The ONS 2011 Sub-national Population Projections
Intelligence Update 23-2012

Introduction

The 2011-based Sub-national Population Projections (2011 SNPP) were released on 28th September 2012. These local authority level projections are the first Office for National Statistics (ONS) population projections since the release of the 2011 Census estimates on the 16th July 2012. These projections take the 2011 Mid-Year Estimate (MYE) as their base (released 25th September 2012) and partially supersede the 2010 Sub-national Population Projections (2010 SNPP). The 2010 SNPP were released in March 2012 and used as their starting point the 2010 indicative MYE, itself an estimate rolled forward from the 2001 Census population estimate.

While operating from a new base, the 2011 SNPP makes use of much the same data as the 2010 SNPP. Components of change data (births, deaths and migration) are from 2005-2010 in both cases. However, due to the methodology employed, the future trends of these components can vary considerably between the two sets of projections. Being an interim projection, the 2011 SNPP does not project as far forward as the 2010 SNPP, extending ten years to 2021 rather than the usual 25 years.

This report outlines the differences in the components of change and the resulting populations between the newly released SNPP and the 2010-based projection.

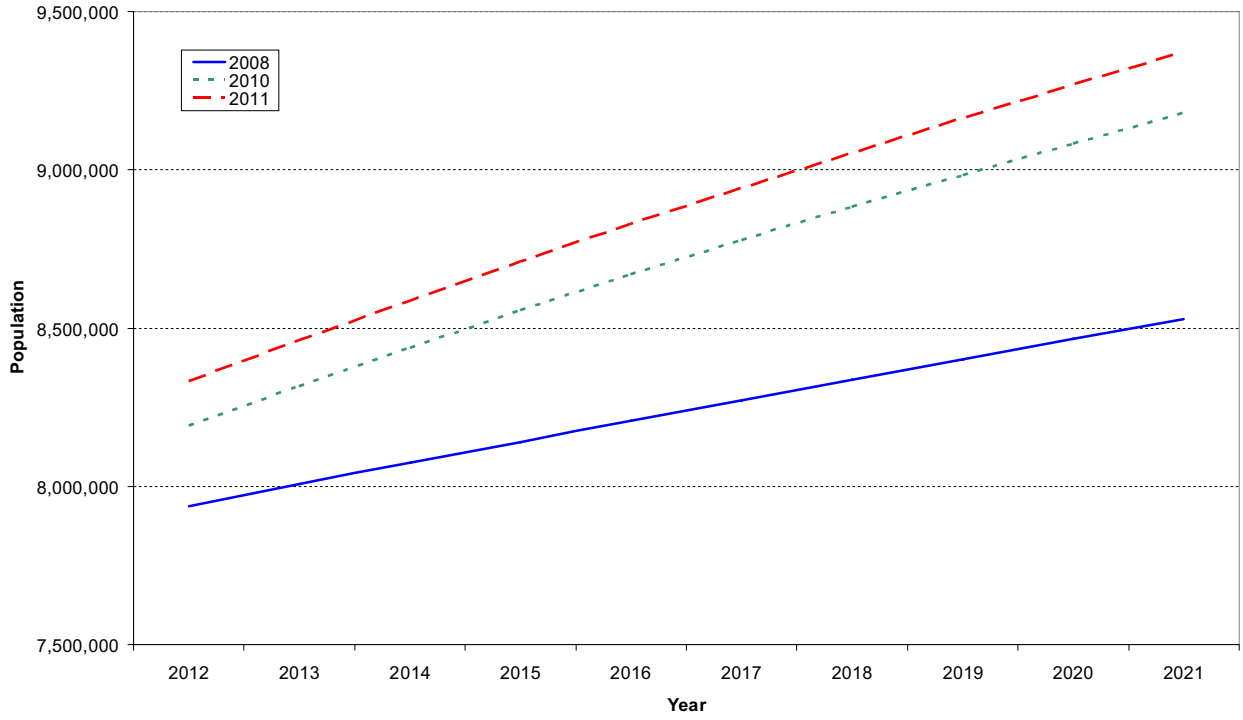
The 2011 SNPP, when compared to the 2010 SNPP, shows:

- London's population reaching nine million two years sooner, in 2018
- An additional 785,700 people in London by 2021
- Births are significantly higher leading to increase the amount of natural change in each year of the projection
- Net migration accounts for 17,100 less people over the ten year period than was previously projected
- Most of the change in migration is driven by a decrease in the estimate of international out-migration
- Counterintuitive differences exist for some individual boroughs that are proportionally much larger than for London as a whole

There are concerns over the methodology employed by ONS in developing these population projections. In particular the application of fertility and migration rates derived using pre-census population estimates to the new 2011 population have the potential to undermine confidence in the projections. These concerns are explored in more detail below.

Greater London: Population Growth

Figure 1: SNPP Population Projection, Greater London



Source: Office for National Statistics

The mid-year population estimate for 2011 forms the starting point of the 2011 SNPP. This figure is in turn derived from the 2011 Census. The 2010 SNPP, which used the 2010 indicative mid-year estimate as a base, differs from the 2011 SNPP in its estimate of the population of London in 2011 by 135,900 persons. The 2011 population in the 2008 SNPP was projected forward from the 2008 mid-year estimate and is 336,100 lower than the 2011 SNPP, and the only one of the three below eight million persons.

The 2011 SNPP, when compared to the 2010 SNPP, shows London's population reaching nine million two years sooner, in 2018. Over the ten-year projection period the 2011 SNPP adds an additional 785,700 people to London's population by 2021. The 2008 SNPP not only starts from a lower point but rises at a slower rate so that the difference between the 2008 SNPP and the other projections increases over time. The comparison with the 2008 SNPP also draws attention to how similar the 2010 and 2011 projections are and highlights the impact of the change in SNPP methodology adopted for the 2010 SNPP and used, largely unchanged, in 2011.

This change in methodology primarily impacted the way in which international migrants were distributed to local authorities with larger proportions coming to London and changes in local authority distributions. For more information on these improvements see Intelligence Update 12-2012: Improvements in Estimating Migration.

Concerns with the 2011 SNPP methodology

Closer examination of the methodology adopted by ONS in the production of the 2011 SNPP highlights anomalies for a number of London local authorities.

The standard ONS methodology for producing subnational projections involves using multiple years of historic births, deaths and migration data in conjunction with past estimates of population by age structure to generate sets of rates. These rates are then used to project future trends.

Taking births as an example: historic birth data is combined with estimates of the number of women of child bearing age in the population in order to arrive at estimates of fertility rates for each locality. These fertility rates are then applied to projected numbers of women in the population in order to arrive at projections of future births.

A similar process takes place for each of the components of change: deaths data are used to estimate mortality rates, and out-migration flows are used to estimate the probability of a person moving from one locality to another.

For particular London boroughs, the 2011 Census figures were a significant departure from previous ONS mid-year estimates. In the case of Newham the 2011 Census figures were close to 68 thousand higher than the 2010 mid-year estimates. Conversely for Westminster the 2011 Census figures were lower by nearly 34 thousand. The 2011 mid-year estimates are based on 2011 Census data and rolled forward by approximately three months. For more information on the difference at local authority level between the 2011 Census data and discontinuities see GLA Intelligence Update 13-2012: 2011 Census Initial Results.

In the absence of a 2011 Census re-based back series of mid-year estimates (a reworking of mid-year estimates from 2011 to 2002 that eliminates the disjoint as a result of the 2011 Census) the ONS calculated rates using the existing mid-year populations (pre 2011 Census release). These rates were then applied to the new 2011 mid-year population and projected forward. Where large discontinuities exist between the 2011 Census figures and previous 2001 based population estimates notable distortions for local authorities are evident. For instance, the fertility rates calculated using pre-census estimates will be artificially high where these estimates are significantly lower than the 2011 Census population. When these inflated fertility rates are applied to larger cohorts of women of reproductively active ages from 2011 onwards there is an upsurge in projected births. The opposite is true where 2001 rolled-forward estimates were significantly higher than the 2011 Census population.

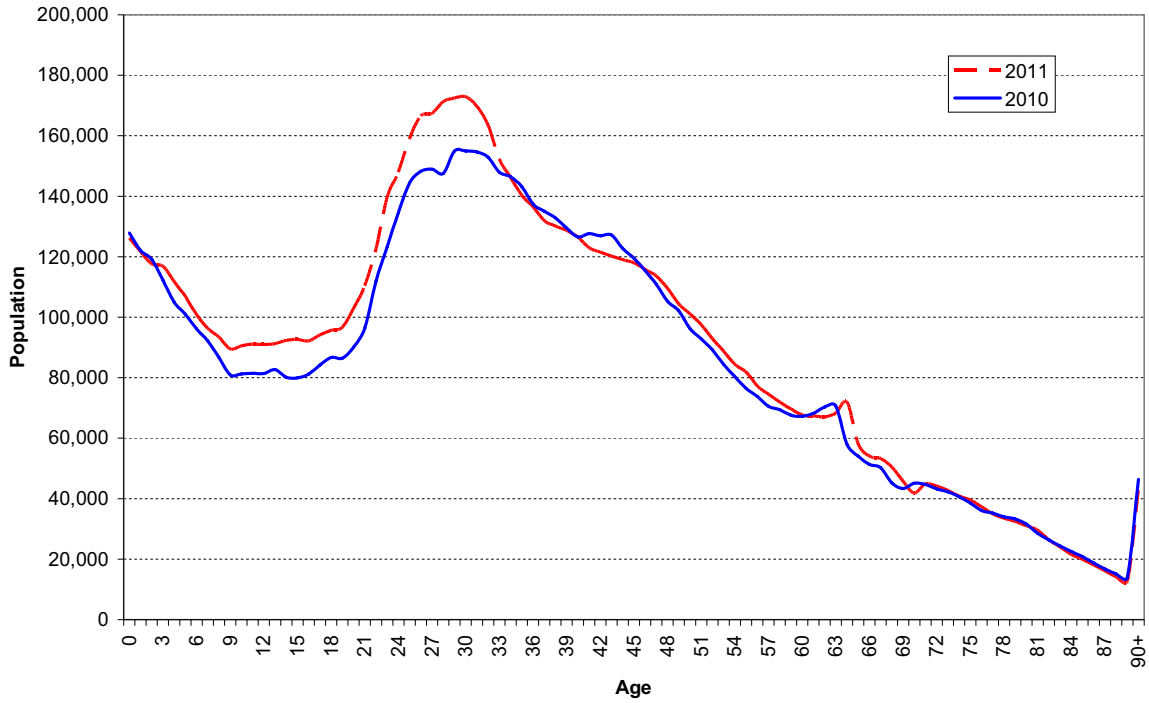
Not all components are equally affected by these issues with most impact being seen for out-migration. International inflows are unaffected as the methodology used is independent of the population of the destination borough. Domestic (internal and cross-border) inflows are affected, but to a lesser extent than for outflows. Inflows are independent of the population of the destination, but changes in outflows from every other borough naturally lead to revised inflows. Projections of deaths are affected, but because past estimates of the elderly population saw less variation when compared with the 2011 Census the impact is relatively small.

In each case it is important to understand that these sudden apparent changes in trends are artefacts resulting from the methodology rather than major demographic shifts.

A revised back series of local authority population estimates that account for 2011 Census data are due for release in March 2013, however until these are available large discontinuities between the 2011 mid-year estimates and those available for the preceding years for many London boroughs will persist. The 2012-based SNPP will be the next set of subnational projections released by ONS. It is expected that these will be better informed by 2011 Census information, however these are not due for publication until Spring 2014. In the meantime the GLA caution the use of the interim 2011 SNPP and users are referred to GLA projections as an alternative.

Figure 2 shows the differing age structures of the baseline populations used in the 2010 SNPP and the 2011 SNPP. The increase in persons in the younger age cohorts, and in particular in the range 25-35 years old, has implications for the derivation (using the former age structure) and application (to the latter) of birth, death and out-migration rates, as discussed above.

Figure 2: Difference in age structures between 2010 MYE and 2011 MYE, London



Source: Office for National Statistics

Implications for Boroughs

The tables that follow provide a comparison of the 2010 SNPP and 2011 SNPP at three points in time: 2011, 2016 and 2021. A negative value in the difference and percentage change column indicates that the 2011 SNPP projects a lower population for a particular borough than the 2010 SNPP.

Twelve of the boroughs with a higher population in the 2011 SNPP than 2010 SNPP see the difference between the two projections narrow, in percentage terms, over the projection period. All ten boroughs that have a lower 2011 SNPP population see the difference between the two decrease over the projection period. The remaining eleven boroughs have projections which diverge over time so that the difference between the two projections is greatest in 2021.

Table 1: 2010 SNPP and 2011 SNPP, London Boroughs, projection for the year 2011

	2011 2010 SNPP	2011 SNPP	Difference	% change
City of London	11,000	7,400	-3600	-32.6%
Barking and Dagenham	186,800	187,000	200	0.1%
Barnet	358,300	357,500	-800	-0.2%
Bexley	231,600	232,800	1200	0.5%
Brent	275,900	312,200	36300	13.2%
Bromley	317,900	310,600	-7300	-2.3%
Camden	235,400	220,100	-15300	-6.5%
Croydon	350,100	364,800	14700	4.2%
Ealing	323,500	339,300	15800	4.9%
Enfield	307,300	313,900	6600	2.1%
Greenwich	233,600	255,500	21900	9.4%
Hackney	227,000	247,200	20200	8.9%
Hammersmith and Fulham	172,400	182,400	10000	5.8%
Haringey	242,400	255,500	13100	5.4%
Harrow	234,600	240,500	5900	2.5%
Havering	238,900	237,900	-1000	-0.4%
Hillingdon	274,100	275,500	1400	0.5%
Hounslow	246,300	254,900	8700	3.5%
Islington	206,200	206,300	100	0.0%
Kensington and Chelsea	163,800	158,300	-5500	-3.4%
Kingston upon Thames	173,900	160,400	-13500	-7.8%
Lambeth	292,400	304,500	12100	4.1%
Lewisham	274,800	276,900	2100	0.8%
Merton	212,400	200,500	-11900	-5.6%
Newham	277,300	310,500	33200	12.0%
Redbridge	277,800	281,400	3600	1.3%
Richmond upon Thames	194,200	187,500	-6700	-3.4%
Southwark	298,100	288,700	-9400	-3.1%
Sutton	198,000	191,100	-6900	-3.5%
Tower Hamlets	255,500	256,000	500	0.2%
Waltham Forest	236,900	259,700	22800	9.6%
Wandsworth	295,900	307,700	11800	4.0%
Westminster	244,300	219,600	-24700	-10.1%

Source: Office for National Statistics

Table 2: 2010 SNPP and 2011 SNPP, London Boroughs, projection for the year 2016

	2016 2010 SNPP	2016 2010 SNPP	Difference	% change
City of London	12,400	10,100	-2,300	-18.6%
Barking and Dagenham	206,600	209,400	2,800	1.4%
Barnet	388,800	390,300	1,500	0.4%
Bexley	243,000	245,700	2,700	1.1%
Brent	295,800	323,100	27,300	9.2%
Bromley	335,500	330,900	-4,600	-1.4%
Camden	251,500	244,500	-7,000	-2.8%
Croydon	368,000	381,100	13,100	3.5%
Ealing	343,800	358,900	15,100	4.4%
Enfield	333,100	340,800	7,700	2.3%
Greenwich	247,100	264,300	17,200	7.0%
Hackney	244,600	259,500	14,900	6.1%
Hammersmith and Fulham	177,100	184,900	7,800	4.4%
Haringey	261,200	272,400	11,200	4.3%
Harrow	252,300	259,000	6,700	2.7%
Havering	252,600	253,100	500	0.2%
Hillingdon	295,800	299,400	3,600	1.2%
Hounslow	268,600	277,300	8,700	3.3%
Islington	223,600	226,400	2,800	1.3%
Kensington and Chelsea	164,100	160,600	-3,500	-2.1%
Kingston upon Thames	189,300	180,900	-8,400	-4.5%
Lambeth	310,800	320,700	9,900	3.2%
Lewisham	297,200	300,100	2,900	1.0%
Merton	230,900	223,900	-7,000	-3.0%
Newham	305,900	329,700	23,800	7.8%
Redbridge	305,600	311,800	6,200	2.0%
Richmond upon Thames	206,600	202,600	-4,000	-1.9%
Southwark	327,100	323,700	-3,400	-1.0%
Sutton	211,400	206,100	-5,300	-2.5%
Tower Hamlets	287,500	289,600	2,100	0.7%
Waltham Forest	257,200	276,900	19,700	7.6%
Wandsworth	316,800	326,400	9,600	3.0%
Westminster	256,400	243,200	-13,200	-5.2%

Source: Office for National Statistics

The overall population in London is projected to be 1.71 per cent higher in 2011 by the 2011 SNPP. This grows to 1.84 per cent in 2016 and then to 2.09 per cent in 2021. The range of individual values for London boroughs is large but decreases over time. The largest percentage difference in all years is in the City of London. If the City is excluded then the range of values moves from 23.3 per cent in 2011, to 14.4 per cent in 2016 and 9.5 per cent in 2021.

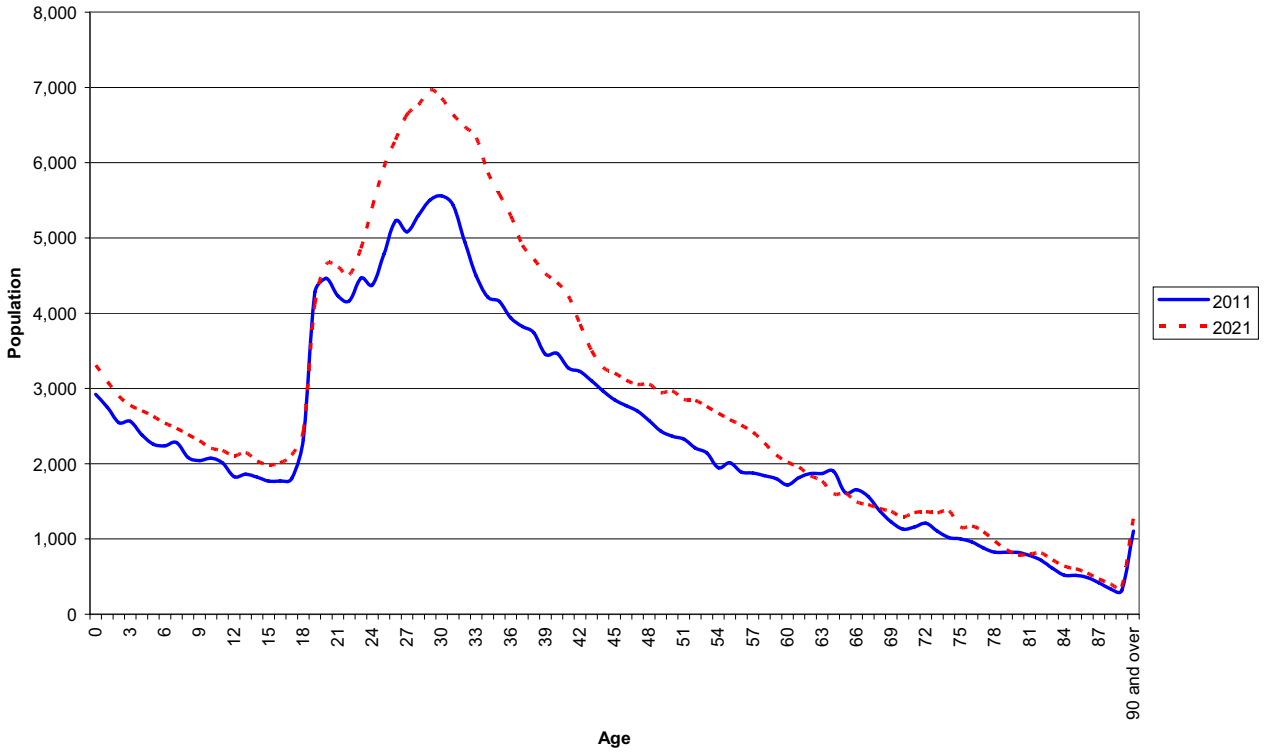
Table 3: 2010 SNPP and 2011 SNPP, London Boroughs, projection for the year 2021

	2021			
	2010-base	2011-base	Difference	% change
City of London	13,500	12,000	-1,500	-11.3%
Barking and Dagenham	224,900	229,400	4,500	2.0%
Barnet	416,200	420,500	4,300	1.0%
Bexley	254,900	258,800	3,900	1.5%
Brent	311,000	332,700	21,700	7.0%
Bromley	353,400	352,000	-1,400	-0.4%
Camden	262,900	260,800	-2,100	-0.8%
Croydon	385,600	398,200	12,600	3.3%
Ealing	361,200	375,600	14,400	4.0%
Enfield	357,100	365,600	8,500	2.4%
Greenwich	259,400	273,800	14,400	5.6%
Hackney	259,200	271,800	12,600	4.8%
Hammersmith and Fulham	180,000	188,100	8,100	4.5%
Haringey	276,700	286,800	10,100	3.7%
Harrow	269,200	276,200	7,000	2.6%
Havering	268,000	270,000	2,000	0.7%
Hillingdon	314,900	320,100	5,200	1.6%
Hounslow	286,400	295,200	8,800	3.1%
Islington	235,800	240,400	4,600	2.0%
Kensington and Chelsea	164,100	163,400	-700	-0.4%
Kingston upon Thames	202,000	197,000	-5,000	-2.5%
Lambeth	325,300	335,000	9,700	3.0%
Lewisham	317,000	321,100	4,100	1.3%
Merton	246,400	243,200	-3,200	-1.3%
Newham	326,400	345,400	19,000	5.8%
Redbridge	332,300	340,100	7,800	2.3%
Richmond upon Thames	217,500	216,600	-900	-0.4%
Southwark	349,100	349,900	800	0.2%
Sutton	224,700	221,600	-3,100	-1.4%
Tower Hamlets	312,000	316,100	4,100	1.3%
Waltham Forest	275,000	292,400	17,400	6.3%
Wandsworth	332,000	342,400	10,400	3.1%
Westminster	265,000	258,800	-6,200	-2.3%

Source: Office for National Statistics

The following age structure analysis outlines how the populations of four boroughs are projected to change over the next decade. It also serves to show how the methodological approach to developing these projections impact at the borough-specific level.

Figure 3: Change in age structure 2011-2021 - Camden



Source: Office for National Statistics

In the case of Camden the MYE's for 2006-2010, on which the migration and fertility rates are based, were an over estimate when compared with the 2011 Census. This has the effect of underestimating projected births and out-migration flows. The results, seen in figure one, is a suppression of births so that there is negligible change in age structure between 2011 and 2021 and a build up of persons in the working age population as the model fails to accurately predict out-migration.

Figure 4: Change in age structure 2011-2021 - Newham

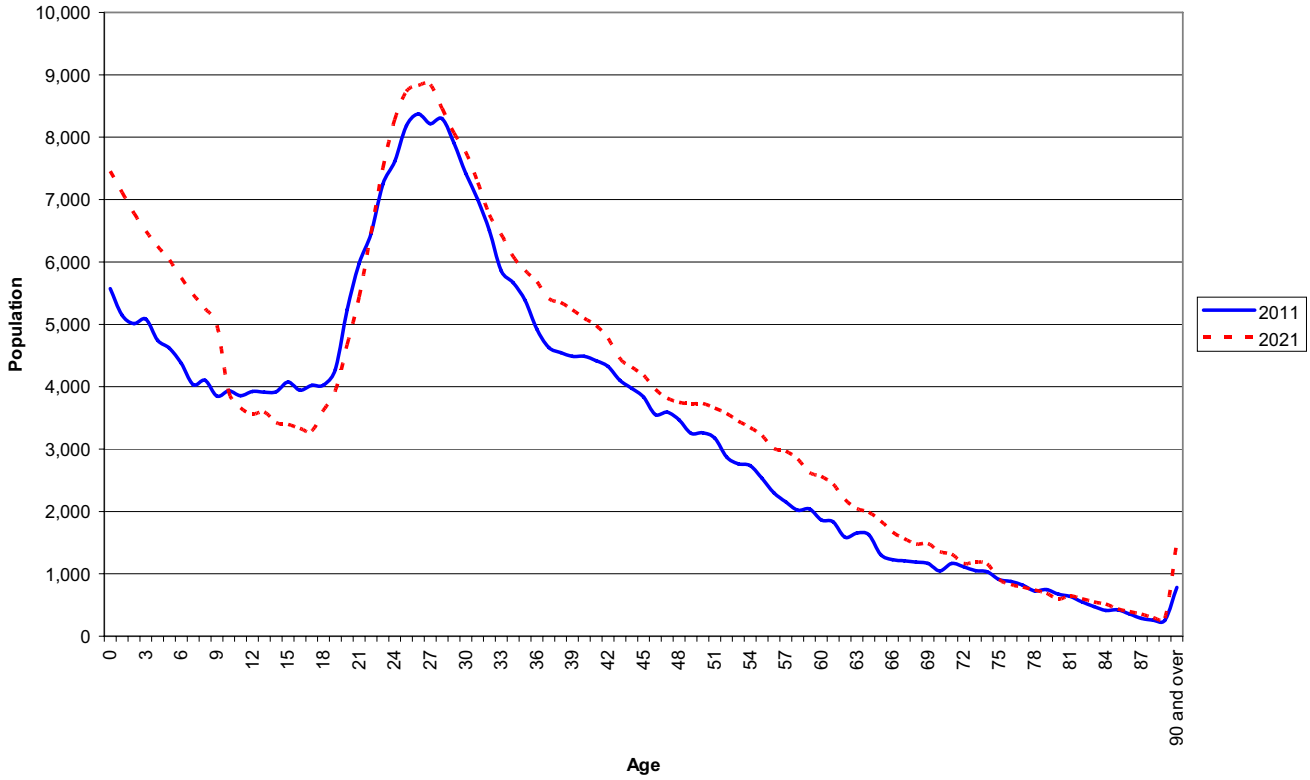
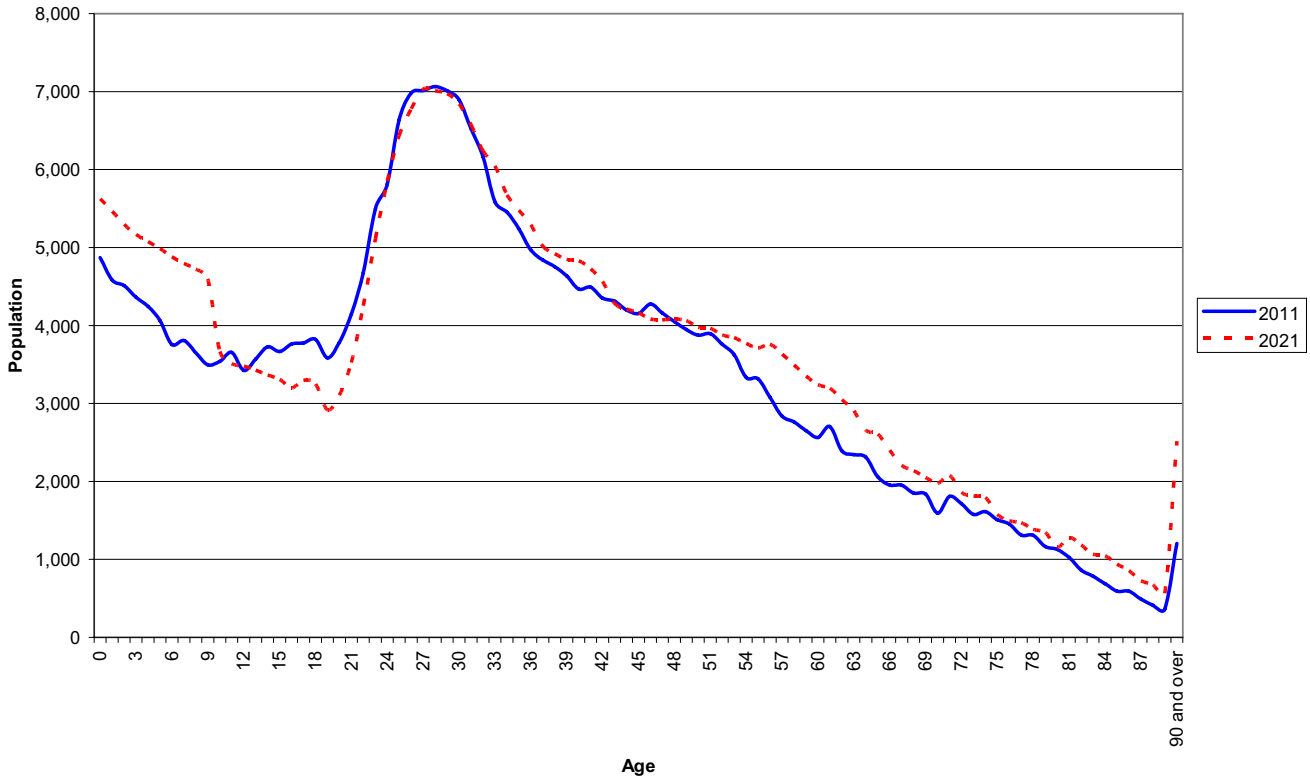


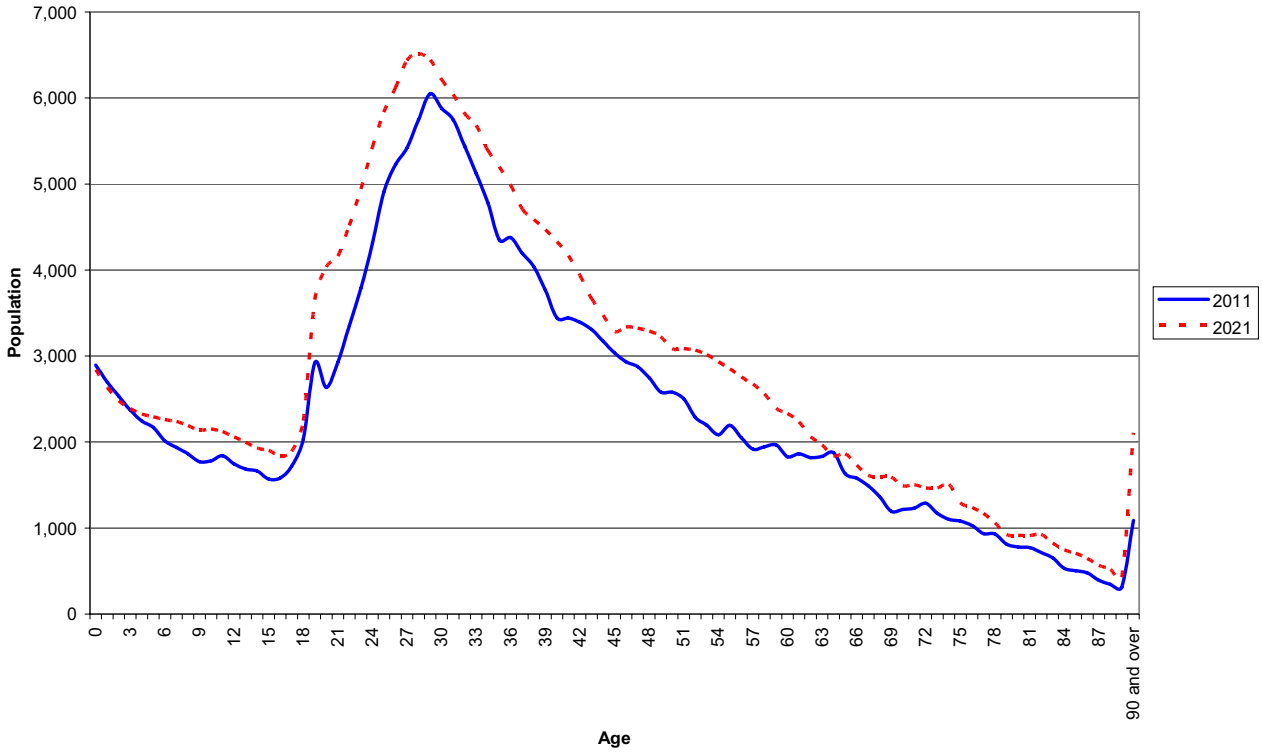
Figure 5: Change in age structure 2011-2021 - Brent



Source: Office for National Statistics

For both Brent and Newham the population in the 2006-2010 MYE back series was significantly underestimated. As a result birth rates calculated for these boroughs are artificially high. In Figures 4 and 5 the effect of this over-estimation in births can be seen in the difference between the 2011 and 2021 projected data for the ages 0 -10. There is little change in the population structure elsewhere in the projection. A lack of growth, particularly in the working age cohort, can be attributed to an over-estimation of out-migration stemming from the issues surrounding the potentially high out-migration rates calculated from the 2006-2010 data.

Figure 6: Change in age structure 2011-2021 – Westminster



Source: Office for National Statistics

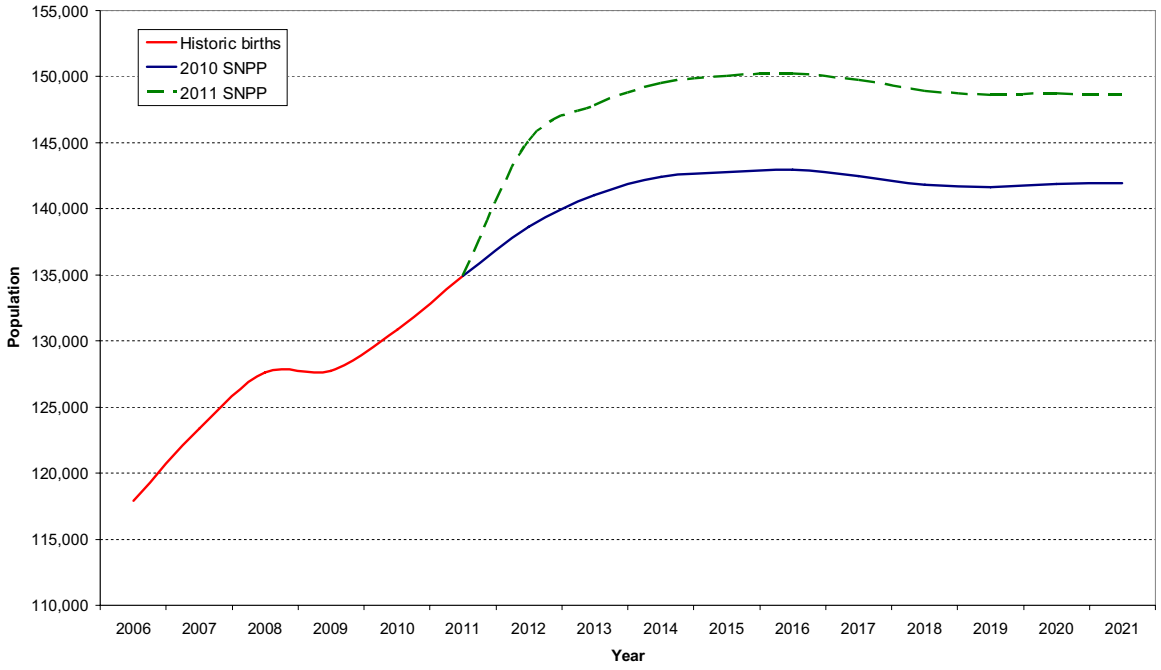
The 2011 SNPP shows growth in almost all ages over the projection period for Westminster. The growth is also relatively constant across all ages with rises of around 300 to 500 in all but the very youngest and very oldest age bands. There is very little change in the younger age cohorts as a result of the suppressed birth rates calculated using high population estimates which were then applied to a smaller population from 2011 onwards.

Births

Projected births in the 2011 SNPP are significantly higher than under the previous model. The trend over time, shown in Figure 7, follows a distinct pattern and there is a sizeable difference in the magnitude of projected births. For London as a whole, there are around 7 thousand more births per year in the 2011 SNPP than in the 2010 SNPP. Over the ten year projection period the 2011 SNPP projects an additional 69,700 births.

These higher numbers of births are entirely an artefact of the methodology applied and comparing the historic births trend with the 2011 SNPP projected births highlights the inflationary impact of the methodology at 2011 and for subsequent years.

Figure 7: Comparison of the Births component of change

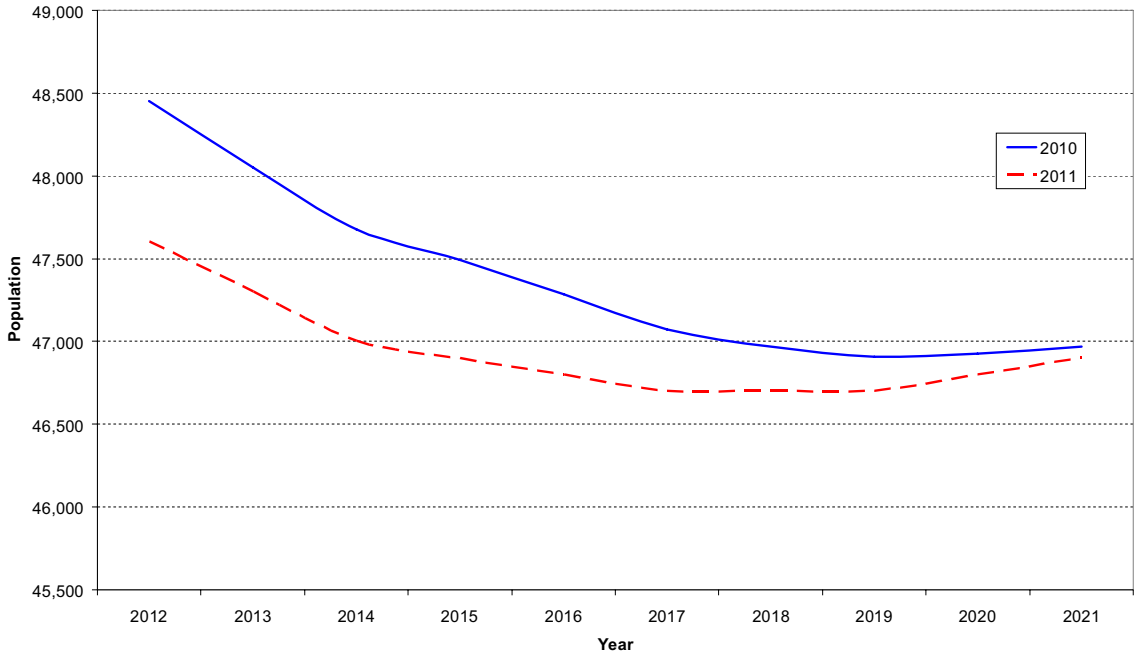


Source: Office for National Statistics

Deaths

Compared to the 2010 SNPP fewer deaths have been for London. The difference is less than 1 thousand fewer deaths per year with a trend towards near convergence by 2021. Over the entire projection period the 2011 SNPP projects nearly four and half thousand fewer deaths.

Figure 8: Comparison of the Deaths component of change

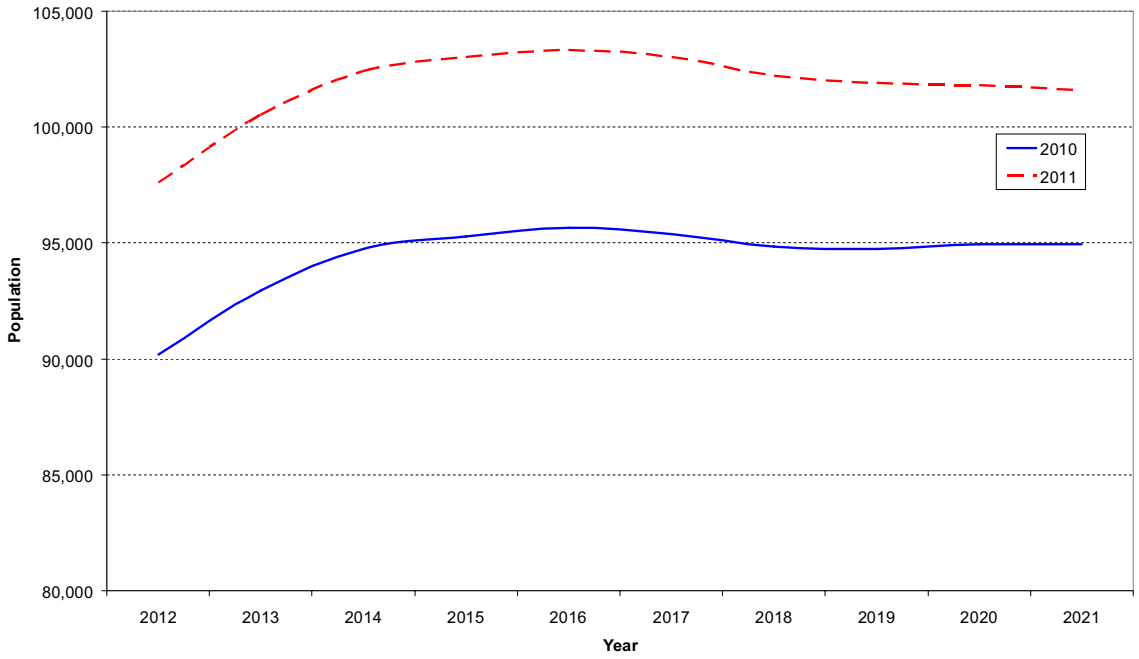


Source: Office for National Statistics

Natural Change

Natural change is the net change in population as a result of births and deaths. As the graphs above demonstrate births significantly exceed deaths and, as such in both the 2011 and 2010 SNPP, natural change is a significant driver of population growth. The comparison of natural change between the 2010 and 2011 SNPP shows the extent to which the larger projected births have contributed to the increase in natural change. The 2011 figures suggest that nearly eight thousand more people per year will be added to the population as result of the excess of births over deaths. Over the ten-year projection period the 2011 SNPP projects an additional 74 thousand people in London.

Figure 9: Comparison of the Natural Change component of change



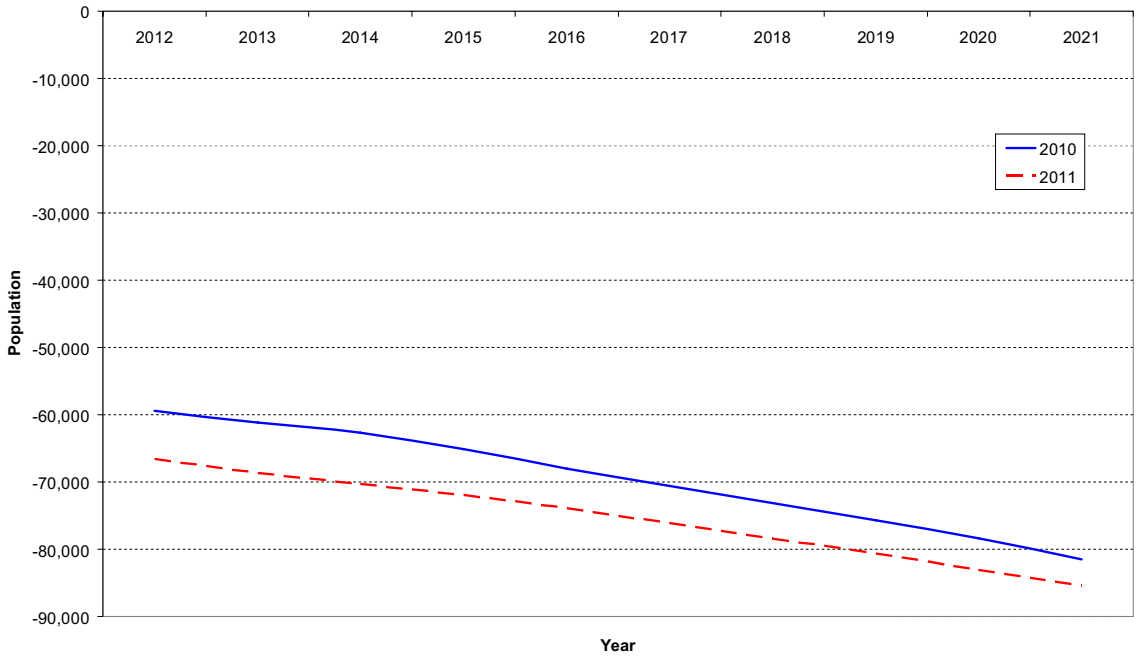
Source: Office for National Statistics

Internal Migration

Internal migration is a count of the number of people moving from one local authority in England and Wales to another[1]. Net internal migration shows that in both the 2010 SNPP and the 2011 SNPP out-migration exceeds in-migration. The 2011 SNPP revises the projection so that the London population loses more people through internal migration than previously. Over the ten-year period the 2011 SNPP projection has a further 60 thousand people leaving the capital for other parts of England and Wales.

The projected internal migration rates are modelled on flows over the period 2006-2010 and incorporate population estimate data for those years. As outlined above the population estimates for this period appear to have under-estimated the population. This has the effect of causing the number of out-migrants to increase. The probability of an individual out-migrating is calculated at an artificially inflated rate and this rate, when applied to the 2011 Census-based population projections, significantly increases the amount of projected out-migration. The impact is greatest where pre-census population estimates were lower than the 2011 Census. The increased levels of out-migration have a downward impact on projected populations.

Figure 10: Comparison of the Net Internal Migration component of change



Source: Office for National Statistics

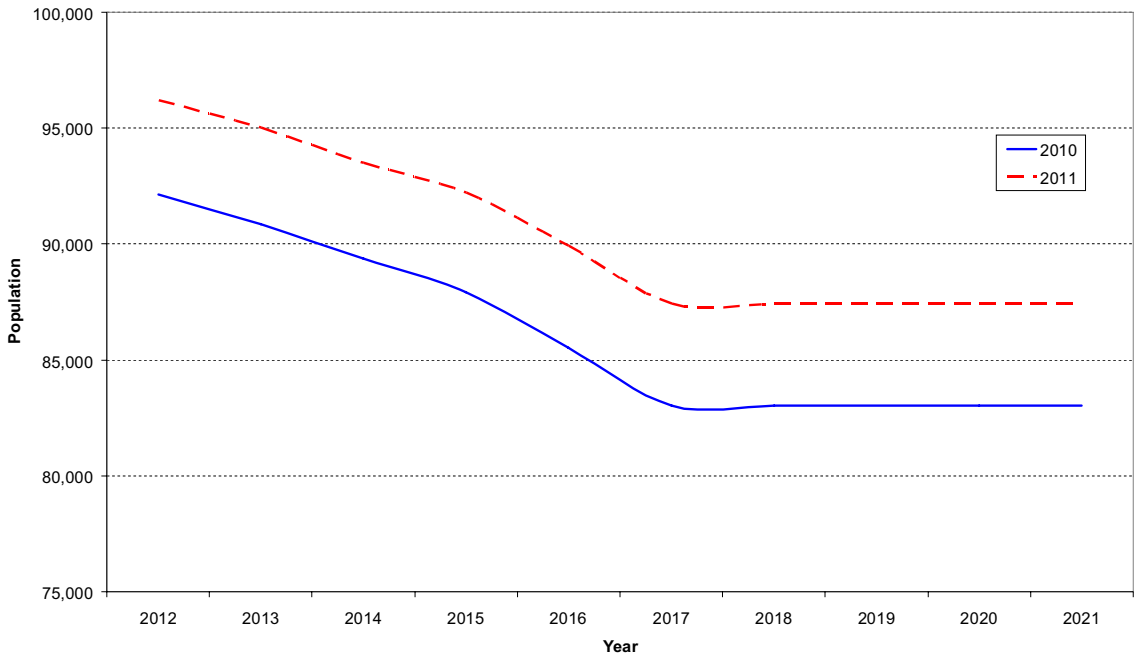
1 The data available for 2011 SNPP includes, in the overall regional London total, moves between London boroughs. The 2010 SNPP provided data at the regional level, i.e. only migration into and out of London are considered, while internal migration between London boroughs was discounted. As a result the in and out migration figures in the 2011 SNPP are much higher than the 2010 SNPP and comparison of the two is not enlightening.

However, net migration (in migration minus out migration), removes this issue. This is because any movement from a London borough to another London borough will be counted in the regional London total as both an in-migration and an out-migration, meaning these movements will have no net impact on the total.

International Migration

International migration projects the number of people entering or leaving local authorities from or to designations outside the United Kingdom. Assumptions of future international in-migration for 2011 SNPP are similar to those used in 2010 SNPP. The out-migration projection is lower with around four thousand people less per year leaving London for international designations. With less people leaving and similar numbers entering the population the net effect is an increase of nearly 43 thousand people in London over the ten-year projection period compared with the 2010 SNPP.

Figure 11: Comparison of the Net International Migration component of change

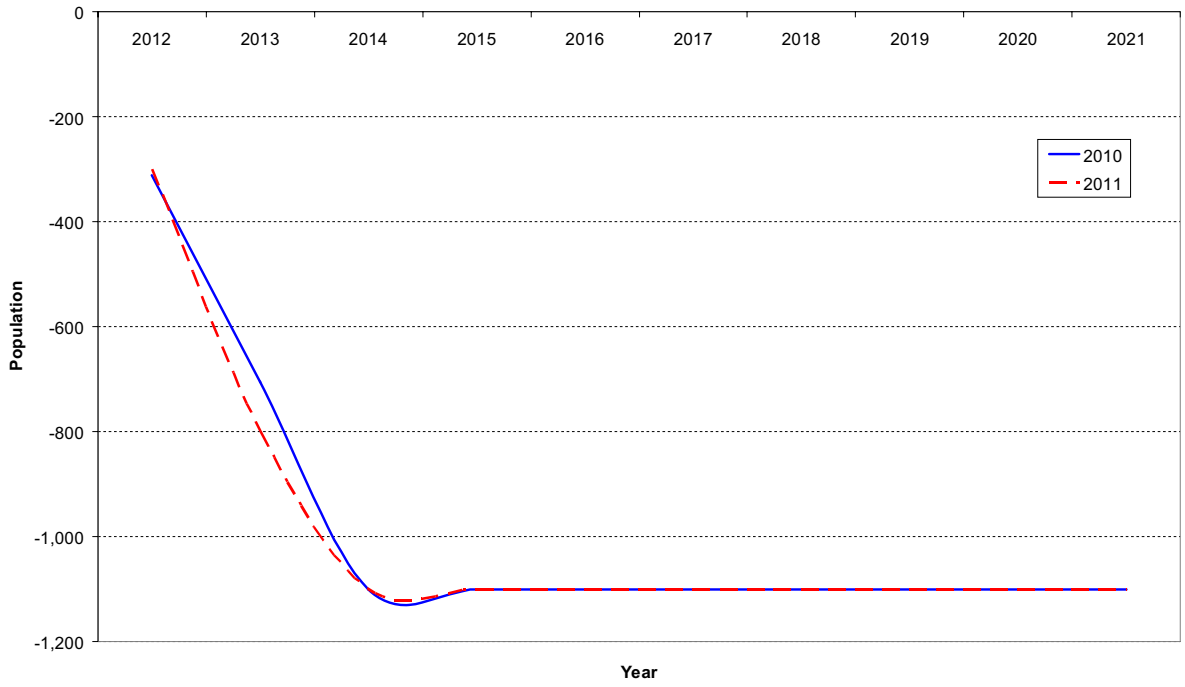


Source: Office for National Statistics

Cross-border migration

Cross-border migration denotes moves from a local authority in England and Wales to a destination in Northern Ireland or Scotland, or vice versa. Both the in-migration and out-migration figures are very similar for the 2010 and 2011 SNPP. As such there are negligible differences in the net migration figures for this category of move. The continuing trend here is a loss of around a thousand people per year from the London population.

Figure 12: Comparison of the Net Cross-border Migration component of change

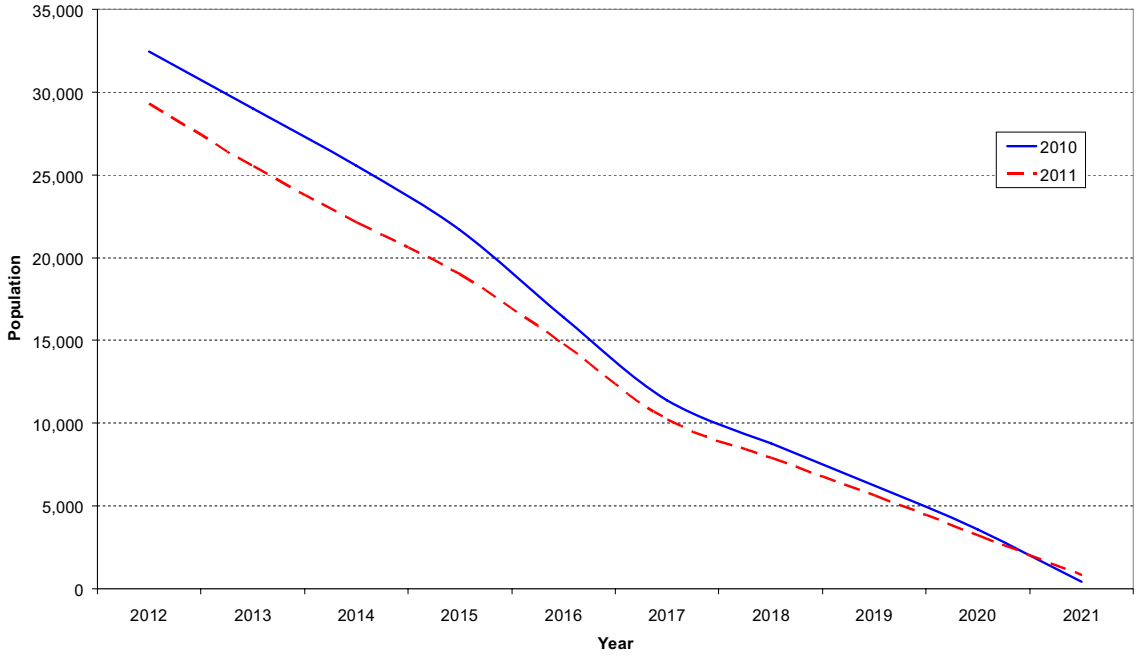


Source: Office for National Statistics

Net migration

Net migration is the sum of net cross-border migration, net internal migration and net international migration. Overall there is less population growth projected from migration in the 2011 SNPP than was the case in the 2010 SNPP. The trend over time is for decreasing migration as stagnant international and cross-border flows do little to mitigate the impact of increasing internal migration away from the capital. Over the ten-year period the 2011 SNPP projects 17 thousand fewer Londoners as a result of net migration compared with the 2010 SNPP.

Figure 13: Comparison of the Overall Net Migration component of change



Source: Office for National Statistics

Using the SNPP

As a result of methodological issues local authorities should use the 2011 SNPP as a source of population projections for their area cautiously. An alternative source for population projections in London are the GLA 2012 Round of population projections, however these are not scheduled for publication until the end of 2012. In the intervening period London boroughs may wish to appraise modelled projections developed by the Demography and Policy Analysis team at the GLA which attempt to approximate ONS SNPP that do not have the methodological issues outlined above. These projections may provide a more reasonable projection for many authorities than the ONS 2011 SNPP. A document containing an outline of the methodology used and the projected data for London boroughs can be obtained by contacting demography@london.gov.uk.

October 2012
For more information please contact Wil Tonkiss Census Analyst/Trainer, Intelligence Unit,
Greater London Authority, City Hall, The Queen's Walk, London SE1 2AA
Tel: 020 7983 5523 e-mail: william.tonkiss@london.gov.uk