INTRODUCTION TO QGIS AND BASIC GEOPROCESSING SKILLS

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AGENDA

Census of Canada

Downloading and displaying datasets

Querying and extracting

Finding and joining Census data

Exploring cartographic principles and generate a map layout

CENSUS OF CANADA

KEY POINTS ABOUT THE CENSUS OF CANADA

Administered by Statistics Canada

Every 5 years (2016, 2011, 2006, etc.) starting 1901

- 1951 was first census to cover all 10 provinces and 2 territories
- Census history

Short form and long form

- Majority of people get the short form (age, household, language); 2016 short form
- 1 in 4 households sent the long form, which provides data about mobility, education, employment, etc.; 2016 long form

Both forms are technically mandatory but no punitive actions if you don't fill it in

NATIONAL HOUSEHOLD SURVEY 2011

2011 was an anomaly and you need to be careful with it

- Long form was voluntary and became National Household Survey (NHS)
- Short form is generally what is meant by the phrase "2011 Census"
- NHS data quality statement

If it's anything but age, household and language, it's NHS so you **need to check the global non-response rate in the table or in the metadata**

Final response rates [1] for Canada, provinces and territories, 2011

Geography	Census private dwellings occupied by usual residents	NHS unweighted response rate (%)	NHS weighted response rate (%)
Canada	13,320,614	68.6	77.2
Newfoundland and Labrador	208,842	63.3	72.5
Prince Edward Island	56,462	60.4	70.0
Nova Scotia	390,279	65.0	74.8
New Brunswick	314,007	63.9	74.2
Quebec	3,395,343	71.9	80.7
Ontario	4,887,508	67.6	76.3
Manitoba	466,138	69.1	76.3
Saskatchewan	409,645	63.8	73.1
Alberta	1,390,275	67.3	75.4
British Columbia	1,764,637	69.5	77.1
Yukon	14,117	64.9	72.7
Northwest Territories	14,700	83.9	83.8
Nunavut	8,661	76.3	76.3

2016 Census of Population collection response rates

Table 1 Collection response rates, Canada, provinces and territories, 2016 Census of Population [1]

Geography	Overall response [2]	Internet [3]	Self-response [4]	Long form [5]
Canada	98.4%	68.3%	88.8%	97.8%
Newfoundland and Labrador	98.6%	45.1%	88.0%	98.1%
Prince Edward Island	98.2%	44.9%	89.6%	97.8%
Nova Scotia	98.4%	55.8%	89.6%	98.1%
New Brunswick	98.3%	65.4%	89.7%	97.9%
Quebec	98.7%	70.5%	89.4%	98.3%
Ontario	98.6%	70.9%	90.0%	98.1%
Manitoba	98.2%	61.1%	88.9%	97.2%
Saskatchewan	98.1%	54.2%	88.6%	97.7%
Alberta [6]	97.9%	65.3%	83.3%	97.2%
British Columbia	97.8%	71.2%	88.1%	97.2%
Yukon	96.6%	56.8%	79.0%	94.7%
Northwest Territories	96.6%	39.5%	87.2%	96.5%
Nunavut	95.2%	... [7]	... [7]	95.2%

NHS Profile, Kindersley, T, Saskatchewan, 2011

NHS data | Census data | Map | Geographic hierarchy | Related data

Select a view: All data ▾ Submit

Characteristic	Kindersley, T Saskatchewan (Census subdivision) Total	Male	Female
Citizenship			
Total population in private households by citizenship [1]	4,575	2,230	2,345
Canadian citizens	4,535	2,220	2,315
Canadian citizens aged under 18	1,075	500	580
Canadian citizens aged 18 and over	3,460	1,720	1,740
Not Canadian citizens [2]	35	15	20
Immigrant status and period of immigration			
Total population in private households by			

Data source

2011 National Household Survey

NHS data quality

Kindersley, T, Saskatchewan

Global non-response rate (GNR) = 36.0%

Download current NHS table

CSV (approx. 70 kb)

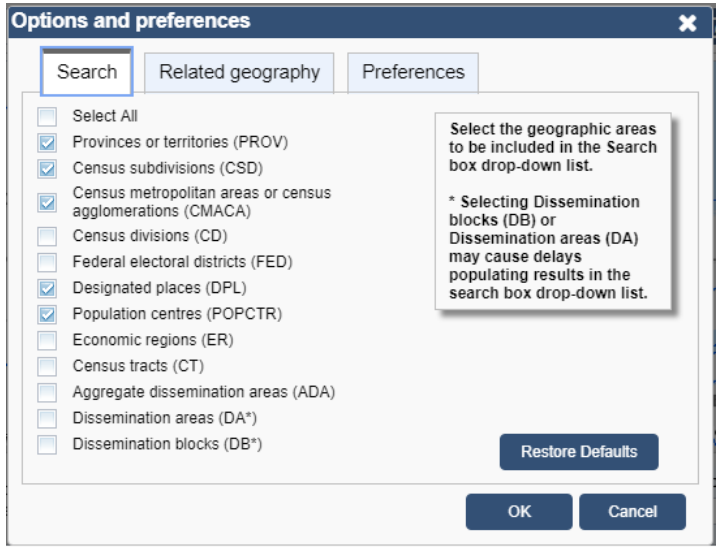
TAB (approx. 70 kb)

CENSUS GEOGRAPHY

Help guide about census geographies

GeoSearch is Statistics Canada's geographic gateway

- Links to Census Profiles
- Handy if you want to know demographics about a town/region/province/etc.
- Also handy to figure out what census tract or census division a location is in



GeoSearch is most easily used for finding towns/cities/regions; go into Settings if you want to find specific census tracts or Federal Electoral Districts

HANDS-ON!

DOWNLOADING CENSUS GEOGRAPHY

Free!

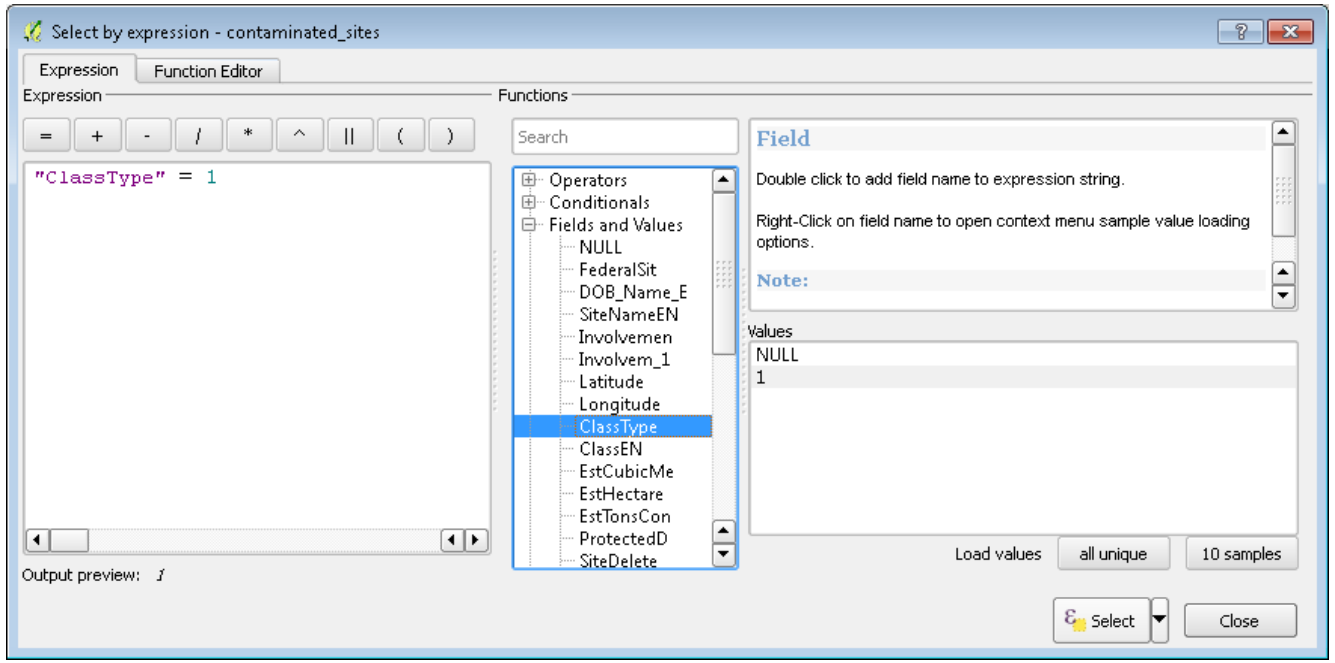
Boundary files for all census geographies in shapefile (GIS) format

Census tracts are the geographic areas in which 2500-8000 people live, and are exclusively in cities of over 100,000 people

QUERYING DATA IN QGIS

Querying allows you to extract subsets from large datasets

QGIS uses SQL queries in a relatively easy-to-use interface



MAP PROJECTIONS

Map projections are mathematical algorithms that allows representation of the 3D earth on a 2D surface

- There is ALWAYS distortion of any combination of area, direction, distance or shape

See what different map projections look like! It's animated!

- http://www.jasondavies.com/maps/transition/

See the distortion!

- http://bl.ocks.org/enjalot/bd552e711b8325c64729

DISPLAY DATA IN NON-GEOSPATIAL FORMAT

E.g.: spreadsheet

Need some/any sort of geographic element

- Address
- Latitude/longitude coordinates
- Country, city, etc.

Lat-long is easiest but can find lat-long with addresses (called **geocoding**)

With Census data there are geographic identifiers (CTUID for a unique census tract identification code; CMAUID for each census metropolitan area, etc.)

DOWNLOADING CENSUS DATA

3 ways of downloading the data

- Through Census Profile
  - Download data in CSV or other formats (free)
  - ALL the data for specific geography
- By Topic (e.g.: income, language, etc.)
  - Click on topic, go to Data Products > Data tables for more specific topics than the Profiles
- Through Canadian Census Analyser
  - Available to Student, faculty and staff ONLY
  - Save data as .dbf

We'll look at INCOME

CARTOGRAPHIC PRINCIPLES

WHAT IS A MAP?

A map shows information spatially, typically emphasizing a theme.

They are a graphic representation of the real world.

Mapmakers select and symbolize what they want to show on the map.

ELEMENTS TO CONSIDER WHEN MAKING A MAP

What is the intent of the map?

Who is the audience?

- Professor? Editor? Members of the public?

What is the format?

- Print? Digital? Both?

How will it be produced?

- Colour, greyscale or b&w?

How will it be viewed?

- In a magazine? On a computer screen? In a newspaper?

THIS IS WHY YOU NEED TO THINK ABOUT HOW IT WILL BE VIEWED

OPINION

Obama's Divided Nation

ama presides over ica more divided any time in 50 ry that was riven g racial lines gath- 2008 to elect its ident. That presi- four years dividing the basis of eco- The campaign re- vealed no evi- dence that Mr. Obama will close the chasm he has created between his voters and those he attacked and vilified.

It may be true that Mitt Romney failed to respond

■ R.I.
■ Conn.
■ Del.
■ D.C.

■ Obama ■ Romney

Source: AP

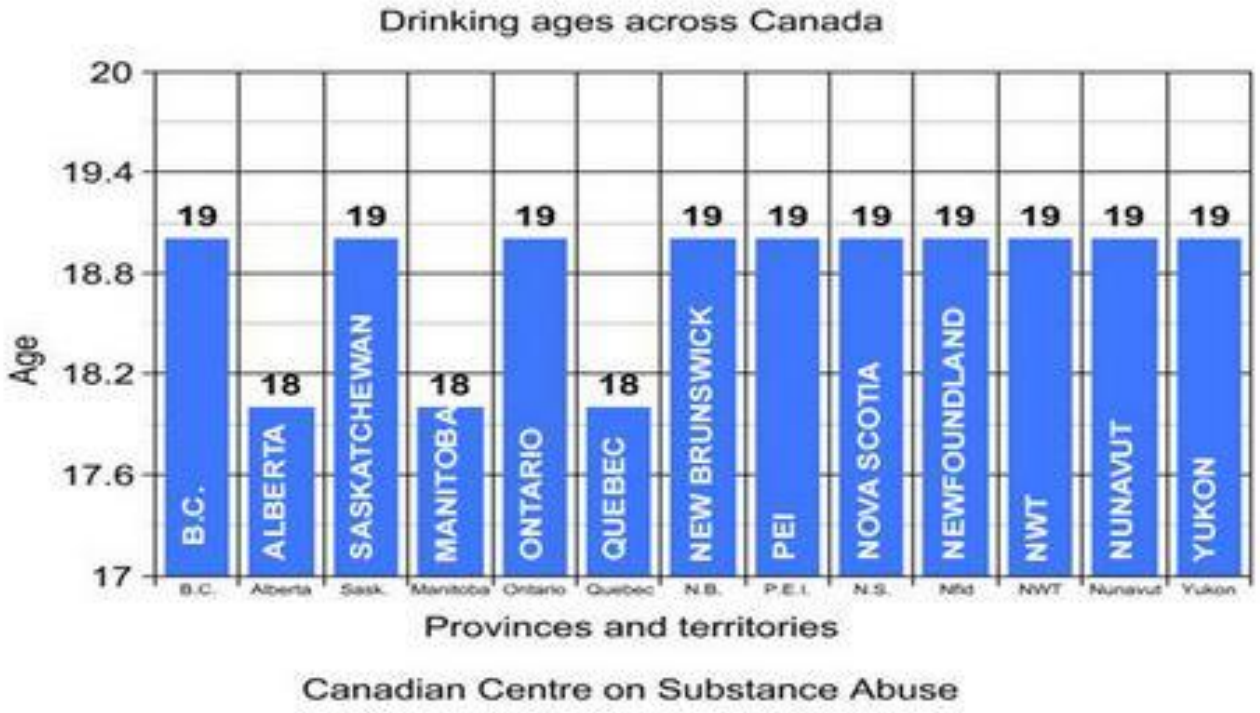
drawn attention to what hap- Obama spokestotum replied:

problem with pols, e verbally facile as Mr. that in crunch time, reverts to No. 1. Exi that 9% of the electo who to vote for jus Tuesday; and amo 42% said Mr. Oban Sandy response—t tie photo-op—wa factor. Of those, voted for Mr. Ob Mr. Christie is o politico who is

Yes, Republic across two pres that there are how crudely issue like ill Blowing up th if you thoug day's results

https://www.mediaite.com/print/divided-no-more-wall-street-journal-prints-hilariously-confusing-electoral-map-showing-unanimous-obama-win/

NOT A MAP BUT SPEAKS TO INTENT



You have to be 19 in Saskatchewan to have a drink, while in Alberta and Manitoba, the drinking age 18. (CBC)

http://web.archive.org/web/20130306083700/http://www.cbc.ca/news/canada/saskatchewan/story/2013/03/04/sk-drinking-age-1303.html

CARTOGRAPHIC ELEMENTS

Title

Legend

Scale

Orientation (North Arrow)

Theme

Symbolization

Necessary map elements

MAPS THAT MAKE REBECCA WANT TO PUNCH THE CLOSEST THING THAT WON'T BREAK HER HAND

http://www.macleans.ca/news/canada/putting-canada-on-the-map/

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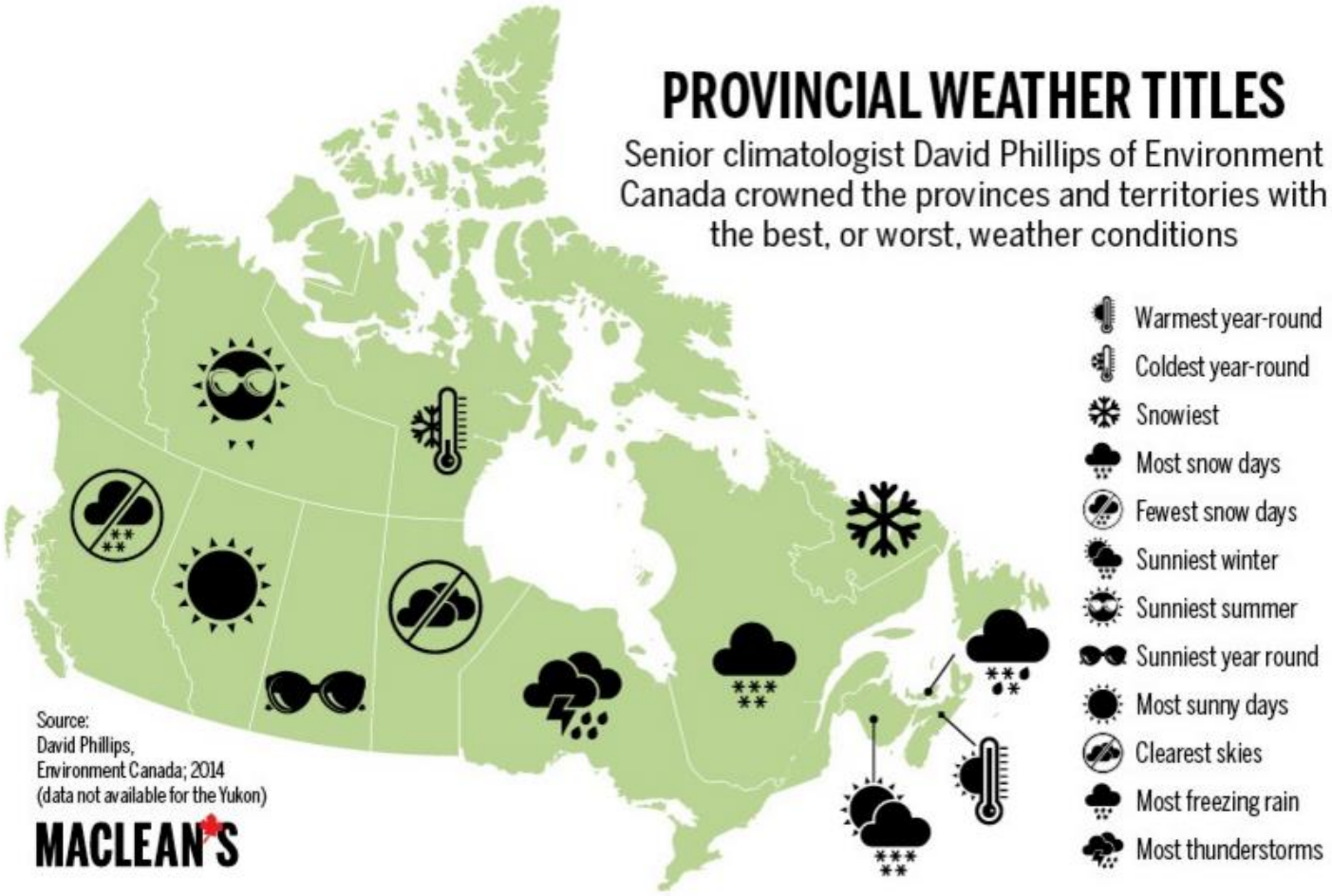

http://www.macleans.ca/news/canada/putting-canada-on-the-map/

TIPS TO KEEP REBECCA FROM HUNTING YOU DOWN IN THE FUTURE

Title, north arrow, scale, and legend

Keep labels **entirely** inside or outside features and, for the love of all that is holy, *keep the text direction the same direction unless it's a river*

Make the font legible

Don't map things that don't need to be mapped

FURTHER RESOURCES

Open Data repositories

- http://www.library.carleton.ca/find/gis/geospatial-data/open-data-repositories

Statistics Canada Boundary files & data

- http://www.library.carleton.ca/find/gis/geospatial-data/census-geography-files

Our mindbogglingly amazing GIS page

- http://www.library.carleton.ca/find/gis/

THANK YOU!

Please don't ever hesitate to contact us about GIS

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- @GIS_Carleton on Twitter
- Lower floor of Library
  - 7 GIS workstations with QGIS and other GIS software, available anytime the library is open