

Calgary 2015

Utilizing free open source tools to create interactive web maps in order to visualize (StatsCan) data

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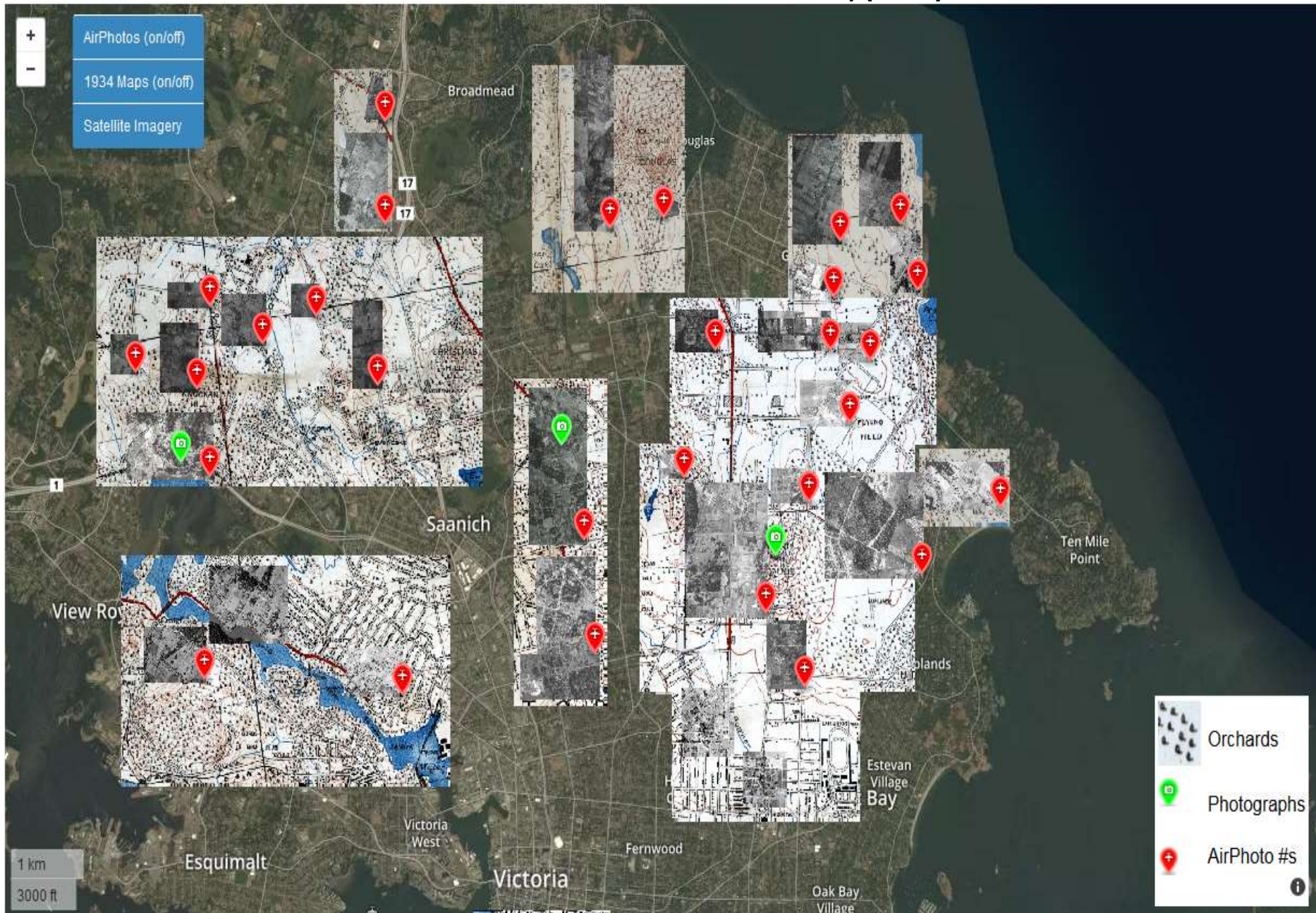
**University
of Victoria**

Libraries

outline

- data libraries have amazing resources...
- visualize the data (to promote the collection)
- web map(s)
 - types of web maps
(specific “type” of web map)
- how?!
- considerations

thousands of aerial photos and maps... Historical and remnant orchards, (2013)



Land use change over time, (2014)



University
of Victoria

Libraries

Land use change over time in Saanich, Victoria, BC

Slide through historic airphotos from 1926, 1954, 1969 and 1992.



(Airphotos also [auto-cycle](#) for mouse-less touch screen devices.)



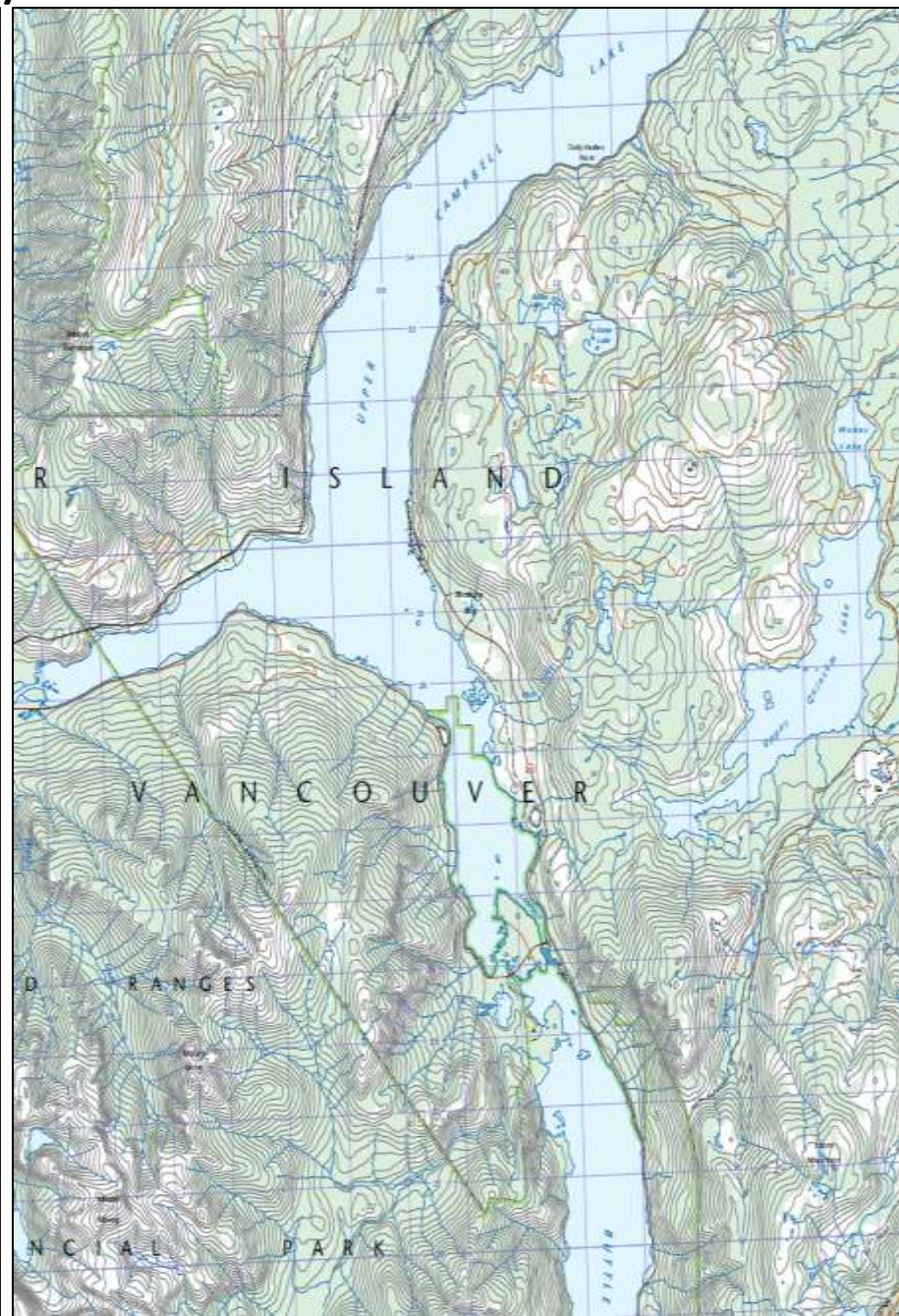
(part of sheet) NTS 92F/13:

before / after

1952-54 dam construction

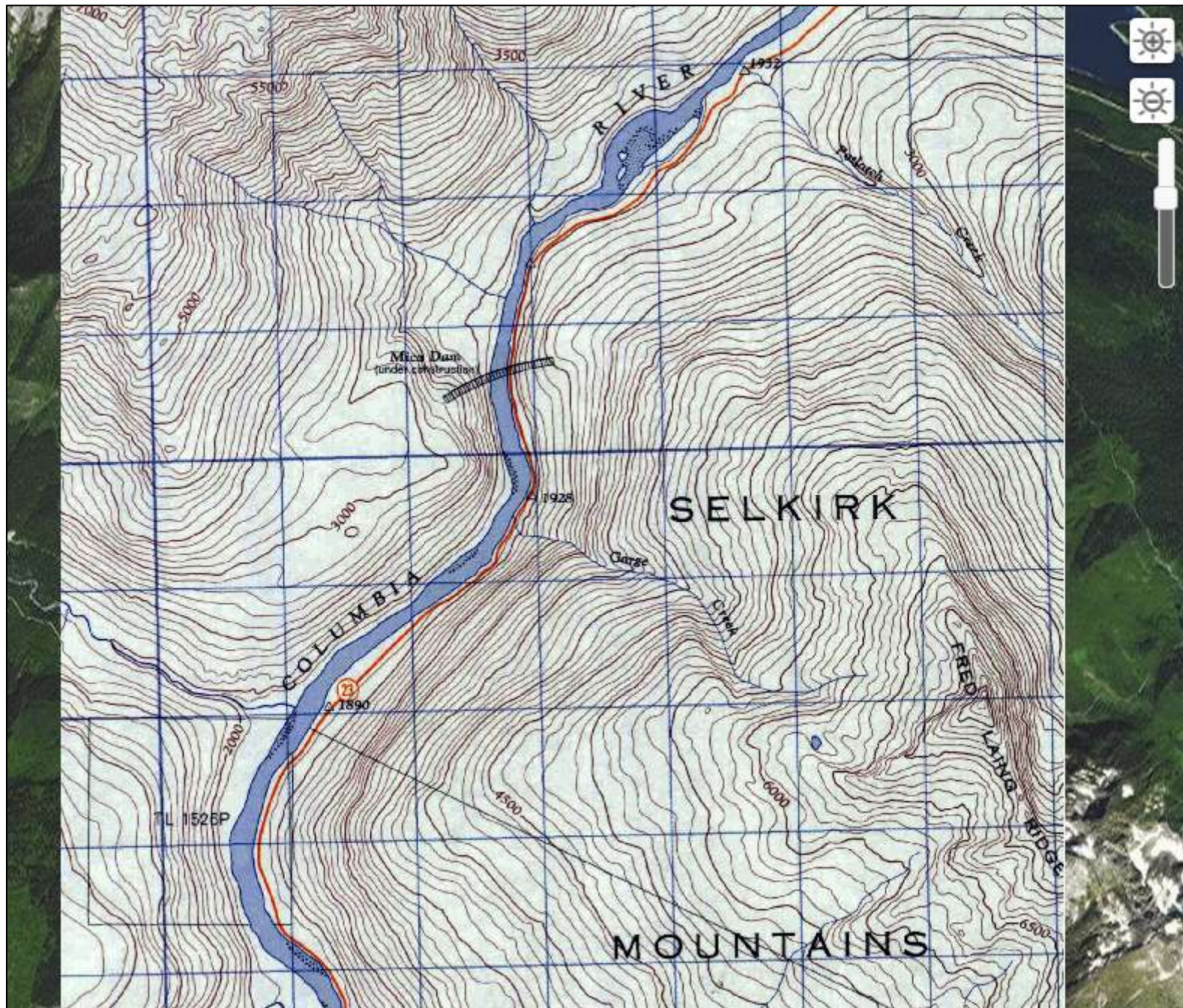


1946: 1st edition



2011 4th edition

Before Mica Dam



hundreds of data sets...

Home » The DLI Collection

Data Liberation Initiative (DLI)

Tentative release dates of DLI products

[Restricted access Data Liberation Initiative Web Site](#)

[DLI Community](#)

[DLI reports, reference and training materials](#)

Other Microdata Access Programs




[The Research Data Centres \(RDC\) Program](#)

[The Real Time Remote Access \(RTRA\) system](#)

All DLI products

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

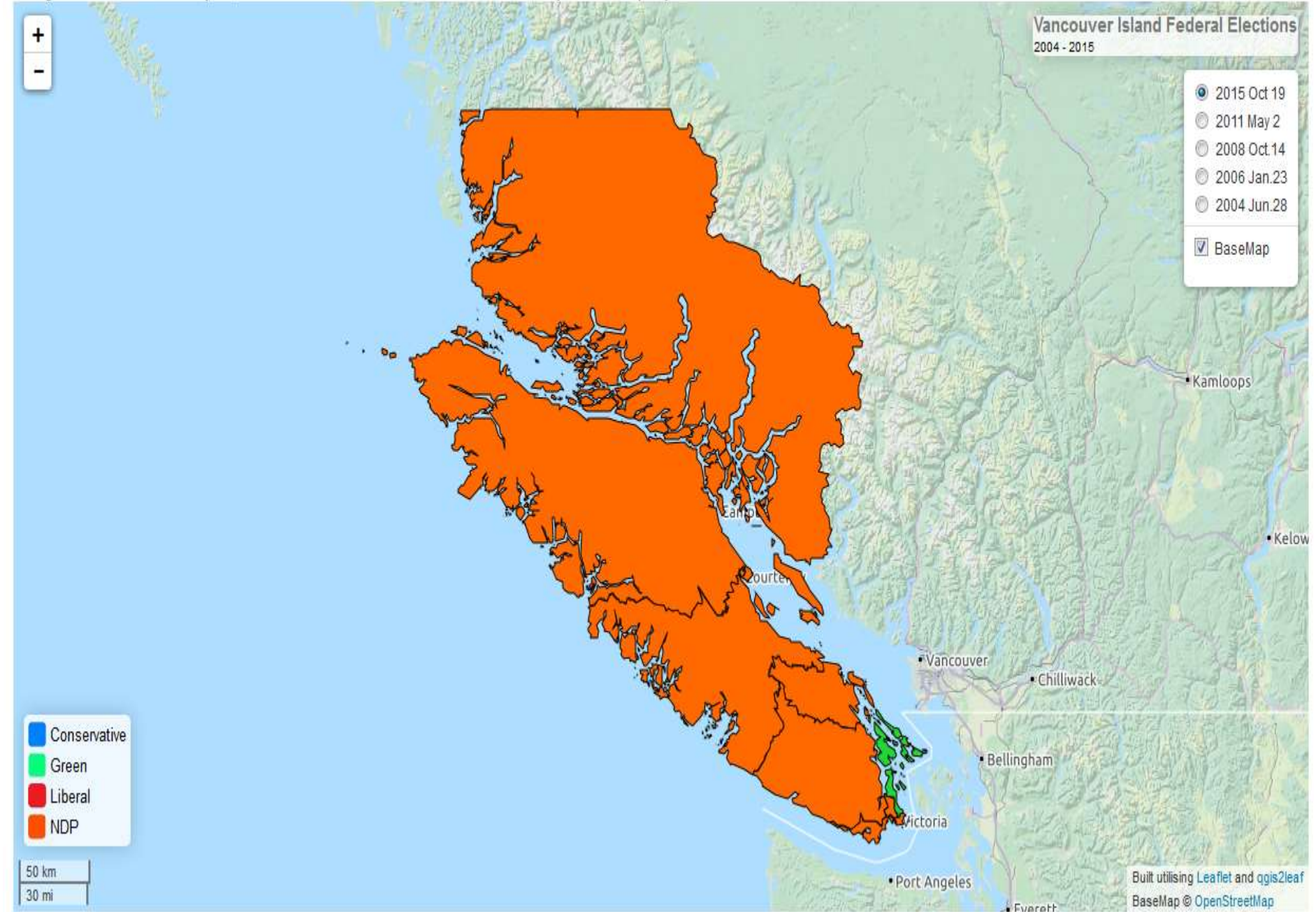
A

Title	Acronym	Survey Number
Aboriginal Children's Survey - Synthetic File 	ACS	5108
Aboriginal Peoples Survey - Tables	APS	3250
Aboriginal Peoples Survey - PUMF		
Absence from Work Survey	AWS	3805
Access and Support to Education and Training Survey	ASETS	5151
Adult Correctional Services	ACS	3306
Adult Criminal Court Survey	ACCS	3312
Adult Education Survey 	AES	3879
Adult Education and Training Survey	AETS	3879
Adult Literacy and Life Skills Survey	ALL	4406
Adult Training Survey 	ATS	3879
Annual Estimates of Employment Earnings and Hours	AEEEH	2612
Annual Retail Store Data	AESD	2446
Annual Survey of Manufactures	ASM	2103

B

Vancouver Island Federal Election results: 2004-2015

Change the Federal Election year, click on a Federal Electoral District for results by candidate/party.



StatsCan interactive maps



Home » Maps and geography » Maps

Interactive maps

Mapping applications

- **GeoSearch:** It is a tool that makes it easy to find any place in Canada, see it on a map, and get basic geographic and population and dwelling data for that place.
 - [Geosearch: 2006 Census data \(Archived\)](#)
 - [Geosearch: 2011 Census data \(Archived\)](#)
- [Crop Condition Assessment Program](#): The Crop Condition Assessment Program combines remote sensing, [GIS](#), and the Internet to provide timely and reliable information on crop and pasture/rangeland conditions for the predominately spring wheat growing regions of western Canada and the northern plains of the United States.

Data products with mapping applications

- [Aboriginal Population Profile](#): These profiles contain free information on the Aboriginal identity population for various communities in Canada where the Aboriginal identity population is above 250.
- [Census Profile](#): This profile presents information from the 2011 Census of Population for various levels of geography, including provinces and territories, census metropolitan areas, communities and census tracts. The profile includes characteristics such as population, age, sex, dwellings, families, marital status and language.
- [NHS Profile, 2011](#): This profile presents information from the 2011 National Household Survey (NHS) for various levels of geography. In order to provide a comprehensive overview of an area this product presents data from both the NHS and the 2011 Census.


GeoSearch

This interactive mapping application makes it easy to find many places in Canada, see them on a map, and get basic geographic and demographic data for those places. To find a specific place of interest, users can click and zoom in on a map of Canada or they can search by place name, street name, street intersection or postal code.

GeoSearch displays the appropriate map showing boundaries and other features. GeoSearch automatically shows, for the selected places, the type of geographic area and its relationship to other geographic areas. A thematic mapping option is also available for selected census topics (for selected levels of geography).

New functionality for 2011 allows users to view data for more than one geographic area at a time and automatically display additional census data for each selected geographic area (including population and dwelling counts). It also includes improved search capabilities and allows users to display two types of geographic boundaries at the same time.

To view this Internet product, please select from the census years below:

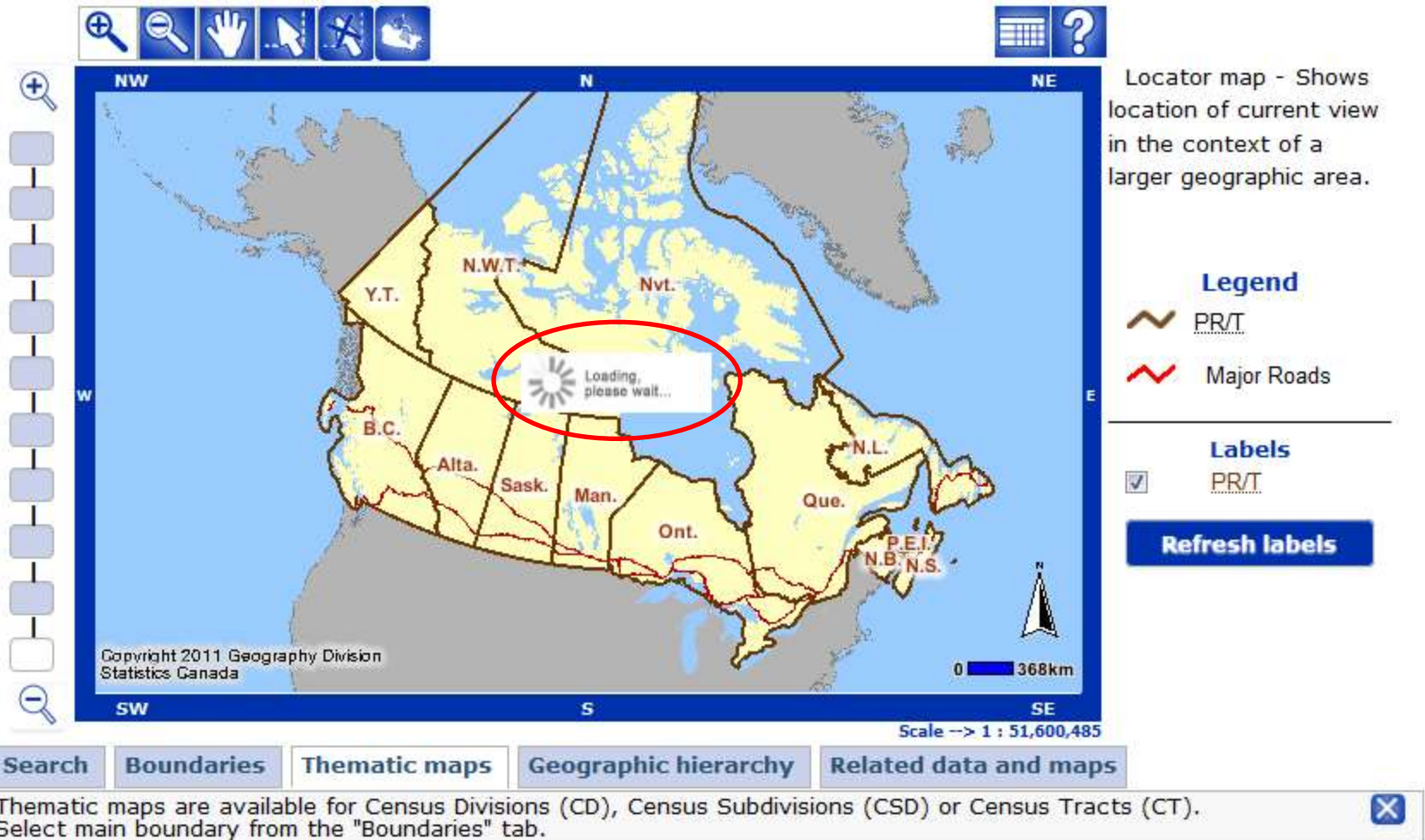
 Census year

[ARCHIVED - 2011](#)

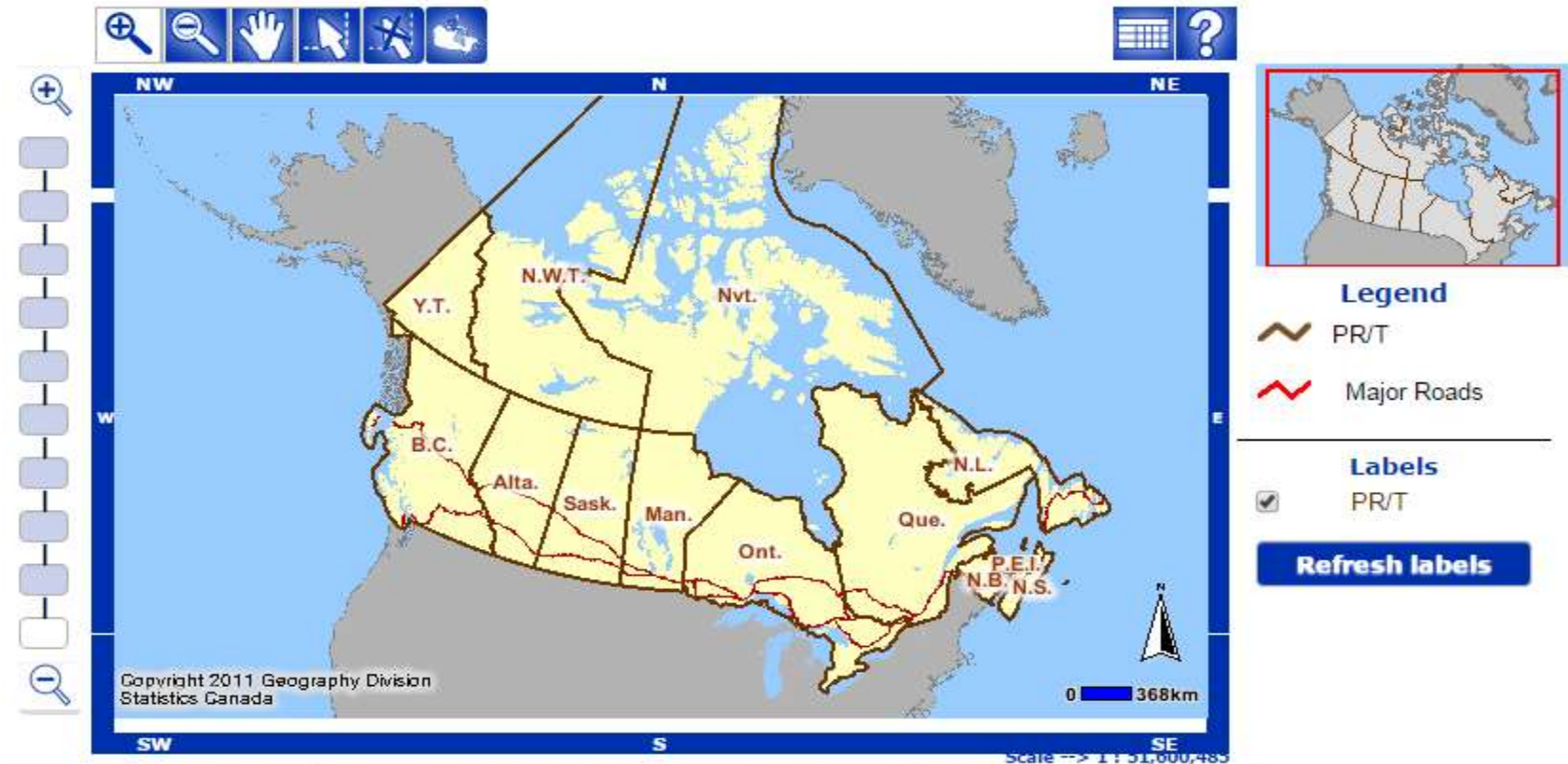
[ARCHIVED - 2006](#)

GeoSearch: slow...clunky...not functioning...?

GeoSearch 2011 - Provinces / Territories (PR/T)



GeoSearch: Census “regions” are greyed out and do not work...?



Search Boundaries Thematic maps Geographic hierarchy Related data and maps

If a boundary is not selectable, zoom in.

Select main boundary to display on map:


- Provinces / Territories (PR/T)
- Provinces / Territories (PR/T)
- Economic Regions (ER)
- Federal Electoral Districts (FED)
- Census Divisions (CD)
- Census Subdivisions (CSD)
- Census Metropolitan Areas and Census Agglomerations (CMA/CA)
- Population Centres (POPCTR)
- Census Tracts (CT)
- Designated Places (DPL)

DA

Current selection

CANADA ±

StatsCan *NHS* thematic maps...???



Statistics Canada

Data for the 2011 National Household Survey income variables were released on September 11, 2013, as part of an integrated release with the housing variables.

The products published using 2011 NHS income data include:

- [Analytical products](#)
- [Data products](#)
 - NHS Profile
 - NHS Data Tables
 - NHS Focus on Geography Series
- [Reference products](#)
- Thematic maps

StatsCan *Census* thematic maps

Statistics Canada

Canada

 Search

Information for... Browse by subject Browse by key resource Help

Home > Census > Geography

Census Program


2011 Census Program

By topic
Data products
Analytical products
Reference materials
Geography
Consultation

Thematic Maps

A thematic map shows the spatial distribution of one or more specific data themes for standard geographic areas. The map may be qualitative in nature (e.g., predominant mother tongue) or quantitative (e.g., percentage population change).

Please select a year below:

 Census year

[2011](#)

[ARCHIVED - 2006](#)

2011 Census – Thematic maps by theme

A thematic map shows the spatial distribution of one or more specific data themes for standard geographic areas. The map may be qualitative in nature (e.g., predominant mother tongue) or quantitative (e.g., percentage population change).

Age and Sex

Released: May 29, 2012

- [Percentage of the population aged 0 to 14 years](#)
 - available by 2011 census subdivision for Montréal, Toronto and Vancouver census metropolitan areas
 - available by 2011 census tract for census metropolitan areas
- [Percentage of the population aged 15 to 64 years](#)
 - available by 2011 census division for Canada
- [Percentage of the population aged 65 years and over](#)
 - available by 2011 census division for Canada
 - available by 2011 census subdivision for Montréal, Toronto and Vancouver census metropolitan areas
 - available by 2011 census tract for census metropolitan areas
- [Sex ratio](#)
 - available by 2011 census division for Canada

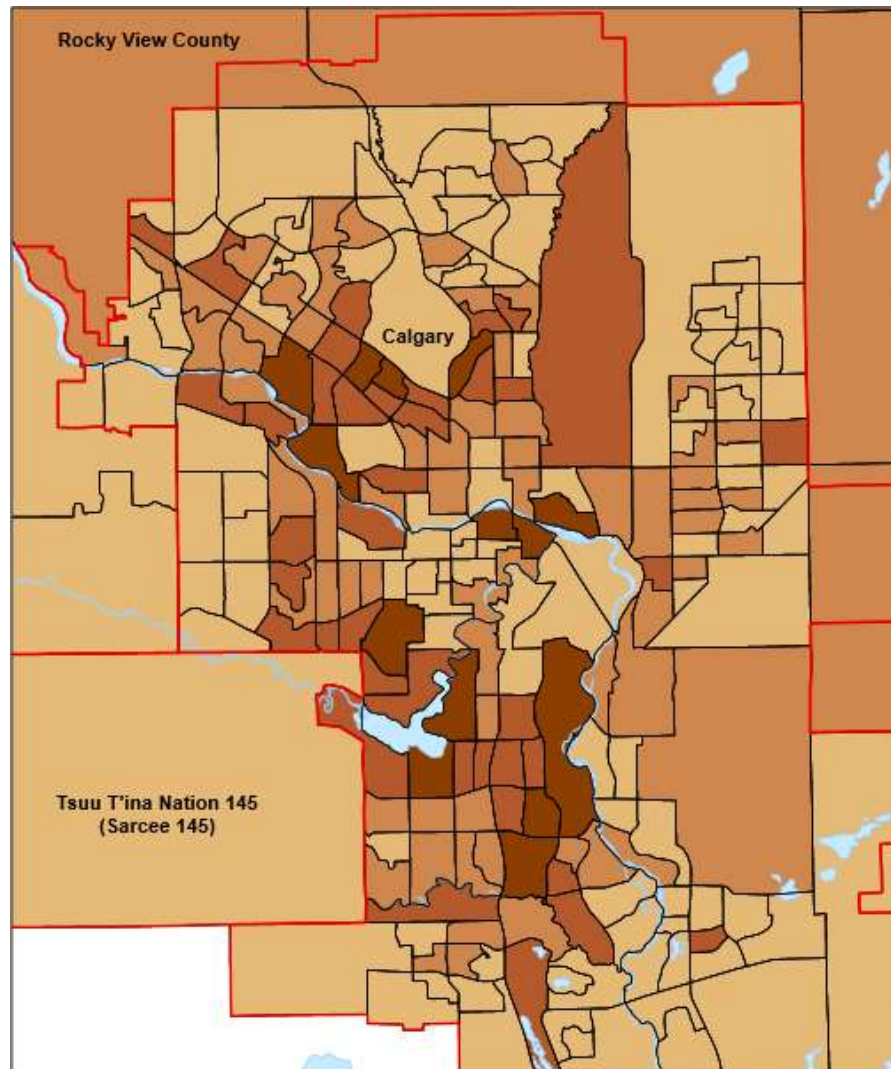
Age and Sex

Families and Households

Language - Mother tongue

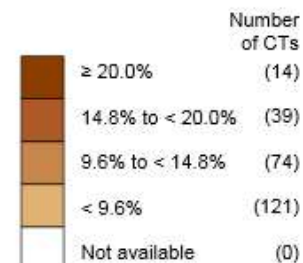
Language - Official / Home

Population

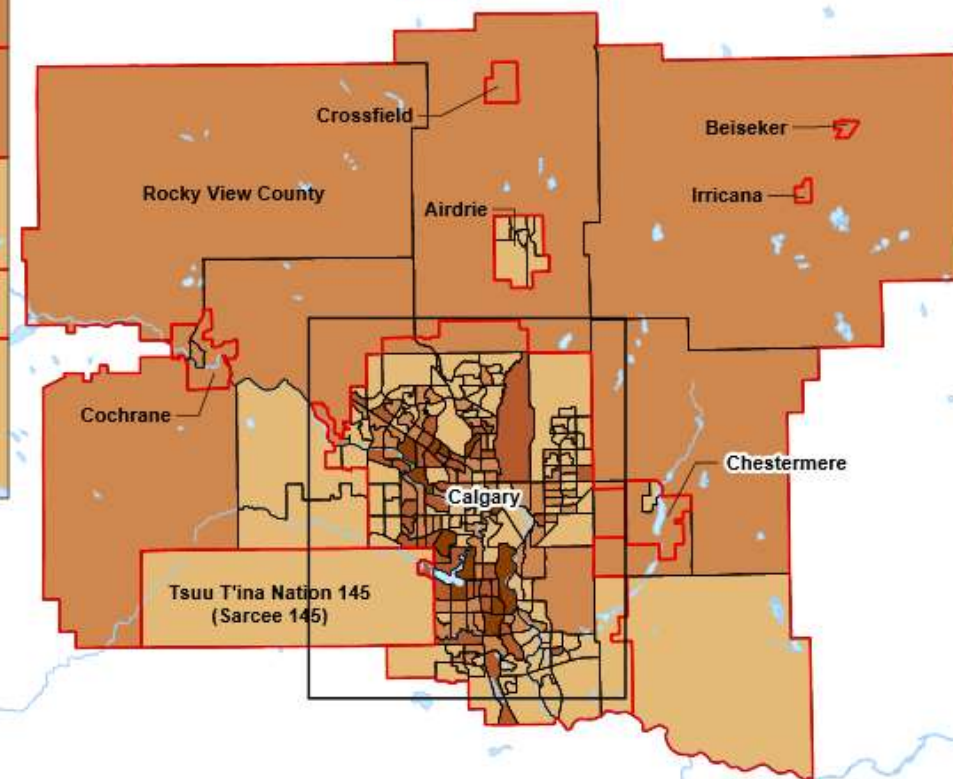


Calgary CMA

Percentage of the population aged 65 years and over in 2011 by 2011 census tract (CT)

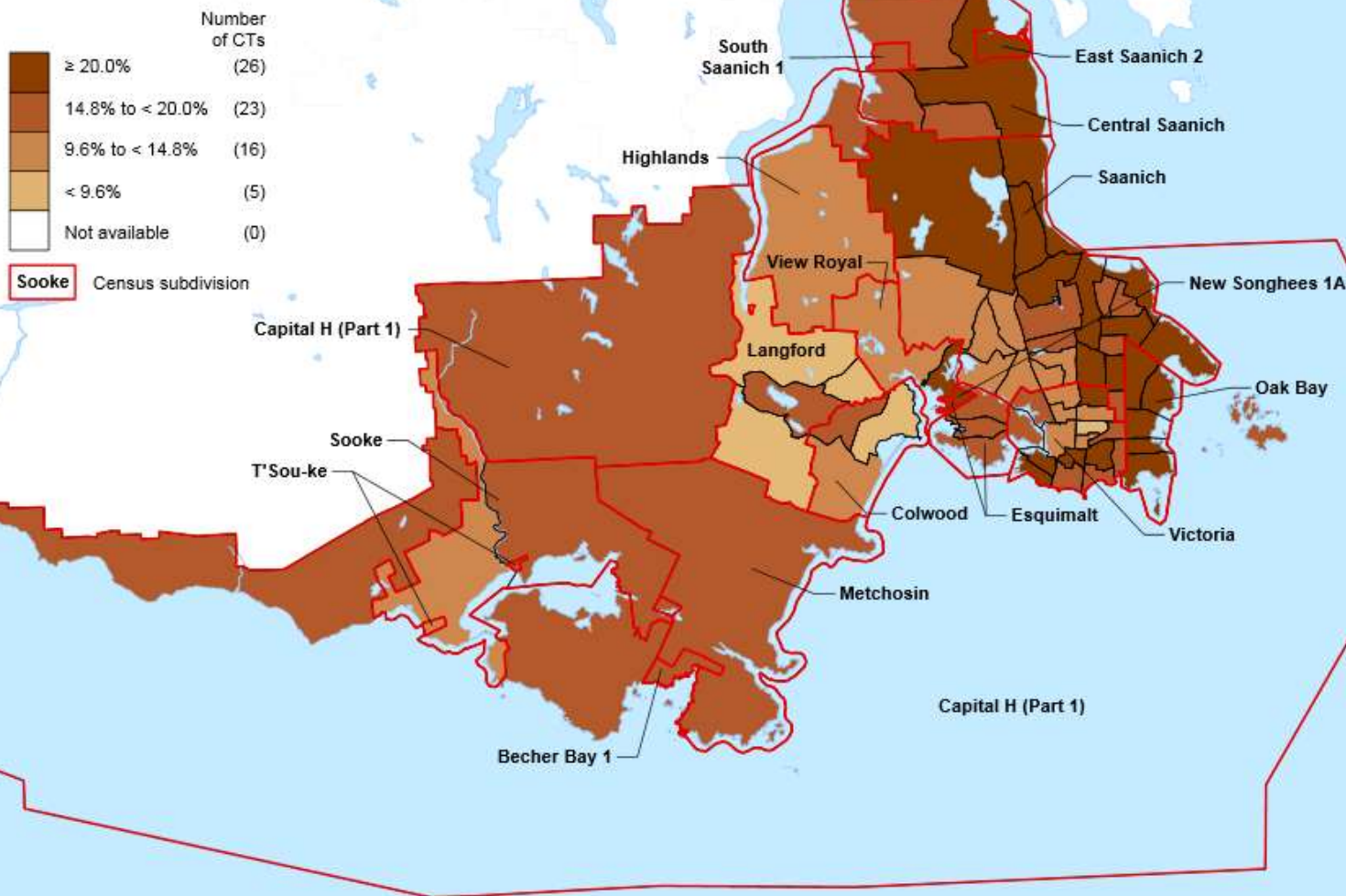


Airdrie Census subdivision



Victoria CMA

Percentage of the population
aged 65 years and over in 2011
by 2011 census tract (CT)



Census
2011 Census
Order the 2011 Census Teacher's Kit
Private Sector Involvement
Reference materials
Census consultation
Census of Agriculture
2006 Census
Release topics
Data products
Analysis series
Reference materials
Geography
Consultation
Custom services
Census of Agriculture
Corrections and updates
Other links
2001 Census of Population
1996 Census of Population
Your Guide to Data Sources on 2006 Census-related Topics
My account

Archived Content

Information identified as archived is provided for reference, research or recordkeeping purposes. It is not subject to the Government of Canada Web Standards and has not been altered or updated since it was archived. Please [contact us](#) to request a format other than those available.

Thematic Maps

A thematic map shows the spatial distribution of one or more specific data themes for standard geographic areas. The map may be qualitative in nature (e.g., predominant farm types) or quantitative (e.g., percentage population change).

The maps can be viewed on the Internet (www.statcan.gc.ca) and downloaded for free (as PDF or EXE files).

They are in colour and the map dimensions are 21.6 cm by 27.9 cm (8.5 inches x 11 inches).

To download this *free* product to your computer, please follow the steps below:

Step 1: Please select the map series

Census Metropolitan Area ▼

Next

Step 2: Please select the geography

Calgary (Alta.) ▼

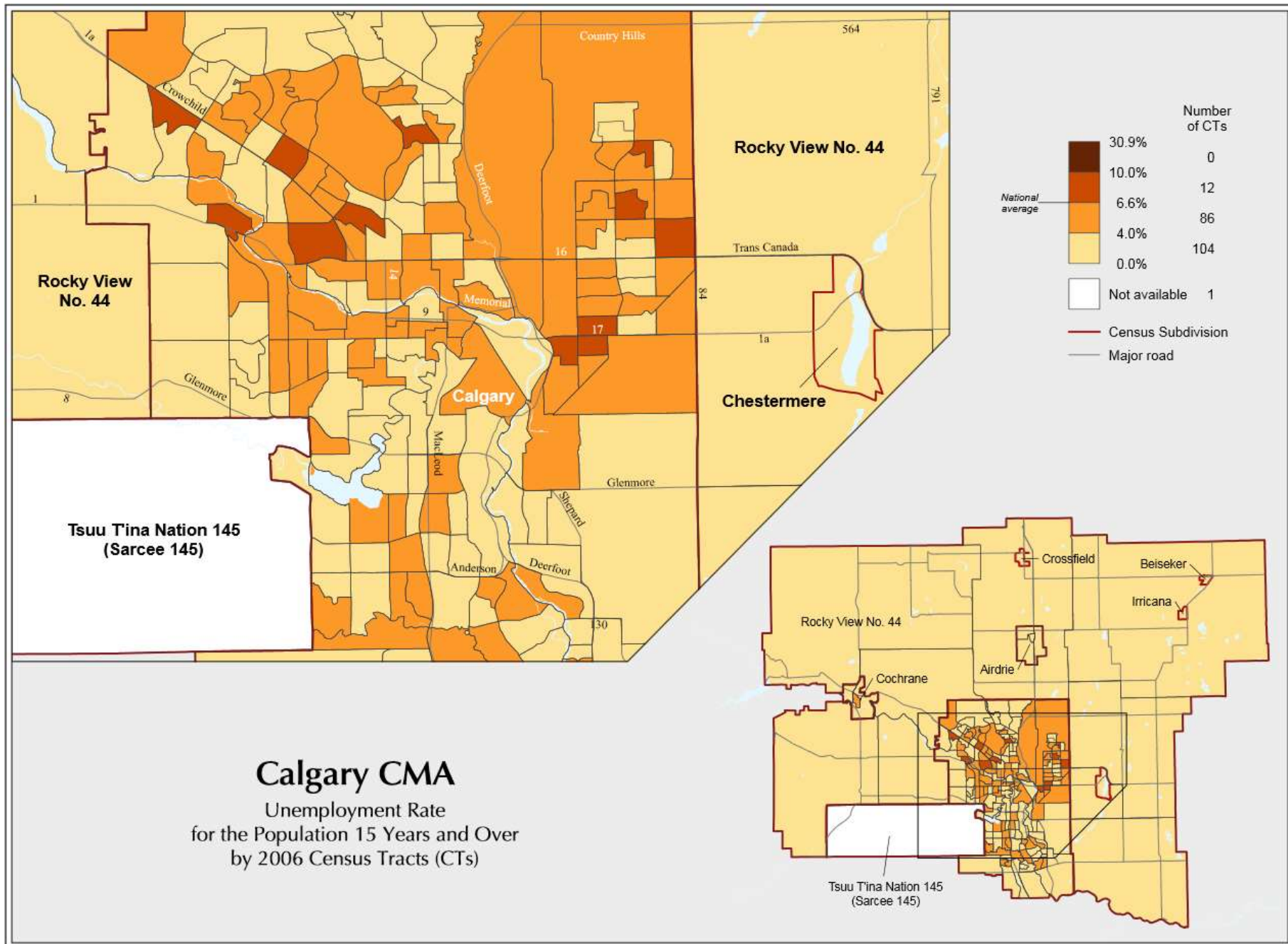
Next

Step 3: Please select the topic/theme

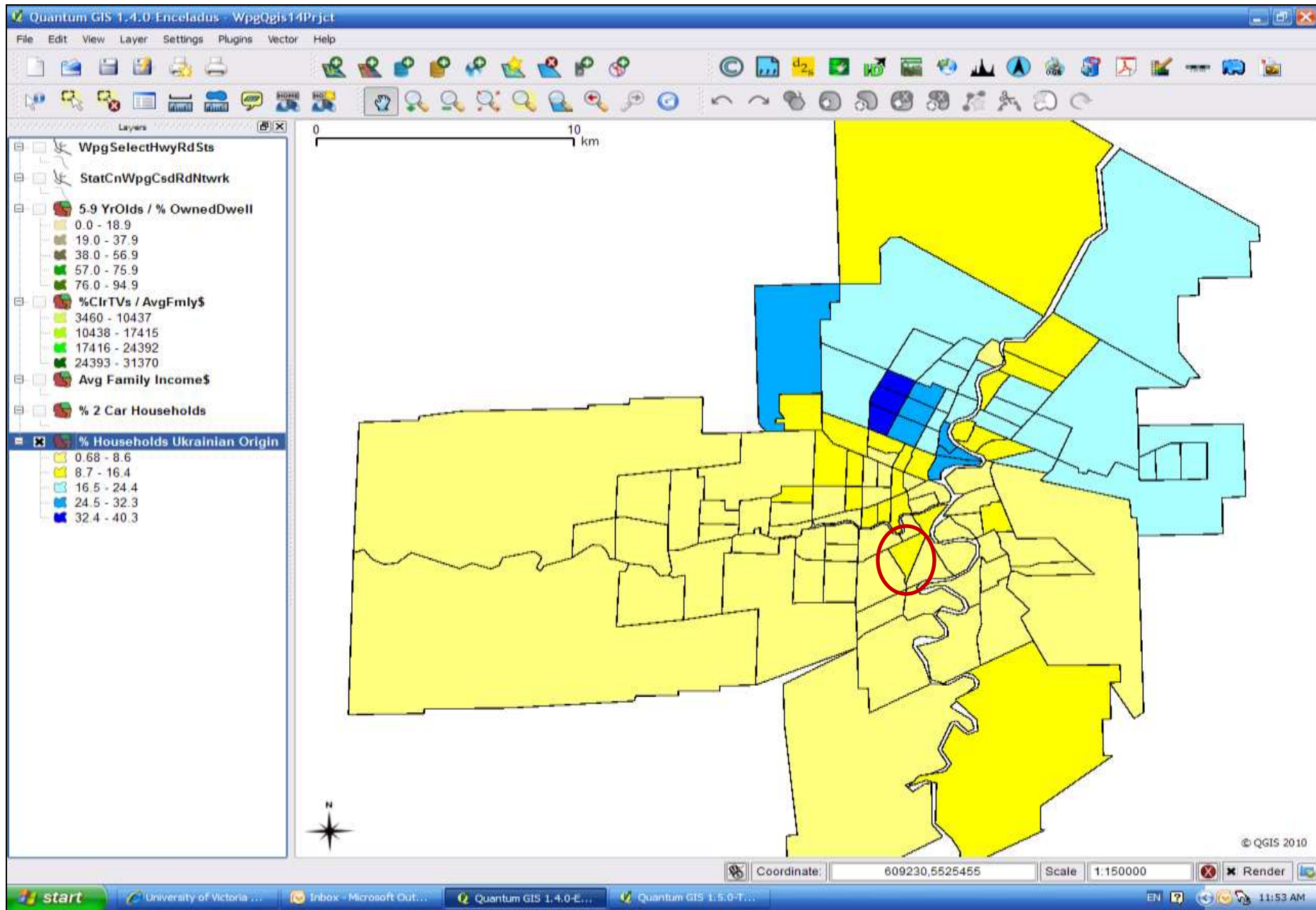
Education and Labour market activity ▼

Next

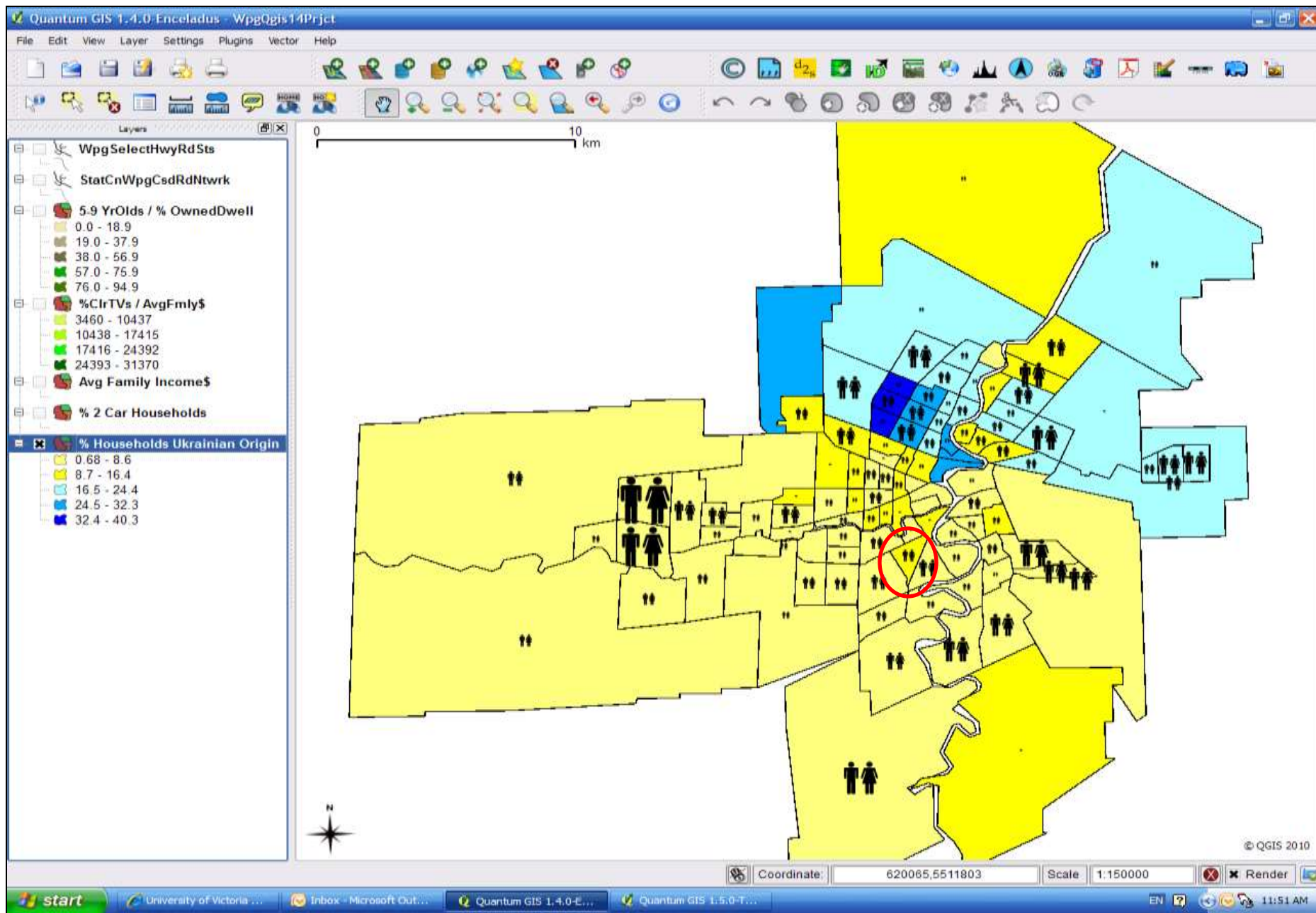
You need the free [Adobe Acrobat Reader](#) to view the maps. For more information, visit [Troubleshooting PDFs](#).



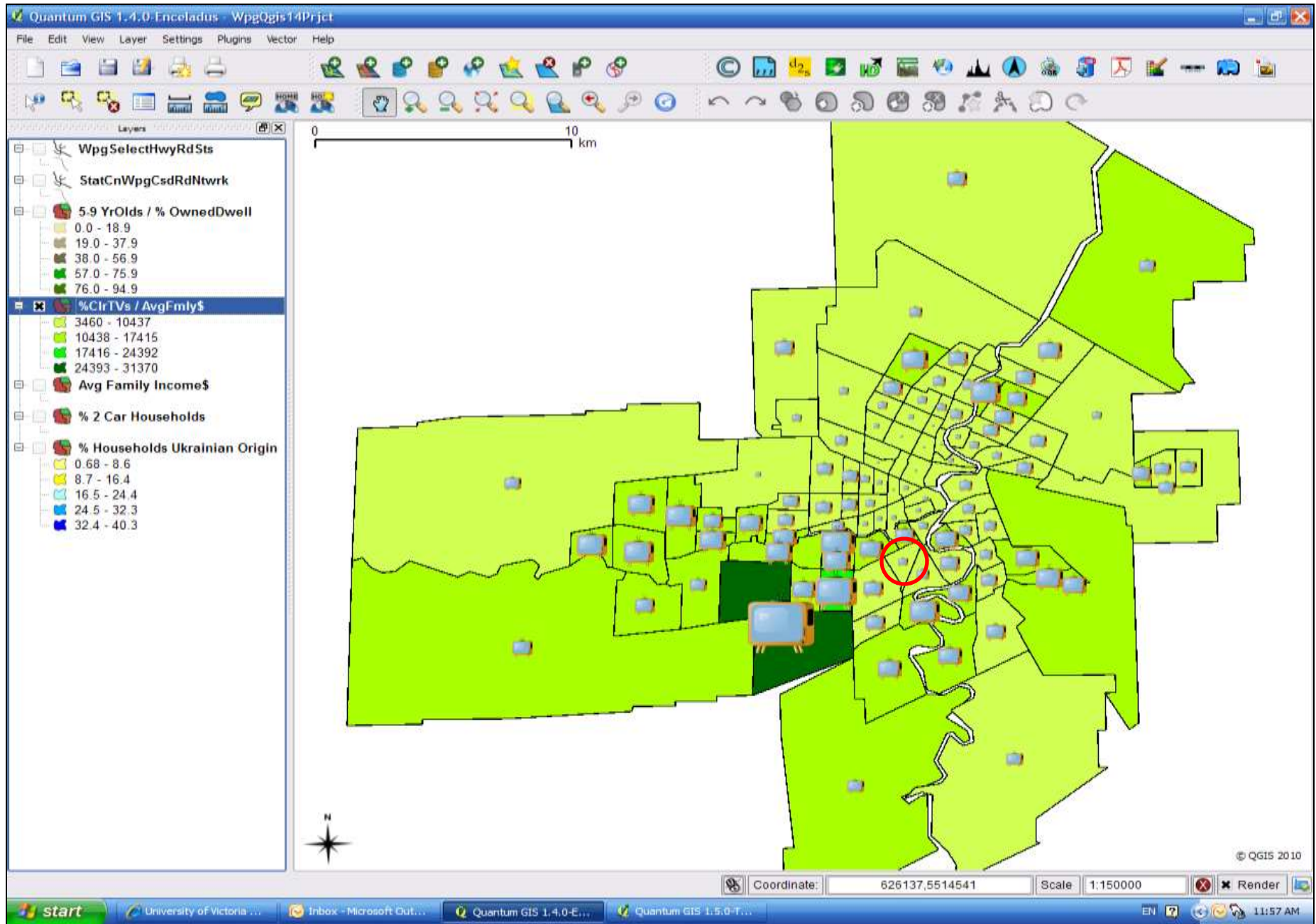
Winnipeg 1971 Census Tracts: % Households Ukrainian Origin



Wpg 1971 CTs: 5-9 yr olds & % households Ukrainian origin



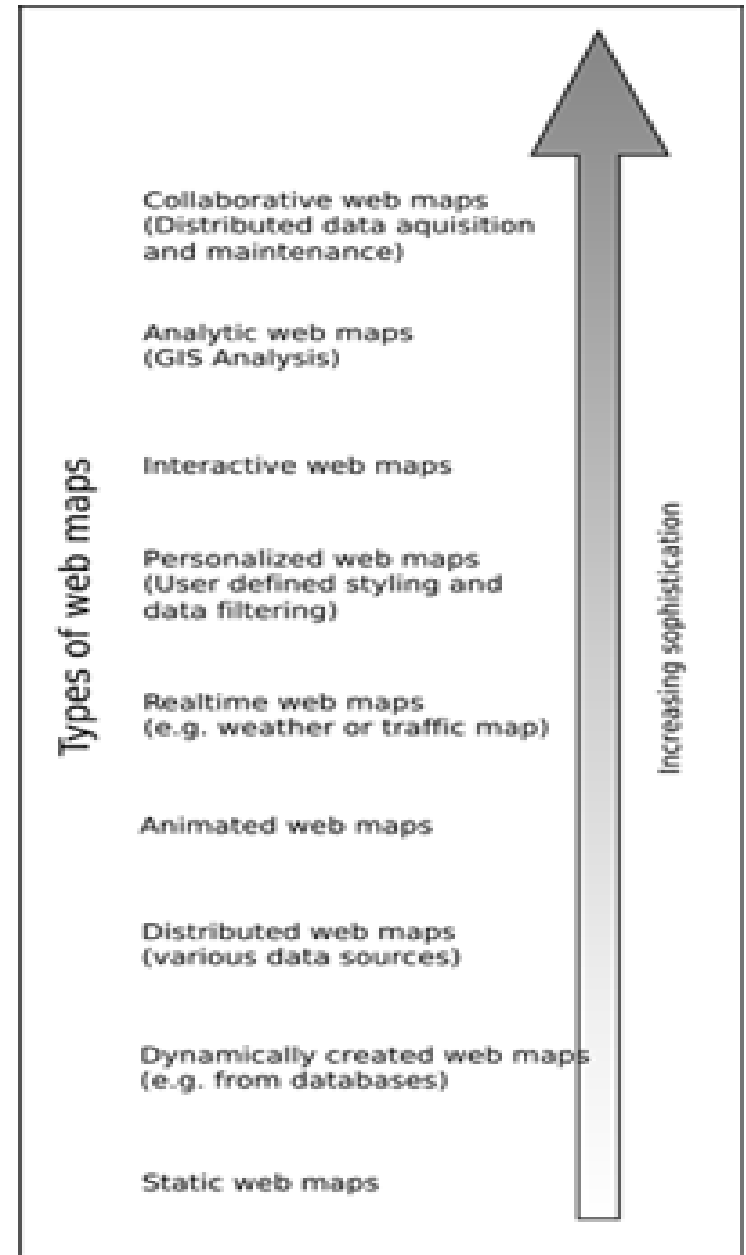
Wpg 1971 CensusTracts: % Households w/ Colour TV over Avg.Family Income



Web Maps

Types of web maps

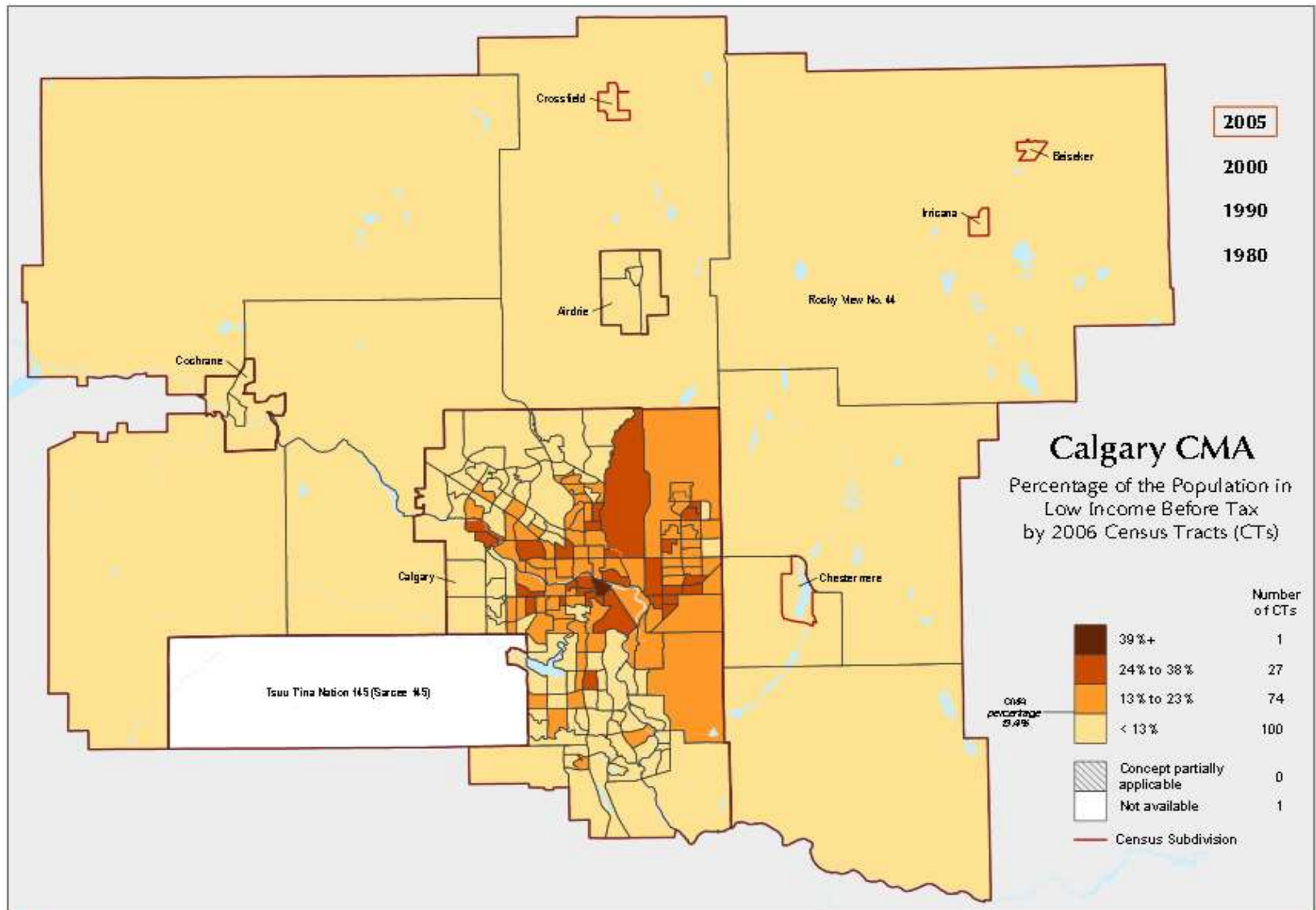
- some spatial analysis
- download data / upload data
- zoom, pan, turn off/on, click for more info
- zoom, pan, turn off/on elements/layers
- zoom, pan
- .pdf with elements to turn off/on
- (static) image (.jpg, .png, .pdf)



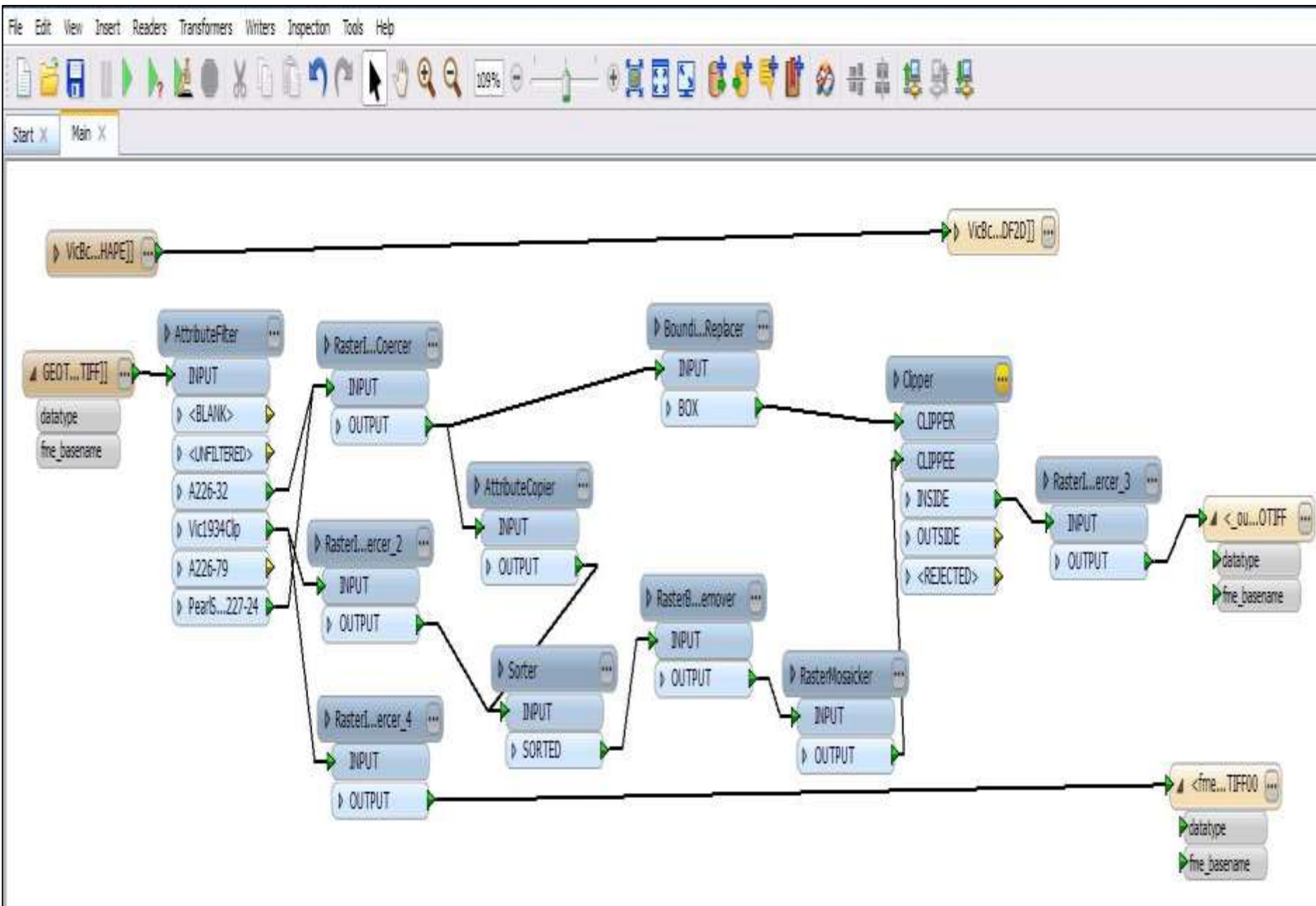
static .pdf:

can generate .pdf from ArcGIS or QGIS but both...

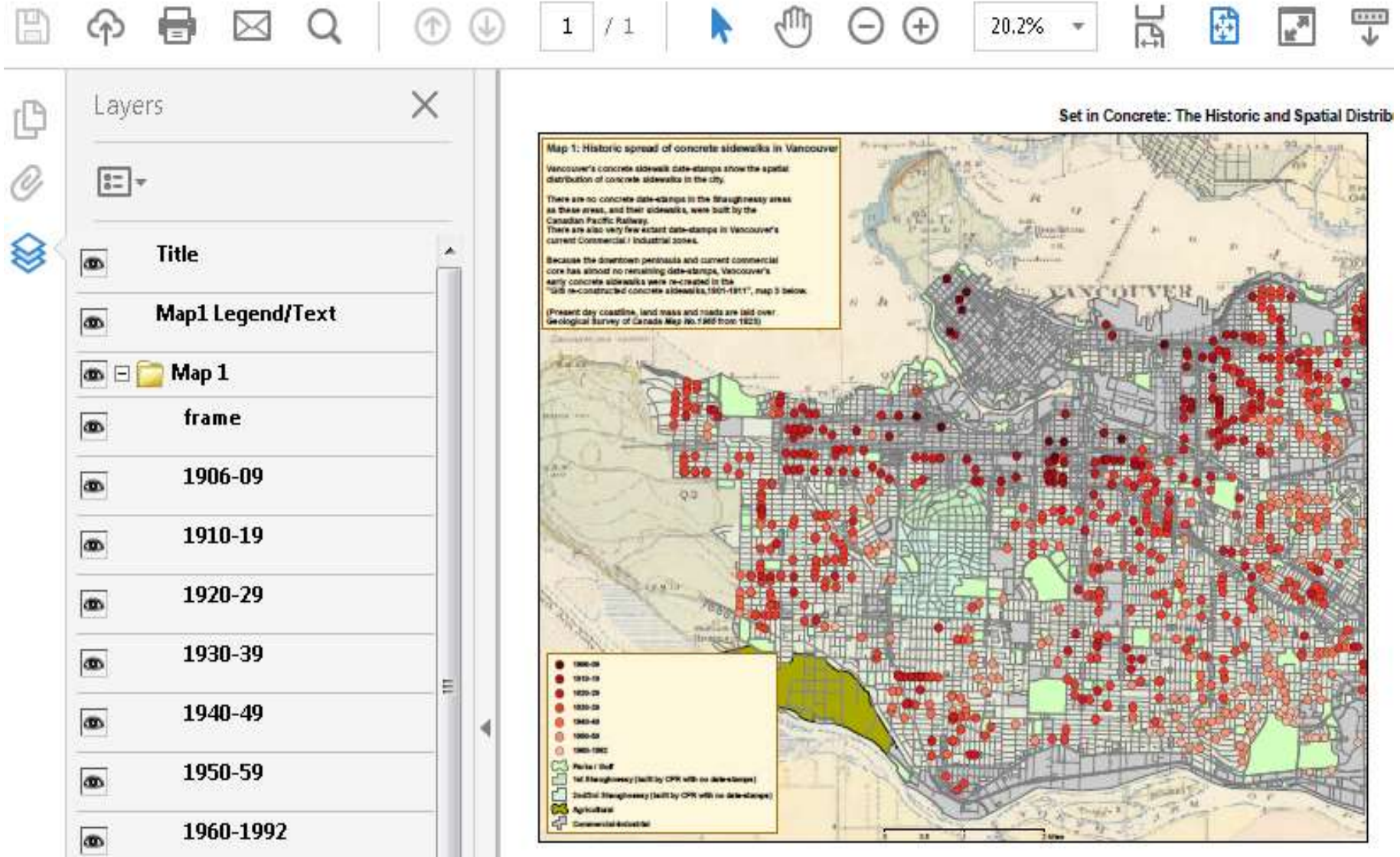
“flatten” 2 or more layers into one inseparable layer



Safe FME translator(s) (Feature Manipulation Engine)...



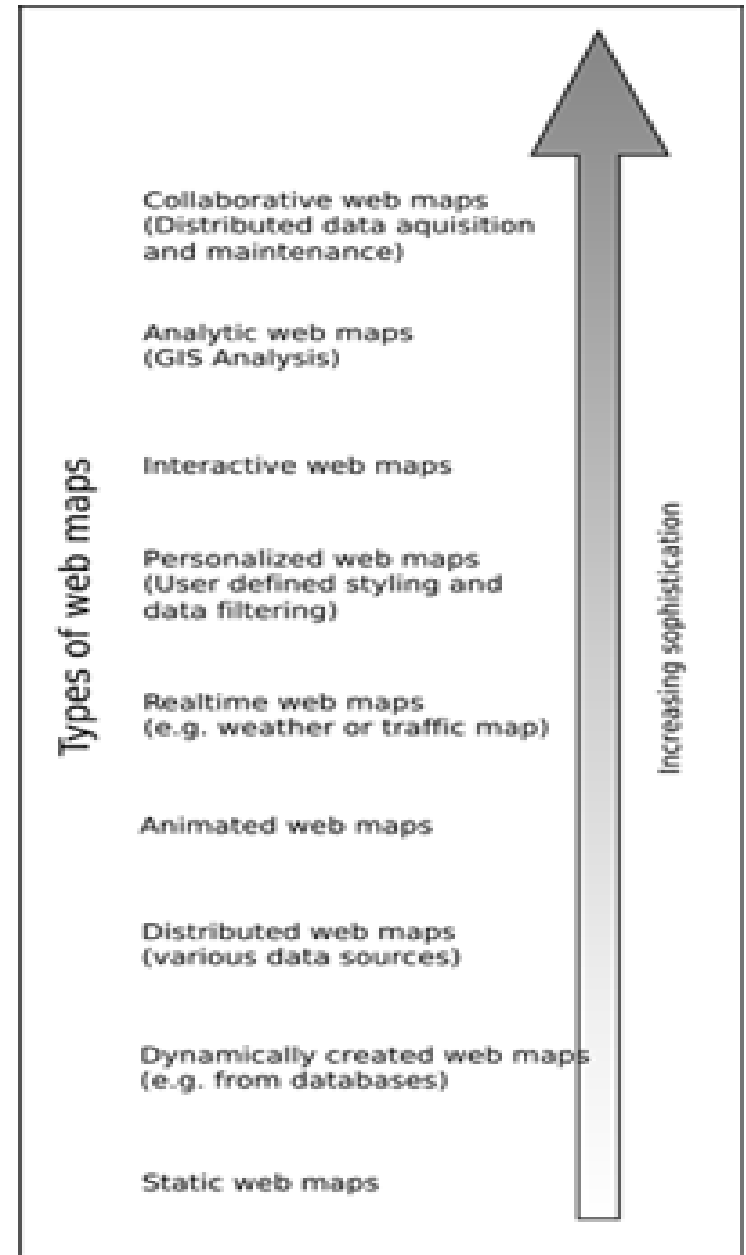
Safe FME (Feature Manipulation Engine) translators OR Adobe Illustrator
can produce a .pdf with clickable layers...but...
slow to load; pan/zoom limited; limited “click” for further info, etc





Web Maps

Types of web maps

- some spatial analysis
- download data / upload data
- zoom, pan, turn off/on, click for more info
- zoom, pan, turn off/on elements/layers
- zoom, pan
- .pdf with elements to turn off/on
- (static) image (.jpg, .png, .pdf)



Web Map services

- ArcGIS on-line  **esri** confusing “credits” system
- Cartodb  **CARTODB** free for 4 layers: otherwise \$149 month
- Click2Map  \$40.-month
- GeoCommons  **geocommons** gone?
- GIS Cloud  Was told: “need to upgrade/change subscription”
- MapBox  free up to 100mb; otherwise \$50 month
- MangoMap  free for 3 maps: otherwise \$49 month
- QGIS cloud  65 euros/month!
- ScribbleMaps ? 
- ZeeMaps  free for 5 maps; otherwise \$20 month

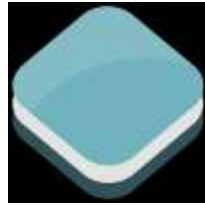
BUT....with all of the above....

their branding / logo; data on their servers, etc

JavaScript libraries

OpenLayers javascript library

- began 2006
- approx. 230,000 lines of code



Leaflet javascript library

- began 2011
- approx. 7000 lines of code



Either work with QGIS
or rather...



QGIS has plug-ins for either of the above

How?

- html5

- css

Link to .css from the web:

```
<link rel="stylesheet" href = "http://cdn.leafletjs.com/leaflet-0.7.3/leaflet.css"/>
```

OR

Download to some computer directory and link:

```
<link rel="stylesheet" href = "SomeLocalComputer/C_drive/leaflet-0.7.3/leaflet.css"/>
```

- javascript

Link to .js from the web:

```
<script src = "http://leafletjs.com/dist/leaflet.js"></script>
```

OR

Download to some computer directory and link:


```
<script src = "SomeLocalComputer/C_drive/Folder/leaflet.js"></script>
```

css, html5, JavaScript libraries !! Yikes!!

Do you have to learn code?

Not really,
knowing code helps but not entirely necessary...
Really!

Use (a little) code...
but store data on your (local) computer / server

b/c QGIS has plug-ins, 
you don't need to know (much) code

- qgis2leaf



April 2014

- qgis2web

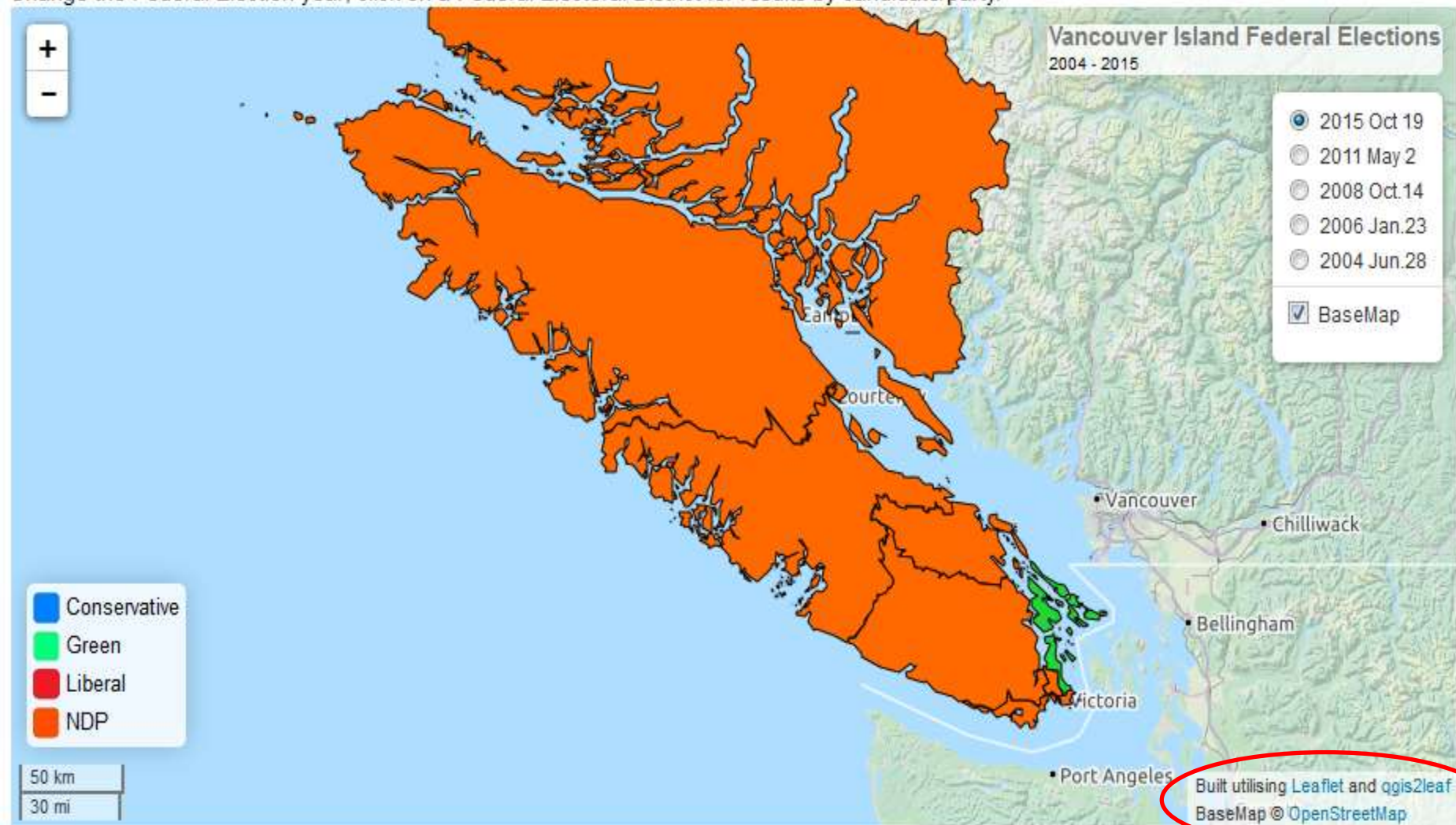


June 2015

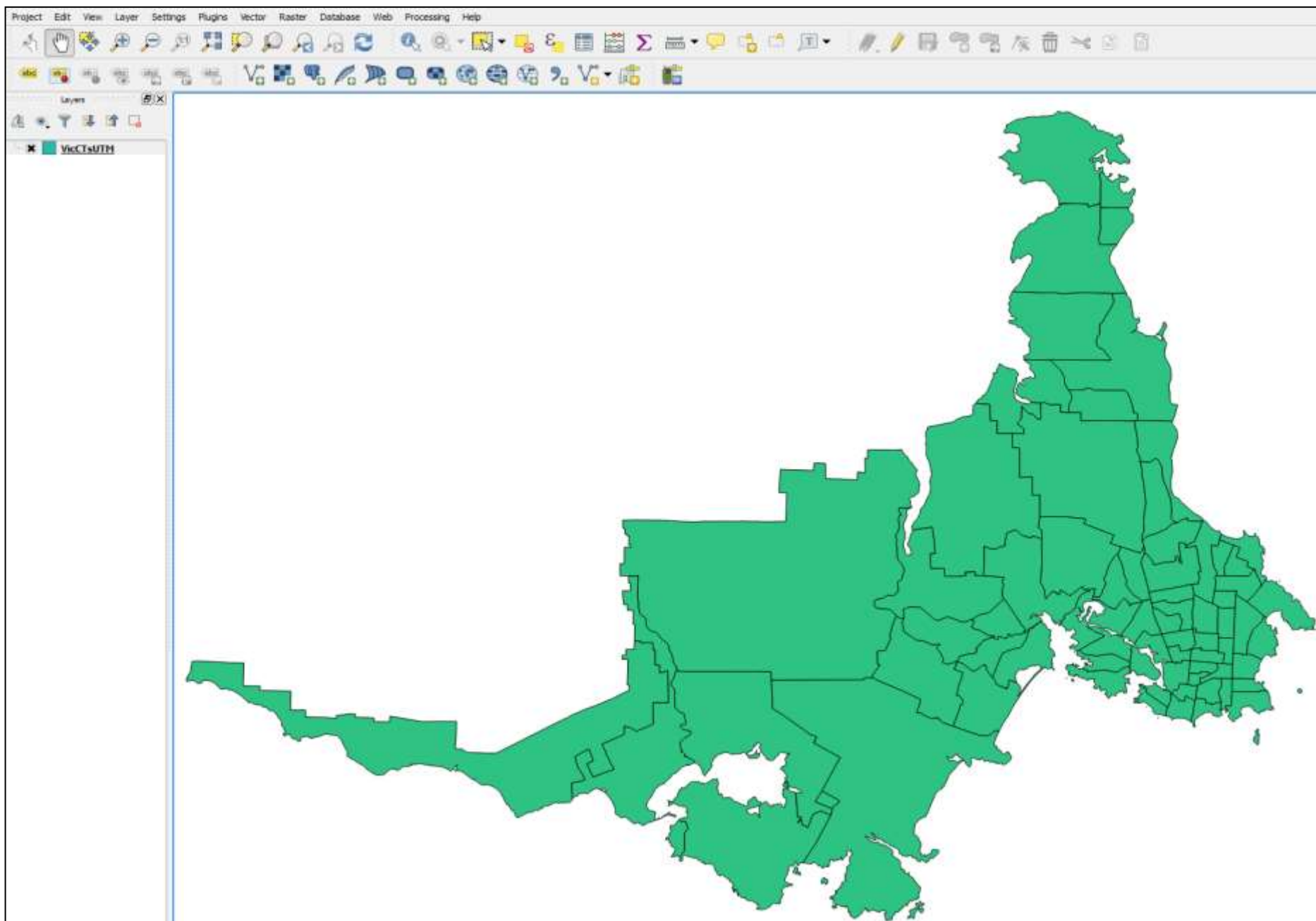
Vancouver Island Federal Election results: 2004-2015

Vancouver Island Federal Election results: 2004-2015

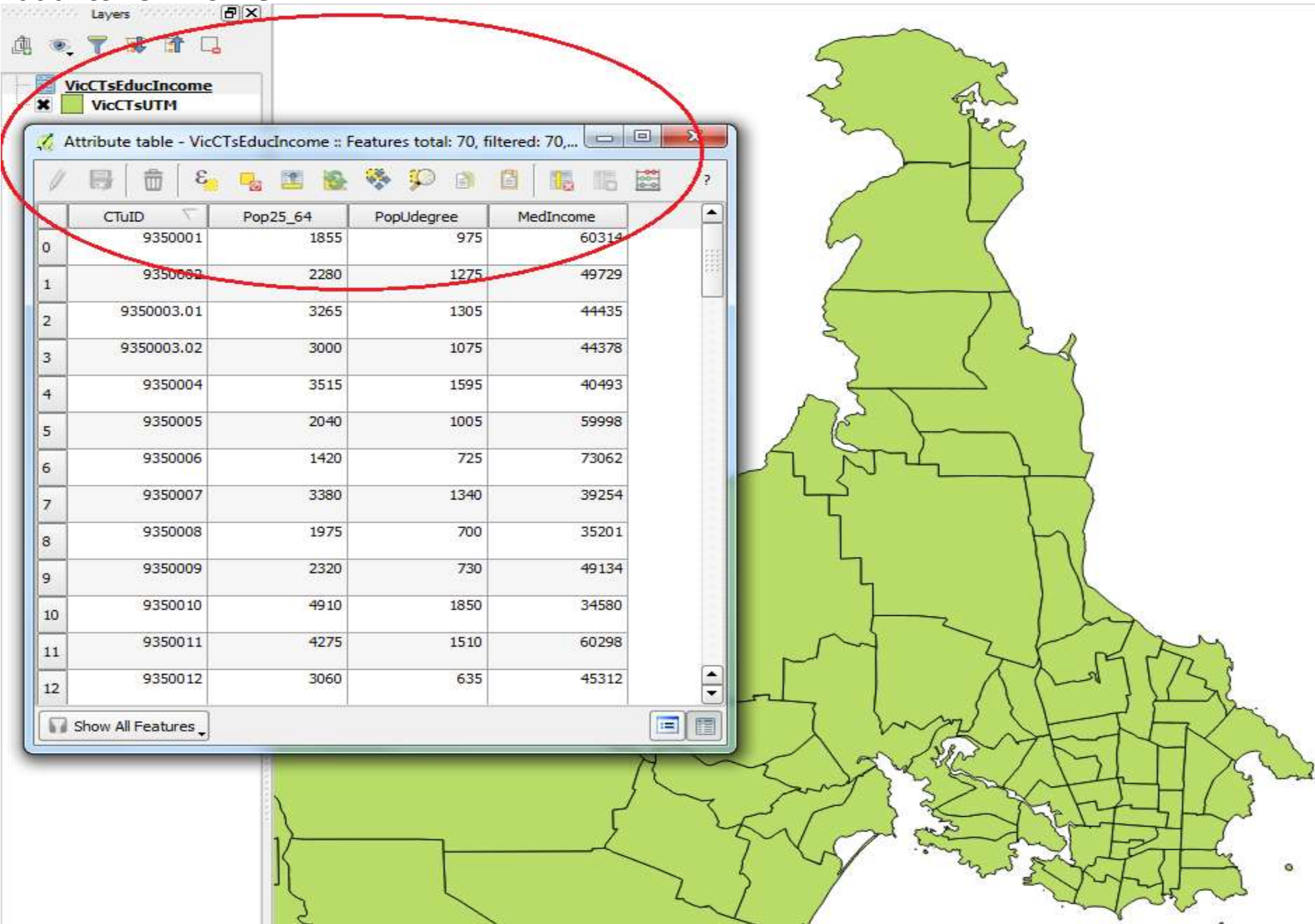
Change the Federal Election year; click on a Federal Electoral District for results by candidate/party.



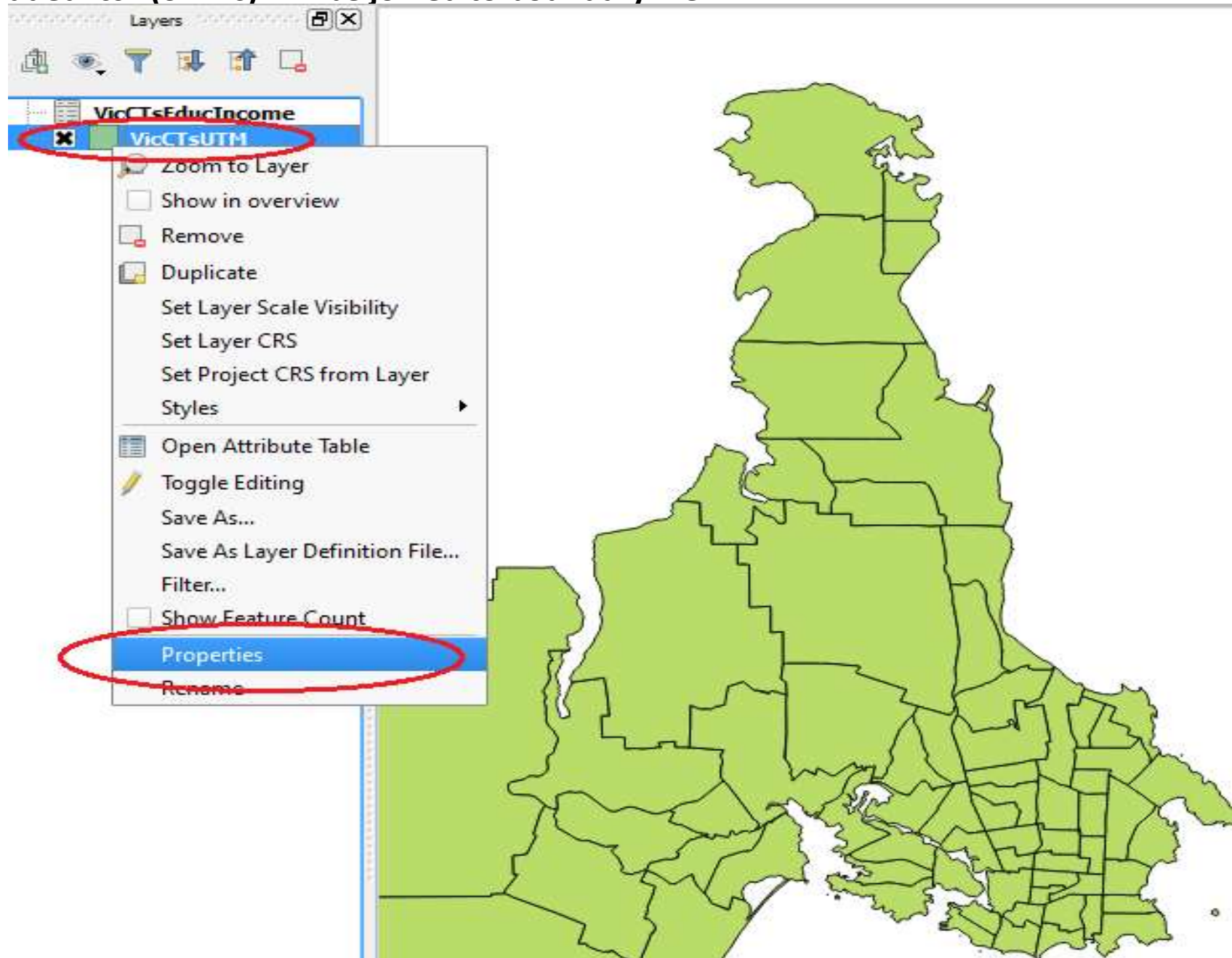
QGIS: add boundary file



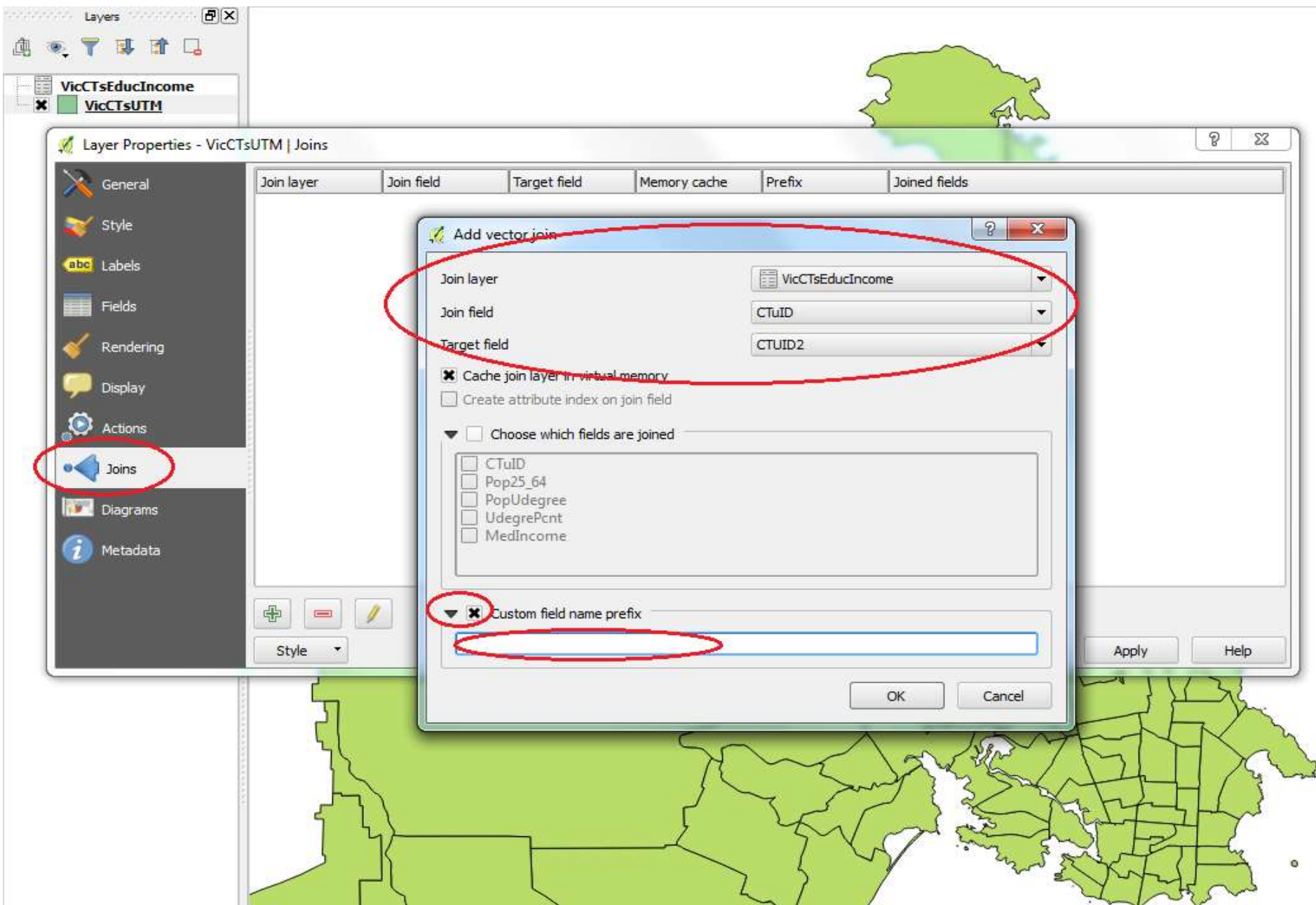
add .csv or .xls file



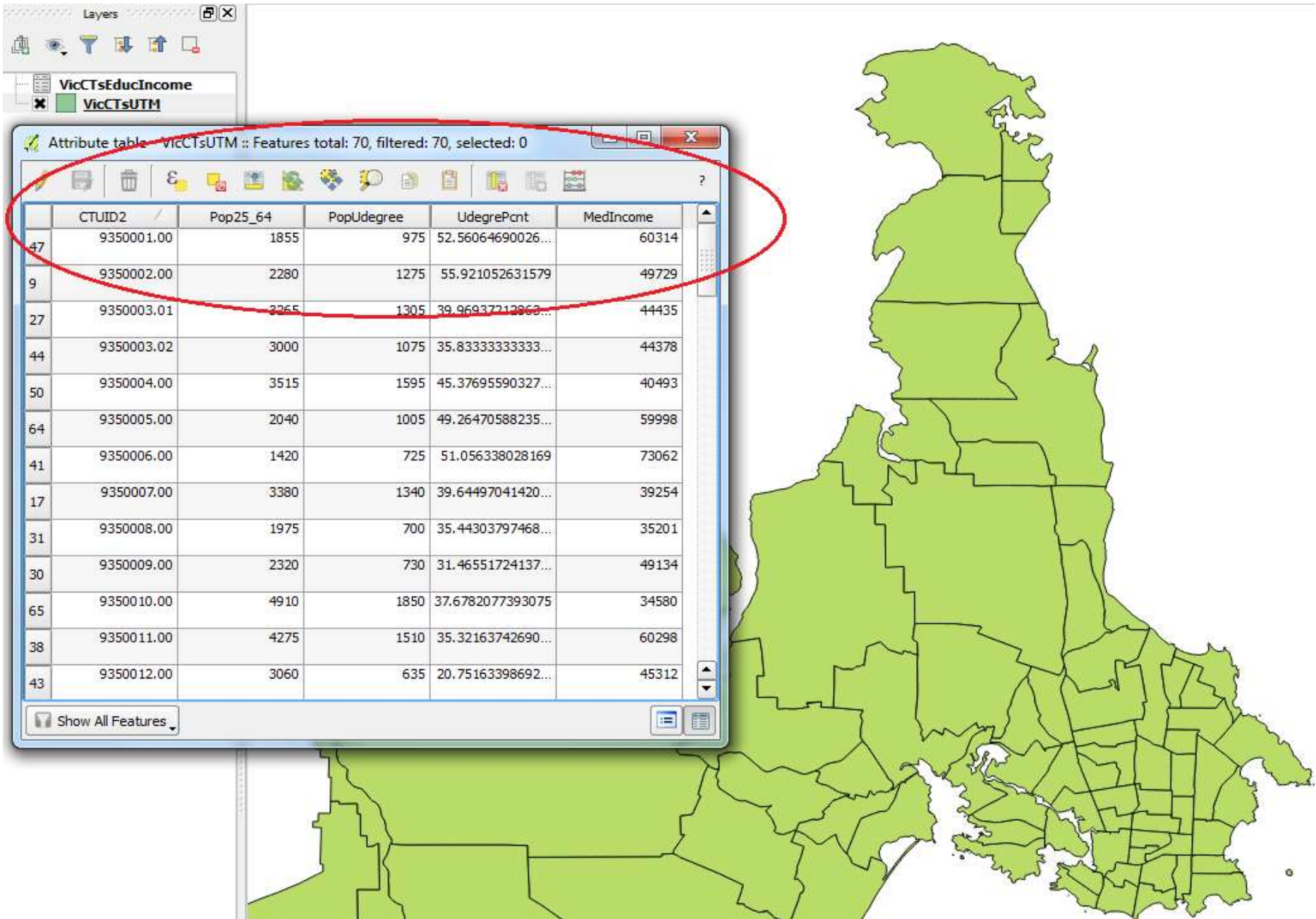
added .csv (or .xls) will be joined to boundary file



join .csv/.xls to boundary file



.csv/.xls joined to boundary file



.csv/.xls joined to boundary file

NOTE: “shapefiles” have 3 necessary components

- .shp / .dbf / .shx

.dbf’s only allow 10 character column titles

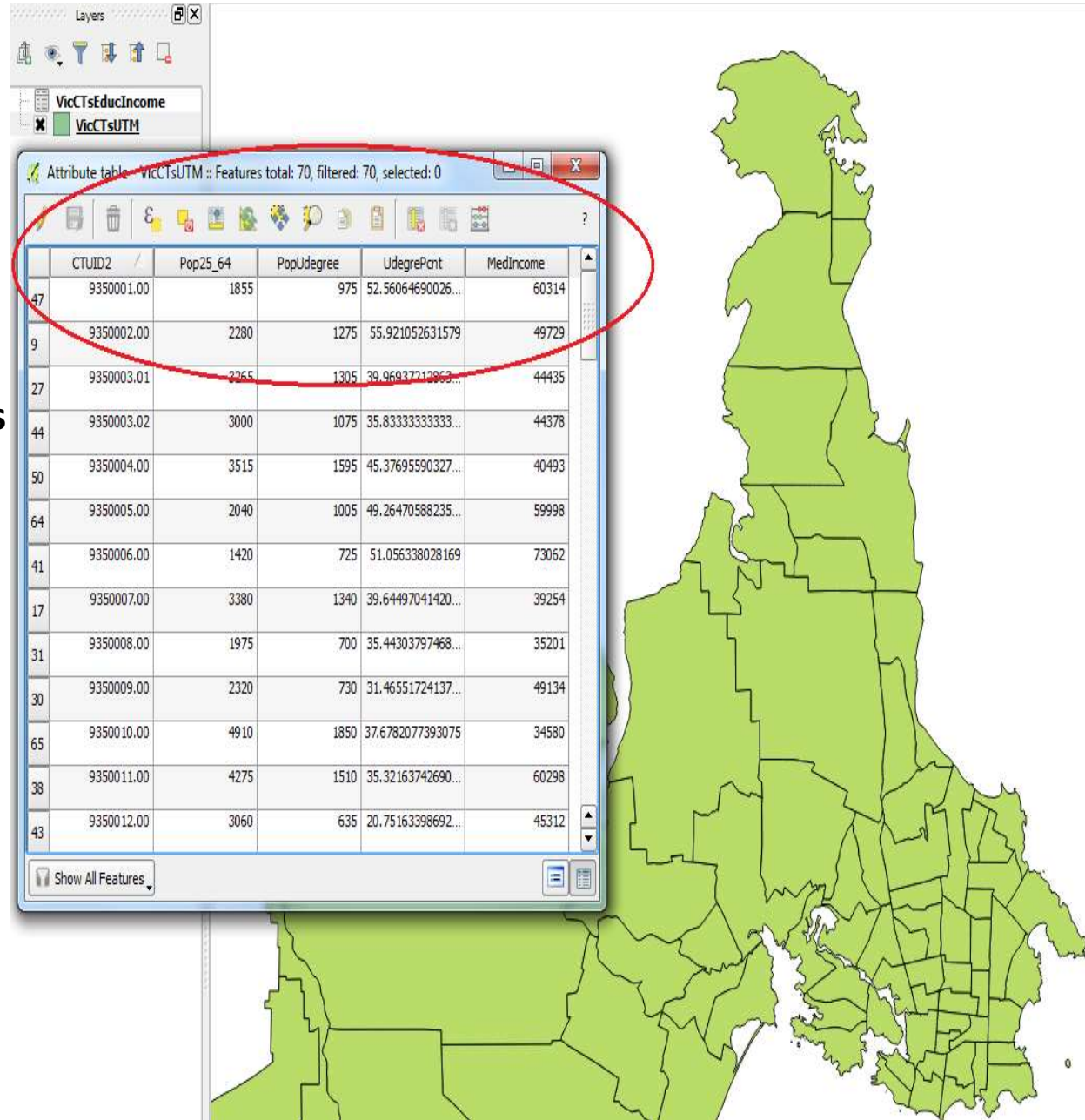
-awkward for public web maps

GeoJson (!?) allow unlimited column title characters!

or

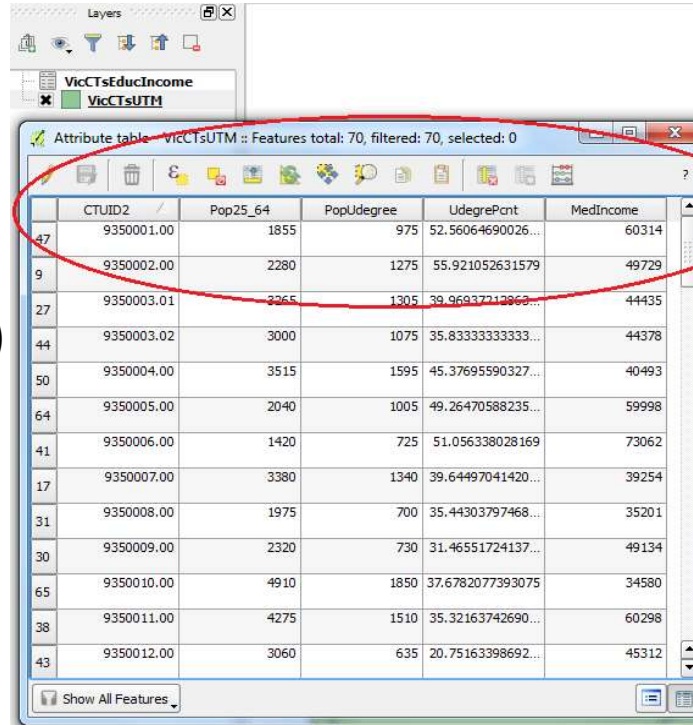
web maps fields could be edited in “code”

more later...



(NOTE) .dbf's only allow 10 character column titles

**if your .xls has
Median Household Income
it becomes
MedianHous
(in the joined saved shapefile)
not reader friendly!**

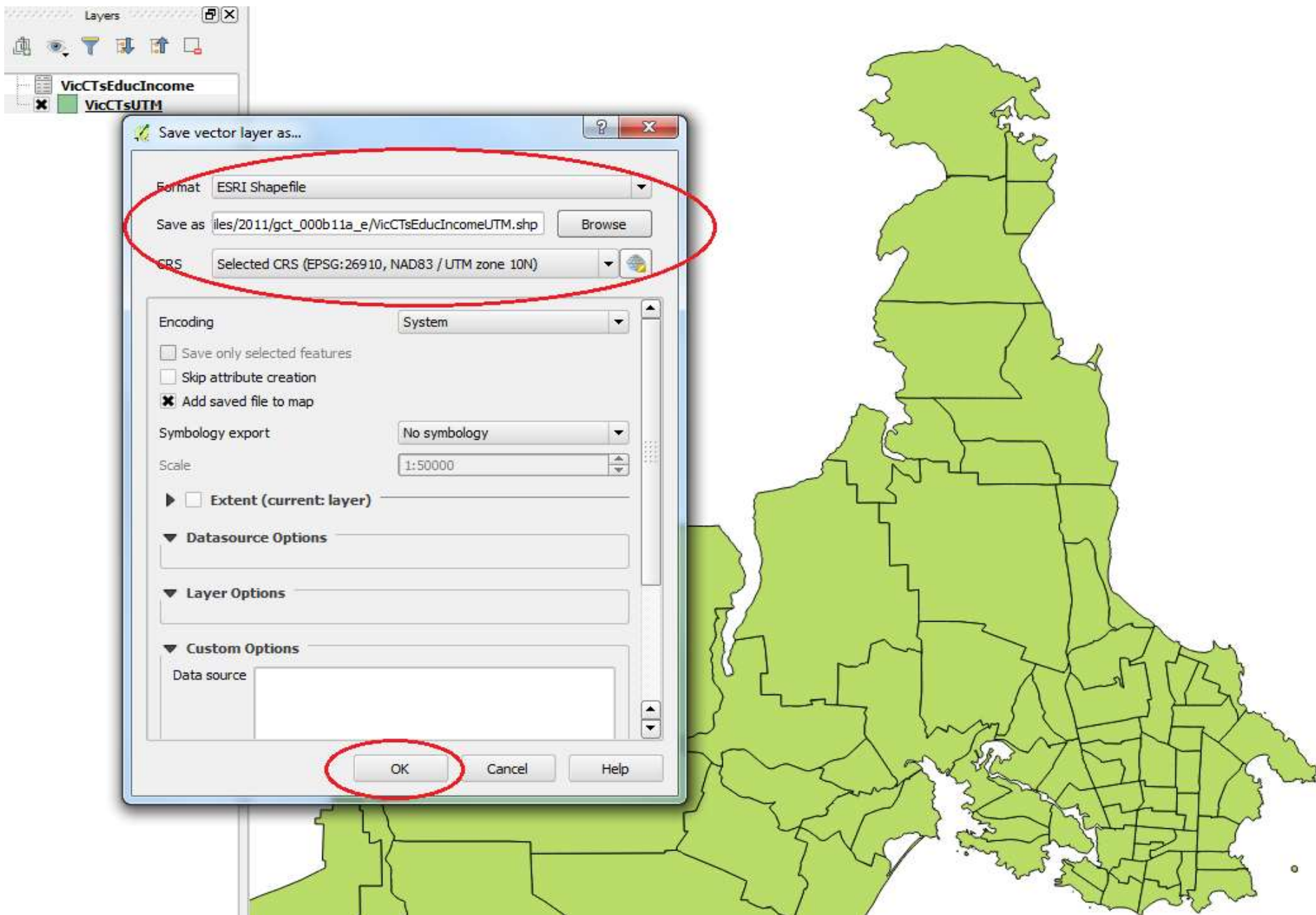


	CTUID2	Pop25_64	PopUdegree	UdegreePont	MedIncome
47	9350001.00	1855	975	52.56064690026...	60314
9	9350002.00	2280	1275	55.921052631579	49729
27	9350003.01	3265	1305	39.969372112863...	44435
44	9350003.02	3000	1075	35.833333333333...	44378
50	9350004.00	3515	1595	45.37695590327...	40493
64	9350005.00	2040	1005	49.26470588235...	59998
41	9350006.00	1420	725	51.056338028169	73062
17	9350007.00	3380	1340	39.64497041420...	39254
31	9350008.00	1975	700	35.44303797468...	35201
30	9350009.00	2320	730	31.46551724137...	49134
65	9350010.00	4910	1850	37.6782077393075	34580
38	9350011.00	4275	1510	35.32163742690...	60298
43	9350012.00	3060	635	20.75163398692...	45312

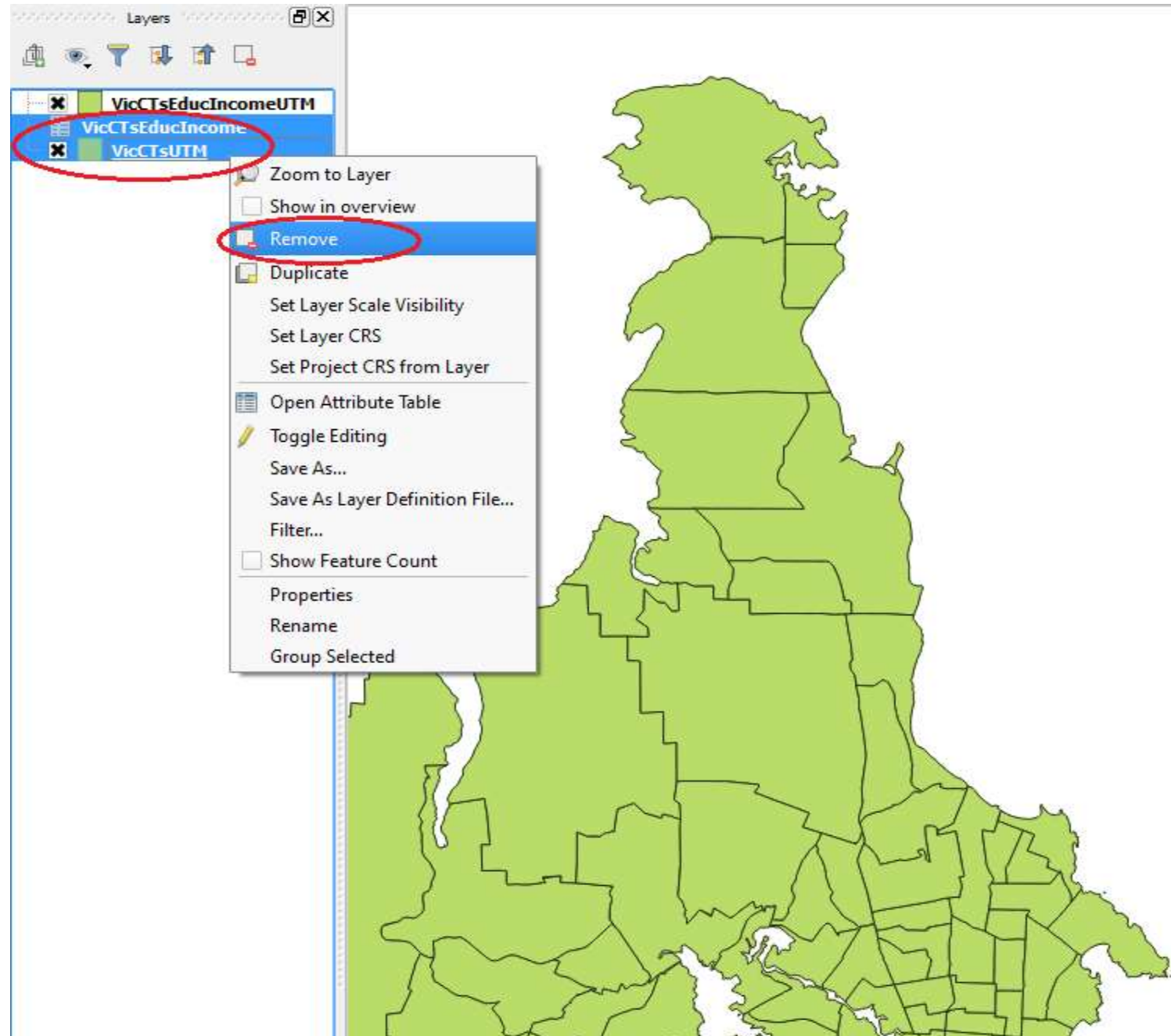
**GeoJson (!?) allow unlimited column title characters!
-important for a web map to have friendly readable fields**

(...can't edit a GeoJson in QGIS...)

(to con't...) Save (joined .csv/.xls and boundary files) and rename new file



remove (now unneeded) files



edit attribute table to delete unnecessary columns (for public display)

Layers

VicCTsEducIncomeUTM

Attribute table - VicCTsUTM :: Features total: 70, filtered: 70, selected: 0

Toggle editing mode (Ctrl+E)

	CTUID	CTNAME	CMAUID	CMANAME	CMATYPE	CMAPUID	PRUID	PRNAME	CTUID2
0	9350111.01	0111.01	935	Victoria	B	59935	59	British Columbia /...	9350111.01
1	9350130.01	0130.01	935	Victoria	B	59935	59	British Columbia /...	9350130.01
2	9350111.02	0111.02	935	Victoria	B	59935	59	British Columbia /...	9350111.02
3	9350124.00	0124.00	935	Victoria	B	59935	59	British Columbia /...	9350124.00
4	9350151.03	0151.03	935	Victoria	B	59935	59	British Columbia /...	9350151.03
5	9350131.00	0131.00	935	Victoria	B	59935	59	British Columbia /...	9350131.00
6	9350132.01	0132.01	935	Victoria	B	59935	59	British Columbia /...	9350132.01
7	9350125.02	0125.02	935	Victoria	B	59935	59	British Columbia /...	9350125.02
8	9350121.02	0121.02	935	Victoria	B	59935	59	British Columbia /...	9350121.02
9	9350002.00	0002.00	935	Victoria	B	59935	59	British Columbia /...	9350002.00
10	9350154.01	0154.01	935	Victoria	B	59935	59	British Columbia /...	9350154.01
11	9350125.01	0125.01	935	Victoria	B	59935	59	British Columbia /...	9350125.01

Show All Features

delete “unnecessary” columns (for public display)

Layers

VicCTsEducIncomeUTM

Attribute table - VicCTsEducIncomeUTM :: Features total: 70, filtered: 70, selected: 0

CTUID =

Delete Attributes

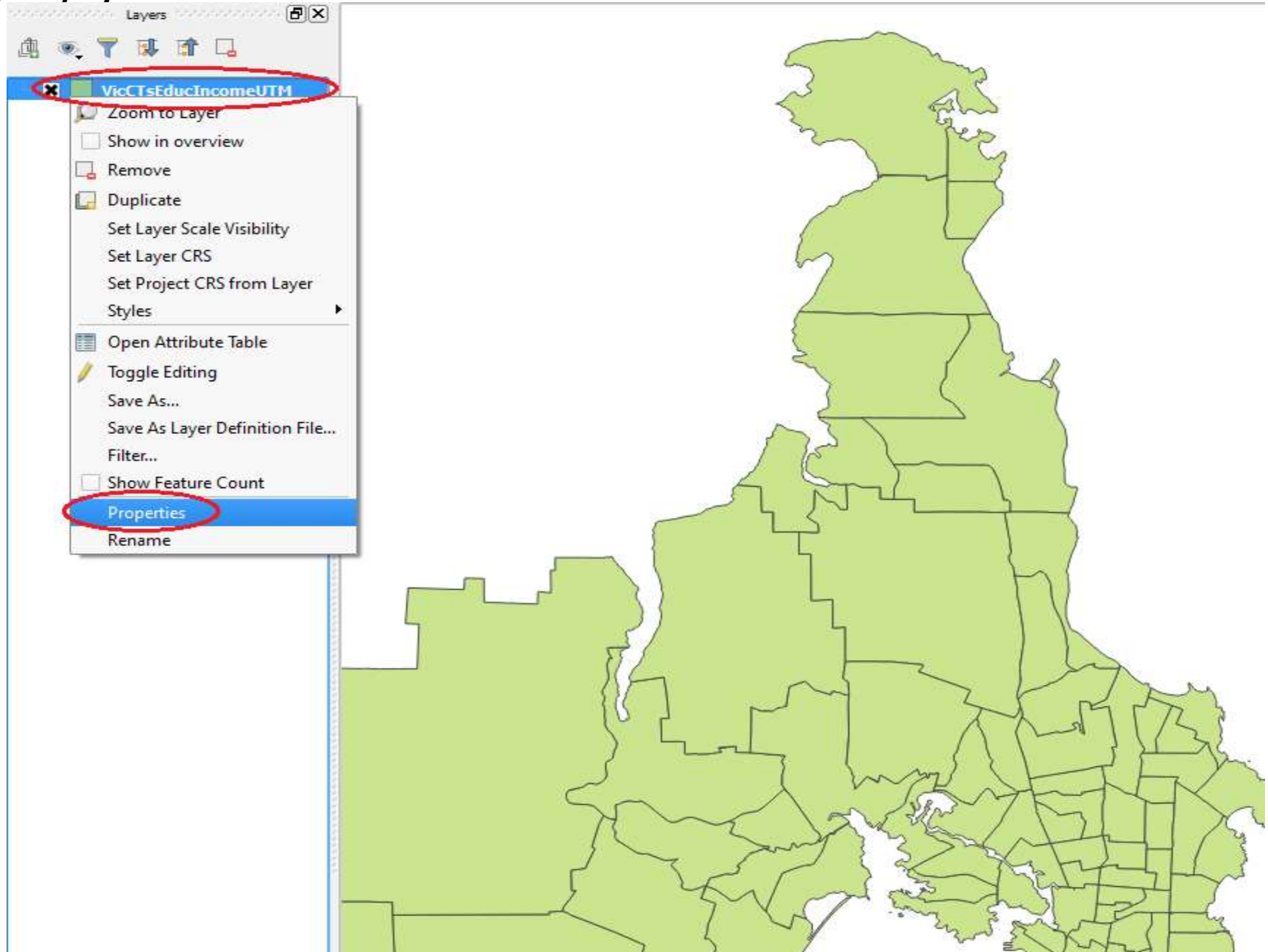
- CTUID
- CTNAME
- CMAUID
- CMANAME
- CMATYPE
- CMAPUID
- PRUID
- PRNAME
- CTUID2
- Pop25_64
- PopUdegree
- UdegreePcnt
- MedIncome

OK Cancel

	CTUID	CTNAME	CMAUID	CM	PRNAME	CTUID2
0	9350111.01	0111.01	935	Victoria	British Columbia / ...	9350111.01
1	9350130.01	0130.01	935	Victoria	British Columbia / ...	9350130.01
2	9350111.02	0111.02	935	Victoria	British Columbia / ...	9350111.02
3	9350124.00	0124.00	935	Victoria	British Columbia / ...	9350124.00
4	9350151.03	0151.03	935	Victoria	British Columbia / ...	9350151.03
5	9350131.00	0131.00	935	Victoria	British Columbia / ...	9350131.00
6	9350132.01	0132.01	935	Victoria	British Columbia / ...	9350132.01
7	9350125.02	0125.02	935	Victoria	British Columbia / ...	9350125.02
8	9350121.02	0121.02	935	Victoria	British Columbia / ...	9350121.02
9	9350002.00	0002.00	935	Victoria	British Columbia / ...	9350002.00
10	9350154.01	0154.01	935	Victoria	British Columbia / ...	9350154.01
	9350125.01	0125.01	935	Victoria	British Columbia / ...	9350125.01

Show All Features

stylize / symbolize CT data



stylize / symbolize CT data

Layers

VicCTsEducIncomeUTM

Layer Properties - VicCTsEducIncomeUTM | Style

General

Style

Labels

Fields

Rendering

Display

Actions

Joins

Diagrams

Metadata

Graduated

Column: UdegrePcnt

Symbol: [Change...]

Legend Format: %1 - %2

Method: Color

Color ramp: [source]

Precision: 1

Trim

Invert

Classes

Mode: Pretty Breaks

Classes: 5

Classify

Symbol	Values	Legend
[X]	10.714 - 20.000	10.7 - 20.0
[X]	20.000 - 30.000	20.1 - 30.0
[X]	30.000 - 40.000	30.1 - 40.0
[X]	40.000 - 50.000	40.1 - 50.0
[X]	50.000 - 60.000	50.1 - 60.0

Add class

Delete

Delete all

Link class boundaries

Advanced

Layer rendering

Layer transparency: 25

Layer blending mode: Normal

Feature blending mode: Normal

Draw effects

Style

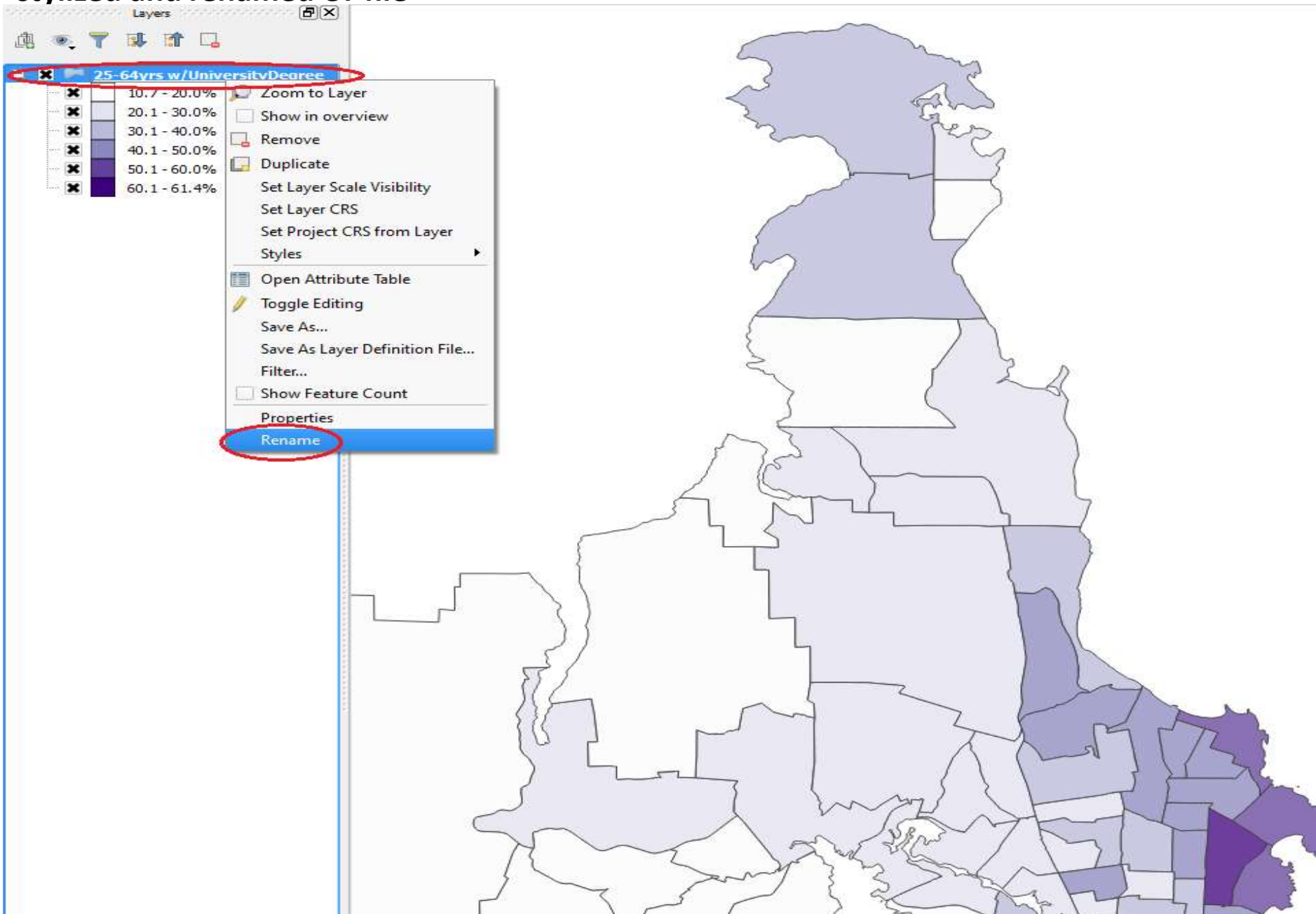
OK

Cancel

Apply

Help

stylized and renamed CT file



(add and) utilise (selected) leaflet plug-in

The screenshot shows the QGIS interface with the Plugins Manager window open. The 'Plugins' menu is highlighted in the top menu bar. In the Plugins Manager, the search bar contains 'leaflet'. Two plugins are listed: 'qgis2leaf' and 'qgis2web', both marked as installed. The details for 'qgis2web' are displayed on the right, including its description, ratings, tags, author, and changelog. The background shows a map of the United Kingdom with various regions shaded in different colors.

Project Edit View Layer Settings **Plugins** Vector Raster Database Web Processing Help

Plugins All (343)

Search:

- ☒ qgis2leaf
- ☒ qgis2web

qgis2web

Export to an OpenLayers 3/Leaflet webmap

qgis2web generates a web map from your current QGIS project, either OpenLayers3 or Leaflet. It replicates as many aspects of the project as possible, including layers, styles (including categorized and graduated), and extent.

★★★★★ 33 rating vote(s), 26677 downloads

Tags: web, webmap, webmaps, Leaflet, OpenLayers, OL3, HTML, Javascript, CSS

More info: [homepage](#) [tracker](#) [code repository](#)

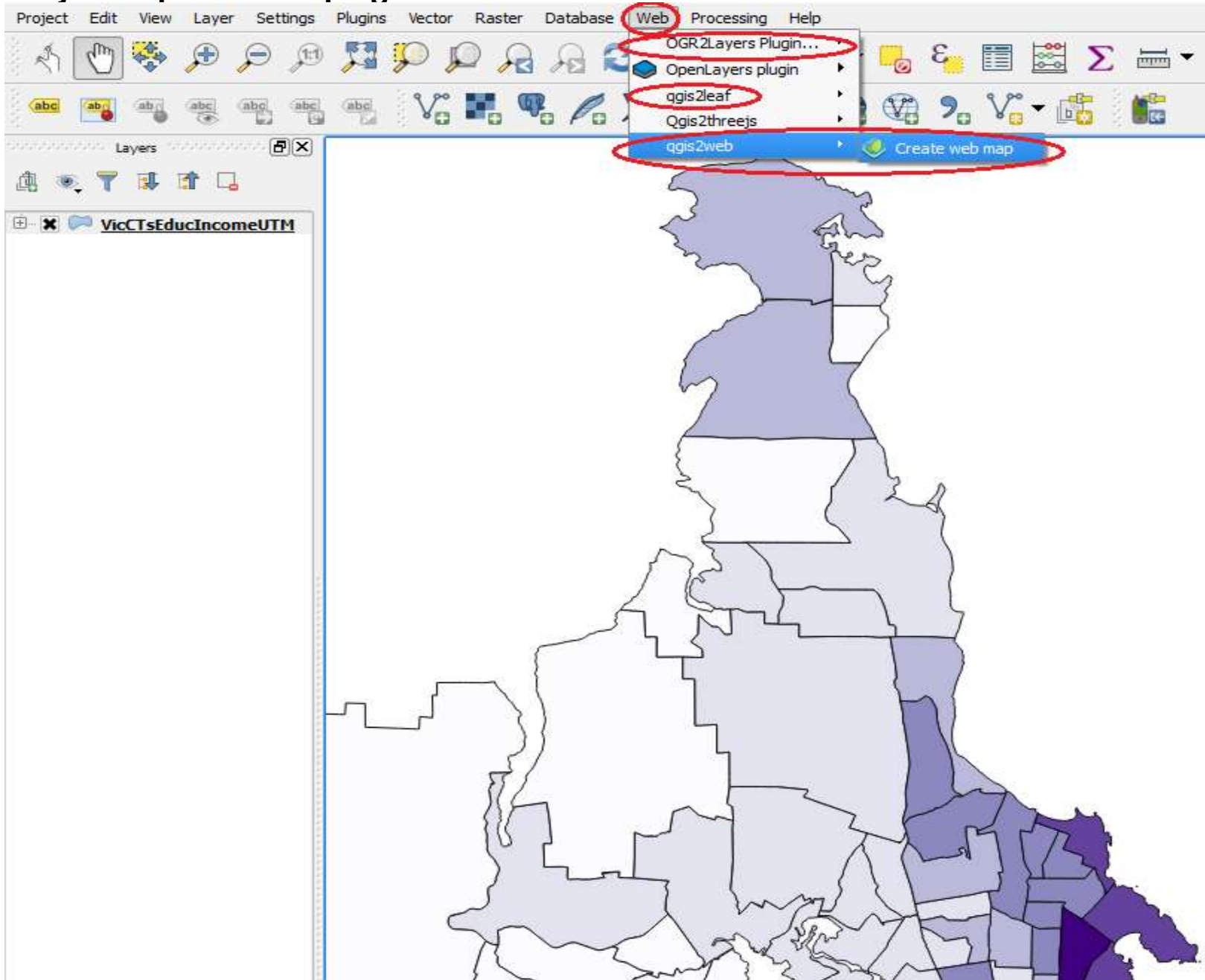
Author: [Tom Chadwin](#)

Installed version: 0.34.0 (in C:\Users\danielbm\qgis2\python\plugins\qgis2web)
Available version: 0.34.0 (in QGIS Official Plugin Repository)

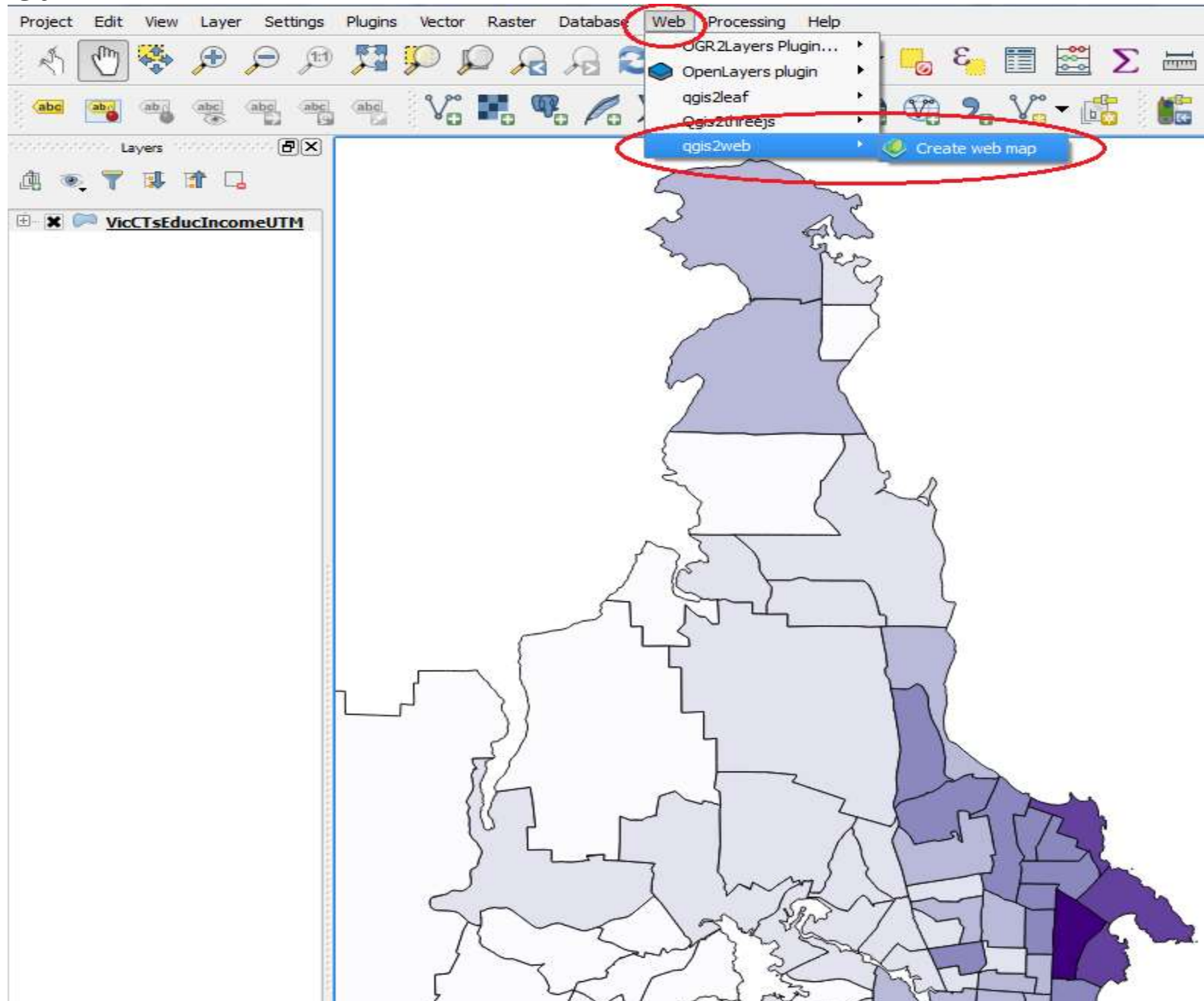
changelog:
2015/11/11 0.34.0 Leaflet pointToLayer error, README improvement
2015/11/11 0.33.0 Code improvements, complete style/geometry Leaflet tests, add all style/geometry OL3 tests, fix OL3 fill bug
2015/11/11 0.32.0 Leaflet major code refactor, PEP8 E501 compliance, no brush fill, Leaflet layers with no geometry, Leaflet simple polygon test

Upgrade all Uninstall plugin Reinstall plugin Close Help

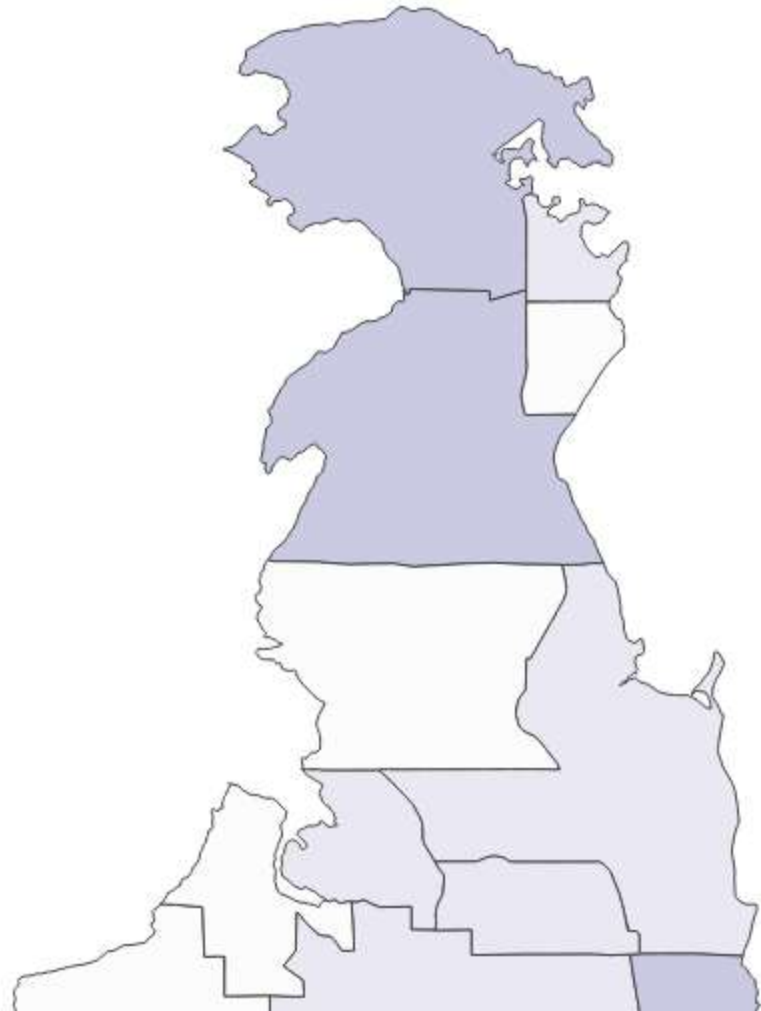
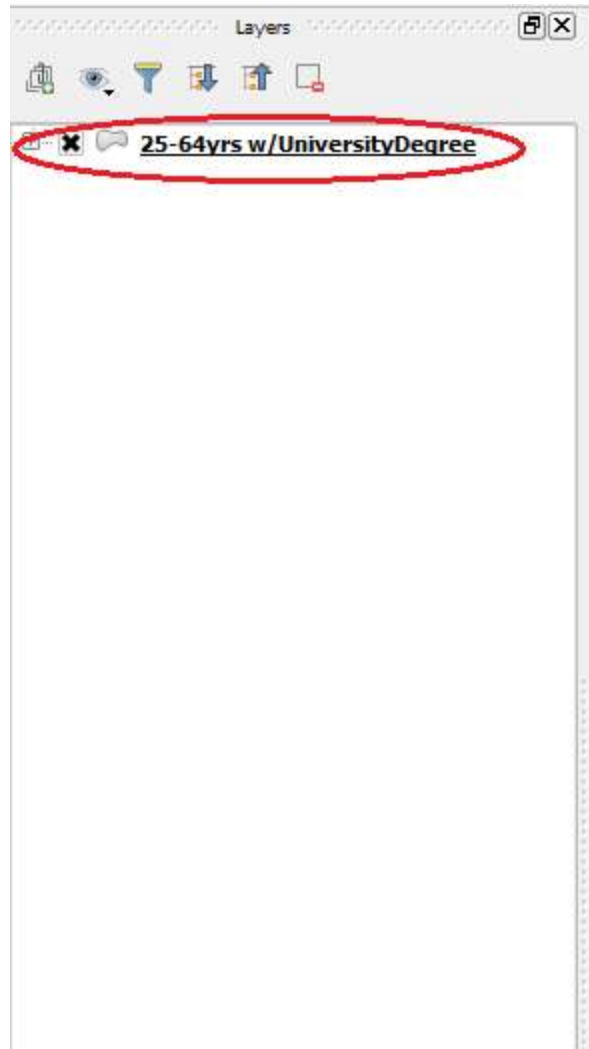
different javascript libraries plug-ins



qgis2web



rename layer to web-friendly title



qgis2web Leaflet dialog box choices

25-64yrs w/UniversityDegree

Export to web map

Export Help

Layers and Groups

- ☒ 25-64yrs w/UniversityDegree
 - Info popup content FIELD:CTUID2
 - Visible ☒
 - Label ☐

Data export

- Delete unused fields ☐
- Export folder C:\Temp\qgis2web
- Mapping library location Local
- Minify GeoJSON files ☐
- Precision 6

Scale/Zoom

- Extent Fit to layers extent
- Max zoom level 28
- Min zoom level 1
- Restrict to extent ☐
- Use layer scale dependent visibility ☐

Appearance

- Add address search ☒
- Add layers list ☒
- Add measure tool ☐
- Add scale bar ☒
- Base layer OSM Standard
- Geolocate user ☐
- Highlight features ☐
- Match project CRS ☐
- Show popups on hover ☐
- Template basic

OpenLayers 3 ☐ Leaflet ☒ Update preview Export

5 km
3 mi

Leaflet | qgis2web © OpenStreetMap contributors, CC-BY-SA

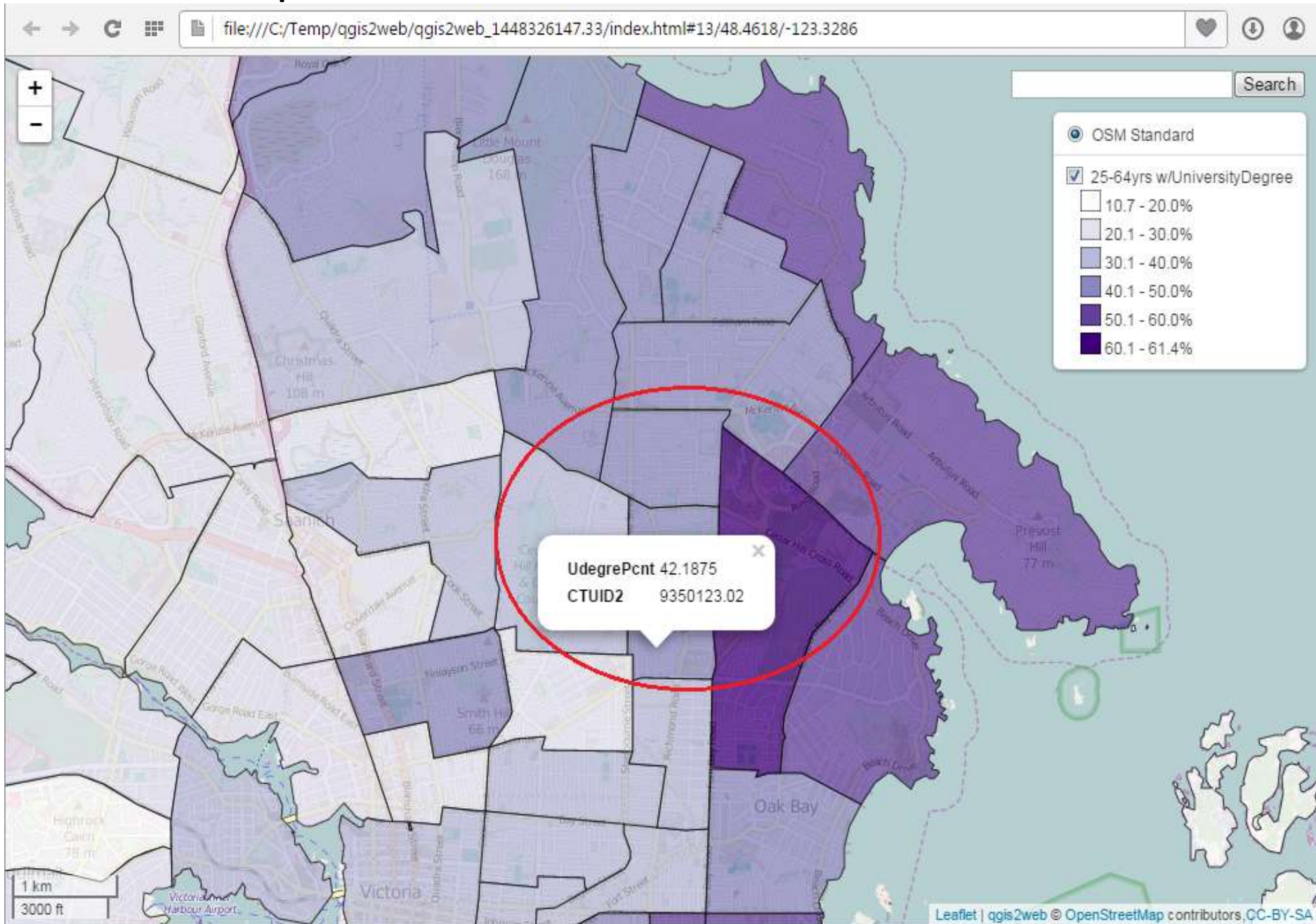
Search

OSM Standard

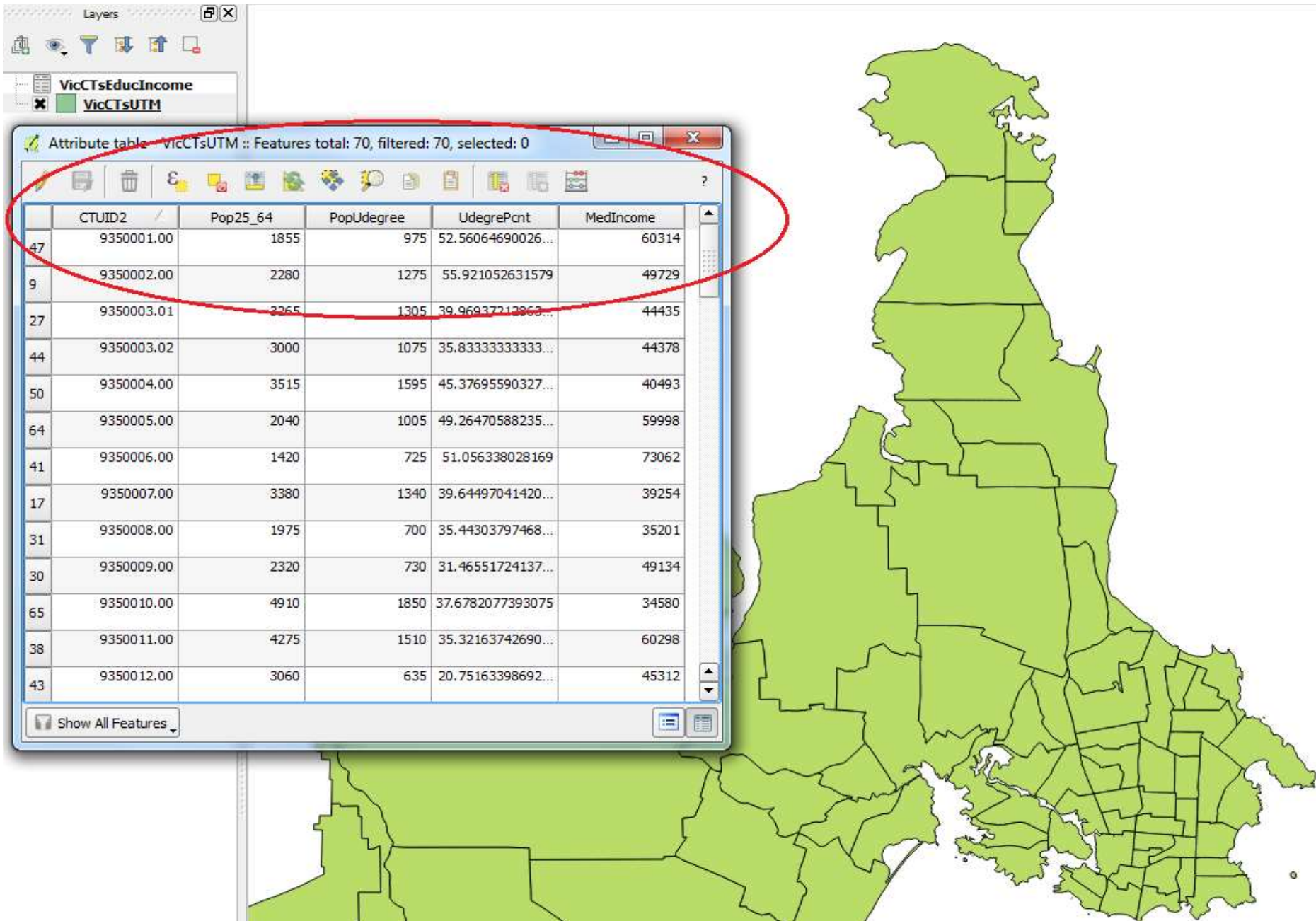
- ☒ 25-64yrs w/UniversityDegree
 - 10.7 - 20.0%
 - 20.1 - 30.0%
 - 30.1 - 40.0%
 - 40.1 - 50.0%
 - 50.1 - 60.0%
 - 60.1 - 61.4%

“finished” web map in a browser!

but... note the awkward field titles



recall the .csv/.xls with awkward field titles joined to boundary file



use .xlsx with “public friendly” column titles to join to boundary file...then...

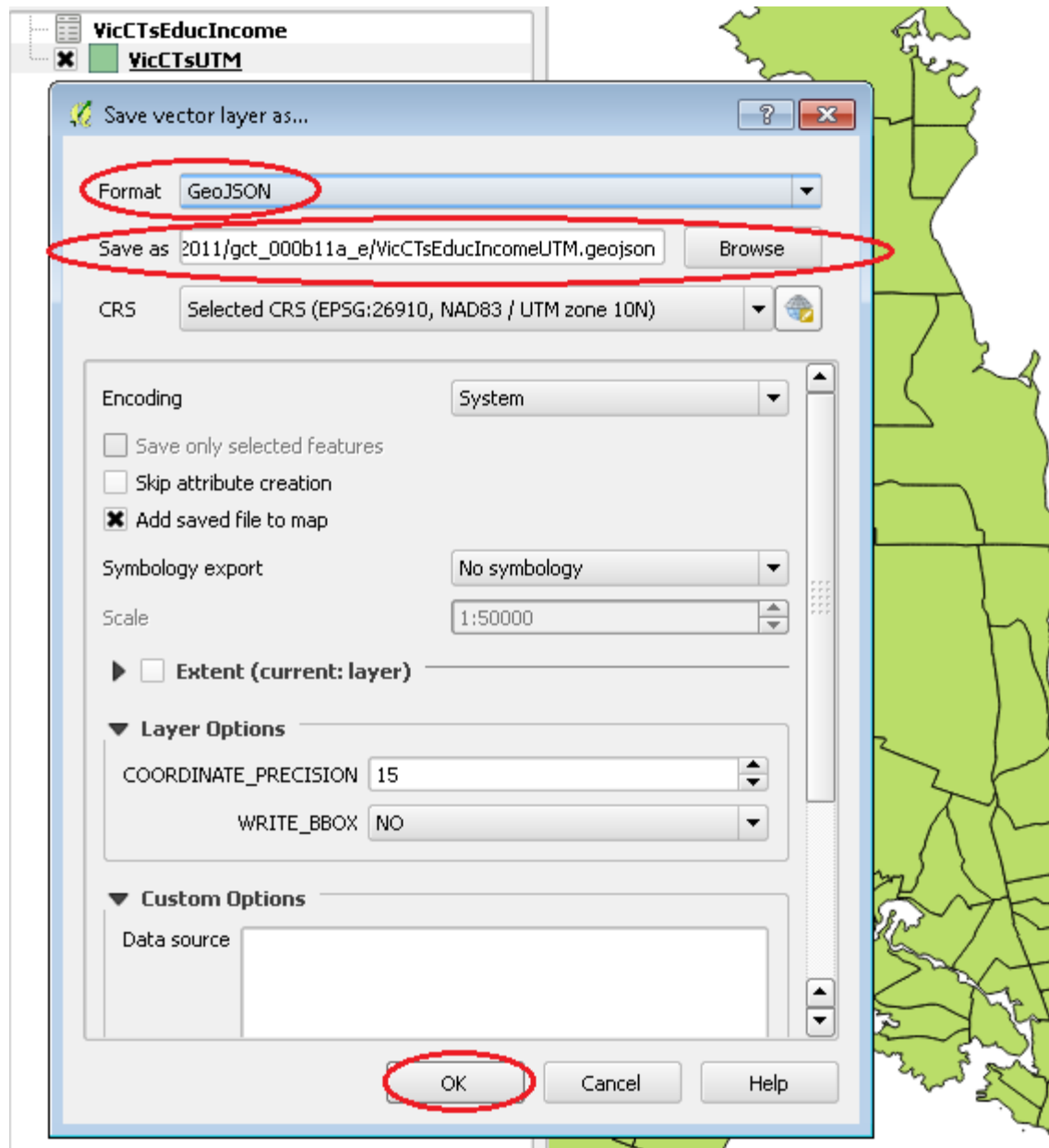
VicCTsEducIncome
VicCTsUTM

Attribute table - VicCTsEducIncome :: Features total: 70, filtered: 70, selected: 0

	CensusTractID	Pop25_64	PopUniversityDegree	UniversityDegree_Percent	MedianHouseholdIncome
0	9350001	1855	975	52.6	60314
1	9350002	2280	1275	55.9	49729
2	9350003.01	3265	1305	40.0	44435
3	9350003.02	3000	1075	35.8	44378
4	9350004	3515	1595	45.4	40493
5	9350005	2040	1005	49.3	59998
6	9350006	1420	725	51.1	73062
7	9350007	3380	1340	39.6	39254
8	9350008	1975	700	35.4	35201
9	9350009	2320	730	31.5	49134
10	9350010	4910	1850	37.7	34580
11	9350011	4275	1510	35.3	60298
12	9350012	3060	635	20.8	45312

Show All Features

...save as GeoJson...and...



GeoJson retains “public friendly” column titles !

MedianHouseholdIncome\$

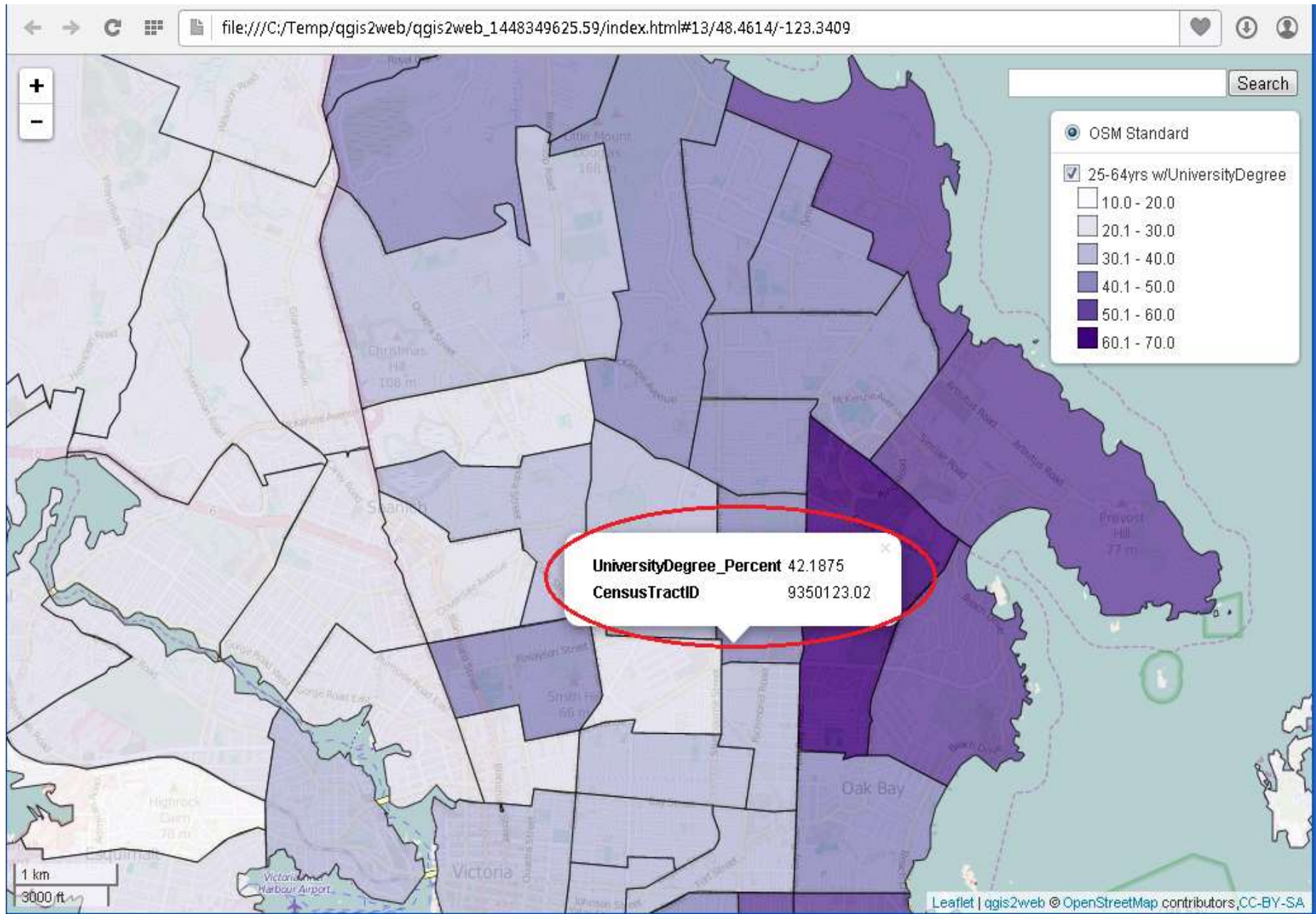
Attribute table - MedianHouseholdIncome\$:: Features total: 70, filtered: 70, selected: 0

	CensusTractID	Pop25_64	PopUniversityDegree	UniversityDegree_Percent	MedianHouseholdIncome
0	9350111.01	2645	450	17.013233	47096
1	9350130.01	1750	505	28.857143	68399
2	9350111.02	3465	815	23.520924	56407
3	9350124	2445	910	37.218814	60053
4	9350151.03	5210	1180	22.648752	74048
5	9350131	2545	1035	40.667976	67645
6	9350132.01	1720	790	45.930233	92693
7	9350125.02	2595	1030	39.691715	65461
8	9350121.02	1865	965	51.742627	95485
9	9350002	2280	1275	55.921053	49729
10	9350154.01	5060	990	19.565217	91550
11	9350125.01	2965	795	26.812816	43934
	9350150.02	3365	915	27.191679	83802

Show All Features

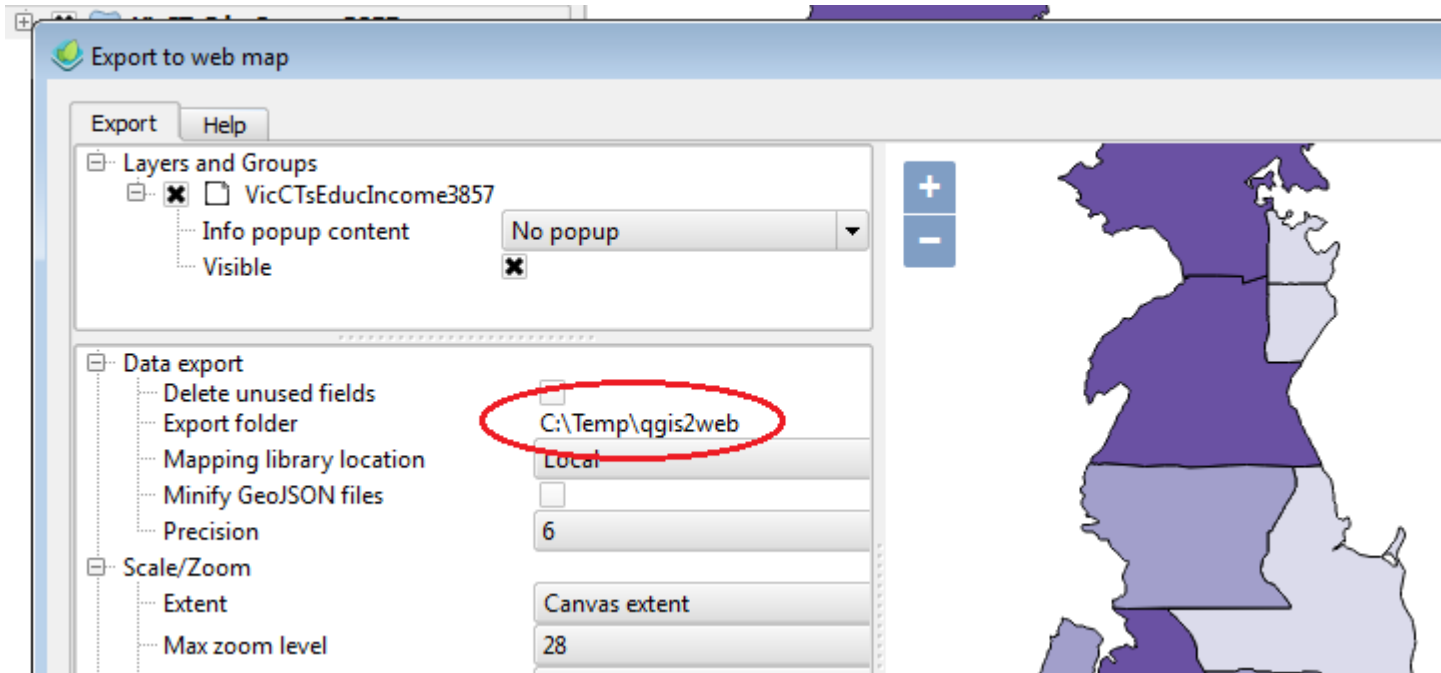
better friendlier field titles...

but now...need to “serve up” the map...

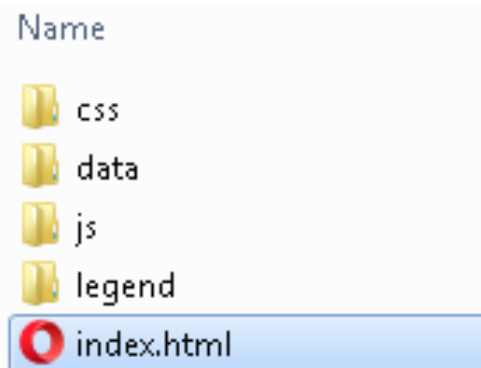
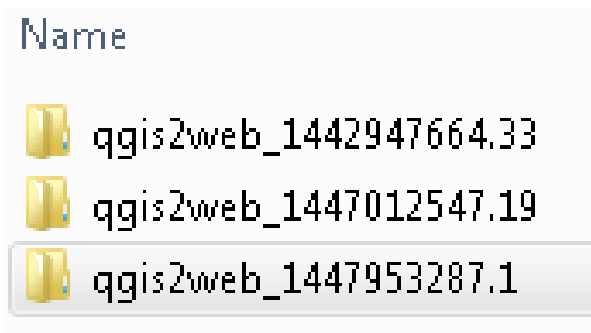


need to “serve up” the map...

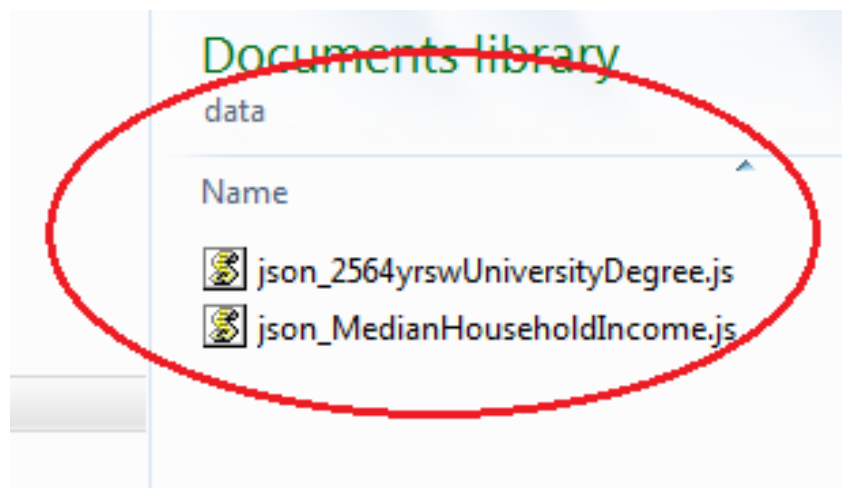
the map worked in your browser b/c the files were saved and accessed there...



1 of the files is the .html

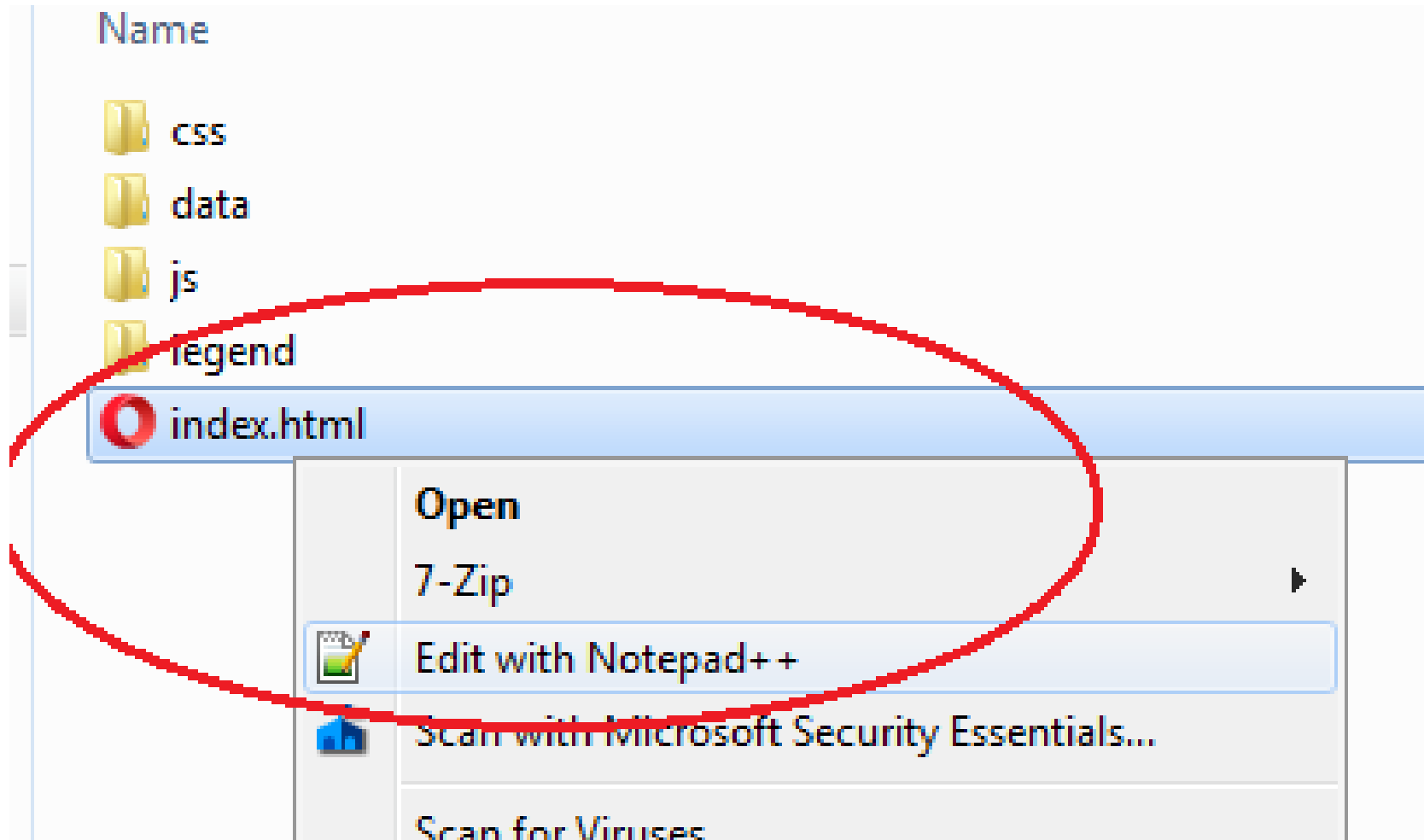


other files are:



...etc

use Notepad++ to open index.html



index.html open in Notepad++

```
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
index.html x
1 <!DOCTYPE html>
2 <html>
3 <head>
4   <title>qgis2web Leaflet webmap</title>
5
6   <meta charset="utf-8" />
7   <link rel="stylesheet" href="css/leaflet.css" />
8   <link rel="stylesheet" href="css/MarkerCluster.css" />
9   <link rel="stylesheet" href="css/MarkerCluster.Default.css" />
10  <link rel="stylesheet" type="text/css" href="css/qgis2web.css">
11  <link rel="stylesheet" href="css/label.css" />
12  <link rel="stylesheet" href="http://k4r573n.github.io/leaflet-control-osm-geocoder/Control.OSMGeocoder.css" />
13  <script src="js/leaflet.js"></script>
14  <script src="js/leaflet-hash.js"></script>
15  <script src="js/label.js"></script>
16  <script src="js/AutoLinker.min.js"></script>
17  <script src="http://k4r573n.github.io/leaflet-control-osm-geocoder/Control.OSMGeocoder.js"></script>
18  <script src="js/leaflet.markercluster.js"></script>
19  <meta name="viewport" content="initial-scale=1.0, user-scalable=no" />
20 </head>
21 <body>
22   <div id="map"></div>
23   <script src="data/json_MedianHouseholdIncome.js"></script>
24   <script src="data/json_2564yrswUniversityDegree.js"></script>
25   <script>
26     var map = L.map('map', {
27       zoomControl:true, maxZoom:19, minZoom:1
28     }).fitBounds([[48.3663750176,-123.674769418],[48.727702253,-122.769256988]]);
29     var hash = new L.Hash(map);
30     var additional_attr = '<a href="https://github.com/tomchadwin/qgis2web" target = "_blank">qgis2web</a>';
```

change locations of the files from

```
<meta charset="utf-8" />
<link rel="stylesheet" href="css/leaflet.css" />
<link rel="stylesheet" href="css/MarkerCluster.css" />
<link rel="stylesheet" href="css/MarkerCluster.Default.css" />
<link rel="stylesheet" type="text/css" href="css/qgis2web.css">
<link rel="stylesheet" href="css/label.css" />
<link rel="stylesheet" href="http://k4r573n.github.io/leaflet-control-osm-geocoder/Control.OSMGeocoder.css" />
<script src="js/leaflet.js"></script>
<script src="js/leaflet-hash.js"></script>
<script src="js/label.js"></script>
<script src="js/Autolinker.min.js"></script>
<script src="http://k4r573n.github.io/leaflet-control-osm-geocoder/Control.OSMGeocoder.js"></script>
<script src="js/leaflet.markercluster.js"></script>
<div id="map"></div>
<script src="data/json_MedianHouseholdIncome.js"></script>
<script src="data/json_2564yrswUniversityDegree.js"></script>
```

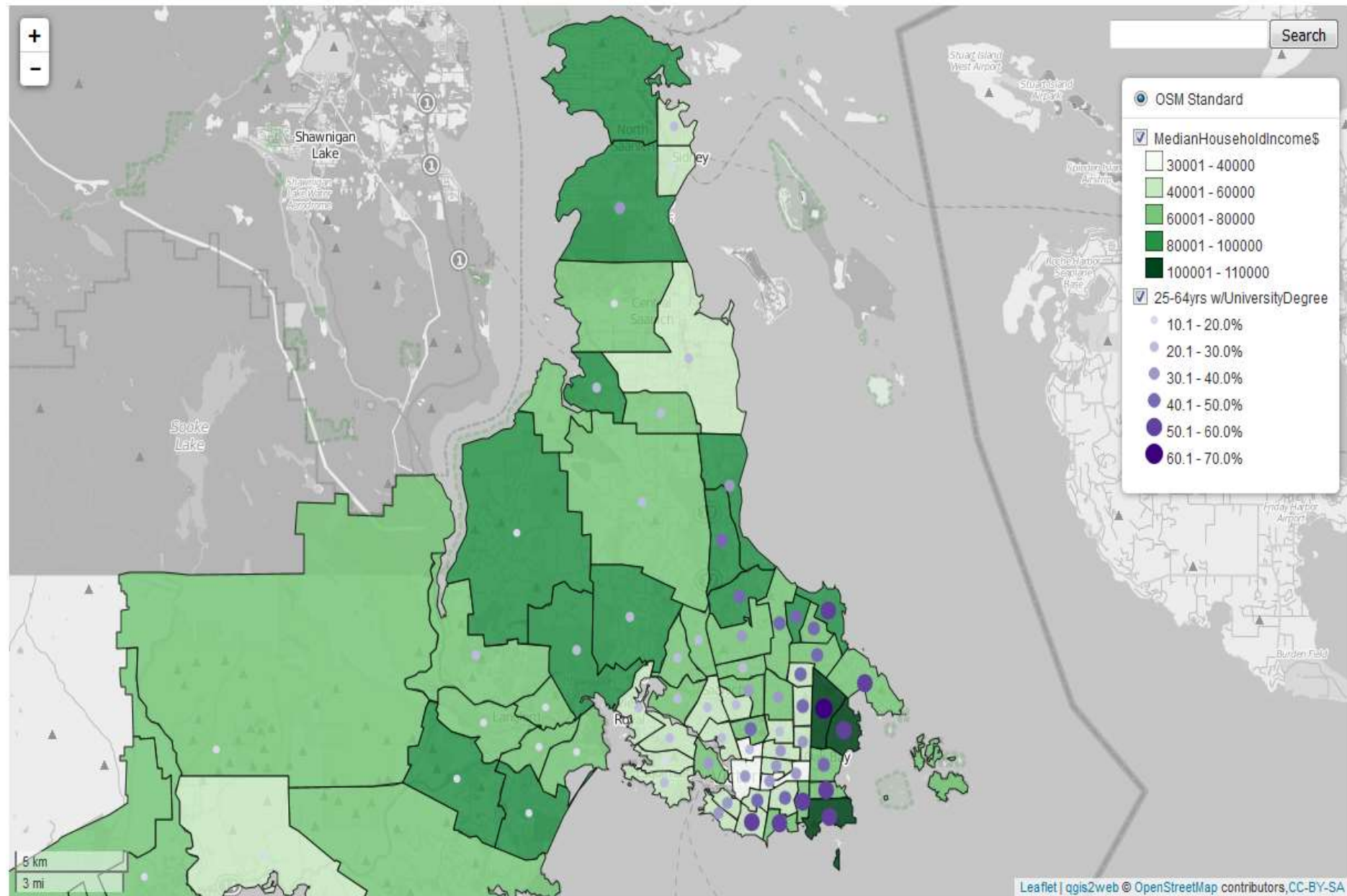
to

```
<meta charset="utf-8" />
<link rel="stylesheet" href="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/css/leaflet.css" />
<link rel="stylesheet" href="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/css/MarkerCluster.css" />
<link rel="stylesheet" href="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/css/MarkerCluster.Default.css" />
<link rel="stylesheet" type="text/css" href="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/css/qgis2web.css">
<link rel="stylesheet" href="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/css/label.css" />
<link rel="stylesheet" href="http://k4r573n.github.io/leaflet-control-osm-geocoder/Control.OSMGeocoder.css" />
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/js/leaflet.js"></script>
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/js/leaflet-hash.js"></script>
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/js/label.js"></script>
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/js/Autolinker.min.js"></script>
<script src="http://k4r573n.github.io/leaflet-control-osm-geocoder/Control.OSMGeocoder.js"></script>
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/js/leaflet.markercluster.js"></script>
<div id="map"></div>
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/data/json_MedianHouseholdIncome.js"></script>
<script src="http://maps.library.uvic.ca/Q2WebLflt/VicCTs/data/json_2564yrswUniversityDegree.js"></script>
```

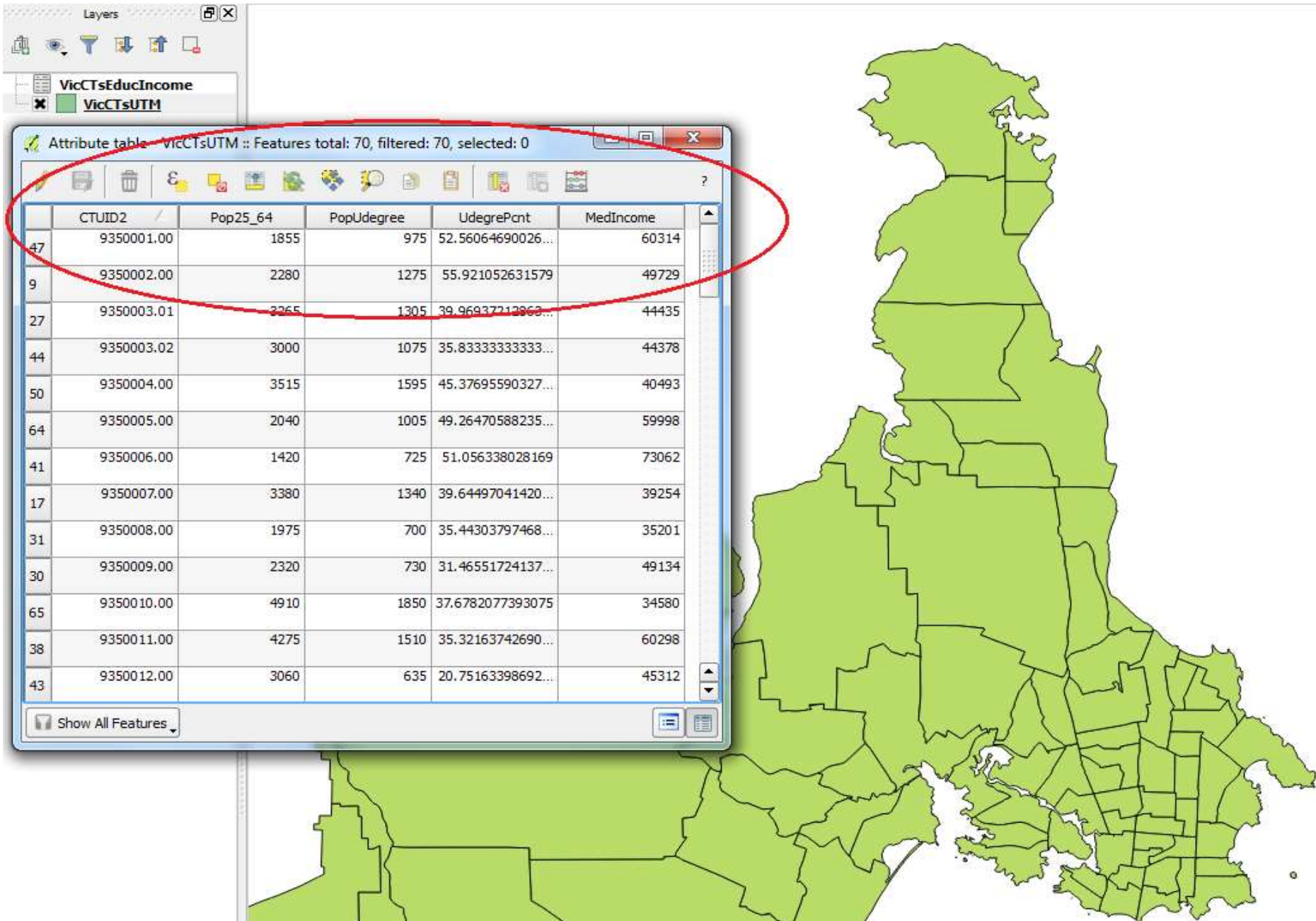

voila...

Victoria Household Income and University Degrees by Census Tracts

Click on census tracts for details.



recall the .csv/.xls with awkward field titles joined to boundary file...



and .xlsx with “full public” column titles...

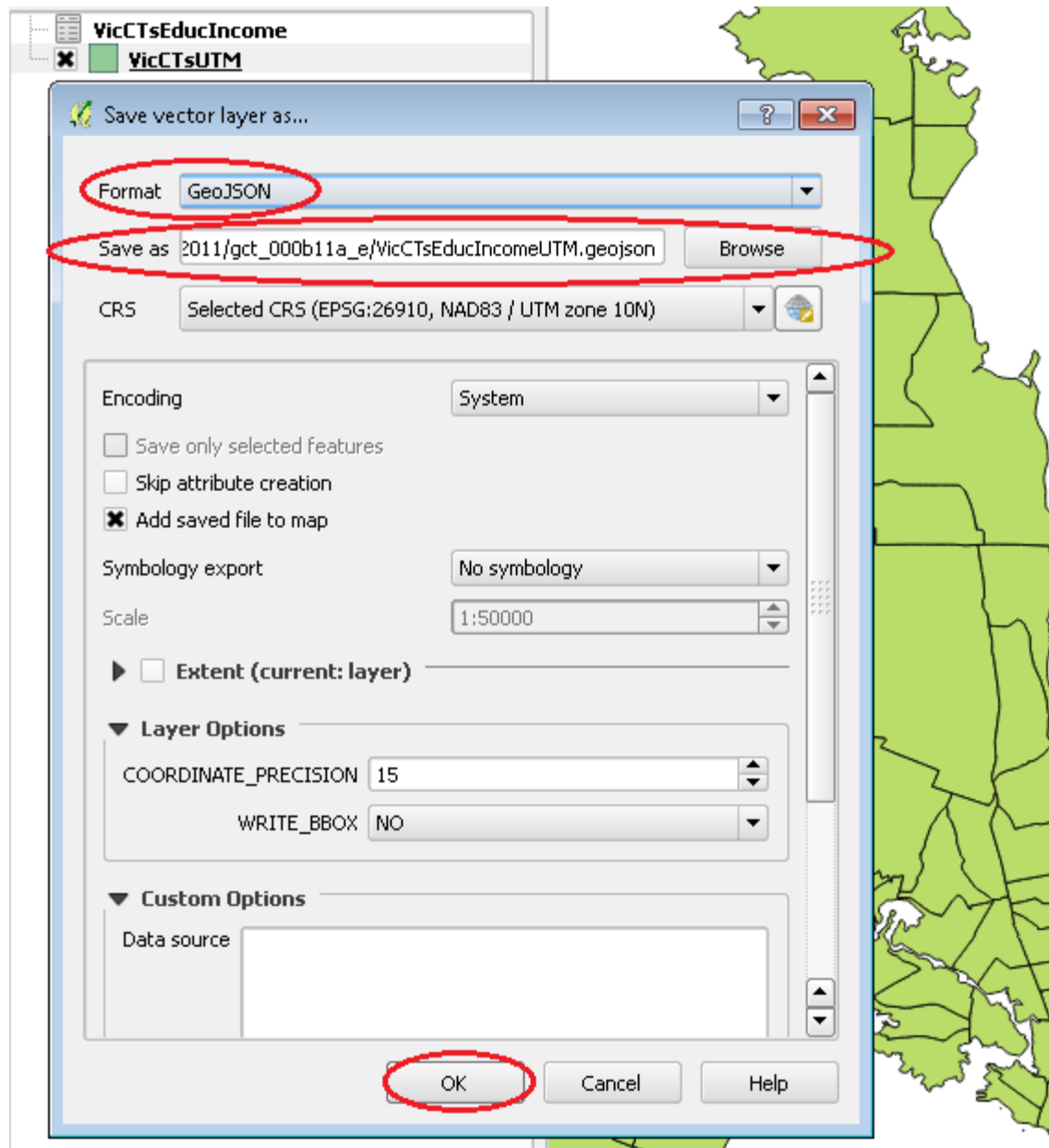
VicCTsEducIncome
VicCTsUTM

Attribute table - VicCTsEducIncome :: Features total: 70, filtered: 70, selected: 0

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1	9350002	2280	1275	55.9	49729
2	9350003.01	3265	1305	40.0	44435
3	9350003.02	3000	1075	35.8	44378
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5	9350005	2040	1005	49.3	59998
6	9350006	1420	725	51.1	73062
7	9350007	3380	1340	39.6	39254
8	9350008	1975	700	35.4	35201
9	9350009	2320	730	31.5	49134
10	9350010	4910	1850	37.7	34580
11	9350011	4275	1510	35.3	60298
12	9350012	3060	635	20.8	45312

Show All Features

and saved as GeoJson...well...



- **change pop-up field titles to friendly terms**

- **change legend terms**

67

remember GeoJson(s)?

.shp versus...

NULNUL' NULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULSOHieèETXNULNULENQNULNULNULxiÔÒÀEMANê@>aitAcq]`ûE[GSai!<q`TANULNUL NULSOHNULNULEOTÀENQNULNULNULR8ó/ FSANULnç-[vTAemúxâ4FSA^ŽL'EwTaSOHNULNULNUL•NULNULNULNULNULNULNULDC2 ĩBİ4FSA~ENQ#''évTA0DC3EOTëÄ4FSAH NARSAvTAemúxâ4FSAÉGS=DLBÄvTA9^óüç4FSASFyû£vTAuißë#4FSAxKâ"@vTAÝæSTXA""FSAøND SYN«vTA>J';Œ,FSA:çæ vTAUØRSİİ! FSA+Èèò'vTAÊpz00[FSAñ{SYN«vTAİtlzvµFSAĀ:;...fvTAsw|žâ°FSA'|ETB SovTAE,ñái°FSAžE:šnvTAëû*a°FSA@'ÂGSi vTAÝRSø,'²FSAIGU'^vTAIĀACKRh²FSABEB[q!]vTAİ -,O²FSAôÿRSİİ\ vTAW£CAN'û±FSANULnç-[vTAUçP=Z±FSAn^o^[vTAGSUB'óc-FSADC4ü'McvTAE METEC7=@FSAP6>AhvTA'šYšZ-FSAPI™vkvTAð66FS_DC2-FSA`ábVTkvTADy °δ-FSAÆj,okvTA4gç-δ-FSA+'7īlvTA)hīŪW«FSAiz[δqvTA ESC-ÀÜª(FSAÍ)|svTAîrŽiÖªFSADC3Q,^svTA%êEBEL©OFSAEZ,VtwvTAaâ%-ÉSFSA,NULà;xvTA¾3Ö>d!(FSARSİđiyvTA58v)ETB£FSAÛæ8úwvTAŽlK#DC3£FSA^ç'ôwvTarACKo ACKREM=FSAVSİBS[uTvTAİ1éðç£FSAçÙ)ÖtvTA,JôqçFSABSTâqvTAK,...C1çFSAixENQqvTA1^øFRSçFSA†FŚİpvTA>*_"RS;FSA5USepvTA9™8]&FSA«mçRSpvTAj'\[BOTFS İÓ!SIpvTADCL1US™SUBŽFSAHYDénvTAòxFSNARSOFSACeİáİjvTA*VTB¾,FSAA,,PzfvTANUL'8Óx™FSA»ĂzrbvTAÖ#İa™FSA†SUBANULtvTAA5†é™FSA SYNFSçñ|vTAİĖNT%-FS SYNUvpzvTAİpYvñ-FSA\$ONw,vTAŁŮETB^h-FSA9¥•J™vTAø„bBS -FSA™BELÉœevTASİùDC1è-FSA'a/ĂšvTawCö

GeoJson (!)

```
var json_MedianHouseholdIncome={"type":"FeatureCollection","crs":{"type":"name","properties":{"name":"urn:ogc:def:crs:OGC:1.3:CRS84"}},  
"features":[{"type":"Feature","properties":{"MedianIncome":47096.000000,"CTUID2":9350111.010000},"geometry":{"type":"MultiPolygon",  
"coordinates":[[[[-123.394283,48.434287],[-123.39431,48.432946],[-123.3942,48.432937],[-123.394291,48.431782],[-123.394847,48.431975],[-  
123.395336,48.432034],[-123.39781,48.431649],[-123.399348,48.431147],[-123.399987,48.430867],[-123.400613,48.430592],[-123.401972,48.429873]  
],[-123.402042,48.429835],[-123.402406,48.429636],[-123.403106,48.429254],[-123.403246,48.429202],[-123.403329,48.429171],[-123.403612,  
48.42913],[-123.404293,48.429141],[-123.405857,48.429415],[-123.406855,48.429589],[-123.407757,48.429701],[-123.407866,48.429686],[-  
123.40798,48.4297],[-123.407963,48.429753],[-123.409363,48.429929],[-123.40979,48.429983],[-123.409803,48.429985],[-123.410821,48.430107],[-  
123.412441,48.430159],[-123.413649,48.430196],[-123.414774,48.430127],[-123.414788,48.430126],[-123.415633,48.430029],[-123.415798,48.43001  
],[-123.416958,48.429895],[-123.41728,48.429886],[-123.417342,48.429864],[-123.418209,48.429841],[-123.419046,48.429829],[-123.419161,  
48.429826],[-123.420392,48.429776],[-123.421722,48.429628],[-123.423057,48.429473],[-123.424499,48.429316],[-123.424464,48.429948],[-  
123.424447,48.43027],[-123.426839,48.430171],[-123.427017,48.430459],[-123.427485,48.431099],[-123.4273,48.431386],[-123.427056,48.431334  
],[-123.426909,48.431523],[-123.426572,48.431614],[-123.426306,48.431956],[-123.426416,48.432208],[-123.426092,48.432479],[-123.425188,  
48.432681],[-123.42529,48.432796],[-123.425172,48.432899],[-123.426397,48.433679],[-123.426644,48.433836],[-123.426518,48.433934],[-  
123.425972,48.43359],[-123.424997,48.432974],[-123.424774,48.433054],[-123.424471,48.432762],[-123.42442,48.43278],[-123.424284,48.432828  
],[-123.425376,48.434011],[-123.42399,48.433279],[-123.423883,48.433352],[-123.423475,48.433137],[-123.423596,48.433047],[-123.423336,  
48.43257],[-123.422836,48.432662],[-123.42239,48.43261],[-123.4222,48.432476],[-123.422171,48.432251],[-123.422021,48.432188],[-123.421144,  
48.432453],[-123.420415,48.432573],[-123.42025,48.433805],[-123.420346,48.433931],[-123.420874,48.433983],[-123.421481,48.433873],[-  
123.422158,48.433916],[-123.422579,48.434121],[-123.423268,48.434253],[-123.42342,48.434495],[-123.42392,48.434701],[-123.423991,48.434898  
],[-123.42387,48.435088],[-123.42352,48.435161],[-123.423422,48.434954],[-123.423328,48.434945],[-123.422859,48.435326],[-123.422888,
```


How?

- html5

- css

Link to .css from the web:

```
<link rel="stylesheet" href = "http://cdn.leafletjs.com/leaflet-0.7.3/leaflet.css"/>
```

OR

Download to some computer directory and link:

```
<link rel="stylesheet" href = "SomeLocalComputer/C_drive/leaflet-0.7.3/leaflet.css"/>
```

- javascript

Link to .js from the web:

```
<script src = "http://leafletjs.com/dist/leaflet.js"></script>
```

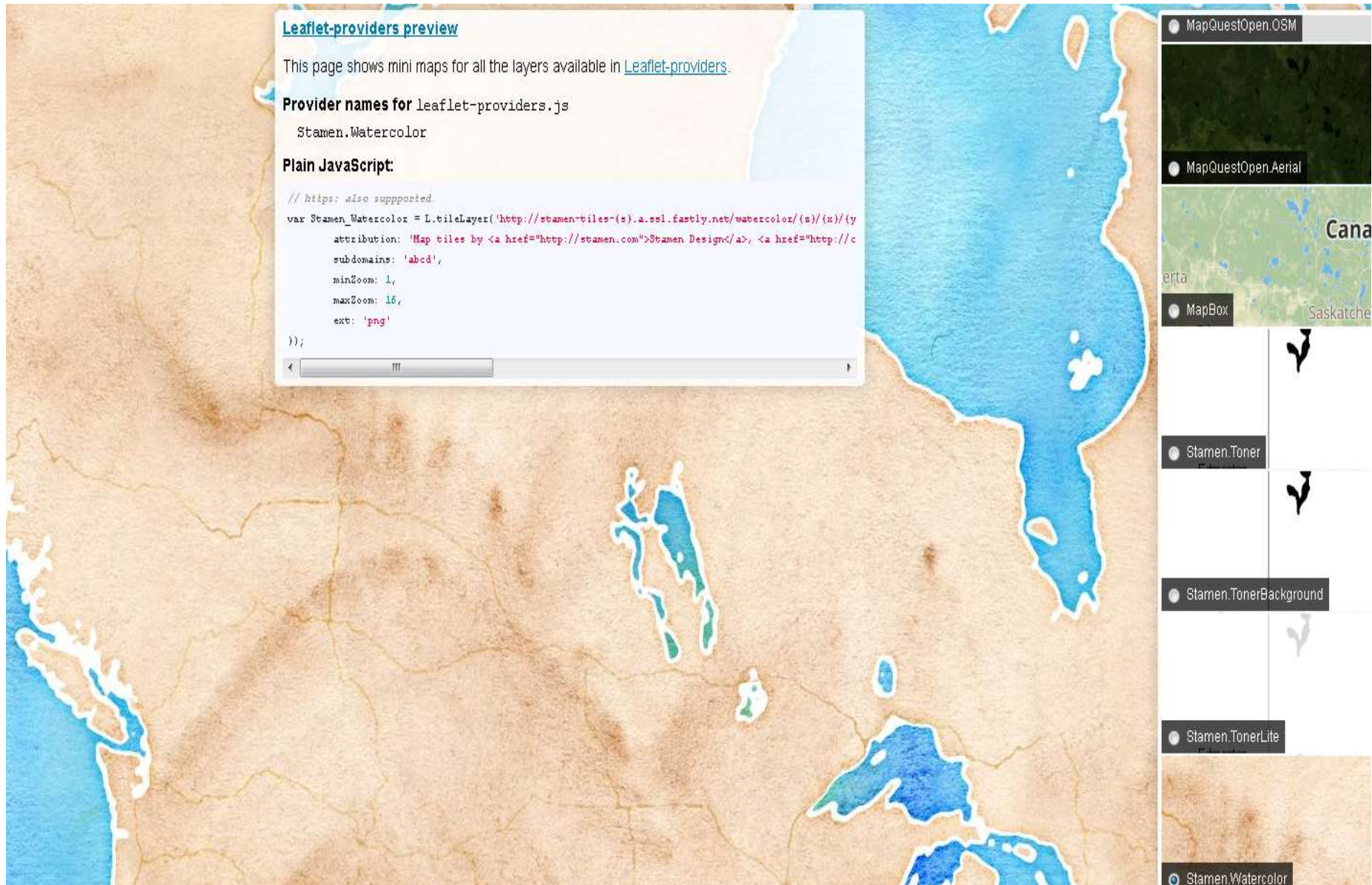
```
<script src = "https://api.tiles.mapbox.com/mapbox.js/v2.1.6/mapbox.js" ></script>
```

OR

Download to some computer directory and link:

```
<script src = "SomeLocalComputer/C_drive/Folder/leaflet.js"></script>
```

30+ Basemap(s)



The screenshot displays the 'Leaflet-providers preview' page. The main map area shows a watercolor-style map of the Pacific Northwest. A code overlay on the left provides the JavaScript code for the Stamen Watercolor provider. On the right, a sidebar lists various map providers with their corresponding map thumbnails. The providers listed are MapQuestOpen.OSM, MapQuestOpen.Aerial, MapBox, Stamen.Toner, Stamen.TonerBackground, Stamen.TonerLite, and Stamen.Watercolor (which is selected).

[Leaflet-providers preview](#)

This page shows mini maps for all the layers available in [Leaflet-providers](#).

Provider names for leaflet-providers.js

Stamen.Watercolor

Plain JavaScript:

```
// https: also supported.  
var Stamen_Watercolor = L.tileLayer('http://stamen-tiles-{s}.a.ssl.fastly.net/watercolor/{z}/{x}/{y}{ext}',  
  { attribution: 'Map tiles by Stamen Design, CC BY 3.0 &mdash;  
    subdomains: 'abcd',  
    minZoom: 1,  
    maxZoom: 16,  
    ext: 'png'  
  });
```

MapQuestOpen.OSM

MapQuestOpen.Aerial

MapBox

Stamen.Toner

Stamen.TonerBackground

Stamen.TonerLite

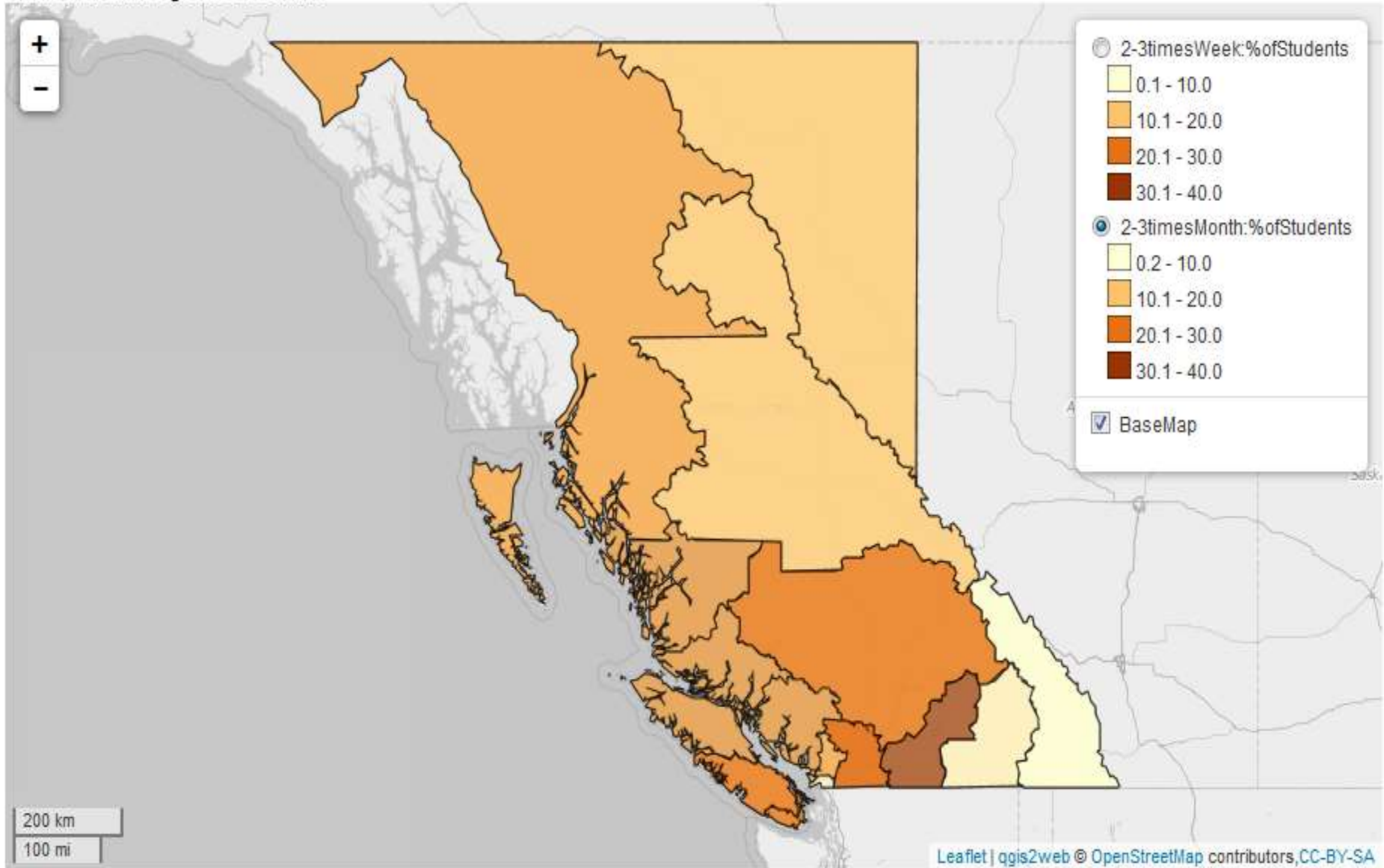
Stamen.Watercolor

```
var Stamen_Watercolor = L.tileLayer('http://stamen-tiles-{s}.a.ssl.fastly.net/watercolor/{z}/{x}/{y}.{ext}',  
{ attribution: 'Map tiles by Stamen Design, CC BY 3.0 &mdash;  
  Map data &copy; OpenStreetMap'
```

other changes and maps possible with some code...

BC high school, college, university students and frequency of alcohol use per week and month

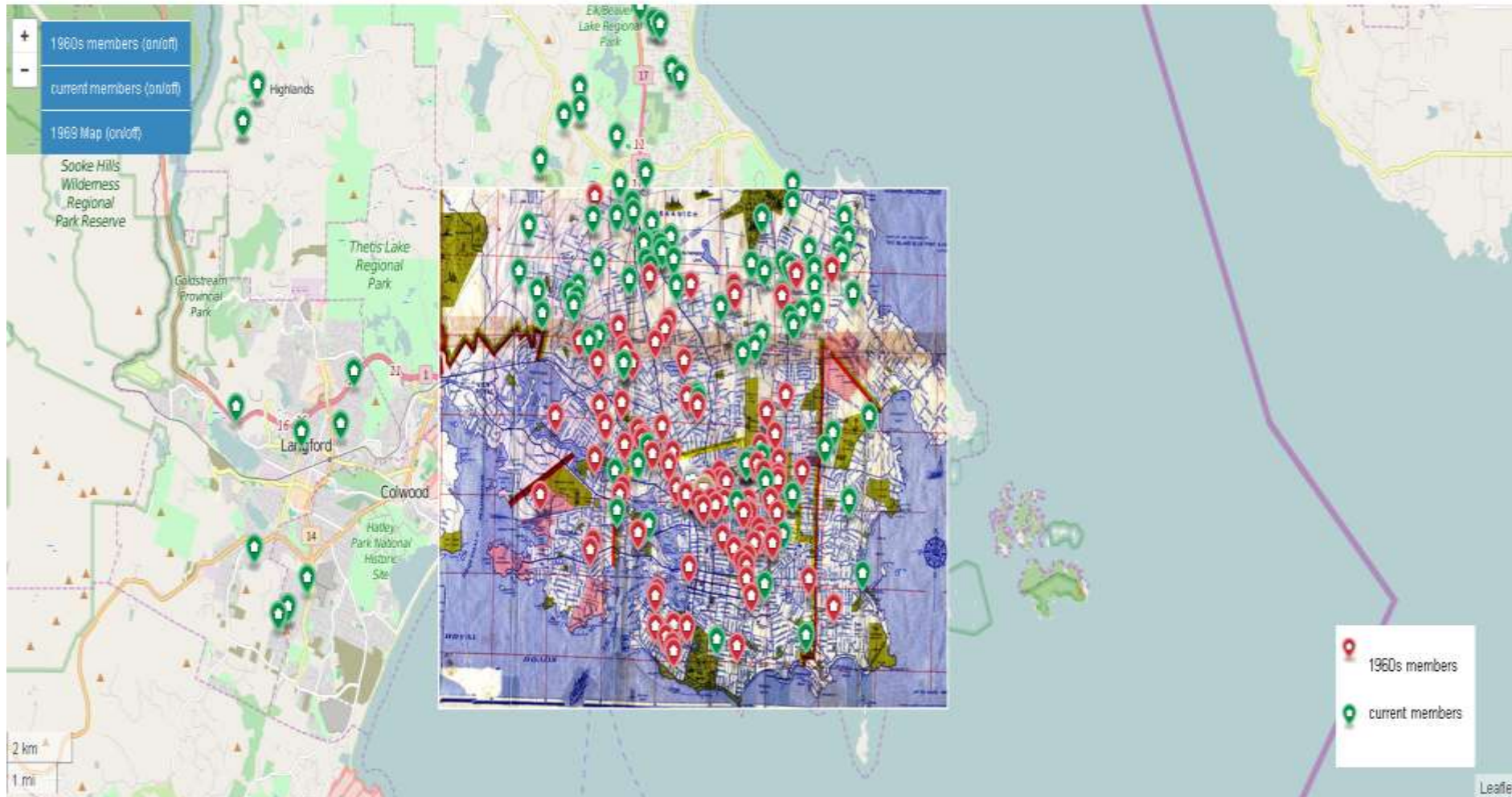
Click on health regions for details.



other changes and maps possible with some code...

Victoria's Da Vinci Italian Cultural Centre: 1960s and current members

(Zoom to the original Italian Cultural Centre location formerly at [803 Kings Rd at Rose/Blanshard](#) on the 1969 map.)



Considerations

- **utilize (open-source) JavaScript libraries to create web maps with custom features**
- (OR**
- **utilize web map providers with standard features)**
-
- **host and serve our maps ourselves**
- OR**
- **upload “our” maps to US server or cloud**
-
- **need to build for mouse and touch screens**

Data Libraries have amazing resources...

- Can web maps highlight our data collections?



- Web maps: “hot like chicken s**t”
- Web maps: necessary geovisualisations in today’s digital world?