Socio-Spatial Polarization in an Age of Income Inequality: An Exploration of Neighbourhood Change in Calgary's "Three Cities"

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Executive Summary

This report examines the changing characteristics and spatial distributions of income in Calgary since the early 1970s. It is one of a series produced by the Neighbourhood Change Research Project (NCRP) for selected metropolitan areas in Canada, which documents and describes the ways in which Canadian cities are being restructured within the context of a dramatic increase in the levels of both income inequality and income polarization over the last few decades.

The Three Cities within Toronto report showed that the city has become increasingly polarized and spatially restructured, with income-increasing neighbourhoods (City 1) in the inner city; a declining share of income-stable neighbourhoods in the middle suburbs (City 2); and a growing region of income-declining neighbourhoods on the suburban periphery (City 3). Are similar patterns evident in Calgary? How is the geography of income change manifested in Calgary? Do we see increasing spatial polarization accompanying income inequality and polarization? What are the significant social attributes of neighbourhoods associated with the new geography of income inequality? These are the questions addressed in this report.

We begin by exploring the changing proportions of neighbourhoods in Calgary categorized by average individual income ratio for each decade between 1970 and 2010. This analysis is based on custom census tract income data obtained by the NCRP team. For each census year studied, neighbourhoods are classified, based on income ratios, into five income groups. The findings point to a remarkable shift in the proportions of neighbourhoods within each group.

We found that middle-income census tracts declined from 70 percent to 41 percent of Calgary tracts between 1970 and 2010. This decline has largely been accompanied by a rising share of low- and very-low-income tracts, increasing from 11 percent in 1970 to 33 percent in 2010. The share of census tracts that are high or very high income has changed little over time, increasing from 19 percent in 1970 to 20 percent in 2010. But we found evidence of increasing concentration of income *within* these tracts. For instance, in the highest income tract in Calgary, the income ratio almost doubled from 1.9 in 1970 to 3.6 in 2010.

In the second part of the report, we focus on the spatial pattern of neighbourhood incomes in 1970 as compared with the pattern in 2010. In 1970, low-income neighbourhoods were concentrated in inner-city and older suburban neighbourhoods, especially on the eastern edge of the downtown, as well as in areas to the east. The vast majority of neighbourhoods, whether established or new suburban, were middle income. Two distinctive sectors of high-income tracts were evident: one in the northwest along the Crowchild Trail corridor, and a second running from the elite inner-city neighbourhoods south of the central business district southwest through areas surrounding the Glenmore Reservoir, linking to high-income new suburban districts on the southern edge of the city.

In 2010, we see a distinctively new geography of low income, in which inner-city concentrations of poverty have given way to a vast region of low and very low income in the northeast sector of the city—many of these neighbourhoods have high concentrations of visible minority immigrants. Former low-income inner-city communities of 1970 have seen extensive gentrification

and condominium development, and have become part of a large above-average-income inner-city region surrounding the central business district.

By 2010 we also find concentrations of high income in rural residential or acreage developments on the western and northwestern periphery of the city. However, the analysis also shows continued and intensifying concentrations of income in the southwestern high-income sector described above—some communities have average incomes almost four times the metropolitan area average.

Another important change between 1970 and 2010 is the pattern of incomes in the suburbs. Many suburban areas experienced a decline in relative incomes over the period. This is particularly evident to the northwest, but can also be seen in the southern communities of the city. Overall, these patterns of neighbourhood change over time reflect broader trends observed in metropolitan Canada, such as the rising incomes of central cities and declining incomes of suburban regions.

The third section of this report tests and describes the Three Cities model in Calgary. This model, initially developed to describe regionalized patterns of income change in Toronto, groups neighbourhoods based on income change through time. Census tracts are classified as income-increasing (City 1); income-stable (City 2); or income-declining (City 3). (Because each neighbourhood (census tract) is measured over time, a common geography must be used. The common geography is a set of 115 census tracts that existed in 1981, so this analysis does not deal with areas developed after 1981.)

The spatial pattern of the Three Cities in Calgary is generally consistent with the findings from Toronto. City 1 comprises 29.6 percent of the 115 tracts, mostly in inner-city and older established mature suburban neighbourhoods, although it also includes selected newer residential areas. City 2 comprises 20.9 percent of the 115 tracts, mainly concentrated in established residential areas that were built out between the 1950s and 1980s. City 3, with 49.6 percent of the 115 tracts, reveals a pattern of income decline, almost entirely within suburban neighbourhoods, in almost all income areas, including neighbourhoods that were formerly high income and those that were formerly low income. The broad patterns of City 1, City 2, and City 3 are consistent with those found in Toronto and elsewhere. They point to a new geography of income change, with income growth in the core and decline in the suburban periphery.

In the final part of the report, 2006 census data is used to identify social attributes that differ significantly between neighbourhoods (census tracts) of City 1, City 2, and City 3. The analysis explores different social indicators associated with education, labour force characteristics, incomes, age structure, household characteristics, immigrant and ethnic characteristics, mobility, and housing attributes. Detailed statistical comparisons are provided, but in general the findings point to a number of important differences.

City 3 is uniquely characterized by lower levels of university-educated people and significantly higher shares of people without a high school education. The neighbourhoods in City 3 also exhibit a very different labour force from City 1 and City 2. Managerial and professional labour force is high in Cities 1 and 2, whereas low incidence of professional and managerial and a high incidence of sales and manufacturing labour force is an important trait of City 3 communities.

City 3 neighbourhoods also have significantly higher shares of children aged 0–14 years. Young adults, aged 25–34, are an important characteristic of City 1, and are part of an ongoing "youthification" of central cities. Late middle age (age 50–64), which is often associated with empty-nester status and established inner suburbs, is highest in the suburban City 3. The highest average incidence of seniors (aged 65 and up) is found in City 2—those income-stable communities that are for the most part, situated in well-established middle suburbs.

City 1 has a greater share of small households and higher income ratios. City 3 has the lowest income ratios, larger households, and significantly higher incidence of single-parent families. In very broad terms, larger households and single parents are a significant feature in the geography of declining incomes and impoverishment in Calgary. There also appear to be important connections between immigrant status, selected immigrant groups, language spoken, and the geography of income decline that defines City 3. These are troubling traits, given the evidence that newcomers and visible minority populations experience inequitable earnings and labour market integration.

City 1 is distinctive from City 2 and City 3 in terms of mobility, with significantly higher shares of recent movers (moved in the last five years). The findings reinforce the trend whereby inner-city redevelopment and a condominium boom are encouraging a return to central-city living.

The suburban areas of City 3 have significantly lower rates of rented dwellings compared with City 1. Interestingly, City 1 is also distinct with respect to the age of the housing stock—it is characterized by simultaneously high rates of older pre-war housing as well as high rates of new housing constructed in the last decade. City 1 is therefore the old and the new juxtaposed, a reflection of the central city gentrification, redevelopment, and housing and condo boom of recent years. Neighbourhoods in City 1 have a significantly higher incidence of both low-rise and high-rise apartment buildings in the housing stock, whereas the suburban areas of City 3 are defined by considerably higher shares of single detached dwellings that are largely owner-occupied.

The report concludes with a summary of the findings and their implications for understanding the changing geography of income in Calgary. The Three Cities model is clearly applicable to Calgary, and the geographical patterns of increasing incomes, decreasing incomes, and stable incomes are broadly similar to those in Toronto. These patterns reveal increasing-income neighbourhoods within the central city and established inner suburbs; a smaller region of stable-income neighbourhoods in typically middle suburban areas; and a rapidly growing set of declining-income suburban neighbourhoods.

The fact that so many social and housing attributes are associated with a large region of declining incomes is disturbing. We are facing undeniable changes in income inequality in our society and in our cities. To the extent that this inequality is increasingly racialized and spatially manifested in City 3, we must be aware of the emerging geography of inequality in Calgary.

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1. Introduction

The publication of Thomas Piketty's (2014) *Capital in the Twenty-First Century* focused the attention of academics and policy makers on the problem of growing inequality in a way that previous analyses had not. Picketty has made a compelling case that capitalist economies tend toward ever-increasing concentrations of income and wealth, as returns on capital exceed returns on labour.

But while Piketty's analysis has received some support, it glosses over the implications of growing inequality for social organization and social relationships. Inequality can take many social and geographical forms. For example, a declining middle class combined with growing upper and lower classes could, potentially, take the form of a more heterogeneous society in which people from diverse class positions live in mixed neighbourhoods and interact in common spaces on an everyday basis. The history and geography of increasingly unequal societies, however, suggests something very different.

As societies become more unequal, they tend to become more spatially polarized. As Engels observed in 1844 Manchester, "the town itself is peculiarly built, so that a person may live in it for years, and go in and out daily without coming into contact with a working-people's quarter or even with workers… This arises chiefly from the fact, that by unconscious tacit agreement, as well as with outspoken conscious determination, the working-people's quarters are sharply separated from the sections of the city reserved for the middle class…" (1845: 76).

Charles Booth's (1902–1903) pioneering empirical work on London and the lived experience of inequality and segregation is portrayed in his remarkable poverty map of London. Returning to this theme more than a century and a half later, Madanipour (1998) argues that social exclusion is a socio-spatial phenomenon with effects that are simultaneously economic, political, and cultural. Where people of different social classes and positions live and interact matters.

The documented trend of growing inequality is clearly concerning, but aspatial statistical data do not convey the full impact of this trend. Polarization that produces increasingly homogeneous and segregated communities produces significant barriers to economic advancement, the building of broad political networks, and cultural integration. Indeed, Massey (1996) has argued that income inequality and related segregation is a global problem that may signal the coming

demise of civil society as we know it. For these reasons it is critical that we understand the extent to which economic polarization is taking the form of socio-spatial polarization, and not merely more economically heterogeneous neighbourhoods.

There has been a renewed interest in the geography of income inequality and income segregation in recent years (Bolton and Breau 2012, Bunting and Filion 2001, Chen, Myles, and Picot 2011, Fong and Shibuya 2000, Heisz 2007, Kazemipur 2000, OECD 2011, Procyk 2014, Townshend and Walker 2002, Walks 2011, Yalnizyan 2011), and authors such as Marcuse and van Kempen have articulated important insights into the so-called "Divided City" (Marcuse 1993, Marcuse and van Kempen 2000, van Kempen 2007). Marcuse has drawn attention to the new patterns of socio-spatial differentiation produced by income inequality. He has shown that these changes are a manifestation of unprecedented socio-spatial inequality—a new form of invidious differentiation or cleavage (Marcuse 1993).

Drawing upon the ideas of the "Divided Cities" literature, the *Three Cities within Toronto* report (Hulchanski 2010) is one of the most influential analyses of socio-spatial polarization in the Canadian context and has received widespread academic and press attention. This report documents the changing geography of individual income in Toronto's neighbourhoods between 1970 and 2005. The report illustrates in detail not only the decline of middle-income neighbourhoods, but the growing income polarization and increasing gap between rich and poor. Importantly, as the report illustrates, these changes are not just a matter of income change. Rather, they have resulted in a spatial outcome that Hulchanski has defined as a new geography of income in which the city has become polarized into what are essentially three distinctive "cities": "City #1" comprises neighbourhoods with rising incomes, "City #2" comprises neighbourhoods with stable incomes, and "City #3" comprises neighbourhoods with declining incomes relative to the metropolitan average. The report reveals a new, highly regionalized geography of the Three Cities.

The Toronto findings raise the question of whether the Three Cities pattern of socio-spatial polarization is unique to Toronto, or if it is evident in other Census Metropolitan Areas (CMAs). The Neighbourhood Change Research Partnership (NCRP) (http://neighbourhoodchange.ca) is examining these ideas, among others, in six metropolitan areas in Canada. Analyses of the Three Cities model in Vancouver and Montreal have identified similar trends to those found in Toronto, even though the spatial patterns may not be as stark (Ley and Lynch 2012, Rose and Twigge-Molecey 2013). In contrast, Halifax does not show patterns of socio-spatial polarization similar to Toronto's, suggesting differences in both structures of economic polarization and processes of socio-spatial sorting (Prouse et al. 2014).

Here we examine the applicability of the Three Cities model to Calgary. Based on data at the neighbourhood (census tract) scale, we document the changing character of income inequality and socio-spatial polarization in the metropolitan area between 1970 and 2010. We describe the changing geography of income and examine the social characteristics of those neighbourhoods that that are classified as being in each of the "Three Cities" in 2006.

2. The Changing Character of Neighbourhood Income Distributions in Calgary 1970–2010

Income in Calgary has increased more rapidly than the Canadian average. Between 1980 and 2010 average individual incomes in Calgary increased by 34.7% in real terms (1980 constant dollars), whereas for Canada as a whole they increased only 14.7% in real terms. In 2006 the Calgary metropolitan area had the highest average household income in Canada ($98,253 according to the 2006 Census of Canada), the highest ratio of head offices to population in Canada (due primarily to its role as the command centre of the Canadian oil and gas industry), and a highly educated labour force. In Calgary, average Individual incomes were 123 percent of the Canadian average in 1980, and by 2010 they were 144 percent of the Canadian average. The city has grown rapidly in the last two decades and expansive development, suburban sprawl, and rapidly rising housing costs have been evident (Miller and Smart 2011).

In this analysis we use income data assembled by the NCRP team for all neighbourhoods in 1970, 1980, 1990, 1995, 2000, 2005, and 2010. Census tracts (CTs) are essentially the census surrogate for neighbourhoods, and the measures we use here are *average individual income* at the census tract scale. Data for 1970 to 2005 are derived from census data, while data for 2010 are derived from tax-filer data aggregated to the 2006 census tract boundaries. A full census was not carried out in 2011 and so 2010 income data derived from the 2011 National Household Survey (NHS) is not considered reliable (Hulchanski et al. 2013).

We analyze how neighbourhoods compare to other neighbourhoods at a given point and how they change over time. To carry out this analysis, it is necessary to standardize neighbourhood income measures. Therefore, several of our comparisons are based on *income ratios*. An income ratio is the ratio of a neighbourhood's average individual income to the metropolitan area average individual income at a given date. For example, a neighbourhood with a ratio of 1.0 has the same average individual income as the metropolitan area average for that date. A neighbourhood in which the ratio changed from 1.5 to 3.0 over time is one in which average individual income was formerly 1.5 times the metro average and has since increased to 3 times the metro average.

To facilitate comparison and illustrate changes in the neighbourhoods, we have classified neighbourhoods into five income ratio groups:

1. VL (Very Low: income ratio 0.48 to 0.59)

2. L (Low: income ratio 0.60 to 0.80)

3. M (Middle: income ratio 0.81 to 1.19)

4. H (High: income ratio 1.20 to 1.40)

5. VH (Very High: income ratio 1.41 to 3.56)

The distribution of census tracts by average individual income groups is shown in Figure 1, which shows a pattern similar to that found in other CMAs when the data is analyzed relative to the CMA average income profile—namely the erosion of the middle-income tracts, and growth in the share of both lower-income and higher-income tracts. Data for 2010 show a modest reversal in this pattern of change, although these data were not derived from the census as in other years.

Of the six CMAs studied by the NCRP, relative to the local metropolitan context Calgary shows the most pronounced and systematic decline of middle-income neighbourhoods since 1970, and the most striking increase in polarization. Only Toronto and Calgary have fewer than half their census tracts in the middle-income category. Figure 1 reveals a systematic erosion of the middle income category between 1970 and 2006, declining from a majority of neighbourhoods in 1970 (70 percent) and 1980 (71 percent) to a minority of neighbourhoods in 2005 (41 percent) and 2010 (47 percent). These data, comparing census tracts against the CMA average income, represent a 24 percentage point decline in middle income tracts between 1980 and 2010. Although many middle income census tracts in Calgary would be considered high or very high income by national standards, a comparison of the data, using national average individual income rather than the CMA average individual income, shows a similar profile, with the share of middle income tracts declining from 59 percent to 31 percent between 1980 and 2010—a 28 percentage point decline.

Figure 1 shows that the growth in the share of tracts in the low- and very-low-income category has increased remarkably—more than tripling from 11 percent in 1970 to 38 percent in 2006. This trend is particularly important within the Calgary context, but again, it must be noted that this dramatic change is relative to Calgary as a whole, and indeed many low- or very-low-income census tracts in Calgary would not be considered low income by national standards. Comparing Calgary's census tracts to the national average income profile also shows a tripling of the share of low- and very-low-income tracts, but the shares are considerably lower—increasing from 2 percent in 1980 to 7 percent in 2010.

Relative to the Calgary CMA profile, the share of tracts in the high- and very-high-income categories has not changed as dramatically (from 19 percent in 1970 and 13 percent in 1980 to 20 percent in 2010). However, given the very high incomes in Calgary and the fact that incomes have risen faster in Calgary than the nation as a whole, a rather different perspective is evident if these tracts are compared with the national income base. Using national average individual incomes as a benchmark, the share of high- and very-high-income census tracts in Calgary increased from 39 percent in 1980 to 63 percent in 2010—a dramatic increase of 24 percentage points. The latter highlights the fact that there are important regional income inequalities throughout Canada's metropolitan system.

**Figure 1: Distribution (Percentage) of census tracts
in Calgary CMA by income ratio group, 1970–2010**
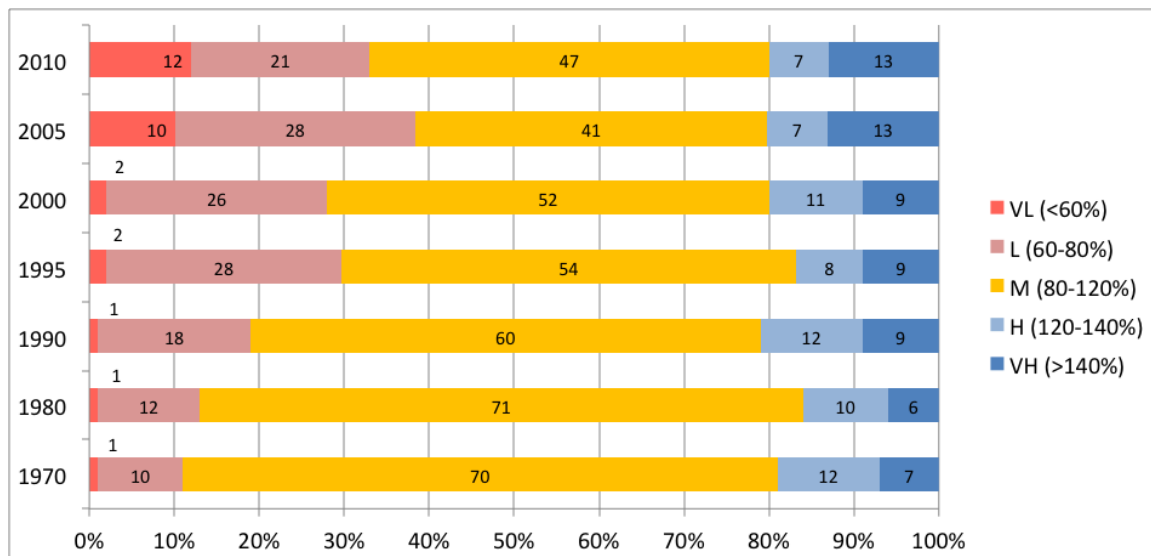
Note: Income ratios are computed as Census Tract Average Individual Income divided by the CMA Average Individual Income for the respective periods.

Because of the income classes used to group the neighbourhoods, Figure 1 masks another important feature of change in the income characteristics of Calgary's neighbourhoods, and in particular the neighbourhoods in the Very High (VH) category: changes in the magnitude of the most extreme income ratios. Essentially, the highest-income neighbourhoods have become even better off through time, a finding in line both with Piketty's analysis, and with the proposition that increasing income polarization is taking the form of increasing socio-spatial polarization (Marcuse 1993).

The temporal intensification of income inequality is evident if we plot the *maximum* value of the census tract income ratios, as shown in Figure 2. In 1980 the highest-income neighbourhood in Calgary had individual incomes 1.78 times the CMA average; by 2010 the highest-income neighbourhood had individual incomes 3.56 times the CMA average. Because Calgary's average individual income in 2010 was 144 percent of the Canadian average individual income, the latter figure also understates the degree of income concentration in the highest income tract. Indeed, using Canadian rather than CMA average incomes as the benchmark or denominator in the ratio calculations, shows that Calgary's highest income tract had average individual income 5.13 times the national average—an increase from 2.21 in 1980.

While Figure 2 shows the significant rise in highest-income ratios since the 1980s, coincident with the rise of neoliberal governance (Allahwala, Boudreau, and Kiel 2010, Harvey 1989, Sancton 2005), Figure 2 also shows the intensification of this trend between 1990 and 2000, with a sharp increase between 1995 and 2000.

Figure 2: Minimum and maximum census tract income ratios, 1970–2010
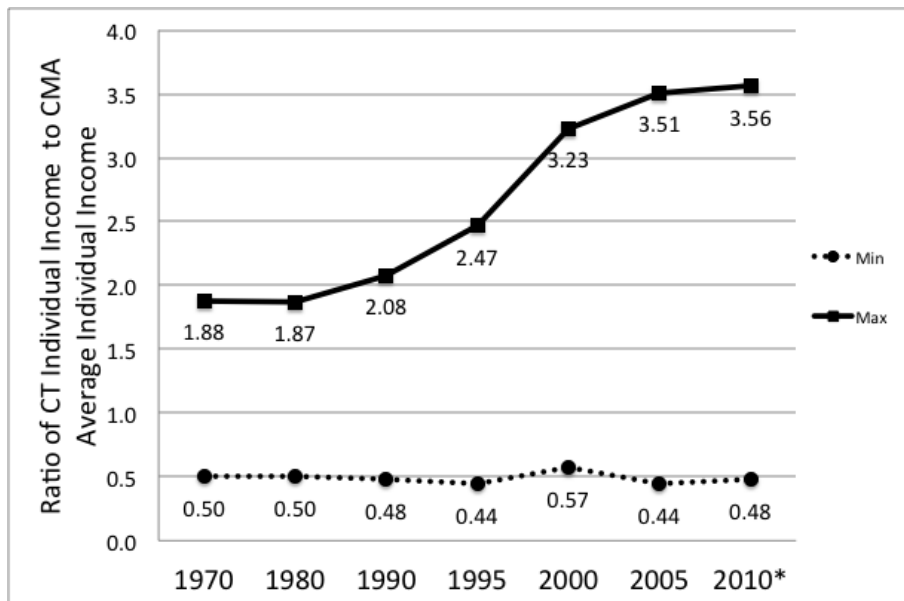
*2010 data is derived from Canada Revenue Agency data made available by Statistics Canada.

Relative to Calgary as a CMA, Figure 1 and Figure 2, taken together, point to the increasing prevalence of low-income tracts, but also the increasing intensification of income in a small share of tracts at the upper end of the income ratio distribution. In other words, while the overall distribution of income is flattening (because of the loss of the middle), it is also becoming more positively skewed by a few very-high-income outliers. This trend is illustrated in the 1970 and 2010 histograms of Calgary census tracts by income ratios shown in Figure 3.

Calgary has seen an increase in both income inequality and income polarization (Walks 2013) and the change is manifested spatially (see Figure 4). This analysis of income ratios by census tract through time reveals unmistakable evidence of systematic erosion in the share of middle-income neighbourhoods, increasing inequality and polarization of income at the neighbourhood scale, and an increasingly skewed distribution. In Calgary, the declining share of the middle has mostly been accounted for by the threefold rise in the share of low- and very-low-income neighbourhoods. Relative to Calgary (but not relative to national income profiles), the share of high- and very-high-income neighbourhoods has not increased systematically over time. But in Calgary, the degree of income concentration in these tracts has intensified, with maximum income ratio values more than doubling over the past 40 years. In short, in the local metropolitan context, more neighbourhoods have become low or very low income, but with income ratios not much lower than they were in the past, while an unchanged share of relatively few neighbourhoods have remained very high income and intensified the extremes of income concentration within them.

Figure 3: Histograms of percent of tracts by income ratio, 1970 and 2010
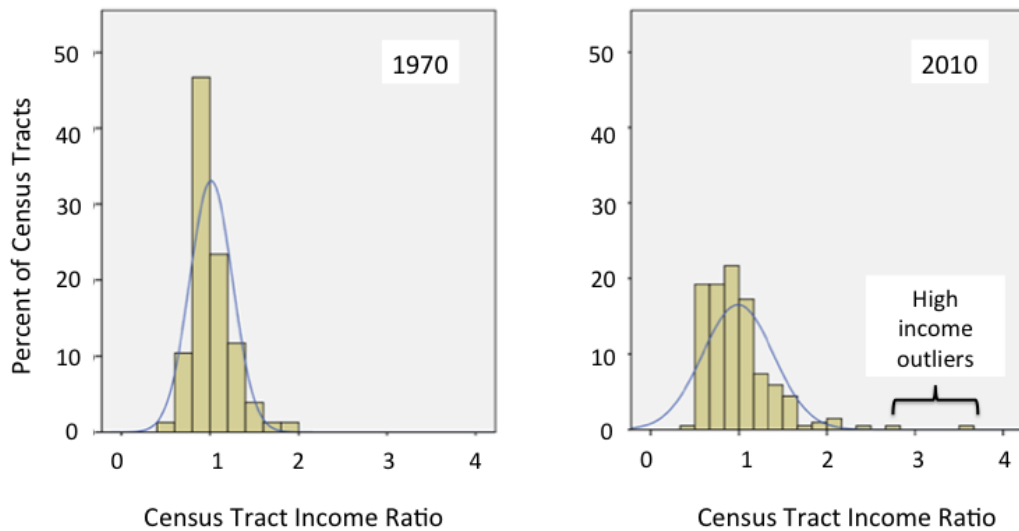
Figure 4: Household Income inequality (Gini) and income polarization (COP), Calgary 1970–2010
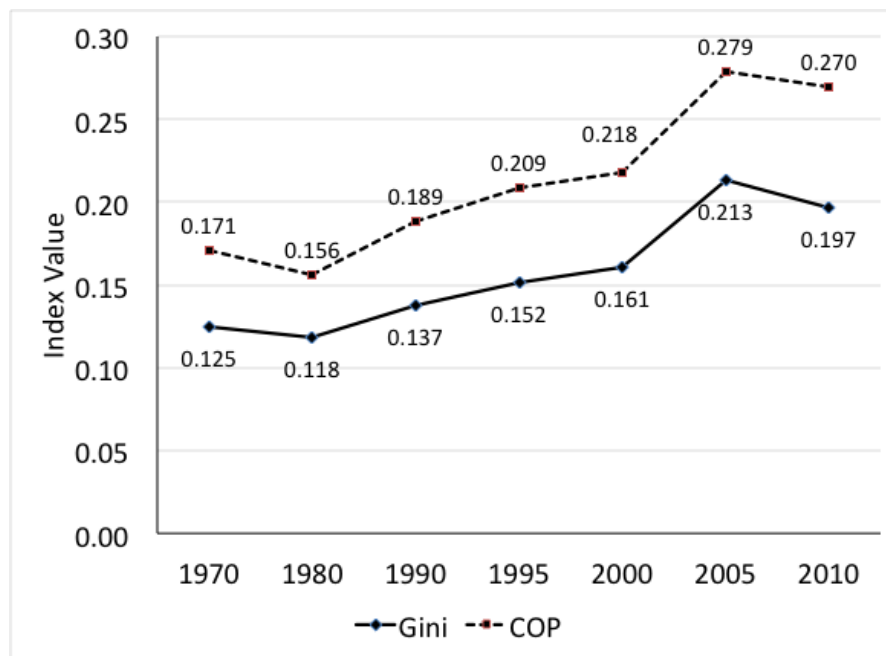
Source: Values derived from Walks 2013: 45, except for the 2010 data, which is calculated from CRA data made available by Statistics Canada.

Note: The Gini Index reported here is a measure of socio-spatial income inequality between census tracts and is considered a measure of the segregation of household income. Inequality generally refers to an increasing dispersion of incomes with income skewed towards high-income earners. Polarization refers to the hollowing out of the middle-income population, with the population massed around two distinct poles (Walks 2013: 10). The COP is the coefficient of polarization and was developed to measure polarization as distinct from inequality; see Walks (2013) for further details.

3. The Geography of Income, 1970 vs. 2010

The spatial patterns of income for 1970 and 2010 are shown in Figures 5 and 6. In 1970, low incomes are concentrated in inner-city and older suburban neighbourhoods, especially on the eastern edge of the downtown, as well as to the east in neighbourhoods such as Inglewood, Ramsay, and Victoria Park, adjacent to the Stampede grounds. In addition, on the western edge of the city, lower-income concentrations in the former towns of Bowness and nearby Montgomery (both annexed in 1963) are evident.

The vast majority of the neighbourhoods, whether established or new suburban, are middle income. Two distinctive sectors of Calgary are high income: one in the northwest along the Crowchild Trail corridor, primarily neighbourhoods developed since the 1960s, and a second sector running from the elite inner-city neighbourhoods of Upper Mount Royal, Rideau, Roxboro, and Elbow Park, southwest through areas surrounding the Glenmore Reservoir, and then linking to a series of high-income new suburban districts on the southern edge of the city.

By 2010 the CMA includes surrounding rural residential areas within the Municipal District of Rockyview as well as distinctive municipalities and other dormitory communities such as Cochrane, Airdrie, and Chestermere. Three important features of the 2010 map should be noted.

First, there is a distinctively new geography of low income, in which inner-city concentrations of poverty have given way to a vast area of low- and very-low income neighbourhoods in the northeast sector of the city—many with very high concentrations of post-1980s visible minority immigrants. Many of the former low- and very-low income inner-city communities of 1970 have seen extensive gentrification and condominium development and have become part of a large above-average-income inner-city area surrounding the central business district (CBD). This return to the city of high income people is not unique to Calgary, and has been well documented in other cities (Bain 2010, Lees, Wyly, and Slater 2010, Ley 1996, Slater 2005, Walks and Maaranen 2008). The 2010 map reveals a much sharper east-west polarization of the geography of income, with poor to the east and rich to the west and in the inner city.

Figure 5: Average individual income by census tract, 1970
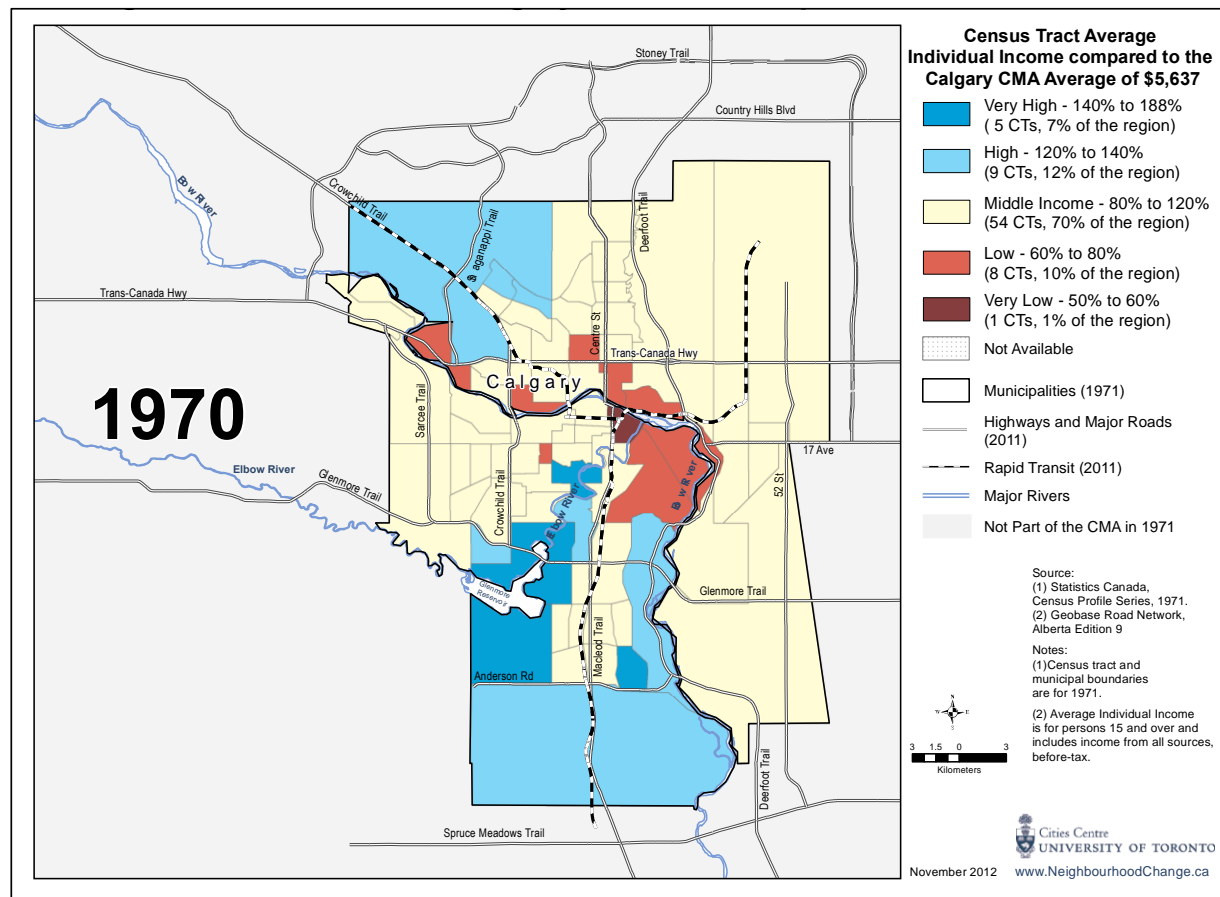
Source: Custom NCRP data.

The second key feature of the 2010 map and contemporary geography of income in Calgary is the high concentrations of high income in rural residential or acreage developments on the western and northwestern periphery of the city that sprang up in the aftermath of the abolition of regional planning in 1995.

We also see the continued concentrations of high income in the southwest sector. In fact, the characteristics of this established region have changed to show an increased spatial concentration of high income. In 1970 no tracts in this area had an income ratio of 2.0 or more. By 2010, four tracts in the southwest sector of the city, which includes community areas such as Lower Mount Royal, Upper Mount Royal, Rideau, Roxboro, Elbow Park, Britannia, Elboya, Windsor Park, Bel-Aire, Mayfair, Meadowlark, Eagle Ridge, Kelvin Grove, and Chinook, had income ratios of 2.0 or higher, with values in 2010 almost four times the CMA average.

Figure 6: Average individual income by census tract, 2010
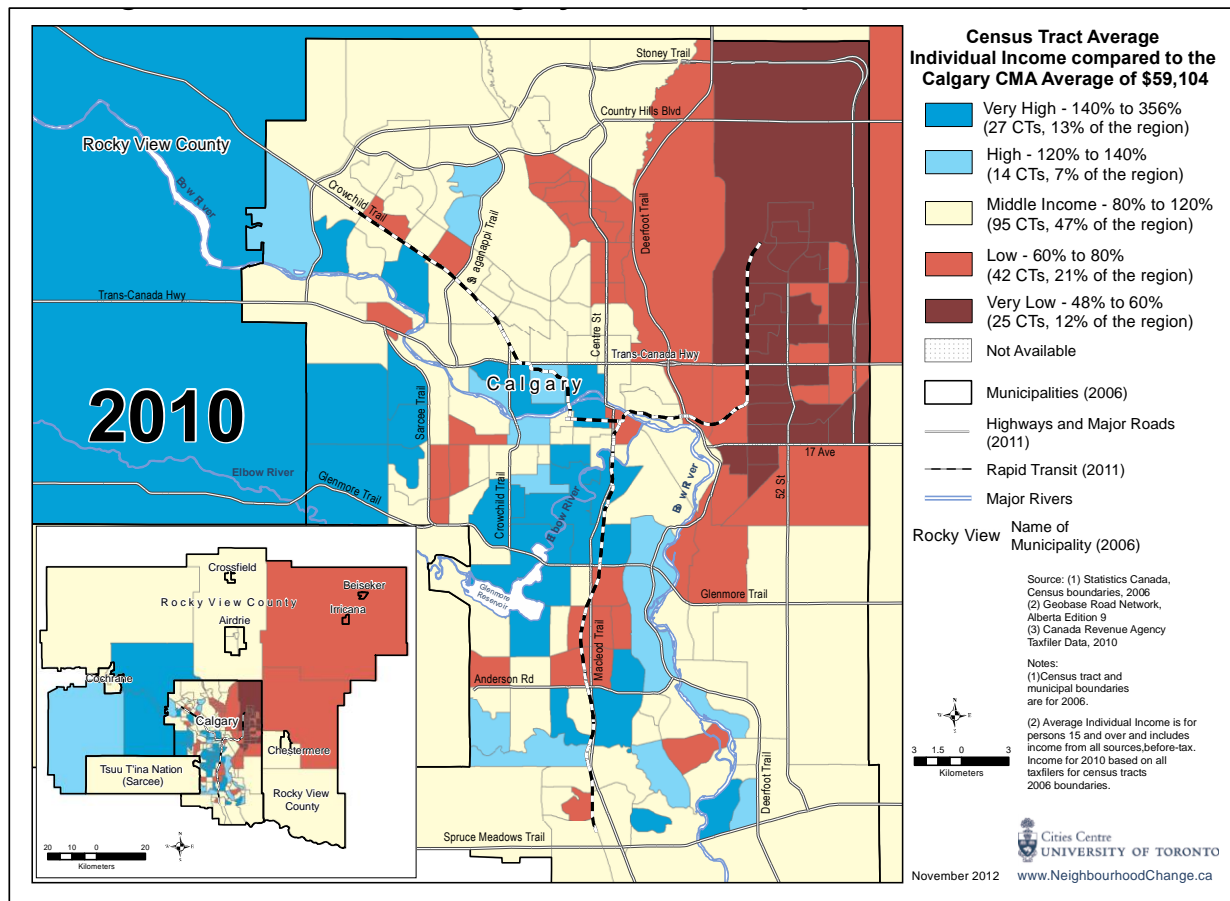
Source: Custom NCRP data.

The third feature of the 2010 map is the relative decline in incomes in many of the suburban neighbourhoods that had either middle or high incomes prior to the 1990s. This is particularly evident in the decline of the 1970s northwest high-income sector and the relative decline in the 1970s high-income district on the southern part of the city in 1970.

Similarly, the large declines in suburban relative income from middle to either low or very low income is particularly evident in the northeast suburbs, which now represent a large contiguous low-income area. This relative impoverishment of the inner ring of mature suburbs and simultaneous rise of the gentrifying inner city is not unique to Calgary.

4. Applying the Three Cities Model to Calgary

The 1981 census tract boundaries define the "reference geography" from which we measure change in income ratios between 1980 and 2010.[1] The Three Cities are the groups of largely but not necessarily contiguous census tracts categorized by change in average individual income:

> City 1. Change in income ratio of +0.1 or more (*increasing* income of 10 percent or more relative to CMA average)

> City 2. Change in income ratio between -0.1 and +0.1 (*stable* income within 10 percent above or 10 percent below CMA average)

> City 3. Change in income ratio of -0.1 or less (*decreasing* income of 10 percent or more relative to the CMA average).

In Calgary, 115 of the 1981 census tracts are used to define this reference geography and the classification of neighbourhoods into City 1, City 2, or City 3. Because this typology is based on areas common to 1981 and 2006, it does not include areas of Calgary that were developed since the 1980s. The resulting map of the Three Cities is shown in Figure 7. Figure 8 shows a simplified version of the Three Cities with Calgary's 2011 residential "community district" boundaries superimposed for general reference (see the Appendix for the key to community district names).

The spatial pattern of the Three Cities is consistent with the findings from Toronto (Hulchanski 2010). City 1 comprises 34 (29.6 percent) of the 115 tracts (Figure 7). This area of increasing relative income is marked by a distinctive inner-city and older established mature suburban concentration, although it also includes selected newer (post-1980s) neighbourhoods (Figure 8), particularly those on the western edge of the city (e.g., Signal Hill [SIG], Strathcona [STR], Coach Hill [COA]) and a few newer residential areas in the southeast of the city (e.g., the "new urbanist" neighbourhoods of McKenzie Towne [MCT] and Copperfield [CPF]).

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1. The Three Cities is a model in which neighbourhoods are classified, not according to income levels at a fixed point, but according to change in their income ratio over time. The model therefore indicates neighbourhood income stability or transition relative to the metropolitan average. The analysis requires neighbourhood income levels observed at a consistent geography at two dates. The NCRP data team has established a consistent framework for each CMA, using income (and other) data for 1980 and 2010, and both have been spatially referenced to the 1981 census tract geography.

**Figure 7: The Three Cities of Calgary as defined by
change in census tract average individual income ratio, 1980–2010**
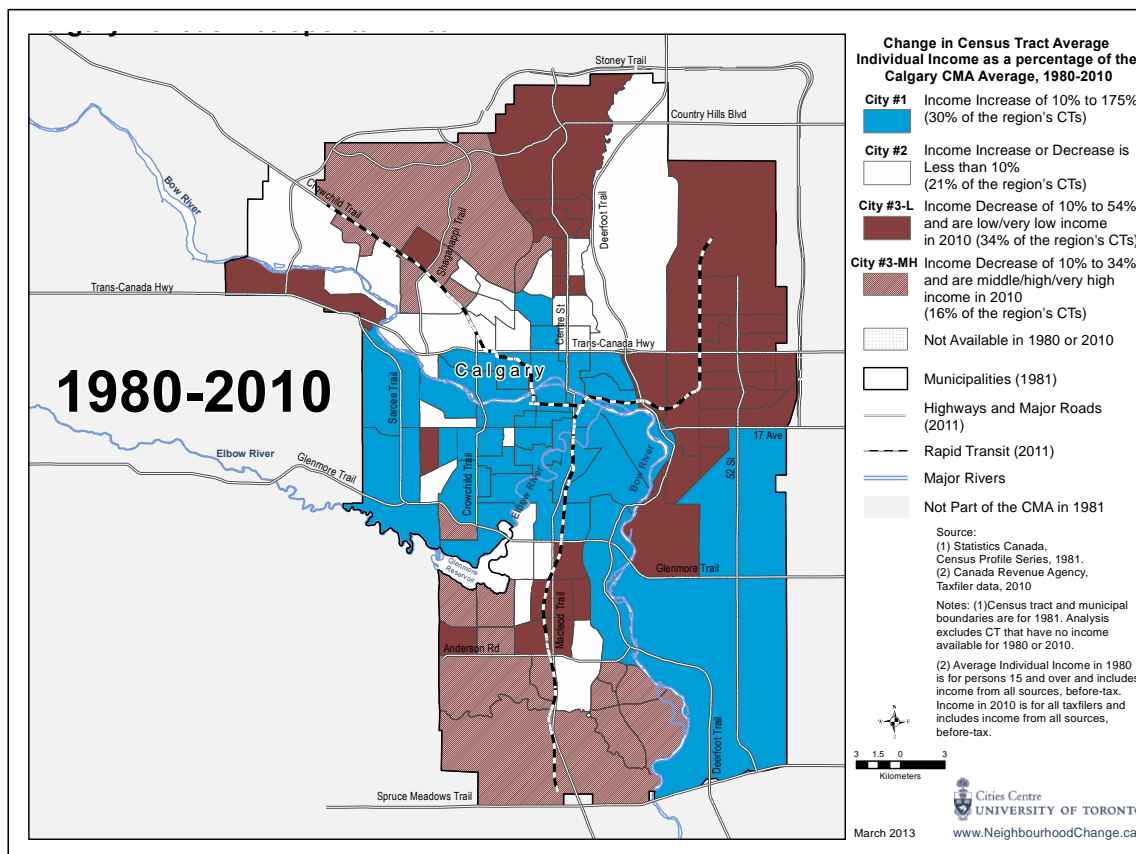
Note: The Three Cities shown above are sets of Census Tracts that have experienced Increasing (>10%) Individual Incomes relative to the CMA Average (City 1), Stable Individual Incomes (within 10%) relative to the CMA Average (City 2); and Declining Individual Incomes (<10%) relative to the CMA Average (City 3).

City 2 comprises 24 (20.9 percent) of the 115 tracts—those with income levels that have not changed more than 10 percent relative to the mean. With the exception of one or two tracts in newly established areas of the city, City 2 is concentrated in mature established residential areas—mostly community districts built out between the 1950s and 1980s (see Figure 8).

City 3, with 57 (49.6 percent) of the 115 tracts, reveals a remarkable pattern of income decline, almost entirely within suburban neighbourhoods, although the zone of suburban decline is broken by the northwest sector of City 2 and the southeast sector of City 3. It is noteworthy that the pattern of income decline has occurred in almost all income areas, including neighbourhoods (see Figure 8) that were formerly high income and those that were formerly low income.

Figure 9 provides a more nuanced view of the general patterns of income in both 1980 and 2010, and shows the incomes of Calgary census tracts relative to the CMA average at each point in time. Figure 10 shows the change in income ratios through time (i.e., the difference between the images in Figure 9), and is the basis for the classification of the census tracts into the three groups that define the Three Cities. The spatial pattern of income change in Calgary is clear, with income growth in the core and decline in the suburban periphery.

**Figure 8: Calgary's Three Cities,
with 2011 residential community district boundaries**

(See Appendix A for key to community district names)
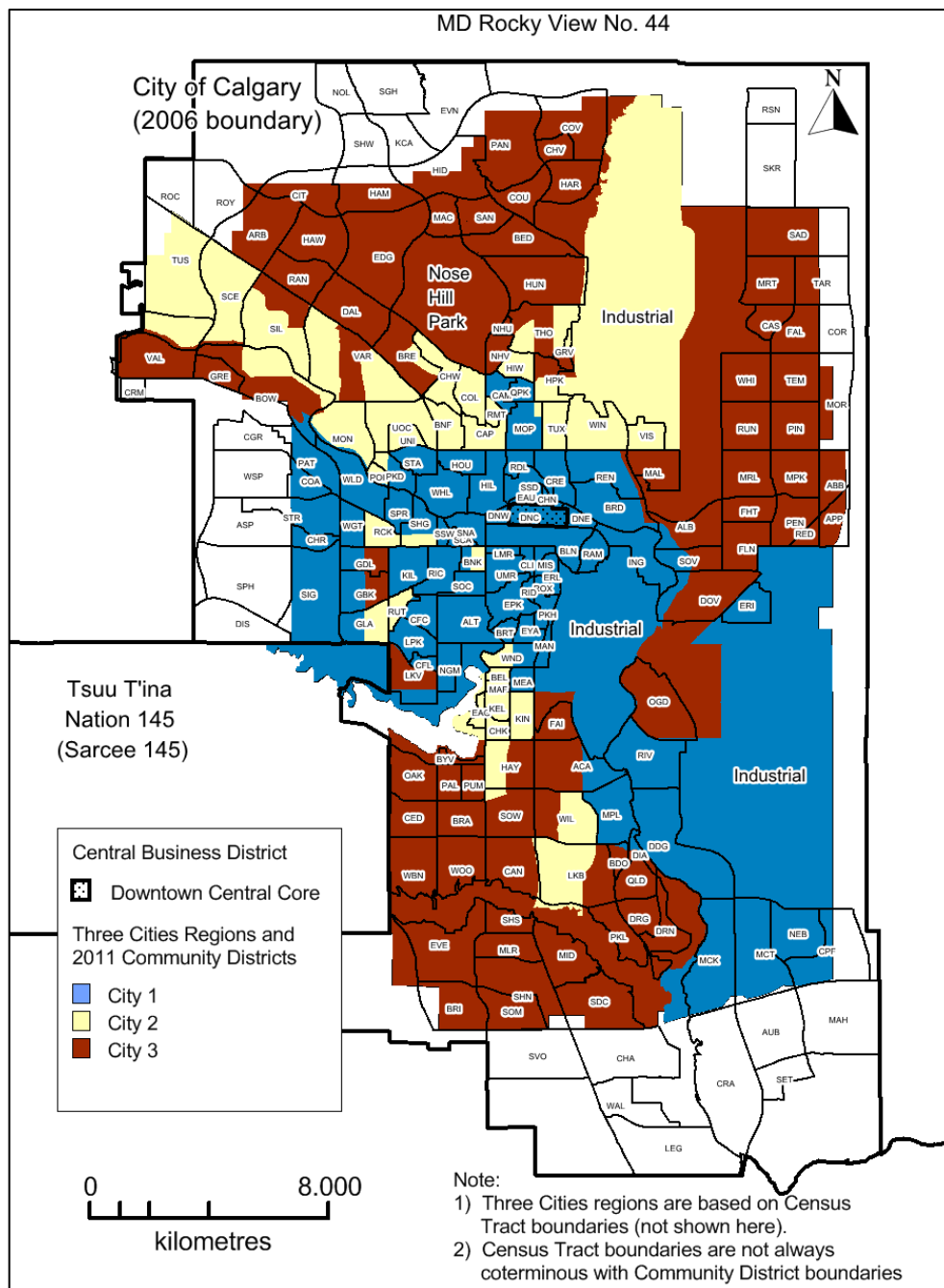
Source: Custom NCRP data, and City of Calgary for Community District polygons.

Note: The Three Cities shown on the preceding page are sets of Census Tracts that have experienced increasing (>10%) individual incomes relative to the CMA average (City 1), stable individual incomes (within 10%) relative to the CMA Average (City 2); and declining individual incomes (<10%) relative to the CMA average (City 3). The community district boundaries (i.e., official municipal neighbourhood boundaries) are superimposed to show approximate correspondence with census boundaries.

Figure 9: Census tract average individual income ratios, 1980 and 2010
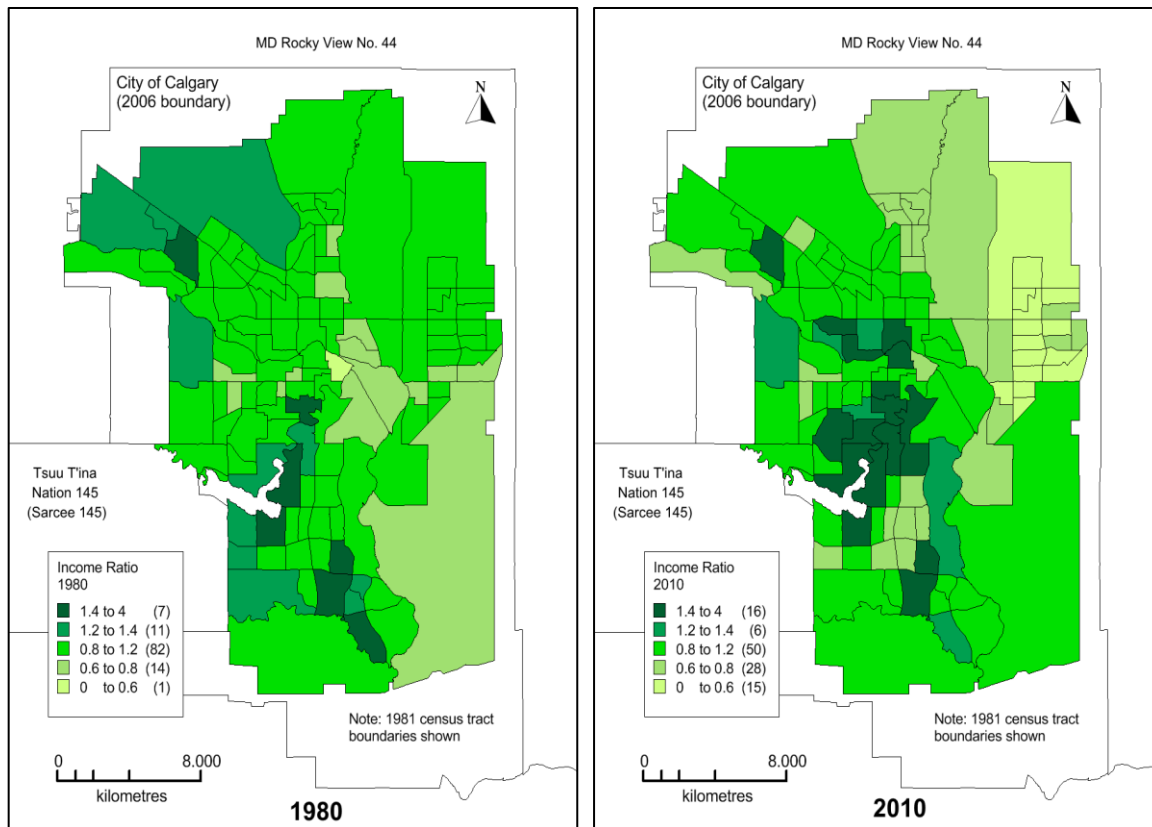
Source: Custom NCRP data.
Note: census tract average individual income ratios are calculated as the mean individual income of the census tract divided by the mean individual income of the Census Metropolitan Area.
The legends in each map are set to the same class intervals to facilitate comparison.

Figure 10: Change in census tract average individual income ratios, 1980–2010
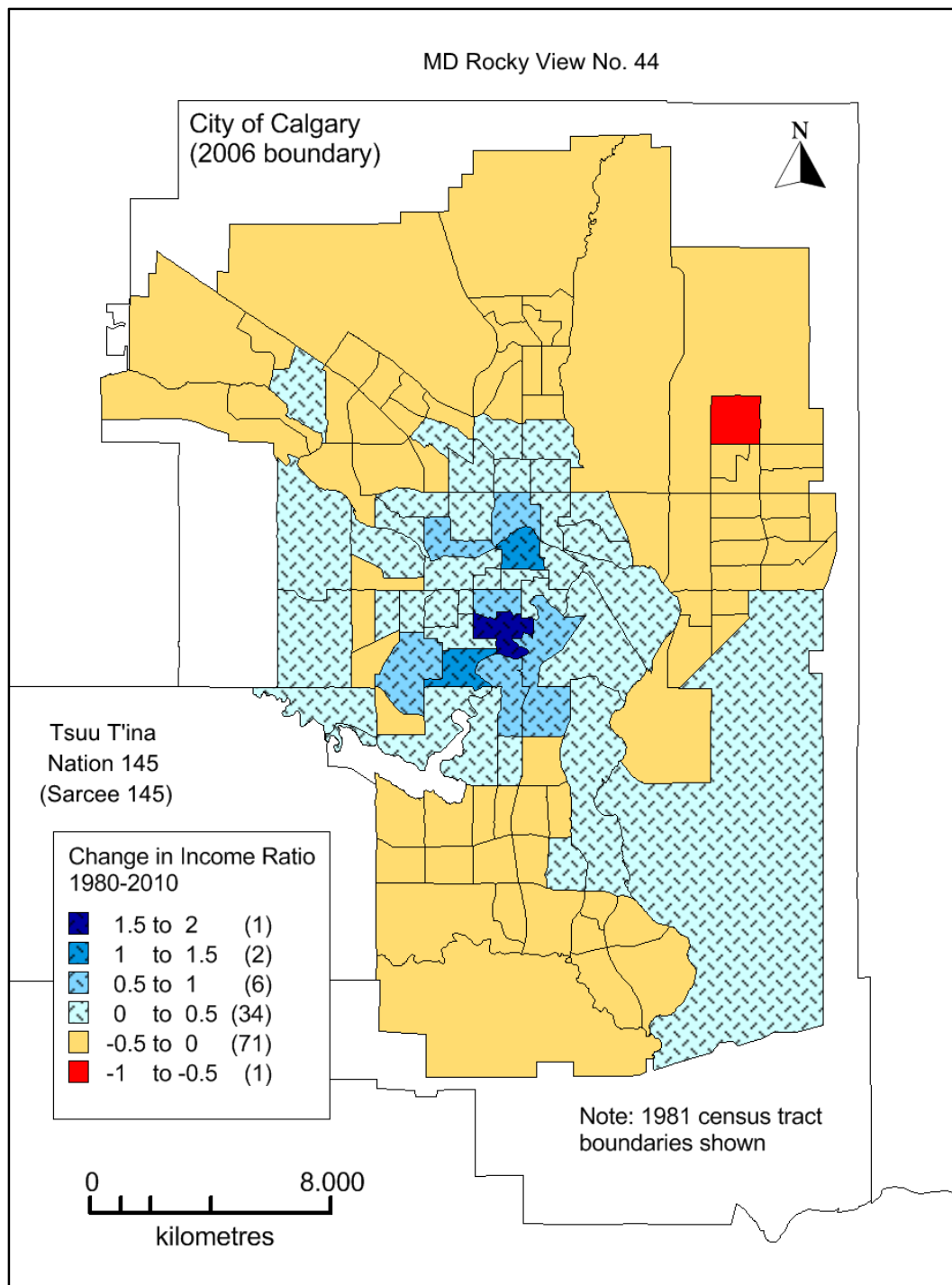
Source: Custom NCRP data.
Note: The map shows the difference in average individual income ratio (see Figure 9) between 1980 and 2010. Census Tracts with no change have remained stable in terms of incomes relative the CMA average. Tracts with positive differences have shown increasing average individual income ratios through time (gaining relative to the CMA average). Tracts with negative differences have shown decreasing average individual income ratios through time (declining relative to the CMA average).

5. Income Characteristics of the Three Cities

Although Figure 10 gives a visual indication of the spatial patterns of change with respect to changes in the income ratio, a statistical understanding of the income changes can be provided by exploring the income group distributions *within* the Three Cities. Descriptive statistics for neighbourhood average income ratios for each of the Three Cities are shown in Table 1.

Table 1: Neighbourhood Average Income Ratio Characteristics in the Three Cities

	City 1 (n=34)		City 2 (n=24)		City 3 (n=57)	
	1980	**2010**	**1980**	**2010**	**1980**	**2010**
Min	0.50	0.60	0.75	0.66	0.73	0.48
Max	1.81	3.56	1.88	1.98	1.68	1.52
Mean	0.92	1.34	1.04	1.02	1.01	0.76
STDev	0.23	0.54	0.31	0.33	0.20	0.21

Note: data is limited to the 115 census tracts that define the joint geography based on 1981 boundaries.

City 1 (increasing incomes) has the highest neighbourhood income ratios, and income increase in Calgary is most associated with higher income neighbourhoods. It is also noteworthy that the maximum income ratio (based on the highest average income neighbourhood) in this group of neighbourhoods has almost doubled from 1.81 to 3.56 over the 30-year period, while the minimum value (based on the lowest average income neighbourhood) has increased only marginally. All indicators point to significantly increased income in City 1.

City 2, the relatively income stable neighbourhoods, have maintained average income profiles over time, although the maximum value in this group has increased marginally, and the minimum income ratio has decreased marginally, suggesting these neighbourhoods are a little more diverse in 2010 than in 1980. The lowest income neighbourhood in City 2 in 2010 was a little worse off than the lowest income neighbourhood in City 2 in 1981. Conversely, the highest income tract in City 2 was slightly better off in 2010 than it was in 1981.

City 3 has, on average, not only seen declines in income ratios, but also the lowest incomes have declined, as have the maximum incomes over time. In other words, relative to the Calgary CMA

average, the poorest of City 3 neighbourhoods in 2010 is worse off than the poorest tract in City 3 in 1980, and the highest income neighbourhood in 2010 is poorer than the highest income City 3 neighbourhood in 1980. This is the only one of the Three Cities to experience a worsening of relative incomes for both the lowest and the highest income tracts within the region.

6. Shifting Shares of Income Classes in the Three Cities

It is useful to explore how the characteristics of the Three Cities have changed with respect to the five income groups defined in Figures 5 and 6. Table 2 shows how the classification of census tracts according to these five income groups has changed within each of the Three Cities. The data in Table 2 are based on the income ratios computed relative to the CMA average income. For comparative purposes, Table 3 illustrates how different these frequencies would be if the income ratios for Calgary census tracts were computed relative to the Canadian average individual income.

In the current City 1 (increasing incomes relative to the CMA average), only 2.9 percent of tracts are low or very low income in 2010 (0 percent if compared relative to national income profile), although in 1980 almost a third of these tracts (29.5 percent) were low income. Almost half (47 percent) of all tracts in City 1 were considered high or very high income in 2010 (97 percent if compared with national income profile), whereas 30 years previously only about 12 percent were very high income. The data in Table 2 show that 30 years of gentrification has shifted a predominantly middle- and lower-income set of neighbourhoods into the middle and higher income categories. In 2010 the vast majority (91 percent) of tracts in City 1 would be considered very high income if compared with the national average income (Table 3).

City 2 is the small group of relatively stable-income communities, relative to the CMA average. There has been little change in the overall shares of income classes in these tracts. In 1980, the majority (63 percent) were middle-income tracts (54 percent compared with national income profile), whereas by 2010 this had increased to 70.8 percent (29 percent relative to national income profile). City 2 has seen small declines in the shares of both low- and high-income tracts, but these have been offset by the increases in the middle-income shares. In essence, Table 2 suggests that City 2 is a temporal consolidation of the middle-income tracts into a relatively small group. However, it is important to bear in mind that by national income standards, the majority (71 percent) of tracts in City 2 in 2010 would be considered high or very high income.

City 3, with declining incomes and deepening impoverishment in some cases, has seen significant transformation in the income class of these tracts. Table 2 reveals that City 3 is primarily the product of the declining income and impoverishment of formerly middle-income neighbourhoods (relative to the CMA income average). In 1980, 79 percent of the tracts in City 3 were

considered middle income relative to the CMA average (53 percent if compared with the national average income), but by 2010 only 26.3 percent of these tracts were middle income relative to the CMA average (61 percent if compared with the national income average). Table 2 shows that this change has been offset by the growth of low- and very-low-income tracts in City 3, changing from 5.3 percent of City 3's tracts in 1980 to 68.4 percent of City 3's tracts in 2010. It should be noted that because Calgary's income is higher than the national average, in 1980 zero percent of City 3 tracts would be considered low or very low income if compared with the national average income, while in 2010 only 12 percent of City 3 tracts would be classified as low or very low income based on the national income profile (see Table 3).

Table 2: Number and shares of tracts by income group in the Three Cities, 1980 and 2010 (Income ratio's based on CMA average individual income)

ALL Census Tracts

Income Group (Income Ratio)	1980 Number of CT	1980 % of Tracts	2010 Number of CT	2010 % of Tracts	Change in % of Tracts Difference (2010-1980)
1 (0.00 to 0.59)	1	0.9	15	13.0	12.2
2 (0.60 to 0.80)	15	13.0	28	24.3	11.3
3 (0.81 to 1.19)	81	70.4	49	42.6	-27.8
4 (1.20 to 1.40)	11	9.6	8	7.0	-2.6
5 (1.41 to 4.00)	7	6.1	15	13.0	7.0
Total	115	100.0	115	100.0	0.0

City 1 Tracts (n=34)

Income Group (Income Ratio)	1980 Number of CT	1980 % of Tracts	2010 Number of CT	2010 % of Tracts	Change in % of Tracts Difference (2010-1980)
1 (0.00 to 0.59)	1	2.9	0	0.0	-2.9
2 (0.60 to 0.80)	8	23.5	1	2.9	-20.6
3 (0.81 to 1.19)	21	61.8	17	50.0	-11.8
4 (1.20 to 1.40)	3	8.8	6	17.6	8.8
5 (1.41 to 4.00)	1	2.9	10	29.4	26.5
Total	34	100.0	34	100.0	0.0

City 2 Tracts (n=24)

Income Group (Income Ratio)	1980 Number of CT	1980 % of Tracts	2010 Number of CT	2010 % of Tracts	Change in % of Tracts Difference (2010-1980)
1 (0.00 to 0.59)	0	0.0	0	0.0	0.0
2 (0.60 to 0.80)	4	16.7	3	12.5	-4.2
3 (0.81 to 1.19)	15	62.5	17	70.8	8.3
4 (1.20 to 1.40)	1	4.2	0	0.0	-4.2
5 (1.41 to 4.00)	4	16.7	4	16.7	0.0
Total	24	100.0	24	100.0	0.0

City 3 Tracts (n=57)

Income Group (Income Ratio)	1980 Number of CT	1980 % of Tracts	2010 Number of CT	2010 % of Tracts	Change in % of Tracts Difference (2010-1980)
1 (0.00 to 0.59)	0	0.0	15	26.3	26.3
2 (0.60 to 0.80)	3	5.3	24	42.1	36.8
3 (0.81 to 1.19)	45	78.9	15	26.3	-52.6
4 (1.20 to 1.40)	7	12.3	2	3.5	-8.8
5 (1.41 to 4.00)	2	3.5	1	1.8	-1.8
Total	57	100.0	57	100.0	0.0

Table 3: Number and shares of tracts by income group in the Three Cities, 1980 and 2010 (Income ratio's based on National (Canadian) average individual income)

ALL Census Tracts

	1980		2010		Change in % of Tracts
Income Group (Income Ratio)	Number of CT	% of Tracts	Number of CT	% of Tracts	Difference (2010-1980)
1 (0.00 to 0.59)	0	0.0	0	0.0	0.0
2 (0.60 to 0.80)	2	1.7	7	6.1	4.3
3 (0.81 to 1.19)	67	58.3	42	36.5	-21.7
4 (1.20 to 1.40)	26	22.6	16	13.9	-8.7
5 (1.41 to 4.00)	20	17.4	50	43.5	26.1
Total	115	100.0	115	100.0	0.0

City 1 Tracts (n=34)

	1980		2010		Change in % of Tracts
Income Group (Income Ratio)	Number of CT	% of Tracts	Number of CT	% of Tracts	Difference (2010-1980)
1 (0.00 to 0.59)	0	0.0	0	0.0	0.0
2 (0.60 to 0.80)	2	5.9	0	0.0	-5.9
3 (0.81 to 1.19)	24	70.6	1	2.9	-67.6
4 (1.20 to 1.40)	4	11.8	2	5.9	-5.9
5 (1.41 to 4.00)	4	11.8	31	91.2	79.4
Total	34	100.0	34	100.0	0.0

City 2 Tracts (n=24)

	1980		2010		Change in % of Tracts
Income Group (Income Ratio)	Number of CT	% of Tracts	Number of CT	% of Tracts	Difference (2010-1980)
1 (0.00 to 0.59)	0	0.0	0	0.0	0.0
2 (0.60 to 0.80)	0	0.0	0	0.0	0.0
3 (0.81 to 1.19)	13	54.2	7	29.2	-25.0
4 (1.20 to 1.40)	6	25.0	8	33.3	8.3
5 (1.41 to 4.00)	5	20.8	9	37.5	16.7
Total	24	100.0	24	100.0	0.0

City 3 Tracts (n=57)

	1980		2010		Change in % of Tracts
Income Group (Income Ratio)	Number of CT	% of Tracts	Number of CT	% of Tracts	Difference (2010-1980)
1 (0.00 to 0.59)	0	0.0	0	0.0	0.0
2 (0.60 to 0.80)	0	0.0	7	12.3	12.3
3 (0.81 to 1.19)	30	52.6	35	61.4	8.8
4 (1.20 to 1.40)	16	28.1	5	8.8	-19.3
5 (1.41 to 4.00)	11	19.3	10	17.5	-1.8
Total	57	100.0	57	100.0	0.0

7. Size, Population, and Density of the Three Cities

The overall area of the 115 neighbourhoods (1981 census tracts) making up the Three Cities is 504.5 square kilometres. City 2 (stable incomes) has the smallest share, at 94.9 square kilometres (18.8 percent), and City 3 (declining incomes) has the largest share, at 234.7 square kilometres (46.5 percent). City 1 (increasing incomes) occupies 174.9 square kilometres (34.7 percent of the area).

In 2006 the Calgary CMA was home to 1,099,310 people in 202 census tracts. Some 182 of these 202 census tracts are associated with the Three Cities areas defined above, with an aggregate area of 676.7 square kilometres and a population of 948,479 (86.3 percent of the CMA population). Estimates from how these 2006 data intersect with the 1981 geography show the following patterns.

City 1 (increasing incomes) was home to 27.2 percent of the population and 32.0 percent of the Three Cities area in 2006[2]. City 1 contains a high proportion of smaller inner-city census tracts, with average census tract population densities of 2,832 people per square kilometre.

City 2 (stable incomes) is the smallest of the Three Cities and in 2006 was home to 13.0 percent of the population in 14.5 percent of the area. Many of these areas are in mature suburbs built between the 1950s and 1970s. With average CT population densities of 2,329 people per square kilometre, City 2 is the least dense of the Three Cities.

City 3 (declining incomes) is the largest of the Three Cities and in 2006 contained an estimated 59.8 percent of the Three Cities population and occupied 53.6 percent of the Three Cities area. Given that City 3 is predominantly defined by the economically and demographically declining post-1970s suburbs, it is not surprising that it had relatively low population densities, averaging 2,704 people per square kilometre—lower than City 1, but still higher than City 2.

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2.   Areas and densities are based on census tract polygon areas, and include non-residential space.

8. Social Differences in the Three Cities in 2006

Who lives in these three distinctive cities? In some cases, our descriptive data are based on aggregate data (the totals for all people in an area), and in other cases descriptions are based on average characteristics of census tracts within each of the Three Cities. Most indicators are derived from data assembled by the NCRP data analysis team; these indicators were used to establish a typology of "who lives where" in 2006 (Murdie, Logan, and Maaranen 2013) as well as a typology of neighbourhood change between 1981 and 2006 (Murdie, Maaranen, and Logan 2014).

However, rather than detailed analysis of change over time, we focus here on 2006 social characteristics.[3] These are shown in Table 4, which includes results from Analysis of Variance post-hoc tests to determine which social attributes exhibit significant differences in average census tract characteristics when comparing the Three Cities. This analysis helps to identify what makes neighbourhoods in each of the Three Cities different from neighbourhoods in the other two cities.

8.1 Education

Calgary is one of the most highly educated CMAs in Canada (Statistics Canada 2008). Because education is a strong correlate of income and income change, it is not surprising to see educational attainment as a feature that differentiates the Three Cities. City 1, with increasing incomes, has the highest share of people aged 25 and over with at least one university degree. City 3, the declining suburbs with deepening impoverishment, has the lowest share. City 1 and City 2 are not significantly different, so in Calgary high levels of education are a trait of both increasing and stable income neighbourhoods.

Table 4 shows that low levels of education tell the same story from the reverse perspective. City 3 has the highest share of residents without a high school diploma (almost 1 in 5), with City 1 exhibiting the lowest share of the poorly educated. Again, City 1 and City 2 are not statistically different on these characteristics, but City 3 differs from both City 1 and City 2. In summary, City 3 is uniquely characterized by lower levels of university-educated people and significantly higher shares of people without high school education.

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3. Although these data are a little dated, similar indicators from the voluntary 2011 National Household Survey (not a census) were deemed potentially unreliable (Hulchanski et al. 2013), and the 2016 census data is not yet available.

8.2   Labour Force

Labour force and occupational characteristics are well-established correlates of socio-economic status, and one of the most important dimensions of social difference. Table 4 shows that in terms of unemployment rates, the Three Cities in Calgary do not differ much. But it also shows that on a variety of labour force indicators, City 3 differs from City 1 and City 2. Managerial and professional occupations are typically white-collar occupations associated with high income and socio-economic status. Not surprisingly, City 1 has the highest share of local residents in these occupations, although the average in City 2 neighbourhoods is not much lower, and is not significantly different from City 1. Rather, City 3 stands out as significantly lower, averaging only 15 percent in managerial and 19 percent in professional occupations.

Sales and service, as well as manufacturing trades, are associated with lower incomes and have been shown to be the opposite kinds of indicators to managerial and professional occupations. Table 4 shows that these two indicators set City 3 apart from the other two cities. In City 3, there is a significantly higher incidence of people employed in the sales and service sector and in the manufacturing sector compared with City 1 or City 2.

In summary, neighbourhoods in City 3 exhibit a very different labour force from City 1 and City 2, which do not differ significantly from each other. Managerial and professional labour force is high in both income-gaining and income-stable areas, whereas low incidence of professional and managerial and a high incidence of sales and manufacturing labour force is an important trait of income-declining communities. This feature of the post-industrial knowledge economy has been well documented (Davies and Donoghue 1993, Hutton 2008, Hutton and Vinodrai 2015, Vinodrai 2015).

8.3   Income Levels

It is important to remember that the Three Cities typology is defined by income *change* characteristics (ratios) between 1980 and 2010, and that these changes are measured relative to the metropolitan average income. But how do recent income *levels* and other characteristics differ in the Three Cities? The means of 2006 census tract average household incomes for the Three Cities reveal high incomes in City 1 (mean of $106,319), lower incomes in City 2 (mean of $99,608), and lowest incomes in City 3 (mean of $88,181). Given the high levels of income in Calgary compared with other CMAs, it is worth noting that even in the income-declining areas of Calgary (City 3), average household incomes are typically more than double the national household average income.

Table 4 shows each of the Three Cities is significantly different from the other two in terms of 2010 average individual income ratios. City 1 is the richest with above-average ratios, City 2 has average incomes, and City 3 has below-average income ratios. Interestingly, Table 4 shows that on other income indicators, the Three Cities do not substantially differ. The prevalence of high-income households, as well as the prevalence of families living in poverty (below the low-income cut-off) are not traits that sufficiently differentiate the three different categories of neighbourhoods. This suggests that none of the Three Cities is characterized by sets of tracts with extreme concentrations of impoverishment; nor by sets of tracts with universally high household incomes. Rather, there is some degree of social and income diversity in the census tracts within each of the Three Cities.

Table 4: Means of census tract social characteristics by Three Cities type

2006 Characteristics	Means				ANOVA Sig Differences (p<0.05)
	City 1	City 2	City 3	Total	
Education					
% Population 25 years and over with a degree	43.8	39.1	24.8	33.5	1-3, 2-3
% Population 25 years and over without high school certificate	10.8	12.3	19.7	15.5	1-3, 2-3
Labour Force					
% Labour Force Managerial	21.5	18.4	14.9	17.6	1-3, 2-3
% Labour Force Professional	28.0	27.4	19.2	23.6	1-3, 2-3
% Labour Force Sales and Service	20.6	21.8	24.9	23.0	1-3, 2-3
% Labour Force Manufacturing (trades, transport and manufacturing)	12.6	15.1	23.2	18.3	1-3, 2-3
Unemployment Rate, Persons 15 and Over	4.0	4.4	4.6	4.4	none
Income					
Income Ratio 2010	1.3	1.0	0.8	1.0	1-2,1-3, 2-3
% High Income Households	26.4	26.7	23.1	24.8	none
% Economic Famlies Prevalence of Low Income in 2005	12.6	11.0	12.1	12.0	none
Age					
%Population Less Than 15 Years	12.1	13.6	16.8	14.7	1-3, 2-3
% Population 25-34 Years of Age	20.9	15.7	13.4	16.1	1-2, 1-3
% Population 50-64 Years of Age	16.1	17.2	18.5	17.5	1-3
% Population 65 Years and Over	12.4	15.0	12.0	12.7	2-3
Households					
% One Person Households	40.5	30.3	22.6	29.6	1-2,1-3, 2-3
% Single Parent Households	14.7	15.8	19.2	17.1	1-3, 2-3
Persons Per Household	2.1	2.3	2.6	2.4	1-2,1-3, 2-3
Immigrant and Ethnicity					
% Visible Minority	16.0	13.9	26.7	21.8	1-3, 2-3
% Population Immigrant	19.8	18.5	23.3	21.2	1-3, 2-3
% Population Recent Immigrant (previous five years)	5.0	4.3	5.1	4.9	none
% Population South Asian	2.3	2.1	4.1	3.1	none
% Population Southeast Asian	2.0	1.4	2.7	2.2	2-3
% Population East Asian (Chinese and Japanese)	6.7	6.4	7.0	6.8	none
% Population Western, Northern and Eastern European	47.5	50.4	44.3	46.6	2-3
% Population Southern European	7.0	6.6	6.3	6.6	none
% Population Latin, Central and South American, and Caribbean	2.1	1.8	2.7	2.3	none
% Population Arab and West Asian	1.8	1.6	3.4	2.5	1-3, 2-3
% Population African (not including North Africa)	1.8	1.6	1.8	1.7	none
% Population Aboriginal	3.7	4.1	4.9	4.4	1-3
% Population British	50.5	51.9	44.9	48.1	1-3, 2-3
% Population French	10.5	10.8	10.0	10.3	none
% Home Language Neither English nor French	9.0	8.1	13.0	10.8	1-3, 2-3
Mobility					
% Persons (5 years +) who did not live at the same address 5 years ago	58.0	47.3	43.2	48.5	1-2, 1-3
Housing					
% Private Dwellings Rented	43.1	36.8	28.1	34.4	1-3
% Dwellings Constructed Before 1946	12.9	3.6	1.0	5.1	1-2, 1-3
% Dwellings Constructed 1996-2006	15.9	5.9	4.8	8.3	1-2, 1-3
% Dwellings Single Detached	39.5	53.2	59.1	52.0	1-3
% Dwellings Apartment Under 5 Stories	25.1	19.2	14.0	18.4	1-3
% Dwellings Apartment 5+ Stories	17.2	4.3	1.8	6.9	1-2, 1-3
Total Persons Per BEDROOM	1.0	0.8	0.9	0.9	1-2, 1-3
Average Number of Persons Per ROOM	0.4	0.4	0.4	0.4	none
% Dwellings Needing Major Repairs	6.8	6.8	6.1	6.4	none
Renters plus owners (avg housing cost) / household income	23.2	26.1	32.5	28.4	1-3, 2-3

Note: ANOVA differences are based on F tests with p<0.05 and on post-hoc tests with Tukey's HSD method (IBM SPSS Statistics 2017: 27). Differences between groups are shown in the table above, such that 1-3 represents a significant difference in means between City 1 and City 3, 2-3 represents a significant difference in means between City 2 and City 3, etc.

8.4   Age

There are some complex differences in age structure of the Three Cities. There is no meaningful difference in the incidence of children in City 1 and City 2, but City 3 is different, with significantly higher shares (mean 16.8 percent) of children aged 0–14. This is not surprising, given the predominantly suburban location of City 3 (with larger immigrant households), middle urban location of City 2 (with older households), and inner/central city location of City 1 (with younger households).

Young adults, aged 25–34, in contrast, are a significantly more important characteristic of City 1 and a feature that differentiates it from both City 2 and City 3. Again, this is no surprise, as this demographic group is leading the preference for inner- and central-city living, particularly in gentrifying areas experiencing a condominium boom. This "youthification" of central cities, which are particularly important to the millennial generation, has been noted by authors such as Moos (2015, 2016).

It is interesting to note that late middle age (age 50–64), often associated with empty-nester status and residence in established inner suburbs (Davies and Murdie 1991), is markedly the highest in the suburban City 3. In Calgary, City 3 contains well-established neighbourhoods developed 30 years ago, and so the prevalence of people aged 50–64 may not be surprising (Townshend and Walker 2015).

Classic models of the age and family structure of the North American city are based on a high incidence of the elderly and late middle age in inner-city and inner-suburban communities, reflecting in large part a process of in-situ aging and resulting in the well-known concentric zonal model of age and family status in the social ecology of the city (Murdie 1969). There is increasing evidence that these older spatial patterns may be breaking down. Results shown in Table 4 support this idea in Calgary. The highest average incidence of seniors (aged 65+) is found in City 2—those income-stable communities that are for the most part situated in well-established middle suburbs. The elderly are now a feature of the middle suburbs, either from in-situ aging of the suburbs or displacement from the central city (City 1) by young adults.

8.5   Households and Families

One of the most important trends in Canadian cities over the past 30 years has been the rapid rise in the share of small (one- or two-person) households and declining average household sizes (Townshend and Walker 2015). Each of the Three Cities in Calgary is statistically different from the other two in terms of the share of one-person households as well as the average number of persons per household. On average, 40.5 percent of households in City 1 neighbourhoods are one-person households, compared with 30.3 percent and 22.6 percent in Cities 2 and 3, respectively. Given the age structure characteristics described above, these findings are expected. Similarly, City 1, based predominantly in central- and inner-city locations with high concentrations of professional and managerial workers, has the smallest household sizes, averaging 2.1 persons, compared with City 2 (at 2.3) and City 3 (at 2.6).

The rise of single-parent families is another important change in family composition in Canada (Townshend and Walker 2015). While there is not necessarily a direct correspondence, there is a strong relationship between the residential geography of single-parent families and low in-

come or poverty—an important feature of the social ecology of Canadian cities that has been previously identified (Davies and Murdie 1991). Table 4 supports this linkage, even at a coarse regional scale such as the Three Cities model. City 3 stands out as distinct from City 1 and City 2 by having a significantly higher incidence (average 19.2 percent) of single-parent households. Cities 1 and 2 do not have the same concentrations of single-parent families.

City 1 has a greater share of small households and higher income ratios. City 3 has the lowest income ratios, larger households, and a significantly higher incidence of single-parent families. In broad terms, larger households and single parents are a significant feature in the geography of declining incomes and impoverishment in Calgary.

8.6   Ethnicity, and Immigrant and Visible Minority Populations

It is well known that Canada's ethno-cultural mosaic has changed dramatically since the 1980s and that visible minority populations have become more prevalent in the population (Statistics Canada 2013). There is also evidence that recent immigrants and visible minorities are not eq-uitably integrated in the labour market, and face structural and earnings inequalities (Bloom, Grenier, and Gunderson 1994, Cardozo and Pendakur 2009, Côté 1991, Galabuzi 2006, Pen-dakur and Pendakur 1998, Pruegger, Cook, and Richter-Salomons 2009, Tran 2004). Indeed, in terms of integration into the residential neighbourhoods of Canada's CMAs, they are becom-ing more spatially constrained and manifest higher levels of residential segregation (Balakrish-nan, Maxim, and Jurdi 2005, Bauder and Sharpe 2002, Myles and Hou 2004).

In this study we find that in aggregate, 73.4 percent of all visible minorities in the Three Cities reside in City 3, while only 18.9 percent and 7.6 percent, respectively, reside in Cities 1 and 2. Moreover, City 3 differs from Cities 1 and 2 because it includes significantly higher shares of visible minorities (Table 4). In fact, the average for City 3 neighbourhoods (26.7 percent) is al-most twice as high as that found in City 2, and in City 3 the tracts range from 5.6 percent to 82.0 percent visible minority.

Table 4 shows that City 3 differs from Cites 1 and 2 due to its significantly higher share of im-migrants. On average, 23.3 percent of the City 3 population is immigrant, compared with 19.8 percent in City 1 and 18.5 percent in City 2. Interestingly, however, it is not the prevalence of recent immigrants (those who immigrated to Canada in the last five years) that underlies this difference. City 3 is home to almost two-thirds (66.3 percent) of recent immigrants, while 24.1 percent of recent immigrants reside in City 1.

Within each of the cities, however, the percentage of recent immigrants in the census tracts varies a great deal, from less than 1.0 percent to almost 18 percent of the census tract popula-tion. Generally, however, the Three Cities are similar in terms of the average shares of recent immigrants (between 4 percent and 5 percent; see Table 4), and the prevalence of recent im-migrants is not a significant way to differentiate the Three Cities.

This means that even though City 3 has the largest share of all recent immigrants, they are not clustering in extremely high concentrations in a few tracts in City 3, but are dispersed through-out the neighbourhoods of City 3 (which comprises 49.5 percent of all tracts), perhaps indicat-ing a trend towards suburban dispersal rather than residential segregation. It is also likely that high concentrations of recent immigrants are to be found in post-1981 suburban neighbour-

hoods that were not included in the geography used to define the Three Cities, and are generally part of the newer metropolitan sprawl (Filion et al. 2010).

Although Table 4 shows that the Three Cities do not differ on many ethnic traits, it also points to a few ethnic and language factors that differentiate the Three Cities. City 3 has a significantly higher share of immigrants of Southeast Asian origin than does City 2. City 3 also differs from City 2 in that it has significantly lower shares of people of Western, Northern, and Eastern European origin; these groups are found in City 2 in higher proportions. Although averaging only 3.4 percent of City 3 tract populations, City 3 nevertheless has significantly higher shares of Arab and West Asian ethnic groups—almost twice the shares of City 1 or City 2. A defining ethnic trait of City 3 is the lower share of people of British origin, although the average of 44.9 percent of the population for this group in City 3 neighbourhoods indicates that it is still an important presence.

Perhaps not surprisingly, given the visible minority, immigrant, and ethnic differences described above, City 3 has, on average, a significantly higher share (13 percent) of people whose home language is neither English or French.

In terms of ethnic, immigrant, visible minority, and language characteristics, the important findings here are that there are no meaningful differences between the rising-income neighbourhoods of City 1 and the stable-income neighbourhoods of City 2. The key differences in these social attributes are the ways in which City 3, with declining incomes and deepening impoverishment, is different from the other two cities. City 3 is distinct because of some, but not all, of its ethnic traits. There appear to be important connections between immigrant status, selected immigrant groups, language, and the geography of income decline that defines City 3.

8.7   Mobility

There is great interest in how the return to the city centre, inner-city gentrification, and the condominium boom is transforming urban landscapes in Canada (Bain 2010, Ley 1996, Lo 1996, Moos 2016, Walks and Maaranen 2008). Of all recent movers in 2006 (people who moved within the previous five years), 30.3 percent resided in City 1, whereas 57.1 percent resided in City 3; the declining pre-1980s suburbs are still claiming the larger share of mobility in the Three Cities.

Average neighbourhood levels of those who have moved in the last five years are high in all Three Cities, averaging 43.2 percent in City 3, 47.3 percent in City 2, and 58.0 percent in City 1. Indeed, City 1 should be considered distinctive from City 2 and City 3, with significantly higher shares of recent movers in these neighbourhoods. Table 4 supports the idea that recent movement into City 1 is an important trend. This finding in Calgary reinforces the generalized trend occurring elsewhere, where inner-city redevelopment and a condominium boom is encouraging a return to central-city living.

8.8   Housing Characteristics

A variety of housing features differentiate the Three Cities. Not surprisingly, the suburban-dominated areas of City 3 have significantly lower rates (28.1 percent) of rented dwellings than City 1, which averages 43.1 percent. Interestingly, City 1 is also distinct with respect to the age of the housing stock—it is characterized by *simultaneously* high rates of pre-war housing as

well as high rates of housing constructed in the last decade, and significantly more so than either City 2 or City 3.

City 1 is therefore the old and the new juxtaposed (Filion and Bunting 1990), a reflection of the central city gentrification, redevelopment, and housing and condo boom of recent years. City 1 also has a significantly higher share of both low-rise (25.1 percent) and high-rise (17.2 percent) apartment buildings than the other two cities. In contrast, the suburban areas of City 3 are defined by considerably higher shares (59.1 percent) of single detached dwellings that are largely owner-occupied.

All areas of the city have diverse housing conditions. Substandard housing, often measured by the percentage of dwelling units needing major repairs (Davies and Murdie 1991), averages 6.8 percent in City 1 and City 2, and is marginally lower in City 3, at 6.1 percent. Substandard housing, according to this measure, is not a trait that significantly differentiates the Three Cities and is largely an indication of older housing stock that has not been renovated or is reaching the end of its lifespan.

9. Conclusion

This report has documented the changing character and geographical distribution of neighbourhood incomes in Calgary over the past 40 years, examining the degree of income inequality and polarization that has taken place over this time period. The findings show consistent and systematic increases in income inequality and polarization, causing Calgary to become the second most unequal city in Canada (after Toronto) based on neighbourhood income inequality characteristics.

Seen through the lens of incomes relative to the CMA average, Calgary has seen a dramatic loss of middle-income neighbourhoods—neighbourhoods that have predominantly become low- or very low income over time—and this in the city with the highest average household income in Canada. The share of high- and very-high-income neighbourhoods has not changed dramatically, but *within* these select communities, predominantly in established areas of the central city, personal income has risen dramatically. In other words, many more neighbourhoods are becoming poorer, and a select few neighbourhoods are becoming extremely rich.

The Three Cities model, developed by Hulchanski (2010) in the Toronto metropolitan area, seems to be applicable to Calgary in the sense that, relative to their respective CMA characteristics, the geographical patterns of increasing incomes, decreasing incomes, and stability are broadly similar in the two metropolitan areas. These patterns reveal increasing income neighbourhoods within the central city and established inner suburbs; a smaller area of stable income neighbourhoods in typically middle suburban areas; and a rapidly growing set of declining-income suburban neighbourhoods. These findings confirm trends observed in Toronto and elsewhere towards the rising incomes and appeal of the central city, and the increasing suburbanization of poverty.

Within the context of the Three Cities, selected social indicators were examined to explore some of the key social attributes that may or may not differentiate neighbourhoods within the Three Cities. Apart from income, household size, housing types, and period of dwelling construction, City 1 and City 2 have many similarities. City 3, the declining income part of Calgary, stands out as having distinct social attributes in many regards. In fact, on educational, labour force, income, age, household, immigrant and ethnicity, language, mobility, and housing variables, City 3 stands in contrast to the other two cities.

Given that so many social and housing attributes are associated with a large area of declining relative incomes is disturbing. It is also perhaps symbolic of the kind of "invidious differentiation" that Marcuse (1993) described as a socio-spatial cleavage that reflects a hierarchical relation-ship, one of domination and subordination, inclusion and exclusion, privilege and deprivation. While we may not yet have definitive ethnic ghettos in Canada (Walks and Bourne 2006), we are facing undeniable changes in income inequality in our society and in our cities.

To the extent that this inequality is increasingly racialized and spatially manifested in City 3 (Pruegger, Cook, and Richter-Salomons 2009), we must be aware of the potential for an emerging economic apartheid (Galabuzi 2006), and be aware of the new spatial order of the Divided City. The indicators presented here may represent timely information that can inform policy interventions to alleviate some of the disparities giving rise to increasing socio-spatial po-larization in Calgary. Whether the policy tools available are sufficient to the magnitude of the challenge is an open question.

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Appendix

Table A-1: Abbreviations and Names of Calgary Residential Community Districts (2011)

Abbreviation	Community District Name	Abbreviation	Community District Name
ABB	ABBEYDALE	DIS	DISCOVERY RIDGE
ACA	ACADIA	DNC	DOWNTOWN COMMERCIAL CORE
ALB	ALBERT PARK/RADISSON HEIGHTS	DNE	DOWNTOWN EAST VILLAGE
ALT	ALTADORE	DNW	DOWNTOWN WEST END
APP	APPLEWOOD PARK	DOV	DOVER
ARB	ARBOUR LAKE	DRG	DEER RIDGE
ASP	ASPEN WOODS	DRN	DEER RUN
AUB	AUBURN BAY	EAG	EAGLE RIDGE
BDO	BONAVISTA DOWNS	EAU	EAU CLAIRE
BED	BEDDINGTON HEIGHTS	EDG	EDGEMONT
BEL	BEL-AIRE	EPK	ELBOW PARK
BLN	BELTLINE	ERI	ERIN WOODS
BNF	BANFF TRAIL	ERL	ERLTON
BNK	BANKVIEW	EVE	EVERGREEN
BOW	BOWNESS	EVN	EVANSTON
BRA	BRAESIDE	EYA	ELBOYA
BRD	BRIDGELAND/RIVERSIDE	FAI	FAIRVIEW
BRE	BRENTWOOD	FAL	FALCONRIDGE
BRI	BRIDLEWOOD	FHT	FOREST HEIGHTS
BRT	BRITANNIA	FLN	FOREST LAWN
BYV	BAYVIEW	GBK	GLENBROOK
CAM	CAMBRIAN HEIGHTS	GDL	GLENDALE
CAN	CANYON MEADOWS	GLA	GLAMORGAN
CAP	CAPITOL HILL	GRE	GREENWOOD/GREENBRIAR
CAS	CASTLERIDGE	GRV	GREENVIEW
CED	CEDARBRAE	HAM	HAMPTONS
CFC	CFB - CURRIE	HAR	HARVEST HILLS
CFL	CFB - LINCOLN PARK PMQ	HAW	HAWKWOOD
CGR	COUGAR RIDGE	HAY	HAYSBORO
CHA	CHAPARRAL	HID	HIDDEN VALLEY
CHK	CHINOOK PARK	HIL	HILLHURST
CHN	CHINATOWN	HIW	HIGHWOOD
CHR	CHRISTIE PARK	HOU	HOUNSFIELD HEIGHTS/BRIAR HILL
CHV	COUNTRY HILLS VILLAGE	HPK	HIGHLAND PARK
CHW	CHARLESWOOD	HUN	HUNTINGTON HILLS
CIT	CITADEL	ING	INGLEWOOD
CLI	CLIFF BUNGALOW	KCA	KINCORA
COA	COACH HILL	KEL	KELVIN GROVE
COL	COLLINGWOOD	KIL	KILLARNEY/GLENGARRY
COR	CORAL SPRINGS	KIN	KINGSLAND
COU	COUNTRY HILLS	LEG	LEGACY
COV	COVENTRY HILLS	LKB	LAKE BONAVISTA
CPF	COPPERFIELD	LKV	LAKEVIEW
CRA	CRANSTON	LMR	LOWER MOUNT ROYAL
CRE	CRESCENT HEIGHTS	LPK	LINCOLN PARK
CRM	CRESTMONT	MAC	MACEWAN GLEN
DAL	DALHOUSIE	MAF	MAYFAIR
DDG	DOUGLASDALE/GLEN	MAH	MAHOGANY
DIA	DIAMOND COVE	MAL	MAYLAND HEIGHTS

Table A-1 (continued): Abbreviations and Names of Calgary Residential Community Districts (2011)

Abbreviation	Community District Name	Abbreviation	Community District Name
MAN	MANCHESTER	SAD	SADDLE RIDGE
MCK	MCKENZIE LAKE	SAN	SANDSTONE VALLEY
MCT	MCKENZIE TOWNE	SCA	SCARBORO
MEA	MEADOWLARK PARK	SCE	SCENIC ACRES
MID	MIDNAPORE	SDC	SUNDANCE
MIS	MISSION	SET	SETON
MLR	MILLRISE	SGH	SAGE HILL
MON	MONTGOMERY	SHG	SHAGANAPPI
MOP	MOUNT PLEASANT	SHN	SHAWNESSY
MOR	MONTEREY PARK	SHS	SHAWNEE SLOPES
MPK	MARLBOROUGH PARK	SHW	SHERWOOD
MPL	MAPLE RIDGE	SIG	SIGNAL HILL
MRL	MARLBOROUGH	SIL	SILVER SPRINGS
MRT	MARTINDALE	SKR	SKYVIEW RANCH
NEB	NEW BRIGHTON	SNA	SUNALTA
NGM	NORTH GLENMORE PARK	SOC	SOUTH CALGARY
NHU	NORTH HAVEN UPPER	SOM	SOMERSET
NHV	NORTH HAVEN	SOV	SOUTHVIEW
NOL	NOLAN HILL	SOW	SOUTHWOOD
OAK	OAKRIDGE	SPH	SPRINGBANK HILL
OGD	OGDEN	SPR	SPRUCE CLIFF
PAL	PALLISER	SSD	SUNNYSIDE
PAN	PANORAMA HILLS	SSW	SCARBORO/ SUNALTA WEST
PAT	PATTERSON	STA	ST. ANDREWS HEIGHTS
PEN	PENBROOKE MEADOWS	STR	STRATHCONA PARK
PIN	PINERIDGE	SVO	SILVERADO
PKD	PARKDALE	TAR	TARADALE
PKH	PARKHILL	TEM	TEMPLE
PKL	PARKLAND	THO	THORNCLIFFE
POI	POINT MCKAY	TUS	TUSCANY
PUM	PUMP HILL	TUX	TUXEDO PARK
QLD	QUEENSLAND	UMR	UPPER MOUNT ROYAL
QPK	QUEENS PARK VILLAGE	UNI	UNIVERSITY HEIGHTS
RAM	RAMSAY	UOC	UNIVERSITY OF CALGARY
RAN	RANCHLANDS	VAL	VALLEY RIDGE
RCK	ROSSCARROCK	VAR	VARSITY
RDL	ROSEDALE	VIS	VISTA HEIGHTS
RED	RED CARPET	WAL	WALDEN
REN	RENFREW	WBN	WOODBINE
RIC	RICHMOND	WGT	WESTGATE
RID	RIDEAU PARK	WHI	WHITEHORN
RIV	RIVERBEND	WHL	WEST HILLHURST
RMT	ROSEMONT	WIL	WILLOW PARK
ROC	ROCKY RIDGE	WIN	WINSTON HEIGHTS/MOUNTVIEW
ROX	ROXBORO	WLD	WILDWOOD
ROY	ROYAL OAK	WND	WINDSOR PARK
RSN	REDSTONE	WOO	WOODLANDS
RUN	RUNDLE	WSP	WEST SPRINGS
RUT	RUTLAND PARK		