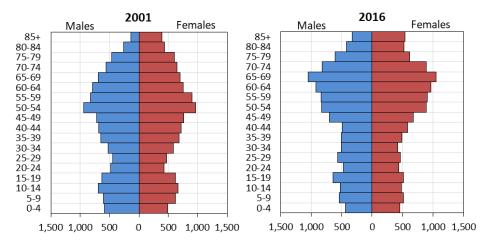

Figure 5: Pembrokeshire Coast National Park population age profile 2001–2016

2.8 The National Park has an older population age profile than each of these areas, with a median age of 53, compared to 47 in the Unitary Authority and 42 in Wales. The old age dependency ratio of 53 is also higher in the National Park than for the Unitary Authority and Wales (42 and 32 respectively).

Table 1: Age profile indicators in 2016 (source ONS)

Indicator	Pembrokeshire Coast National Park	Pembrokeshire UA	Wales
Percentage 65+	30%	25%	20%
Percentage 80+	8%	7%	5%
OAD Ratio	53	42	32
Median Age	53	47	42

OAD = Old Age Dependency Ratio (Population Aged 65+/Population Aged 15–64)

Housing Completions

2.9 Figure 6 presents net housing completions in the Pembrokeshire Coast National Park since 1993/94 alongside the rolling 10-year average[1]. Since 1993/94, 1,719 dwellings have been built in the National Park, with the majority completed prior to 2008/09. This also reflects a period of

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[1] Pembrokeshire Coast National Park. Housing Background Paper [April 2018]

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population growth for the National Park (2001/02–2008/09), particularly through net migration (see Figure 4 on page 5).

2.10   Excluding 2014/15 which experienced a spike in dwelling completions, the 2009/10–2015/16 reflects a period of lower net completions. This is also reflected in the components of population change which suggests lower annual net migration flows into the National Park. The rolling 10-year average over the historical period ranges from 60 to 90[2] (Figure 6).

Figure 6: Pembrokeshire Coast National Park housing completions & rolling 10-year average
(Source: Housing Background Paper, April 2018 & PCNP Authority)

Commuting Flows

2.11   In terms of travel-to work commuting flows, the 2011 Census recorded 10,055 workers aged 16–74 living in the Pembrokeshire Coast National Park and 8,981 people aged 16–74 working within the Park. This imbalance between the number of resident workers and the number of workplace-based employed in the National Park results in a commuting ratio of 1.12, a net out commute from the Park (Table 2).

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[2] Figures rounded to the nearest ten

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Table 2: Pembrokeshire Coast National Park 2011 travel-to-work statistics

	2011 Census
Resident Workers	10,055
Workplace-based employment	8,981
Commuting Ratio	**1.12**

2.12   Of the 10,055 resident workers, 58% work within the National Park (including those who work at or from home), 32% commuting to the rest of Pembrokeshire for work, with the remaining 10% working elsewhere in the UK, offshore or abroad. Of the 8,981 people working in the National Park, 64% also live in the Park, with 29% coming from the rest of Pembrokeshire (Figure 7).

Where do people who live in the Pembrokeshire Coast National Park work?

Where do people who work in the Pembrokeshire Coast National Park live?

- ■ Pembrokeshire Coast National Park
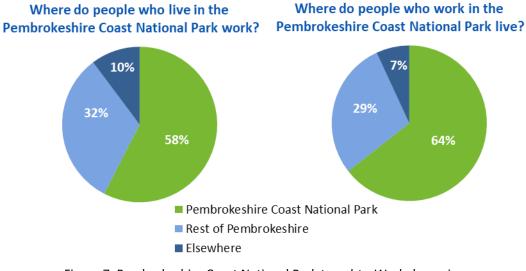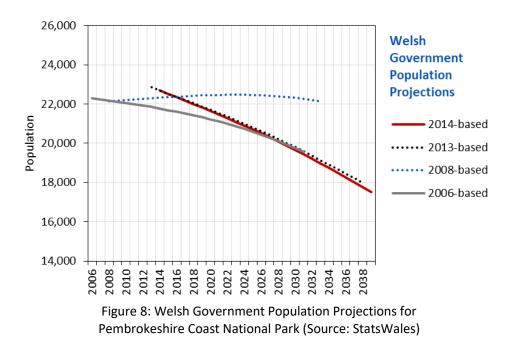- ■ Rest of Pembrokeshire
- ■ Elsewhere

Figure 7: Pembrokeshire Coast National Park travel-to-Work dynamics
(source: 2011 Census)

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3 Welsh Government Population & Household Projections

Population Projections

3.1   The Welsh Government (WG) produces population and household projections for the three National Parks located in Wales; Snowdonia, Brecon Beacons and Pembrokeshire Coast. The latest 2014-based population projection for Local Authorities and National Parks in Wales was published in 2017[3]. The official WG 2014-based population projection for Pembrokeshire Coast National Park uses the ONS 2014 mid-year population estimate for the park, applying fertility, mortality and migration assumptions based on a historical five-year period (prior to 2014)[4]. The 2014-based projection for Pembrokeshire Coast National Park is presented in Figure 8, alongside previous projections for the Park.

Figure 8: Welsh Government Population Projections for Pembrokeshire Coast National Park (Source: StatsWales)

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[3] https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/National-Park
[4] http://gov.wales/docs/statistics/2017/171019-local-authority-population-projections-technical-en.pdf

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3.2   Under the WG 2014-based projection for the Pembrokeshire Coast National Park, the population
          is estimated to *decline* by 3,076 over the 2015–2031 plan period; a 13.7% decline. This assumes a
          higher rate of decline in the population compared to the earlier 2013-based, 2008-based and
          2006-based projections; -13.1%, -0.3% and -9.8% respectively.

3.3   The components of population change which underpin the 2014-based projection for
          Pembrokeshire Coast National Park are presented in Figure 9, with historical components of
          change for 2001/02 to 2013/14 included for comparison. Net migration is estimated to remain
          negative throughout the projection period, with an average net outflow of -53 per year. As the
          population ages, natural change is expected to have an increasingly negative impact on
          population change over the projection period. The two components of population change
          working in tandem, results in a consistent population decline over the 25-year projection period.

Figure 9: Welsh Government 2014-based Components of Population Change for
Pembrokeshire Coast National Park (Source: StatsWales)

Household Projections

3.4   The WG 2014-based household projections provide the 'starting point' in the assessment of
          housing need, underpinned by the 2014-based population projection model (Figure 10)[5]. Over
          the 2015–2031 plan period, the 2014-based household projection model suggests a decrease of -
          1,053 (-66 per annum), driven by estimated population decline. Whilst this is similar to the 2013-
          based household projection model (-61 per annum), it differs from the 2008-based household

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[5] http://gov.wales/docs/statistics/2017/170726-household-projections-national-parks-2014-based-en.pdf

projection model which assumed an annual *growth* in households (+45 per year), underpinned by a higher population growth trajectory. Under the 2006-based household projection model, an annual decline of -27 households per year (2015–2031) was projected.
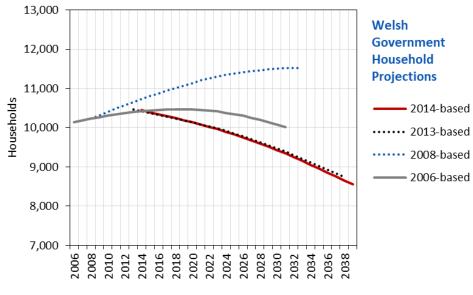

Figure 10: Welsh Government Household Projections for
Pembrokeshire Coast National Park (Source: StatsWales)

3.5   Underpinning the household projections for the National Park are assumptions on membership rates and average household size. Whilst the average household size is estimated to decline under each of the household projection models, the 2014-based model assumes an overall larger average household size of 2.12 in 2015 reducing to 2.02 by 2031. Whilst this is similar to that under the 2013-based model, the earlier 2008-based and 2006-based models assume a smaller average household size of approximately 2.05 in 2015, reducing to 1.9 by 2031.

Dwelling growth associated with the projected household growth is calculated using a dwelling vacancy rate which takes account of the number of vacant or second properties in the Park. Pembrokeshire Coast National Park has a high vacancy rate due to the number of second/holiday homes in the area (Table 3).

Table 3: Census vacancy rate

Area	Vacancy Rate	
	2001	2011
Pembrokeshire Coast NP	22.6%	26.7%

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4 Demographic Scenarios

Approach

4.1   There is no single definitive view on the likely level of growth expected in Pembrokeshire Coast National Park. Ultimately, a mix of demographic, economic and local policy issues will determine the speed and scale of change.

4.2   POPGROUP v4.0 has been configured for the area of Pembrokeshire UA that is covered by the Pembrokeshire Coast National Park (Figure 1 on page 3). A range of scenarios has been developed for the 2015–2031 plan period and presented alongside the official 2014-based population and household projection from the Welsh Government. These scenario forecasts incorporate mid-year population, births and deaths estimates for 2001–2016 (i.e. two additional years of historical data to the official projection). Household and dwelling growth under each of the scenarios has been estimated using assumptions from the WG 2014-based household projection model and the 2011 Census dwelling vacancy rate of 26.7% for the National Park.

Scenario Definition & Outcomes

4.3   The **WG 2014-based** population projection provides the 'benchmark' growth outcome, to which other scenarios are compared. Three trend scenarios have been developed using migration assumptions based on (1) 'balanced' flows, (2) derived from a ten-year (2006/07–2015/16) history and (3) derived from a fifteen-year (2001/02–2015/16) history. Four 'dwelling-led' scenarios have also been developed in which population growth is determined by the annual growth in the number of dwellings, as defined by Pembrokeshire Coast National Park Authority. These dwelling growth options have been derived from the National Park's rolling 10-year average of net completions, which begins at 90 per year for the ten-year period ending in

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2002/03, falling to 60 per year for the ten-year period ending in 2015/16[6] (refer to Figure 6 on page 7).

4.4   Under all scenarios (excluding the **WG 2014-based** projection) historical population is defined for the 2001–2016 period.

- **WG 2014-based:** Welsh Government 2014-based population projection for the National Park

- **PG 10yr:** Migration assumptions based on the last ten-years of migration history (2006/07–2015/16).

- **PG Long Term:** Migration assumptions based on the last fifteen-years of migration history (2001/02–2015/16).

- **Net Nil:** Migration inflows and outflows are balanced over the 2016/17–2030/31 *forecast* period, resulting in zero net migration.

- **Dwelling-led (60):** Annual dwelling growth of 60 per year is applied in each year of the *forecast* period (2016/17–2030/31).

- **Dwelling-led (70):** Annual dwelling growth of 70 per year is applied in each year of the *forecast* period (2016/17–2030/31).

- **Dwelling-led (80):** Annual dwelling growth of 80 per year is applied in each year of the *forecast* period (2016/17–2030/31).

- **Dwelling-led (90):** Annual dwelling growth of 90 per year is applied in each year of the *forecast* period (2016/17–2030/31).

4.5   The population growth trajectories for all scenarios are presented in Figure 11 for the 2001–2031 time-period. In Table 4, each of the scenarios is summarised in terms of population and
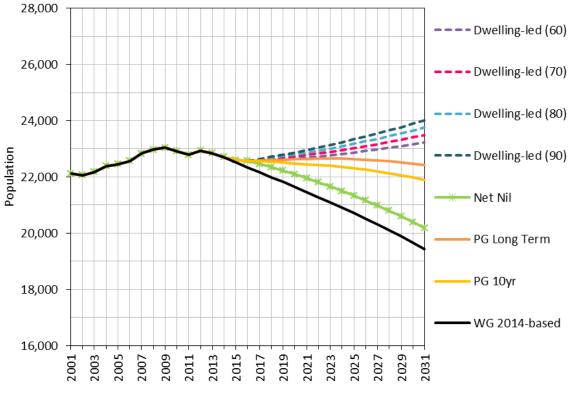
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[6] Figure rounded to nearest ten. Source: Pembrokeshire Coast National Park Authority and Housing Background Paper, April 2018

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household growth for the 2015–2031 plan period[7], together with the annual average net migration and dwelling growth outcomes.

4.6   Excluding the **WG 2014-based** scenario, all demographic trend-based and dwelling-led scenarios include historical population for the 2001–2016 period. Under the dwelling-led scenarios, the annual change in dwellings has been defined from 2016/17 onward. As the 2015–2031 plan period includes one year of historical data, the dwelling growth presented in Table 4 includes dwellings derived from the 2015/16 population change. Therefore, there are small differences between the annual dwelling growth targets applied from 2016/17 onward and the derived annual dwelling growth over the 2015/16–2030/31 plan period.

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[7] Note that under the trend-based and dwelling-led scenarios, historical population is defined for the 2001–2016 period. Therefore the plan period includes one year of historical data.

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Pembrokeshire Coast National Park Scenario Outcomes

Figure 11: Pembrokeshire Coast NP population growth outcomes 2001–2031

Table 4: Pembrokeshire Coast NP scenario outcomes 2015–2031

Scenario		Change 2015–2031				Average per year		Total Dwelling Growth 2015–2031
		Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	
Dwelling-led	90 dpa	1,410	6.2%	1,020	9.8%	210	87	1,392
	80 dpa	1,151	5.1%	910	8.8%	195	78	1,242
	70 dpa	891	3.9%	800	7.7%	180	68	1,092
	60 dpa	632	2.8%	690	6.6%	165	59	942
Demographic	PG Long Term	-169	-0.7%	391	3.8%	123	33	534
	PG 10yr	-702	-3.1%	124	1.2%	87	11	169
	Net Nil	-2,408	-10.7%	-516	-5.0%	6	-44	-704
	WG 2014-based	-3,076	-13.7%	-1,055	-10.1%	-53	-90	-1,440

WG 2014-based household change may differ slightly from published figures due to rounding. WG 2014-based household model assumptions applied to all scenarios.

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4.7   Population change over the 2016–2031 ranges from a 13.7% *decline* under the **WG 2014-based** 'benchmark' scenario, to a 6.2% *growth* under the **Dwelling-led (90)** scenario.

4.8   Under each of the demographic-led scenarios, the population of Pembrokeshire Coast National Park is forecast to decline over the plan period. Under the official **WG 2014-based** projection, this is driven by net out-migration flows, combined with the annual negative impact of natural change.

4.9   Under the demographic trend scenarios (**Net Nil**, **PG 10yr** and **PG Long Term)** scenarios, where a balanced or net in-migration is assumed, this decline in the population (-10.7%, -3.1% and -0.7% respectively) is a reflection of the ageing profile of the National Park. A smaller decline in the population is estimated under the **PG Long Term** scenario, capturing higher net inflows to 2008/09 compared to the latter half of the historical period. Population decline under the **PG 10yr** scenario is more closely aligned to the **PG Long Term** scenario rather than the **WG 2014-based** projection, capturing the higher net inflows in the 2006/07–2008/09 and the last two years of historical data, compared to the five years on which the **WG 2014-based** projection is calibrated. Average annual dwelling change under the demographic scenarios ranges from an annual decline of -90 under the **WG 2014-based** scenario to +33 dpa under the **PG Long Term** scenario (2015–2031), a total dwelling growth range of -1,440 to 534 over the 16-year plan period.

4.10   Under the dwelling-led scenarios, population growth is determined by the annual change in dwellings. Population growth is highest under the **Dwelling-led (90)** scenario, driven by increased migration flows to fulfil the growth in new houses over the forecast period. In assuming a lower annual dwelling growth target in each year of the forecast period, the population growth ranges from 2.8% under the **Dwelling-led (60)** scenario to 5.1% under the **Dwelling-led (80)** scenario, driven by lower net in-migration flows.

Population Age Structure

4.11   The ageing population of Pembrokeshire Coast National Park is a key factor when considering future housing requirements of the area. The *change* in population age profile over the 2015–2031 plan period for each of the scenarios are presented in Figure 12.

4.12   Over the 2015–2031 plan period, a greater decline in the population aged 0–69 is estimated under the demographic scenarios compared to the dwelling-led scenarios. Under the dwelling-

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led scenarios, growth is estimated in the 30–44 age groups, as a result of increased net in-migration. Under all scenarios, the older population aged 75+ is expected to experience a significant increase over the 16-year plan period.
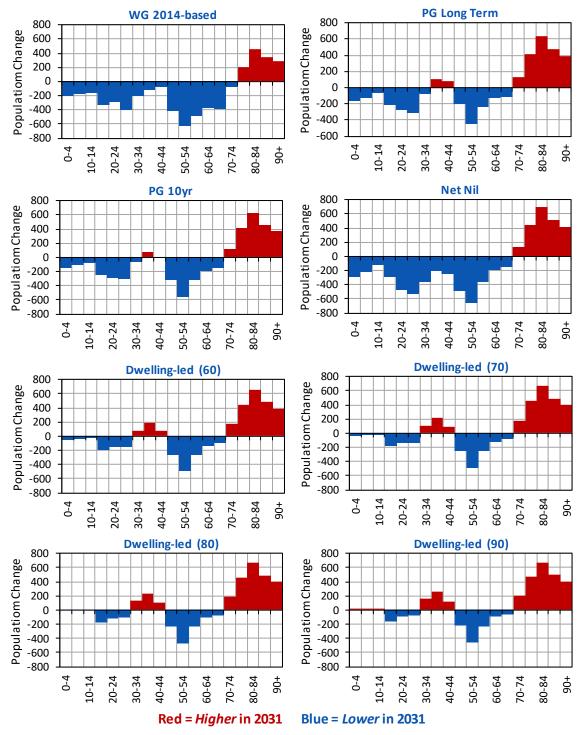

Red = *Higher* in 2031   Blue = *Lower* in 2031

Figure 12: Population change by 5-year age group (2015–2031)

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Membership Rate Sensitivity

4.13   The latest WG 2014-based household projection model suggests lower household growth for the National Park compared to the 2008-based equivalent, which were underpinned by assumptions for higher rates of household formation. To evaluate the potential impact of higher household formation on growth in the National Park, each of the demographic and dwelling-led scenarios has been configured using membership rate assumptions from the WG 2008-based household projection model.

Demographic Scenarios

4.14   Under the demographic trend-based scenarios, changes to the membership rates influence the level of household and dwelling growth required to support the estimated change in population. Under the 2008-based membership rate assumptions, a greater number of households are formed, resulting in increased dwelling growth over the 2015–2031 plan period compared to the 2014-based equivalent (Figure 13).
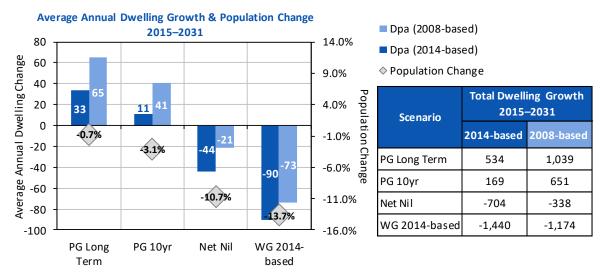

Scenario	Total Dwelling Growth 2015–2031	
	2014-based	2008-based
PG Long Term	534	1,039
PG 10yr	169	651
Net Nil	-704	-338
WG 2014-based	-1,440	-1,174

Figure 13: Dwelling growth and population change under the 2008-based and 2014-based membership rates 2015–2031

Dwelling-led Scenarios

4.15   Under the dwelling-led scenarios, population change is determined by the annual change in dwellings assigned in each year of the forecast period (i.e. 2016/17–2030/31). The relationship between the annual change in dwellings and the level of population estimated to support that

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growth is determined by membership rate, average household size and vacancy rate assumptions. Changes to any of these assumptions will impact upon the ratio between the forecast population and the target number of new dwellings.
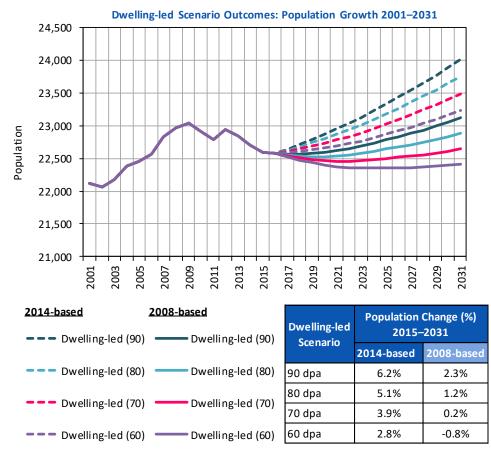

Figure 14: Population change under the dwelling-led scenarios

4.16 Under the 2008-based assumptions, the population growth estimated to meet the assigned annual change in dwellings is *lower* than that under the 2014-based assumptions. Under the 2008-based membership rates, the estimated change in population over the plan period ranges from -0.8% to 2.3%, compared to 2.8% to 6.2% using the 2014-based membership rates.

4.17 The 2008-based rates assume a lower population is required to support the forecast change in dwellings, thus reducing the level of in-migration (and therefore population growth) to the National Park.

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5 Summary

Approach

5.1   The Pembrokeshire Coast National Park commissioned Edge Analytics to provide a range of alternative demographic and dwelling-led scenarios, for comparison with the Welsh Government's (WG) 2014-based population projection.

5.2   Scenarios have been developed in POPGROUP v4.0, configured for Pembrokeshire Coast National Park. Demographic statistics have been derived from Unitary Authority and Census Output Area statistics.

5.3   The latest 2014-based population projection from the WG has been considered, alongside three demographic scenarios based on variant migration assumptions, and four dwelling-led scenarios in which population change is determined by the annual dwelling growth trajectories.

5.4   With the exception of the **WG 2014-based** population projection, all scenarios are based on historical evidence for the 2001–2016 period. All scenarios consider household and dwelling growth using assumptions from the WG 2014-based household projections and a 2011 Census vacancy rate for the National Park.

5.5   Scenarios have also been developed to consider the impact of the WG 2008-based membership rates on the relationship between population and dwelling growth in the Pembrokeshire Coast National Park.

Growth Outcomes

5.6   Population growth ranges from -13.7% under the **WG 2014-based** projection to 6.2% under the **Dwelling-led (90)** scenario. Over the 2015–2031 plan period, this estimated level of population change results in an average annual dwelling requirement of -90 to +87 (Figure 15).
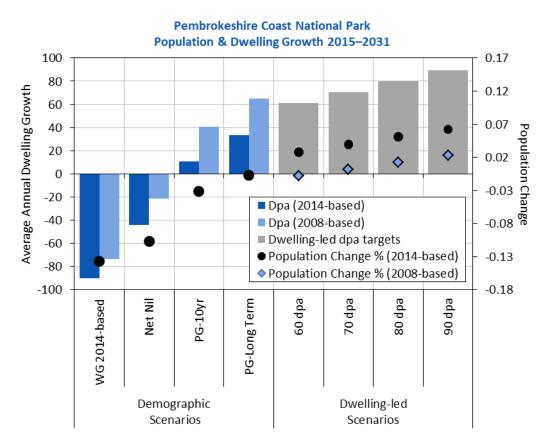
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Figure 15: Population change (%) and average annual dwelling growth (2015–2031)

5.7   The **PG Long Term** and **PG 10yr** growth scenarios are reflective of the fifteen (2001/02–2015/16) and ten-year (2006/07–2015/16) historical periods, from which their migration assumptions have been calibrate. These include two additional years of population data compared to the **WG 2014-based** projection. The last two years of historical population estimates for the National Park are higher than that estimated under the **WG 2014-based** population projection, with net in-migration contrasting to the out-migration flows estimated under the **WG 2014-based** projection.

5.8   The 2014-based dwelling-led scenarios suggest population *growth* rather than decline. Under these scenarios, the assigned annual housing growth results in population change ranging from 2.8% to 6.2% over the plan period.

5.9   Higher household formation under the 2008-based membership rates result in reduced in-migration flows and therefore a lower population growth, ranging from -0.8% to 2.3%. The dwelling-led scenarios retain more of a youthful population profile for the National Park, compared to the demographic scenarios, but a significant growth in the older age-groups remains a feature of all scenarios.

5.10   The scenarios presented in this report are designed to provide a range of demographic and dwelling growth outcomes for Pembrokeshire Coast National Park authority to consider. The report has not sought to make a specific scenario recommendation for the Local Plan but has provided the basis from which a preferred outcome for housing and population growth can be selected for the National Park.

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Appendix A

POPGROUP Methodology

Forecasting Methodology

A.1   Evidence is often challenged on the basis of the appropriateness of the methodology that has been employed to develop growth forecasts. The use of a recognised forecasting product which incorporates an industry-standard methodology (a cohort component model) removes this obstacle and enables a focus on assumptions and output, rather than methods.

A.2   Demographic forecasts have been developed using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups. The main POPGROUP model (Figure 16) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

A.3   The Derived Forecast (DF) model (Figure 17) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

A.4   For further information on POPGROUP, please refer to the Edge Analytics website (http://www.edgeanalytics.co.uk/).
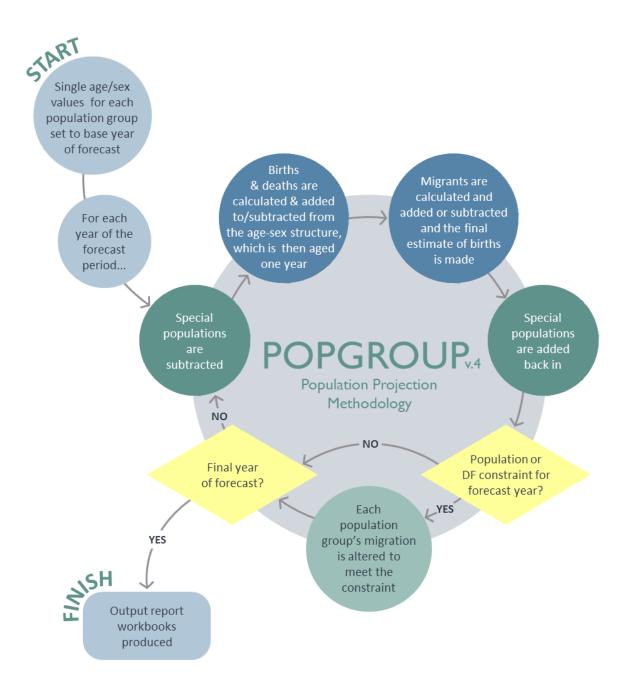
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Figure 16: POPGROUP population projection methodology

$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g}\ R_{a,s,u,y,d,g}}{100}$$

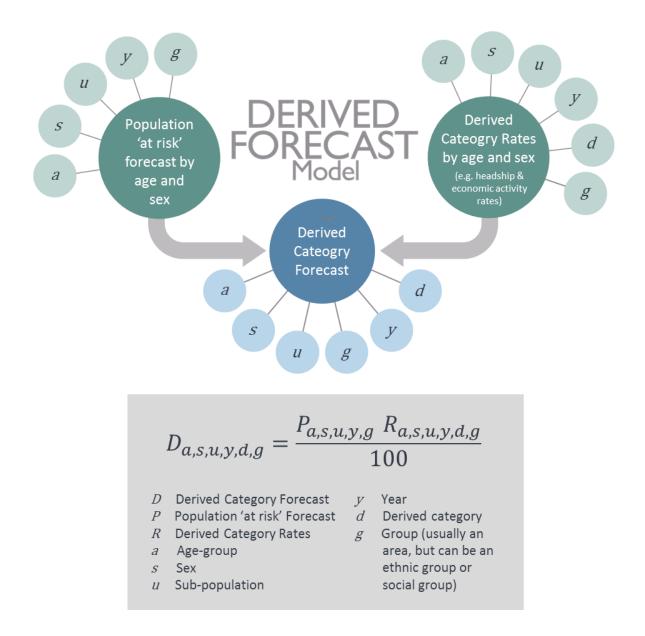|			
D	Derived Category Forecast	y	Year
P	Population 'at risk' Forecast	d	Derived category
R	Derived Category Rates	g	Group (usually an
a	Age-group		area, but can be an
s	Sex		ethnic group or
u	Sub-population		social group)

Figure 17: Derived Forecast (DF) methodology

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Appendix B

Data Inputs & Assumptions

Introduction

B.1   Using historical evidence in conjunctions with information from the ONS, Census and Welsh Government, a series of assumptions have been derived which drive population and dwelling forecasts for the Pembrokeshire Coast National Park.

B.2   The following scenarios have been produced for Pembrokeshire Coast National Park:

- WG 2014-based
- Net Nil
- PG 10yr
- PG Long Term
- Dwelling-led (60)
- Dwelling-led (70)
- Dwelling-led (80)
- Dwelling-led (90)

Population, Births & Deaths

Population

B.3   In each scenario (excluding **WG 2014-based**) historical population statistics are provided by the mid-year population estimates (2001–2016) for Census Output Areas. These data include the revised MYEs for the 2002–2010 period.

B.4   In the **WG 2014-based** scenario, historical population is provided up to 2014, with future population counts provided by single-year of age and sex thereafter, to ensure consistency with the Welsh Government 2014-based population projection for the National Park.

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Births & Fertility

B.5   In all scenarios, historical mid-year to mid-year counts of births by sex have been sourced from ONS, aggregated and apportioned to Census Output Area statistics. Under the **PG** and **Dwelling-led** scenarios, historical births are provided for the 2001/02–2015/16 period.

B.6   In combination with the 'population-at-risk' (i.e. all women between the ages of 15–49), the assumptions listed below provided the basis for the calculation of births in each year of the forecast period:

    (a) A Pembrokeshire UA age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age in 2016/17, derived from the WG 2014-based population projection for the unitary authority.

    (b) A fertility differential for the National Park, derived from the historical births data up to 2015/16.

    (c) Long-term assumptions on changes in age-specific fertility rates from the WG 2014-based population projections for Pembrokeshire.

B.7   Under the **WG 2014-based** scenario historical births are provided up to 2013/14. From 2014/15 future counts of births are specified in combination with an ASFR, to ensure consistency with the 'official' WG 2014-based population growth trajectory.

Deaths & Mortality

B.8   In each scenario, historical mid-year to mid-year counts of deaths have been sourced from ONS, aggregated and apportioned from Census Output Area statistics. Under the **PG** and **Dwelling-led** scenarios, historical deaths are provided for the 2001/02–2015/16 period.

B.9   In combination with 'population-at-risk' (i.e. the total population of the National Park), the assumptions listed below provide the basis for the calculation of deaths in each year of the forecast period:

    (d) A Pembrokeshire age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex in 2016/17, derived from the WG 2014-based population projection.

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(e) A mortality differential for the National Park, derived from the historical deaths data up to 2015/16.

(f) Long-term assumptions on changes in age-specific mortality rates from the WG 2014-based population projection for Pembrokeshire.

B.10   In the **WG 2014-based** scenario, historical deaths are provided up to 2013/14. From 2014/15, future counts of deaths are specified in combination with an ASMR, to ensure consistency with the 'official' WG 2014-based official population projection for the National Park.

Migration

B.11   Other than Census statistics, there are no historical migration statistics available for the National Park. Therefore, migration is calculated as the 'residual' of annual population change, after taking account of births and deaths.

B.12   Using the Census statistics, historical estimates of migration are derived for the National Park comparing the migration implied by the schedule of rates with the pattern of migration observed in the Census statistics. Once historical estimates of migration have been derived, a weighted average of the last ten years (2006/07–2015/16) of estimated migrant counts is used directly as input to scenario forecasts for all years after the latest 2016 mid-year population estimate. Under the **PG Long Term** scenario, historical estimates of migration have been derived from the last fifteen years (2001/02–2015/16) of estimated migration counts.

B.13   In the **Net Nil** scenario, net migration is set at zero for each year in the forecast period (i.e. in- and out-migration still occur but the net balance is zero).

B.14   The **Dwelling-led** scenarios calculate their own migration assumptions to ensure an appropriate balance between the population and the targeted increase in the number of new houses in each year of the forecast (2016/17–2030/31) period. A higher level of migration will occur if there is insufficient population to meet the forecast dwelling target. The profile of migrants if defined by an age-specific ASMigR schedule derived using a weighted average of the last ten years of estimated migrant counts.

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B.15   In the **WG 2014-based** scenario, historical counts of migrants are used from 2001/02 to 2013/14. From 2014/15, future counts of migrants are specified along with an ASMigR, to ensure consistency with the 'official' WG 2014-based official projection.

Households & Dwellings

B.16   The 2011 Census defines a household as:

> *"one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room or sitting room or dining area."*

B.17   In POPGROUP, a dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant.

B.18   Apart from in the **Dwelling-led** scenarios, the household and dwelling implications of the population growth trajectory have been evaluated through the application of membership rates, average household size, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the WG 2008-based, 2014-based household projection model and 2011 Census.

B.19   In the **Dwelling-led** scenarios, these assumptions are used to determine the level of population growth required by the defined dwelling growth trajectory.

Membership Rates

5.11   The membership rates are used to calculate the proportion of the household population in each household category by age group and sex (Table 5), taken from the WG 2014-based household model for the Pembrokeshire Coast National Park. The household population is then converted into households using average household size assumptions, taken from the WG 2014-based household model. Under the sensitivity scenarios, membership rate assumptions are taken from the WG 2008-based household projection model for the National Park.

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Table 5: Household Categories

Household Category
1 person
2 person (No children)
2 person (1 adult, 1 child)
3 person (No children)
3 person (2 adults, 1 child)
3 person (1 adult, 2 children)
4 person (No children)
4 person (2+ adults, 1+ children)
4 person (1 adult, 3 children)
5+ person (No children)
5+ person (2+ adults, 1+ children)
5+ person (1 adult, 4+ children)

Communal Population Statistics

B.20   Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). These data are drawn from the WG 2014-based household projections for the National Park. Examples of communal establishments include prisons, residential care homes and student halls of residence.

B.21   For ages 0–74, the number of people in each age group not-in-households is fixed throughout the forecast period. For ages 75–85+, the proportion of the population not-in-households is recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending on the size of the population.

Vacancy Rate

B.22   The relationship between households and dwellings is modelled using a 'vacancy rate', derived from the 2011 Census using statistics on households (occupied household spaces) and dwellings (shared and unshared).

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B.23   A vacancy rate of 26.7% for the Pembrokeshire Coast National Park has been applied, fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been evaluated.

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