

Demographic Analysis

Assignment 3 (5%) due Feb 4th

Questions in this lab forms up assignment #3.

Submission

- Submission should be in one file including a title page, all maps and write-up in either PDF or WPRD format.
- Save the file as **lastname_firstname_geog413_A3** and send it to your lab instructor by email at baip@unbc.edu with Subject of Geog413 A3

Nearly half the world's population currently lives in cities. In the twentieth century, the number of city dwellers increased worldwide. In Canada, one out of 5 people is foreign-born. According to the first data from the 2011 NHS, Canada had a total of about 6,775,800 foreign-born individuals who arrived as immigrants. They represented 20.6% of the total population, compared with 19.8% in the 2006 Census and the trend continually grow.

This migration leads to some interesting questions:

- When ethnic group move to urban areas, do they remain the same neighborhoods over time or do they spread uniformly or in some pattern throughout the metropolitan region?
- Once neighborhoods were segregated, do they remain so or does the segregation abate over time?
- What does this distribution say about the relationship and attitudes for relations between different ethnic groups?
- What influence do improving economic conditions have on this migration?

In this lab, you will be working with Canadian census data to examine the ethnic population distribution, diversity and income etc. throughout the Greater Vancouver metropolitan area for the year of 2006 and 2011

Problem

You need to produce some maps and charts for a research team to explore the changing urban demographics of the Greater Vancouver area

- A demographics research team is examining neighborhood integration and transition by measuring increasingly multiethnic and multiracial populations. The team would like to see the maps of Aboriginal, ON_Amer(Other North American), European, Asian populations for the year of 2006 and 2011.
- The team would also like to see diversity indexes as well as the mean centers and directional distribution of ethnic groups and calculated and displayed for both 2006 and 2011.
- Finally, the team wants to examine the impact of income on diversity by studying the spatial distribution of median income in 2011 and how that measure correlates to changing neighborhood settlement patterns. The researchers have requested that the data be displayed in 3D to engage their users.

Deliverables

After identifying the problem, you need to envision the kinds of data displays (maps, graphics, and tables) that will provide the solution. The following deliverables are required for this exercise.

1. *A basemap showing population density for 2011 and 2006. The map should show the population density classified in graduated color. Discussion of the spatial distribution of population for each year and the changes from 2006 to 2011 should be included*
2. *A map showing population percentage for Asian, Aboriginal, European, ON_Amer for 2011. Discuss the spatial distribution for each ethnic group*
3. *A map showing diversity indexes for each year(2006,2011). A map showing the percentage of Aboriginal, ON_Amer, European, Caribbean, LCSA, African, Asian and Oceania population as a bar graph(2011) and diversity indexes as graduated color for 2011. A short discussion should be included in your analysis*

4. A map showing the mean center and directional distribution of Asian population in 2006 and 2011. Examine the changes in mean center and directional distribution between 2006 and 2011
5. A map showing distribution of median income for the year of 2011 and 2006 with histogram.
6. A double variable 3D map of diversity index in relation to median income for 2006 and 2011

Data Downloading

All the data required for this lab can be downloaded from census Canada. The data you need are boundary file at census tract level, the tabular data containing ethnic origins and median income for the year 2006 and 2011

Get the boundary files:

The boundary file is different for each census year, so you need to download the boundary file for each census year

- Open a web browser and search for 'Census Canada boundary file'
- Go to the link [Boundary files – Statistics Canada](#)
- Click 2011 for the Census year, English for Language, ArcGIS for Format.
- Click the radio button for Census Tract under Cartographic Boundary File. Click Continue button
- Right-click on the file link and save it to your local folder
- In the same way download the boundary file for the year of 2006

Download tabular data

The tabular data contains the information we need for analysis that include the ethnic origin and income

- In web browser, Go to UNBC library->Collections->Data & Statistics->Canadian Data
- Scroll down and find [Canadian Census Analyser](#). Click the link and Click [Canadian census analyser@CHASS](#)
- Here you need to enter your UNBC credentials, then you will be in the main page of census data
- Click 2011 NHS ->Profile of Census Tracts(cumulative)
- In step 1, remove all check marks, and click by Province tab and click Vancouver
- In step 2, select NHS Profile variables, Click Eth, Relig, Aborig tab->Ethnic origin Total
- Here you can select the data you need. Place a check mark for the followings:
 - Total population in private households by ethnic origins; Both sexes
 - North American Aboriginal origins; Both sexes
 - Other North American origins; Both sexes
 - European origins; Both sexes
 - Caribbean origins; Both sexes
 - Latin, Central and South American origins; Both sexes
 - African origins; Both sexes
 - Asian origins; Both sexes
 - Oceania origins; Both sexes
- Double check the Selected items to make sure you have the data list above
- In step 3, highlight HTML for Screen output, click Submit Query button. Then you will see the result showing in HTML
- Now click File->Save As to save the file and name it as **2011ethnic_origin.html**.
- Back to 2011 NHS page and click Profile of Census Tracts(cumulative) to download income data
- In step 1, Choose British Columbia->Vancouver
- In step 2, click Inc tab and individuals Inc. 2010, place a check mark for the following
 - Total income in 2010 of population aged 15 years and over; Both sexes
 - Median income; Both sexes
 - Average income; Both sexes
- Submit the query and save the file as **2011_incom.html**
- Back to the main page and download 2006 data. The data for 2006 is a bit different

- Click year 2006-> Profile of Census Tracts (cumulative)-> Ethnic origin and visible minorities
- Highlight British Columbia->Vancouver[933](B.C.)
- Highlight the followings to download
 - Total population by ethnic origin – 20% sample data
 - Aboriginal
 - Other North American origins
 - Caribbean origins
 - Latin, Central and South American origins
 - European origins
 - African origins
 - Arab origins
 - West Asian origins
 - South Asian origins
 - East and Southeast Asian origins
 - Oceania origins
- Place a check mark for CTUID to include it in the result. This field will be used as join item later
- Highlight HTML for Screen output and click Submit Quer. Save it as **2006ethnic_origin.html**
- Back to 2006 main page -> Profile of Census Tracts (cumulative) -> Income and earnings and housing and shelter costs
 - Total income in 2005 of population 15 years and over - 20% sample data
 - Median income
 - Average income
- Include CTUID in the result and save the file as **2006_income.html**

Examine the data

Thoroughly investigate the data layers to understand how they will help you address the problem. The spatial coordinate system, the resolution of the data, and the attribute data are all important pieces of information about a feature class.

Examine tabular data

As the heading of each column is too long and wouldn't work for ArcGIS, you need to rename them to a shorter name

- Run LibreOffice Calc from Start->All programs->LibreOffice. Open the file **2011ethnic_origin.html**. Click OK if any popup warning
- Delete the first two rows to remove the title. Scroll down to the end of file and delete any rows with text
- Rename each column heading accordingly:
 - Total population in private households by ethnic origins; Both sexes (v168) -> TOT_POP
 - North American Aboriginal origins; Both sexes -> Aboriginal
 - Other North American origins; Both sexes -> ON_Amer
 - European origins; Both sexes -> European
 - Caribbean origins; Both sexes -> Caribbean
 - Latin, Central and South American origins; Both sexes -> LCSA
 - African origins; Both sexes -> African
 - Asian origins; Both sexes -> Asian
 - Oceania origins; Both sexes -> Oceania
- Click File->Save As. Choose dBASE for the file type and save it as **2011ethnic_origin.dbf**
- Open **2006ethnic_origin.html** in LibreOffice. Here you need to do some editing
- Remove the title rows and the bottom text as you did for 2011 data
- Add a new column Asian and give the total of West Asian, South Asian, East and Southeast Asian to this column.

- Rename the column heading accordingly
 - Census Tract Name -> CTName
 - CTUID(CMA/CA code + CT name -> CTUID
 - Total population by ethnic origin – 20% sample data ->TOT_POP
 - Aboriginal -> Aboriginal
 - Other North American origins -> ON_Amer
 - Caribbean origins ->Caribbean
 - Latin, Central and South American origins ->LCSA
 - European origins -> European
 - African origins ->African
 - Arab origins -> Arab
 - Oceania origins -> Oceania
 - Asian -> Asian
- Save the file as **2006ethnic_origin.dbf**
- Open **2011_incom.html** in LibreOffice and rename the heading as the following
 - Total income in 2010 of population aged 15 years and over; Both sexes -> TOT_In
 - Median income \$; Both sexes -> Med_In
 - Average income \$; Both sexes -> Ave_In
- Save the file as **2011_incom.dbf**
- In the same way rename the 2006 income data. Save the file as **2006_income.dbf**

Examine boundary data

The boundary files are in geographic projection for both 2006 and 2011 year

- First you need to unzip the downloaded file. Go to your local folder and right-click the zipped file for 2011 and unzip it in the same directory. You will have the boundary file something like *gct000b11a_e.shp*
- In the same way, unzip the file for 2006. You will have two shape files *gct000b11a_e.shp* and *gct000b06a_e.shp*
- Open a new map file and add these two shape files
- Set the data frame coordinate system to BC Albers (you can import the coordinate system from BC layer under L:\labs\geog413/bc folder)
- Make a selection from each layer with the following expression to extract greater Vancouver area
CMAUID = '933' (single quotation)
- Export the selected features from each layer and save it as *ct2011_van* and *ct2006_van* respectively using the coordinate system of the data frame (BC Albers). This will reproject the data to BC Albers coordinate system and make the AREA calculation easier later
- Remove the original layers and just keep *ct2001_van* and *ct2006_van* in the data frame.
- Add table of *2011ethnic_origin.dbf*, *2006ethnic_origin.dbf*.
- Examine the field of CTUID in *ct2011_van* and GEO_UID in *2011ethnic_origin.dbf*. These two fields should be the join item. The data type of CTUID is in text string while GEO_UID is numeric. This will cause problem when joining two tables. You need to make the joining field in the same data type.
- Open the attribute table of *ct2011_van*. Add a field CTUID_NUM with 15 for precision and 2 for scale.
- Now assign the value from CTUID to the field of CTUID_NUM with field calculator. The field CTUID_NUM will be used for joining field
- In the same way add a field to *ct2006_van* and assign the value from CTUID.

Analysis

Set the environments

In GIS analysis, you will often get data from several sources, and these data may be in different coordinate system and/or map projections. When using GIS to perform area calculation, you would like your result to be in familiar units. This can be done by setting environment variables

- Set environment as the following:
 - Current /Scratch Workspace: your local folder
 - Output Coordinate System: BC Albers
- Save the map file as **pop_density.mxd**

Step 1: Create a based map of population density for Greater Vancouver

First, you will prepare a basemap showing the 2011 census tracts displayed by population density. The population density should be classified in graduated color.

1. Add a new field AREA and calculate the area in square kilometer for each layer
2. Examine **2011ethnic_origin** table. This table contains ethnic origin and population for each census tract, which can be joined to **ct2011_van** for spatial analysis. The join item is CTUID_NUM in **ct2011_van** and GEO_UID in **2011ethnic_origin**. Join **2011ethnic_origin** table to **ct2011_van** and export it as **my_ct2011**. Remove **ct2011_van**
3. In the same way join table **2006ethnic_origin** to **ct2006_van** and export it as **my_ct2006**. Remove **ct2006_van**. The join item is CTUID_NUM in **ct2006_van** and CTUID in **2006ethnic_origin** (Note: it is different from 2011 data)
4. Rename the data frame name to “Population Density 2011”. Turn off all layers except **my_ct2011**
5. Classify **my_ct2011** using graduated color with proper color ramp. The TOT_POP should be used for Value field and normalized by AREA. Classify the data by manually altering the class breaks. In this case you could classify the data in 6 classes and use class breaks of 200, 500; 1000; 2000; 5000, and the highest number for the last class.
6. The number labels should be formatted to show 0 decimals in map. In the symbology window, right-click on Label (heading) ->Format Label. Set 0 to Number of decimal places. Click OK
7. Copy the “Population Density 2011” data frame and paste it in the table of contents. Rename it to “Population Density 2006”.
8. In the new data frame, turn off **my_ct2011** and turn on **my_ct2006**. Repeat step 5 to produce a population density map for 2006.
9. Create a based map showing Greater Vancouver population density for 2011 and 2006 with proper cartographic principles.
10. Save the map document as **pop_density.mxd**

Deliverable 1: *A basemap showing population density for 2011 and 2006. The map should show the population density classified in graduated color. Discussion of the spatial distribution of population for each year and the changes from 2006 to 2011 should be included*

Step 2: Compare race/ethnicity for 2006 and 2011

To compare data, you need to create a standard classification that can be used for both years. This can be done by creating a layer definition and applying it to both the 2006 and 2011 data.

1. Save the map document again as **comparison.mxd**.
2. Remove the data frame “Population Density 2006”
3. Rename the data frame “Population Density 2011” to “Percentage Asian 2011”
4. Turn on **my_ct2011** and turn off **my_ct2006**
5. In “Percentage Asian2011” data frame, classify the 2011 data using graduated color with Asian as the Value field and TOT_POP as the normalization field. Choose proper color ramp and classify the data by manually

altering the class breaks. In this case the normalized value cannot be greater than 1, which represents 100 percent. Suggested break values could be 0.2, 0.4, 0.6, 0.8 and 1.0. Format the labels as Percentage.

- Right-click **my_ct2011** -> Save as Layer File and save the layer file with proper name, such as **pop_percent.lyr** for later use

It is important to note that the layer file that is used to symbolize all the data must include the maximum value possible in any of the layers.

- Copy the “Percentage Asian 2011” data frame and paste. Rename the duplicate data frame to “Percentage Aboriginal 2011”.
- In the Symbology window of **my_ct2011**, import the **pop_percent.lyr** layer file that you are using as the standard symbology and change the Value Field to Aboriginal and corresponds population for Normalization Field (TOT_POP)
- Repeat the step 7,8 for ON_Amer, European
- Create a four-data-frame layout using correct cartography principles showing the percentage of Asian, Aboriginal, European, ON_Amer for the year 2011.
- Save the map document as **comparison2011.mxd**.
- Save the map document again as **comparison2006.mxd**
- Turn off **my_ct2011** and turn on **my_ct2006** in each data frame. Repeat steps above to produce a map for the year 2006

Deliverable 2: *A map showing population percentage for Asian, Aboriginal, European, ON_Amer for 2011. Discuss the spatial distribution for each ethnic group*

These questions may help focus your analysis

Q. Why should you normalize that data?

Q. How does the normalized data differ from the original data?

Q. Describe the distribution of the Asian, European, and how it changed between 2006 and 2011

Q. Do you notice anything about the physical geography where there are large percentages?

Step 3: Calculate the population diversity index for 2006 and 2011

There are many ways to measuring distribution of population. Diversity index is a simple way to look at the differences. In this step, you will calculate the diversity index for 2006 and 2011, make observations about diversity in Greater Vancouver, and compare diversity in 2006 with that observed in 2011.

A. Calculate diversity index for 2011

- Open a new map file and add **my_ct2011**. Export it as **my_ct2011_DI**. Remove **my_ct2011**. Save the map file as **diversity.mxd**. Change the name of data frame to Diversity Index 2011
- Open the attribute table of **my_ct2011_DI**. This attribute table is long. You can hide some fields not needed by opening the properties window and go to Fields tab. Here you can toggle a field on/off. The following fields should remain visible: TOT_POP, Aboriginal, ON_Amer, European, Caribbean, LCSA, African, Asian and Oceania. Save the map document.
- In order to calculate the diversity, the percentage of each attribute (Aboriginal, ON_Amer, European, Caribbean, LCSA, African, Asian and Oceania) is required, you need to add fields and make any necessary calculations. Percentage calculations will include decimals so that the field should be float or double type. Add following fields to **my_ct2011_DI** with Double type, precision at 15 and scale at 3:

PER_ABO	PER_ONA	PER_EUR	PER_CAR	
PER_AFR	PER_ASI	PER_OCE	PER_LCSA	DIV_INDEX

- With the Field Calculator calculate the percentage of each ethnic groups
 - Select by attributes Aboriginal > 0 and TOT_POP > 0
 - With the Field Calculator calculate the PER_ABO field by using the formula Aboriginal /TOT_POP.

- If you examine the data, you can see that some the field values are <NULL>. The <NULL> values need to be set to 0.
 - Switch Selection. Use the Field Calculator to enter 0 for the value <NULL> if necessary
5. Repeat the previous step for PER_ONA, PER_EUR, PER_CAR, PER_LCSA, PER_AFR, and PER_ASI, PER_OCE. Make sure to use the appropriate selection criteria

We will use a simple formula below to calculate the diversity index (DIV_INDEX)

$$1 - ([PER_ABO]^2 + [PER_ONA]^2 + [PER_EUR]^2 + [PER_CAR]^2 + [PER_LCSA]^2 + [PER_AFR]^2 + [PER_ASI]^2 + [PER_OCE]^2)$$

6. With Field Calculator, calculate DIV_INDEX field using the formula above. Display the DIV_INDEX in graduated colors and exclude values of 1 or greater. Exclusion can be found under the Classify tab in the graduated colors menu or you can exclude values by using a Definition Query of DIV_INDEX < 1.
7. Create a layer file to use for comparing the diversity index in different years. Symbolize manually with five classes. Suggested values could be 0.2, 0.4, 0.6, 0.8, 1.0. Format the labels properly, higher values of the diversity index indicate greater ethnic diversity.
8. Save the layer file as **div_index.lyr** and save the map document to **diversity.mxd**

B. Calculate the diversity index for 2006

1. Inset a new data frame and follow the same produce calculate diversity index for 2006. Note: there is an ARAB group which does not exist in 2011 data. Make sure not forget to include this field
4. Symbolize DIV_INDEX by importing the **div_index.lyr** layer file. Save the map file to **diversity.mxd**
5. Compare the 2011 diversity index to the 2006 diversity index.
6. Save the map file to **diversity.mxd**

Step 4: Examine diversity of individual census tracts

1. Insert a new data frame and name it “Individual Census Tracts 2011”. Copy the layer **ct2011_DI** and paste it twice in the “Individual Census Tracts 2011” data frame. Don’t forget to set the coordinate system for the new data frame.
2. In the Symbology tab, display the top layer by Bar/Column with Aboriginal, ON_Amer, European, Caribbean, LCSA, African, Asian and Oceania normalized by TOT_POP. Make the background color hollow so you can see the 2011 classified diversity index layer as well.
3. Save the map file to **diversity.mxd**.

Deliverable 3: *A map showing diversity indexes for each year(2006,2011). A map showing the percentage of Aboriginal, ON_Amer, European, Caribbean, LCSA, African, Asian and Oceania population as a bar graph(2011) and diversity indexes as graduated color for 2011. A short discussion should be included in your analysis*

These questions may help focus your analysis:

Q. Where are the clusters of high diversity and where are there clusters of low diversity??

Q. What does low diversity mean?

Q. In what ways did the diversity index change between 2006 and 2011?

Q. Closely investigate Greater Vancouver by zooming in. What do you observe about the diversity of the census tracts?

Step 5: Calculate mean center and directional distribution

The mean center identifies the geographic center (or the center of concentration) for a set of features. It is useful for tracking changes in the distribution of ethnic groups over time.

Directional distribution measures the compactness of a distribution and show the degree to which a distribution varies north to south (y-axis) and east to west (x-axis).

1. Save the map file as **mc_dd.mxd**. Remove the Individual Census Tracts data frame and the Diversity Index 2011 data frame.
2. Rename the Diversity Index 2006 to “Statistics 2006 – 2011”
3. You should have **my_ct2006_DI** and **my_ct2011_DI**. If not add them to data frame.
4. Calculate the mean center for the percentage of Asian for **my_ct2006_DI**. Give the output features appropriate names such as **mc_asian06**. Use PER_ASI (ASIAN percentage) as the Weight Field.

ArcToobox->Spatial Statistics ->Measuring Geographic Distributions->Mean Center

Input Feature Class: **my_ct2006_DI**

Output Feature Class: **mc_asian06**

Weight Field: PER_ASI

5. Repeat previous step to create mean center for **ct2011_DI**. Save the output feature as **mc_asian11**
6. Calculate the directional distribution for the percentage of Asian (PER_ASI) for **ct2006_DI**. Give the features appropriate names such as **dd_asian06**. Use 1 standard deviation for Ellipse Size and PER_ASI as the Weight Field.

ArcToobox->Spatial Statistics ->Measuring Geographic Distributions->Directional Distribution

Input Feature Class: **my_ct2006_DI**

Output Feature Class: **dd_asian06**

Weight Field: PER_ASI

Ellipse Size: 1_STANDARD_DEVIATION

7. Repeat steps 4, 5 and 6 using percentage European (PER_EUR).
8. Label appropriately and show the mean center and directional distribution over time. Save the map file
9. You can examine other groups the same way

Deliverable 4: *A map showing the mean center and directional distribution of Asian population in 2006 and 2011. Examine the changes in mean center and directional distribution between 2006 and 2011*

These questions may help focus your analysis

Q: Do the mean centers for Asian vary over time?

Q: What would cause the mean centers to shift?

Q: How did the mean centers shift between 2006 and 2011?

Q: Do the directional distributions vary between 2006 and 2011?

Q: Why would directional distributions change?

Q: What can you tell about changes in segregation from these map?

Step 6: Analyze distribution and change in median income

Many factors can affect diversity in an urban setting, but economics is one of the most powerful forces. Income can serve as an economic indicator that can help you understand the changing patterns of diversity. Think about other indicators (such median house value etc.) you might use to explore this situation.

Prepare the map

1. Open a new map file and add **ct2011_van** and **2011_income.dbf** to ArcMap
2. Rename the data frame to “Median Income”
3. Joint the **2011_income** to the layer **ct2011_van**. The joining field is GEO_UID in **2011_income** and CTUID_NUM in **ct2011_van**. Export it as **income_ct2011**. Remove the **ct2001_van** and **2011_income**
4. Display **income_ct2011** by Graduated Color using the Med_in for Values field. Classify the data in 5 classes with value break as 20000, 30000, 35000, 40000, 60000. Reformat the labels with proper cartography principles. Save it as a layer file **med_income.lyr**

5. Add a new data frame and add *ct2006_van, 2006_income.dbf*. Repeat 2 – 6 for the year of 2006. Save the map file as **med_incom.mxd**

Create a histogram of median income in 2011

1. Create a Histogram Graph using *my_income_ct2011* with the Graphs tool (View->Graph->Create Graph). Set the Value field to *Med_in*.
2. Title and label the legends appropriately. Include the graph on the layout
3. Create a histogram graph for 2006
4. Save the map file as **med_incom.mxd**

The graph is dynamically linked to the map. As you click a histogram bar, the census blocks with median income in the range are highlighted on the map. Starting at left (lowest median income). Click each section of the histogram. Observe the spatial patterns on the map.

Deliverable 5: *A map showing distribution of median income for the year of 2011 and 2006 with histogram. Think about the following questions in your map analysis*

Q. What does the median income represent and what is the lowest and highest median income?

Q. Describe the spatial distribution of median income in Greater Vancouver area

Q. Explain the patterns that you see in the graph.

Q. Any changes on median income from 2006 to 2011?

Step 7: Prepare a double variable map showing the relation between diversity index and median income in 3D

Use ArcScene to display the data in 3D. The height of individual features is provided by either using base height (elevation) data or extruding features by particular attribute values.

You can control the vertical exaggeration, which allows you to exaggerate the difference in features to help you analyze variation in your data. While this technique is often very useful, you must not forget that ArcScene has exaggerated the view which might lead you to draw some very erroneous conclusions.

1. Open ArcScene. Set the scene document properties. Select “Store relative pathnames to data sources”. Set the data frame properties coordinate system and Set the environment
2. Add *my_ct2011_DI* and *2011_income*. Join *2011_income* to *my_ct2011_DI*
3. Export the *my_ct2011_DI* and save the file as *tractsdi_income_2011*. Remove *my_ct2011_DI* and the *2011_income*

You now have one feature class with the diversity index and the median income include.

4. Display *tractsdi_income_2011* by graduated color using the *Med_in* field and exclude 0.
5. Extrude the feature class by the diversity index and Calculate from Extent Vertical Exaggeration.
6. Save the map file as **van_di_med_in**
7. You can play around for 2006

Step 8: Prepare 3D race/ethnicity maps relating to 2011 median income

1. Open ArcScene and add *tractsdi_income_2011*
2. Symbolize *tractsdi_income_2011* by importing the *pop_percent.lyr* file from step 2. Select Asian for value field and TOT_POP for Normalization Field
3. Extrude by the attribute *Med_in*. Click the Calculate From Extent button to set the vertical exaggeration
4. Repeat for European, Aboriginal, and ON_Amer population percentages and observe their variations with respect to the extruded median house value.
5. Record your observations as you examine each of the sense to help you in your analysis

Deliverable 6: *A double variable 3D map of diversity index in relation to median income for 2006 and 2011.*

Address the following questions in analyzing your map:

Q. What other variables might you analyze to understand the changing patterns of diversity in greater Vancouver area?

Discuss on overall results. How has the distribution of ethnic group (Asian, European) in the Greater Vancouver area changed between 2006 and 2011? Can you predict what changes might be seen in the future?