

2020 Adirondack Park population by age and sex using the Hamilton-Perry method

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Introduction

The Cornell Program on Applied Demographics (PAD) brings skills in demographics, economics, statistics, data gathering and data analysis together to provide a variety of organizations with data, information and advice. PAD works closely with the New York State Departments, the U.S. Census Bureau and other organizations to assist them in their activities.

One of the activities PAD is involved in is population projections. Population projections for the counties in New York State can be found on the PAD website (Cornell Program on Applied Demographics, 2011). We are also the members of the Federal State Cooperative on Population Projections, a national network of organizations that are involved in population projections.

To support the longer term thinking about the Adirondack Park we were asked to project what the population in the Park could look like in 2020.

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Adirondack Park

The Adirondack Park was created in 1892 by the State of New York amid concerns for the water and timber resources of the region. Today the Park is the largest publicly protected area in the contiguous United States. The boundary of the Park encompasses approximately 6 million acres, nearly half of which belongs to all the people of New York State and is constitutionally protected to remain “forever wild” forest preserve (Adirondack Park Agency website).

In 2010 around 130,000 people have their primary residence within the Park and many more have seasonal homes within the park.

The future of everything in the Park is a concern to many. The Adirondack Park Agency is the main regulator as it is responsible for maintaining the protection of the forest preserve, and overseeing development proposals of the privately owned lands.

Description of the Hamilton-Perry method

The Hamilton-Perry projection method was first mentioned in an article by C. H. Hamilton and J. Perry (Hamilton, 1962). It is widely used especially when data on components of change is not available, for example in sub-counties or regions that are crossing county boundaries.

The method takes the age distribution at two moments in time (t_0 and t_1) and uses those to project an age distribution at a future point in time (t_2). The idea behind the method is to examine the change in the size of a cohort between t_0 and t_1 . So we look at all people that are born in a certain period and tally them at t_0 and again at t_1 . The change in size between t_0 and t_1 is because of migration and mortality. It is assumed that this rate of change is age dependent and we can apply the same rate of change to a following cohort that has the same age at t_1 as our earlier cohort had at t_0 .

In our analysis we look at Census 2000 as t_0 and Census 2010 as t_1 . If you take for example the 30-34 year old men in 2000 then we can calculate a rate of change by looking at the 40-44 year old men in 2010. We can apply this rate of change to the 30-34 year old men in 2010 to get a projected value of 40-44 year old in 2020.

To project the population aged 0-4 and 5-9 one can use the Child Woman Ratio (CWR) or more generally a “Child Adult Ratio” (CAR). See for example (Swanson D. a., 2013). In our analysis we established relations between the number of potential mothers at t_0 with the number of 0-4 year old and 5-9 year old at t_1 to project the number of 0-4 and 5-9 year old in 2020.

(Swanson D. A., 2010) note in their evaluation of this method that for smaller areas expert local knowledge is necessary to adjust smaller areas forecasts. This is because only local expertise can inform us whether past changes are likely to be part of a trend or were incidental. The presence of large group quarters can also disturb projections for small areas as especially the migration of people moving into those facilities is not dependent on the cohort size of the resident population in similar cohorts.

Estimating the 2000 and 2010 population by age and sex

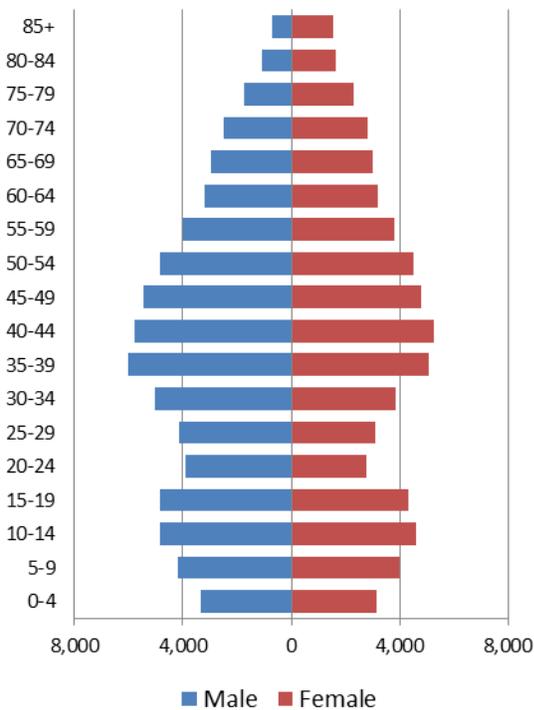
To calculate the age distributions at two different moments in time it is important that the geography is constant and similar methods are used. For these projections we used age and sex distribution of the population at the Census blocks.

Some of the Census blocks are partly inside and partly outside the Park boundaries. We estimated for each block how much of that block was inside the Adirondack Park and assumed that the people of all ages were spread out evenly over that block, so we could apply the % of the block in the Park to the each of the age groups. We aggregated the population of each age-sex category and then rounded those totals to the nearest integer. Other methods might be preferred to estimate the total population in the Park, but because we needed a consistent methodology for 2000 and 2010 and we needed the age-sex detail we felt that this was the preferred method to estimate the age-sex details of the population in the Park.

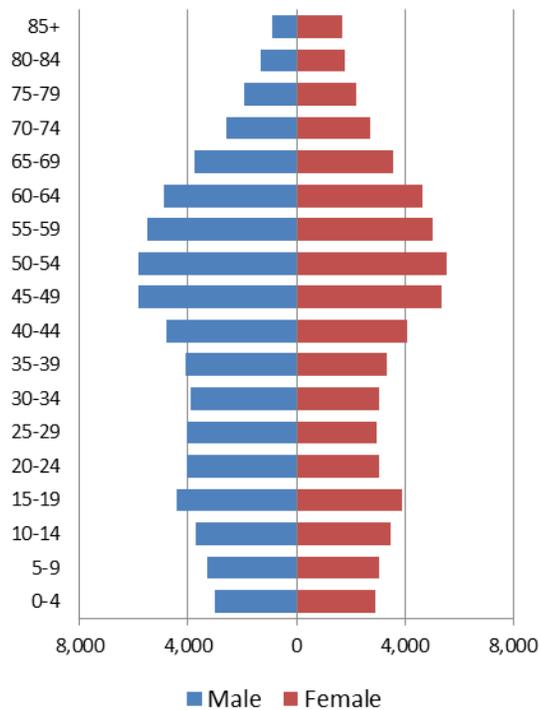
In Appendix A is a table with all counts; here we present the results in charts.

Population pyramids:

Estimated 2000 Population Pyramid, Adirondack Park



Estimated 2010 Population Pyramid, Adirondack Park



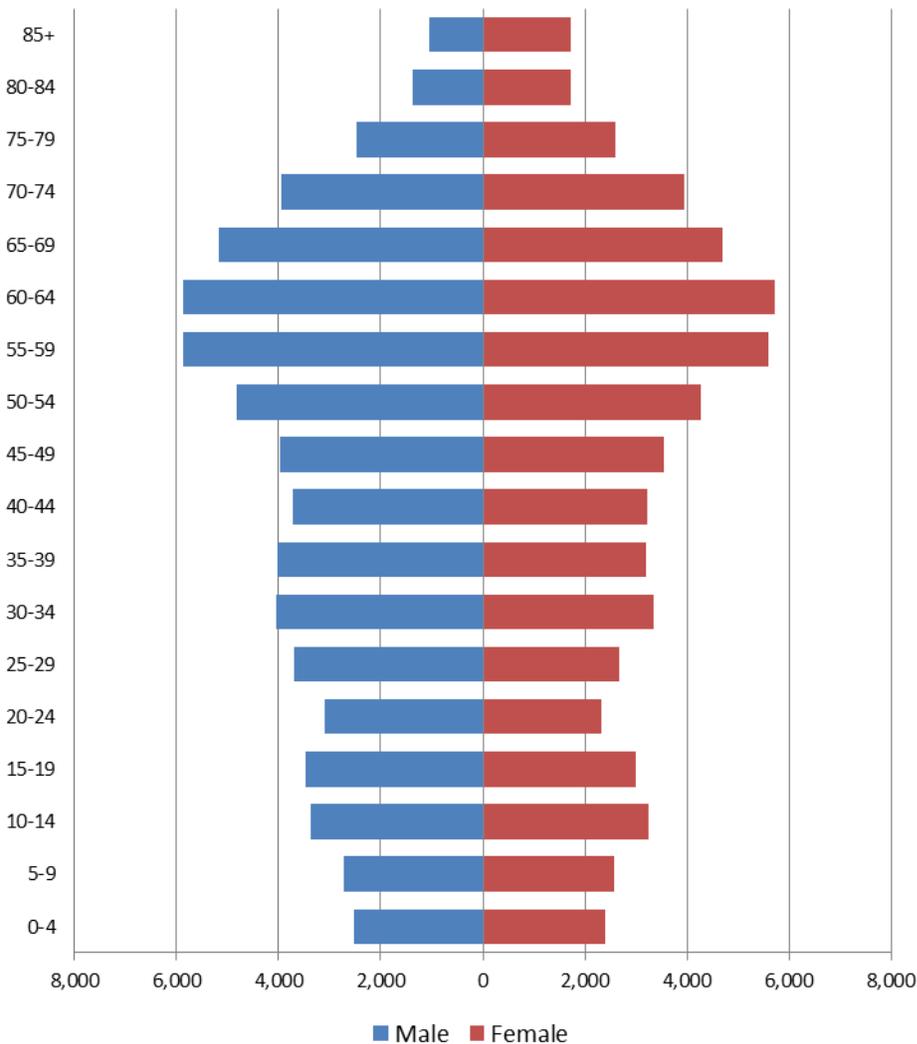
In 2000 the 35-39 and 40-44 year old were the largest age groups in the Park. Ten years later these people are 45-49 and 50-54 and are still the largest group. These people are part of the baby boom generation. The name baby boom generation is generally given to the group born between 1946 and

1964. This generation was between 45 and 64 in 2010 and many are expected to reach retirement age in the coming years. Also noticeable in the population pyramids is the fact that there are more men than women in many of the age categories. The presence of prisons in this area contributes to this phenomenon.

2020 projections

Appendix A contains the projected counts for 2020 and Appendix B the Hamilton Perry ratios of change we calculated from the 2000 and 2010 Census data. These ratios were applied to the 2010 population to create 2020 projections and the results of that projection are presented here.

Projected 2020 Population Pyramid, Adirondack Park



In 2020 the baby boom generation is another 10 years older and the peak of the population pyramid is expected to be in the 55-59 and 60-64 year age category.

If we look at the size of certain age categories through the decades we can make the following table:

	Counts				Percent of total		
	2000	2010	2020		2000	2010	2020
Total	132,436	130,324	125,071				
Age 0-4	6,457	5,929	4,943		4.9%	4.5%	4.0%
Age 5-14	17,633	13,559	11,919		13.3%	10.4%	9.5%
Age 15-24	15,908	15,464	11,913		12.0%	11.9%	9.5%
Age 25-44	38,317	30,296	27,929		28.9%	23.2%	22.3%
Age 45-64	33,869	42,624	39,671		25.6%	32.7%	31.7%
Age 65+	20,252	22,452	28,696		15.3%	17.2%	22.9%
Age 85+	2,219	2,552	2,769		1.7%	2.0%	2.2%
Median age	39.5	45.0	48.9				

The total population decreased from circa 132 thousand in 2000 to 130 thousand in 2010. The projections indicate a further decrease to 125 thousand in 2020.

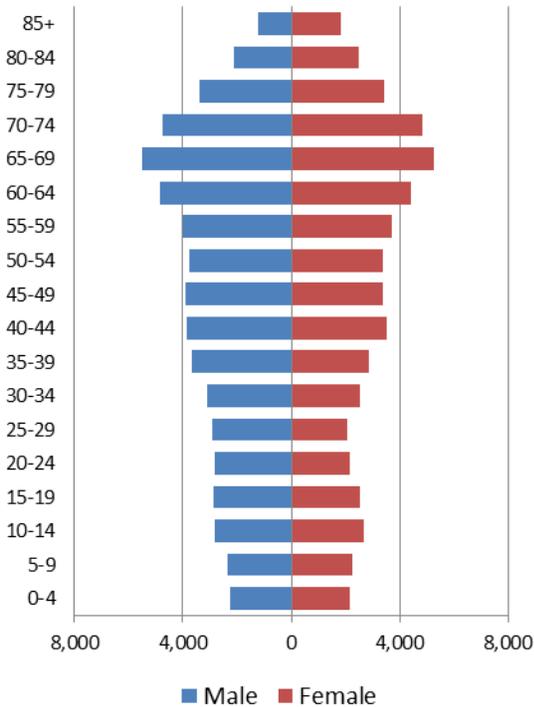
The projections indicate a further increase in median age to almost 49 in 2020. This means that we project that in 2020 50% of the population is 49 or older. All age groups under 45 saw a decrease between 2000 and 2010 and we project that they will further decrease in the coming ten year.

The age group 45-64 saw an increase between 2000 and 2010 because of the baby boom generation, but the projections indicate that this group will decrease in the coming decade. The 65 and over group is increasing in size and we expect an even greater increase in the coming ten years. In 2020 over 20% of the Park population is 65 or older.

2030 Extrapolations

If we assume that the 2000-2010 change ratios were a good approximation of what happens to the 2010 population, we could apply them again to the projected 2020 population. This results in a projection for 2030, but these need to be seen as a very raw impression of what the Park population could look like in 2030.

Projected 2030 Population Pyramid, Adirondack Park



These analyses showed a further decrease in total population to circa 115 thousand, a median age of 51 year old and a 30% share of the population 65 or older.

Works Cited

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Hamilton, C. H. (1962). A short method for projecting population by age from one decennial census to Another. *Social Forces*, pp. 41: 163-170.

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Appendix A: Population counts

	2000 estimates		2010 estimates		2020 projected	
	Male	Female	Male	Female	Male	Female
0-4	3,325	3,132	3,012	2,917	2,532	2,411
5-9	4,184	3,996	3,277	3,075	2,716	2,586
10-14	4,857	4,596	3,718	3,489	3,368	3,249
15-19	4,852	4,343	4,441	3,906	3,478	3,006
20-24	3,924	2,789	4,060	3,057	3,108	2,321
25-29	4,117	3,114	4,043	2,969	3,701	2,670
30-34	5,018	3,867	3,903	3,053	4,038	3,346
35-39	6,036	5,077	4,099	3,357	4,025	3,201
40-44	5,802	5,286	4,784	4,088	3,721	3,227
45-49	5,462	4,796	5,842	5,361	3,967	3,545
50-54	4,865	4,505	5,843	5,536	4,818	4,281
55-59	4,013	3,825	5,493	5,019	5,875	5,610
60-64	3,190	3,213	4,882	4,648	5,863	5,712
65-69	2,968	3,008	3,772	3,587	5,163	4,707
70-74	2,496	2,821	2,581	2,722	3,950	3,938
75-79	1,721	2,313	1,947	2,189	2,474	2,610
80-84	1,076	1,630	1,328	1,774	1,373	1,712
85+	683	1,536	872	1,680	1,039	1,730

Appendix B: Ratios of change

Cohort		Males			
Age in 2000	Age in 2010	2000	2010		Ratio of Change
0-4	10-14	3,325	3,718		1.12
5-9	15-19	4,184	4,441		1.06
10-14	20-24	4,857	4,060		0.84
15-19	25-29	4,852	4,043		0.83
20-24	30-34	3,924	3,903		0.99
25-29	35-39	4,117	4,099		1.00
30-34	40-44	5,018	4,784		0.95
35-39	45-49	6,036	5,842		0.97
40-44	50-54	5,802	5,843		1.01
45-49	55-59	5,462	5,493		1.01
50-54	60-64	4,865	4,882		1.00
55-59	65-69	4,013	3,772		0.94
60-64	70-74	3,190	2,581		0.81
65-69	75-79	2,968	1,947		0.66
70-74	80-84	2,496	1,328		0.53
75+	85+	3,480	872		0.25
Cohort		Females			
Age in 2000	Age in 2010	2000	2010		Ratio of Change
0-4	10-14	3,132	3,489		1.11
5-9	15-19	3,996	3,906		0.98
10-14	20-24	4,596	3,057		0.67
15-19	25-29	4,343	2,969		0.68
20-24	30-34	2,789	3,053		1.09
25-29	35-39	3,114	3,357		1.08
30-34	40-44	3,867	4,088		1.06
35-39	45-49	5,077	5,361		1.06
40-44	50-54	5,286	5,536		1.05
45-49	55-59	4,796	5,019		1.05
50-54	60-64	4,505	4,648		1.03
55-59	65-69	3,825	3,587		0.94
60-64	70-74	3,213	2,722		0.85
65-69	75-79	3,008	2,189		0.73
70-74	80-84	2,821	1,774		0.63
75+	85+	5,479	1,680		0.31

A ratio greater than 1 indicates that there were more people present of that cohort in 2010 compared to 2000. This is explained as being 'attractive' for those age groups to migrate into the area. Please keep in mind that some of the migration is due to people placed in prisons in the area. A ratio less than 1 can be caused by mortality and more people of that cohort leaving the area than moving in.

For the women to child ratios we made the following calculations:

			Mother child ratio
Age in 2010	Boys plus girls (2010)	Potential mothers (age 10 - 39 in 2000)	
0-4	5,929	23,786	4.01
Age in 2010	Boys plus girls (2010)	Potential mothers (age 15 - 44 in 2000)	
5-9	6,352	24,476	3.85

This means that we looked at the female generation being age 15-49 at the moment of birth.