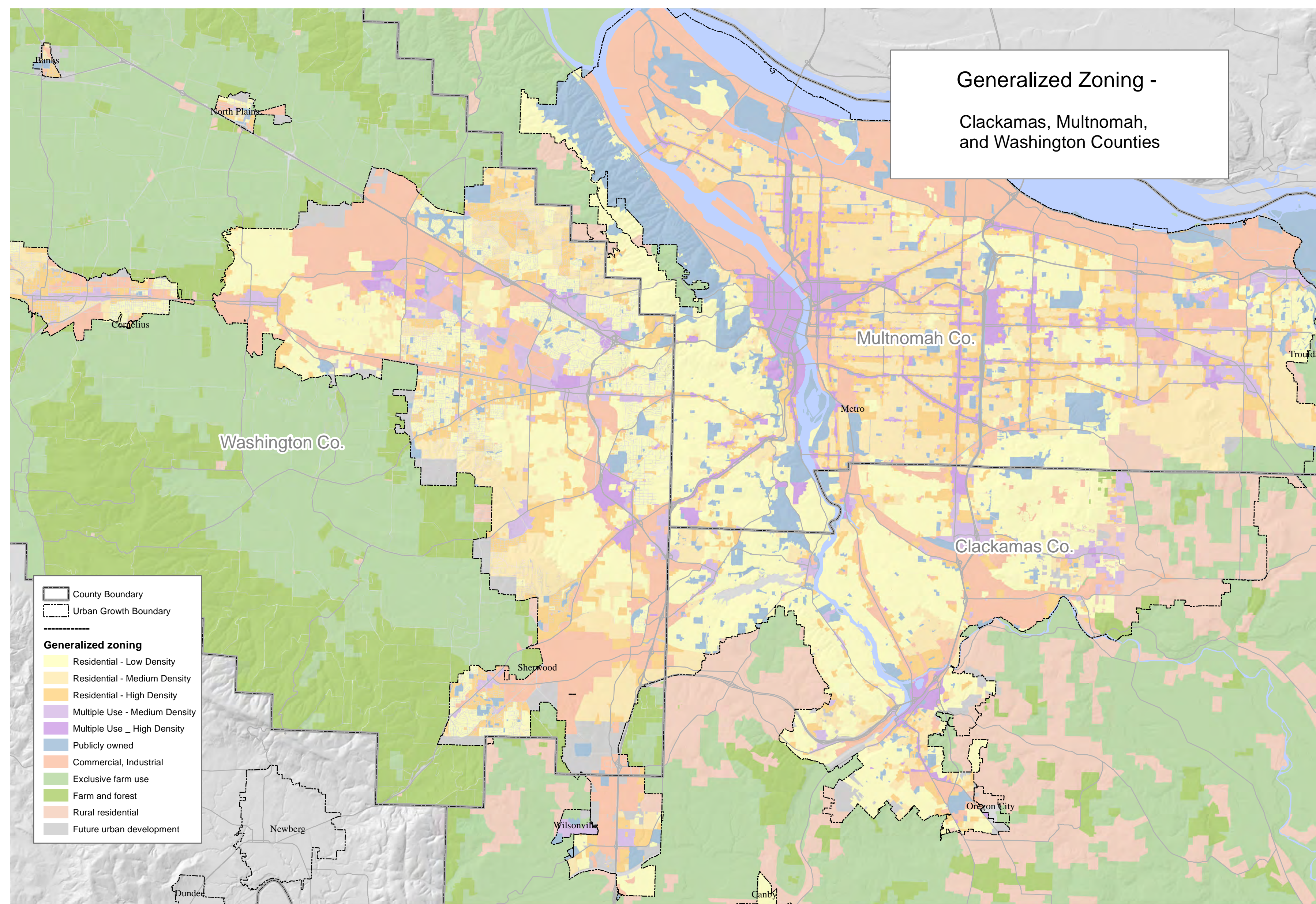# The Demographics of Zoning

The Population Research Center (PRC) at Portland State University, Oregon was tasked by the Oregon legislature to work with county governments to develop *coordinated population forecasts* for Oregon counties and the cities within. This poster shows how linking zoning to population data can help in this effort and how it may assist in forecasting where older persons may live over the next few decades. The Portland Metro area is used to demonstrate the approach.

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ESRI User Conference 2014

Generalized Zoning -

Clackamas, Multnomah, and Washington Counties

County Boundary
Urban Growth Boundary

Generalized zoning
Residential - Low Density
Residential - Medium Density
Residential - High Density
Multiple Use - Medium Density
Multiple Use - High Density
Publicly owned
Commercial, Industrial
Exclusive farm use
Farm and forest
Rural residential
Future urban development

Where the Seniors Live
Number and Percent
by Census Block
2010

Block Population
and Percent
Age 55+

Percent Age 55+
75-100 50-74 20-49 0-19

Block Population
1
4
10
20
33
55
90
160
275

Area of symbol proportional to block population.
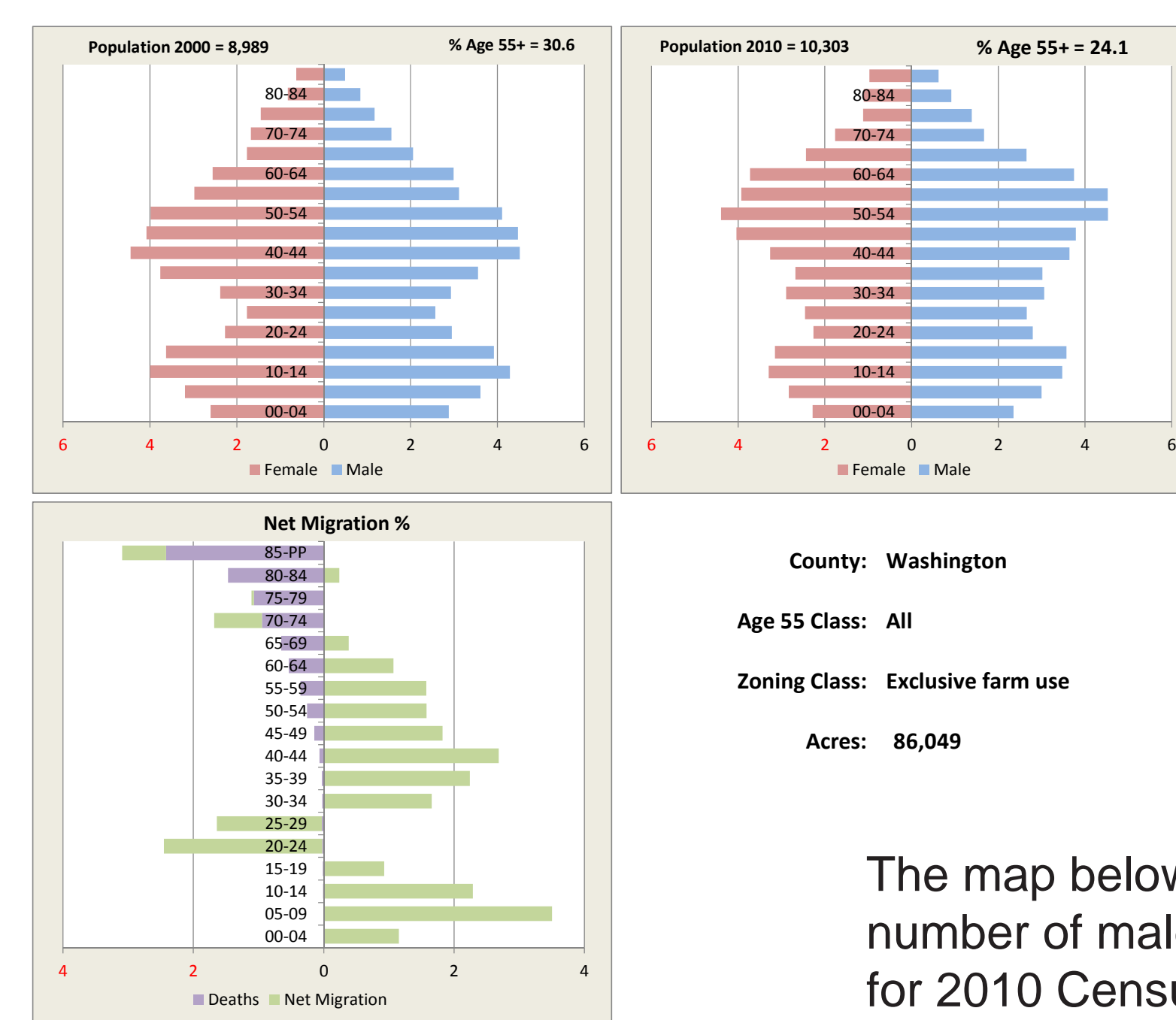
2010 Census block data

The map above shows generalized zoning classes for the Portland area, part of a larger effort by the Oregon Geospatial Enterprise Office to publish state-wide zoning maps. Zoning class from the above map was added to block level point age/sex data from the 2000 and 2010 Census Summary File 1.
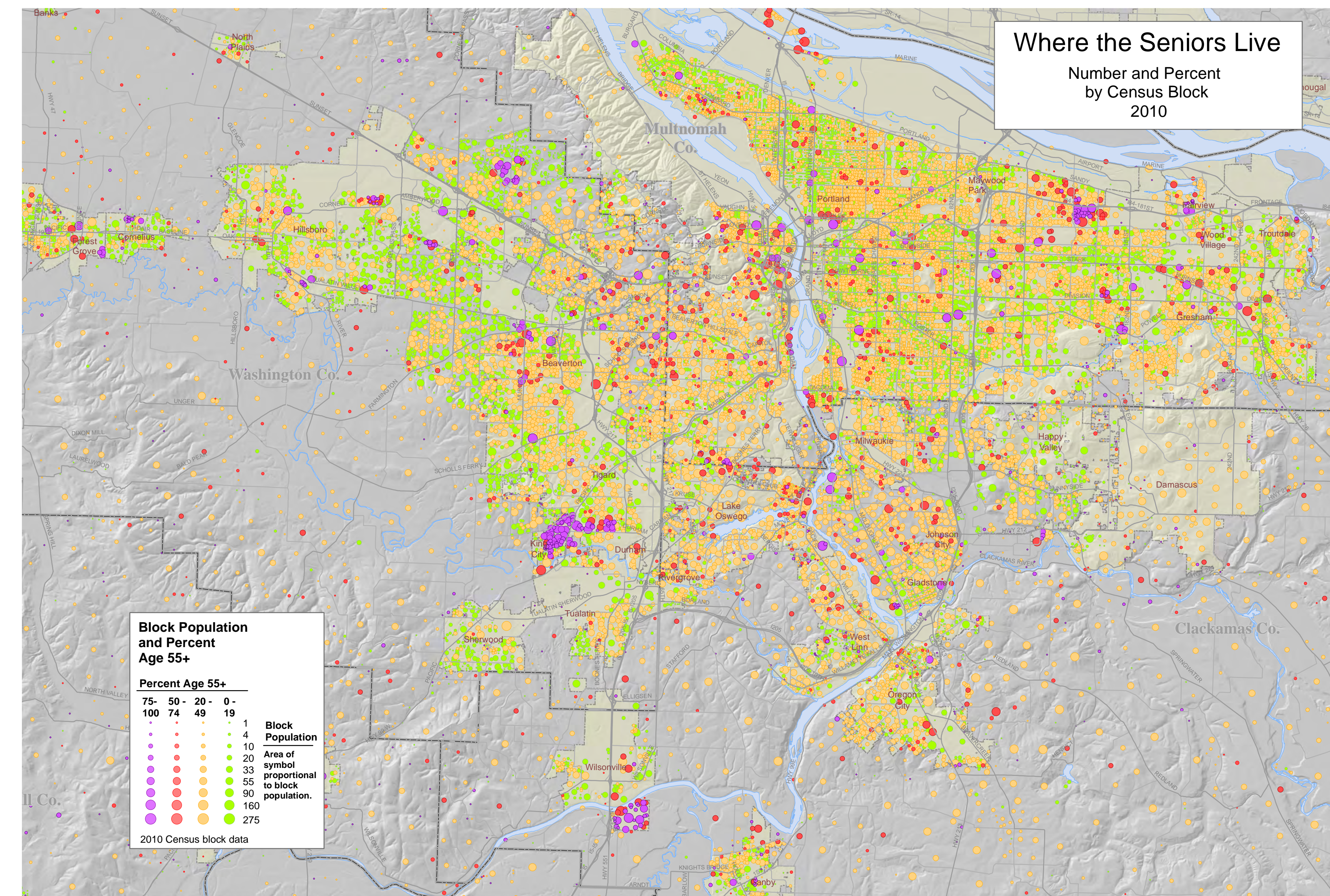
The map above shows concentrations of seniors. The largest numbers are in the yellow areas where 25-49 percent of the populaton are age 55 or older, the *aging in place* senior population. Also, seniors concentrate in the red and purple areas where over 50 percent of the population is age 55 plus.
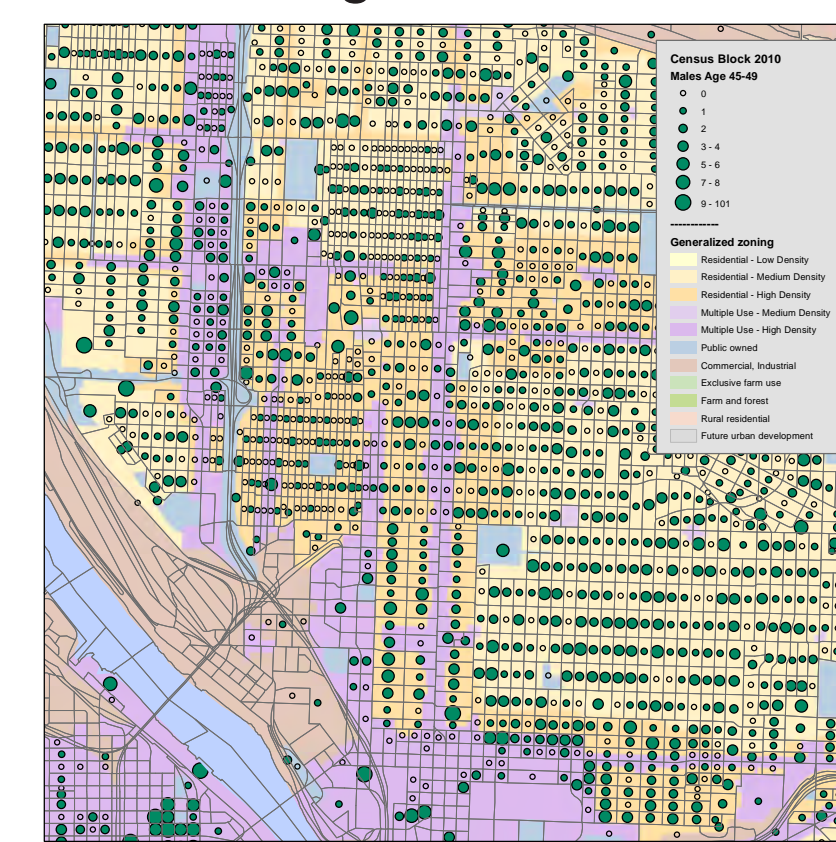
Zoning to Demographics

The *cohort-component* model frequently is used for long term population forecasts. It follows the trajectory of cohorts (e.g. females age 25-29 in 2000) over time and applies fertility, mortality, and migration rates to forecast future population by age and sex. Net migration is most difficult for the forecaster to estimate. The example to the right shows an estimate of net-migration (green) between 2000 and 2010 for persons residing on land zoned for exclusive farm use in Washington County. The population pyramids imply a concentration of older households and the net migration diagram shows the loss of younger persons and vacancies created by out-migration (green) and deaths (purple) of seniors.

The graphs were produced in Excel using a *pivot table* query like that shown to the right. The data queried were 2000 and 2010 age/sex data from the Census with each block labeled by county, age class, in or out of the urban growth boundary, and zoning.

Population 2000 = 8,989   % Age 55+ = 30.6
Population 2010 = 10,303   % Age 55+ = 24.1

Net Migration %

County: Washington
Age 55 Class: All
Zoning Class: Exclusive farm use
Acres: 86,049

The map below shows the number of males age 45-49 for 2010 Census blocks over zoning code.

Excel Pivot Table   EFU

		Zoning:	Exclusive farm use
InUGB	(All)	In UGB:	All
HUGB	41067	County:	Washington
CLA_55P	(All)	AgeClass:	All

| 2010 Zoning	Sum of M0004	Sum of M0509	Sum of M1014	Sum of M1519	Sum of M2024	Sum of M2529	Sum of M3034
RE_L	6,867	7,509	7,266	6,436	4,894	6,149	6,935
RE_M	3,100	3,428	3,646	2,962	2,364	2,776	
RE_H	5,685	5,150	4,765	4,548	5,092	6,812	6,526
MU_L	1,051	854	729	776	1,018	1,588	1,461
MU_H	516	327	242	244	561	813	729
COIN	593	518	535	555	618	913	797
PUB	219	222	211	218	199	271	261
RRES	32	33	52	45	34	32	24
FAFO	372	481	610	601	375	304	285
EFU	242	309	358	368	288	274	315
FUD	133	113	151	124	137	145	148
#N/A	764	696	654	585	491	641	727
Total	19,574	19,640	19,219	17,462	15,711	20,306	20,984
EFU	242	309	358	368	288	274	315

Examples

1. Varying Zoning Classes. The largest acreage of rural lands in Washington Co. are in the zoning class *Exclusive Farm Use* whereas in Clackamas Co they are in the *Rural Residential* Class.

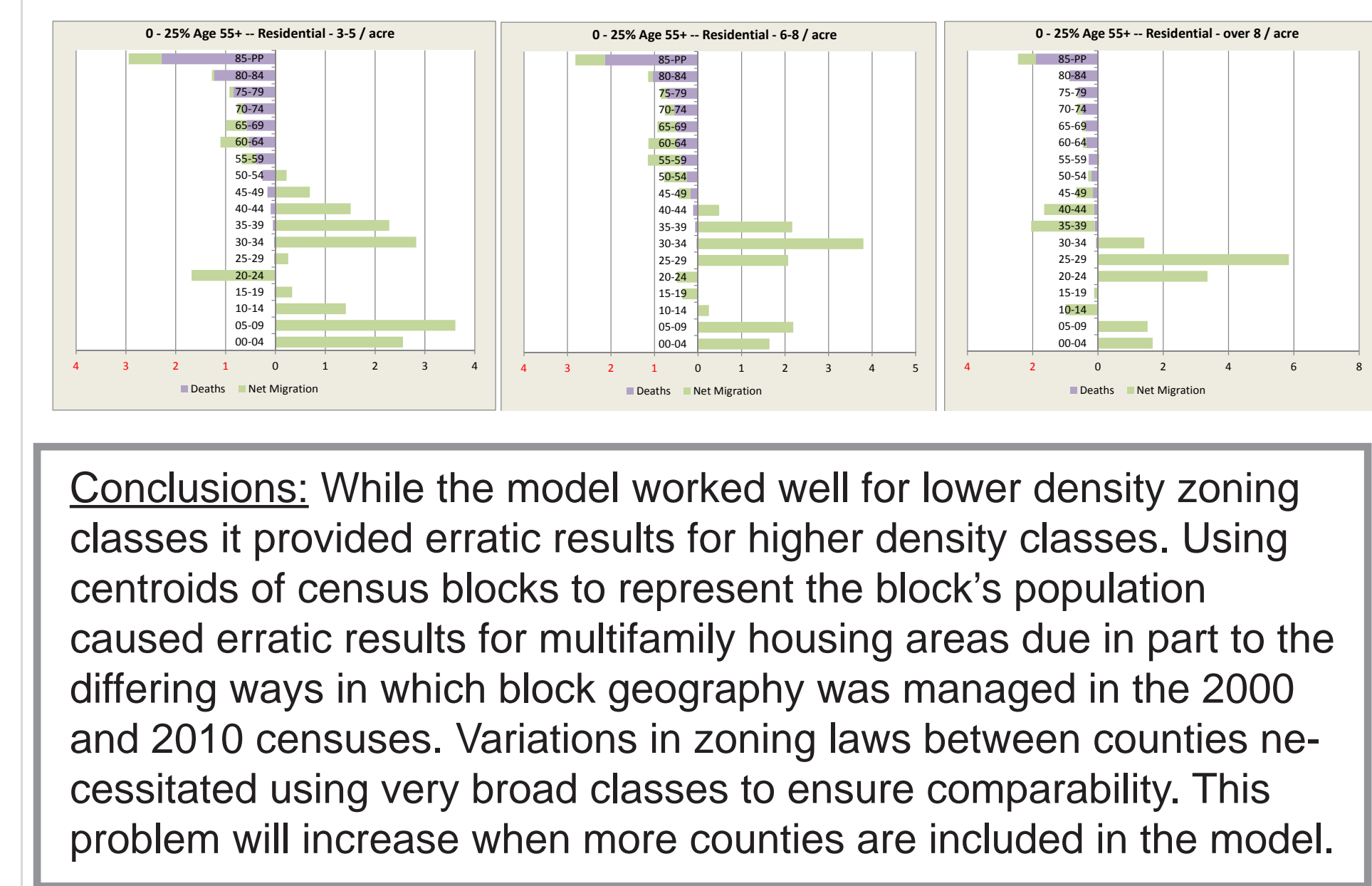Question - Are the population pyramids or age distribrutions for net migration different?

Answer - No. They are nearly the same. Compare graphs below and to the left
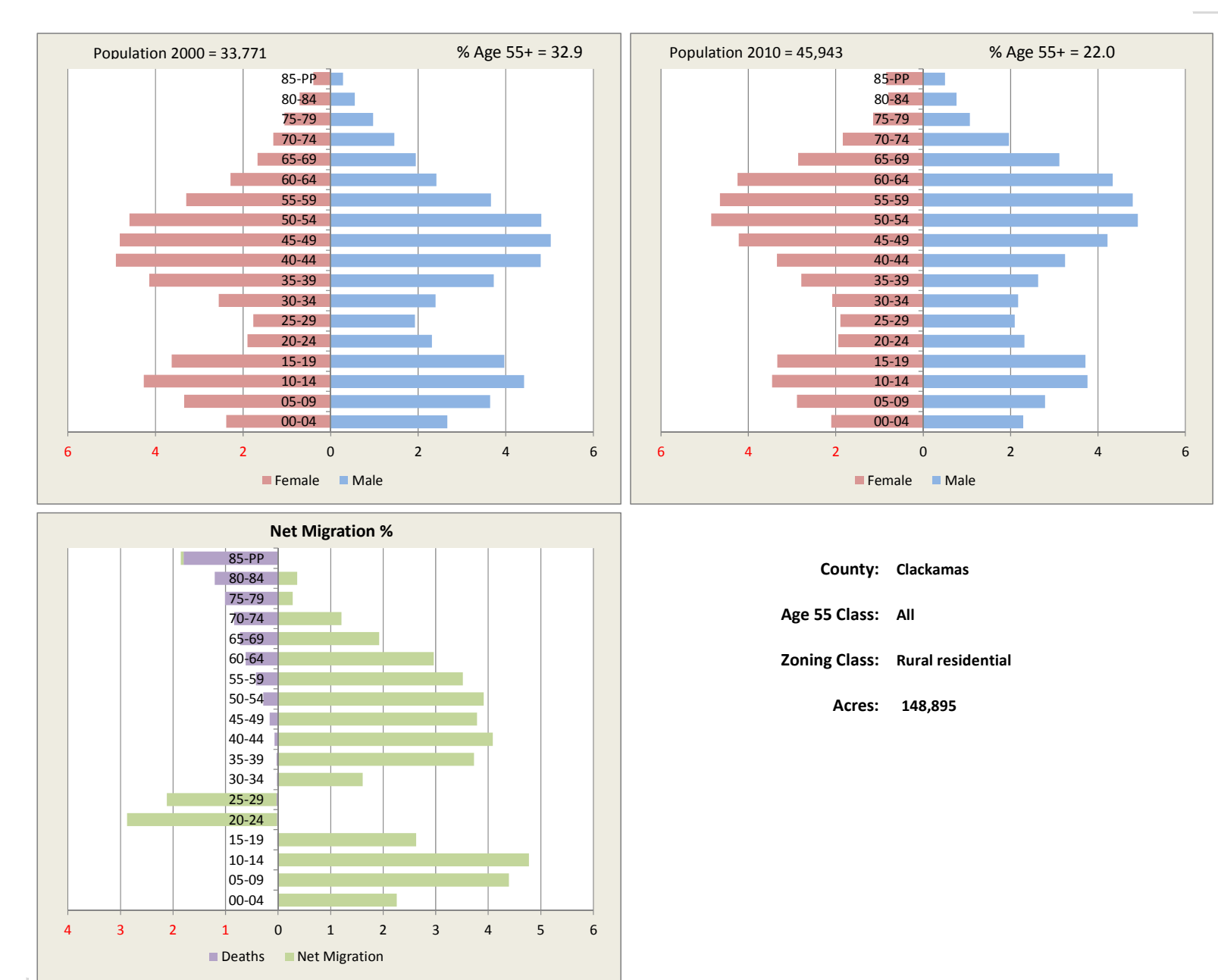
2. Varying Housing Density. In the green and yellow areas on the map above less than 50 percent of the population was age 55 and over in 2010. The majority of those areas consisted of single family housing in residential low, medium and high density zoning classes.

Question - Does the pattern of net migration by age vary by housing density class - low, medium, and high?

Answer: Yes, to a moderate degree. Net migration into the lowest density zoning tended to be older, that into the highest density zoning younger. In lower density areas deaths and out-migration of seniors created more vacancies.

Population 2000 = 33,771   % Age 55+ = 32.9
Population 2010 = 45,943   % Age 55+ = 22.0

Net Migration %

County: Clackamas
Age 55 Class: All
Zoning Class: Rural residential
Acres: 148,895

0 - 25% Age 55+ – Residential - 3-5 / acre
0 - 25% Age 55+ – Residential - 6-8 / acre
0 - 25% Age 55+ – Residential - over 8 / acre

Conclusions: While the model worked well for lower density zoning classes it provided erratic results for higher density classes. Using centroids of census blocks to represent the block's population caused erratic results for multifamily housing areas due in part to the differing ways in which block geography was managed in the 2000 and 2010 censuses. Variations in zoning laws between counties necessitated using very broad classes to ensure comparability. This problem will increase when more counties are included in the model.