

Create Custom Map with *QGIS* Print Layout



EXERCISE

Understand QGIS interface



*your interface may look different

Menu Bar

Toolbar

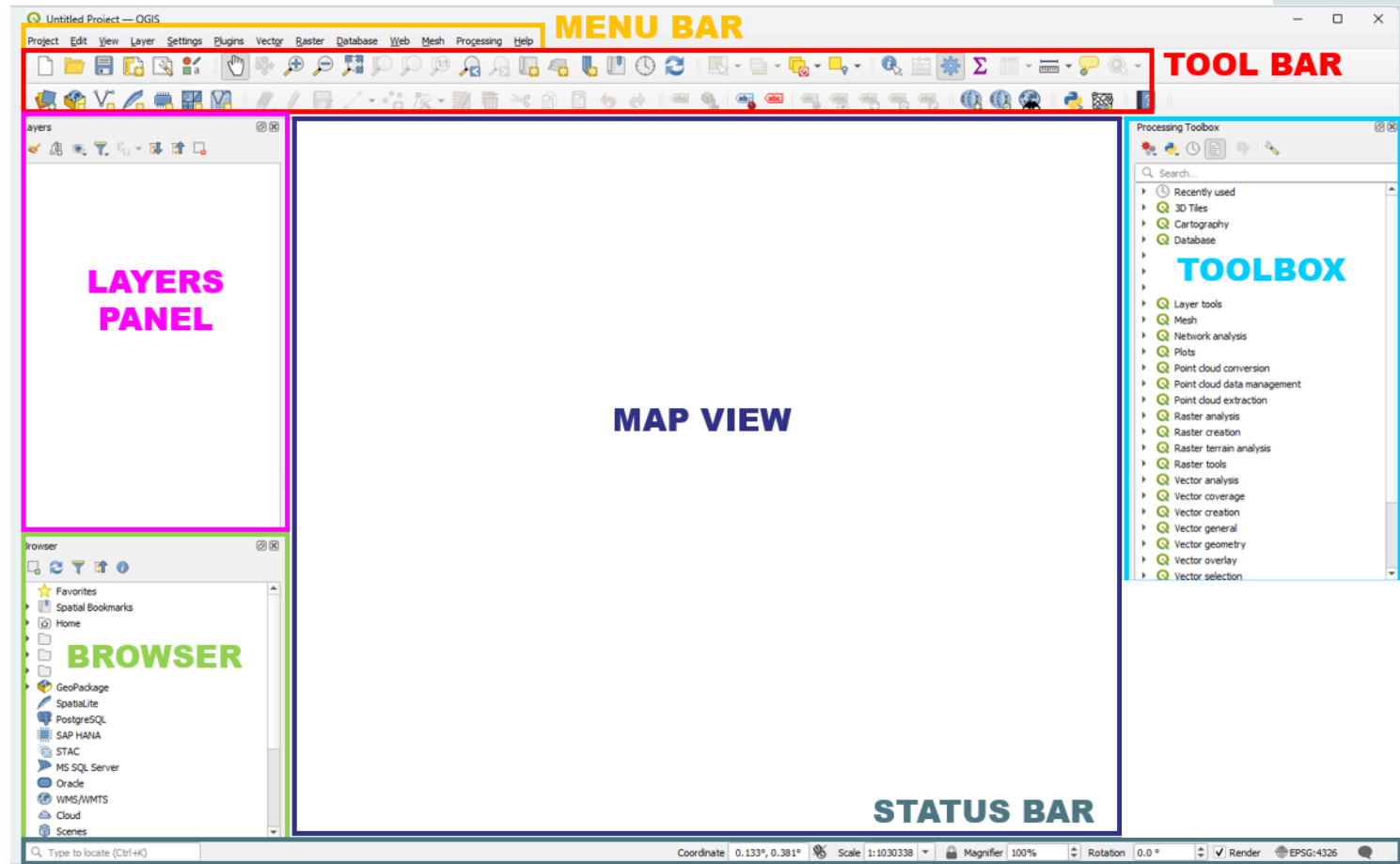
Layers Panel

Browser

Map View

Status Bar

Toolbox



Understand *QGIS* interface

Menu Bar: Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh HCMGIS Processing Help

Horizontal bar at top provides access to various functions and tools

(Project management, Edit, Plugins, Vector & Raster tools, etc.)

Toolbar: 

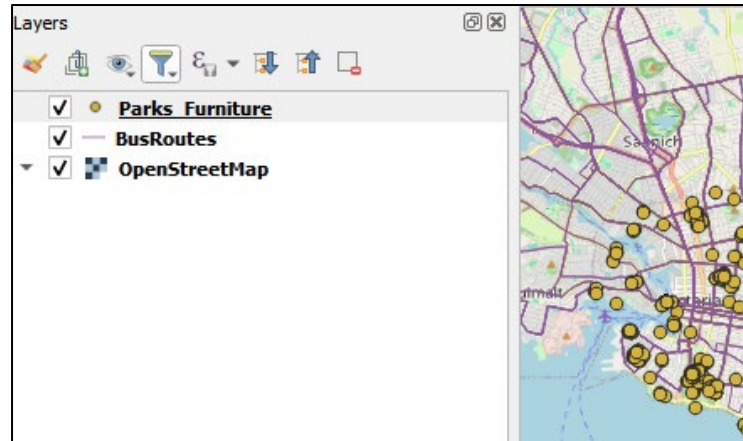
Contains icons for frequently used tools, such as Add Data, Pan, Zoom, Identify, etc.

Quick access to essential operations.

Layers Panel:

Displays all active **Layers** in the project.

Allows users to organize, manage visibility and access properties of layers



Understand *QGIS* interface

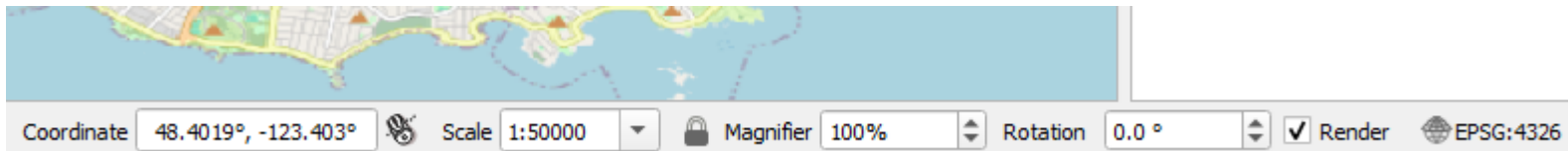
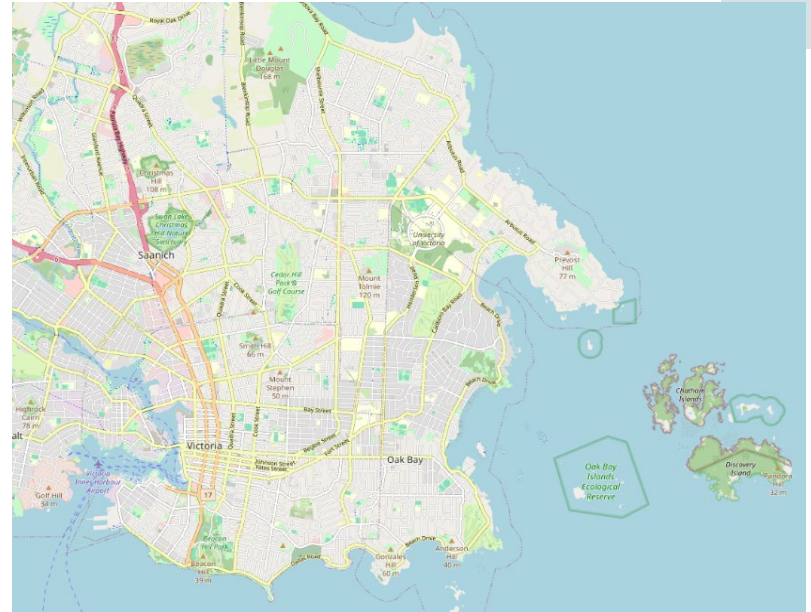
Map View:

The central area where spatial data is displayed.

Users can interact with the map, visualize layers and analyze spatial relationships.

Status Bar:

Located at the bottom, it provides information about current project: coordinate display, scale and CRS settings.

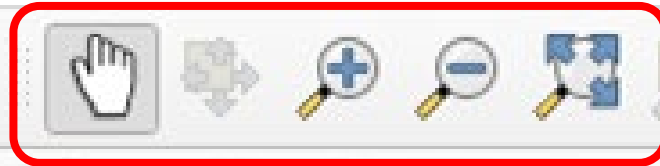


Toolbar essentials

New project, open, and save



Pan



zoom

“zoom full”



Add data

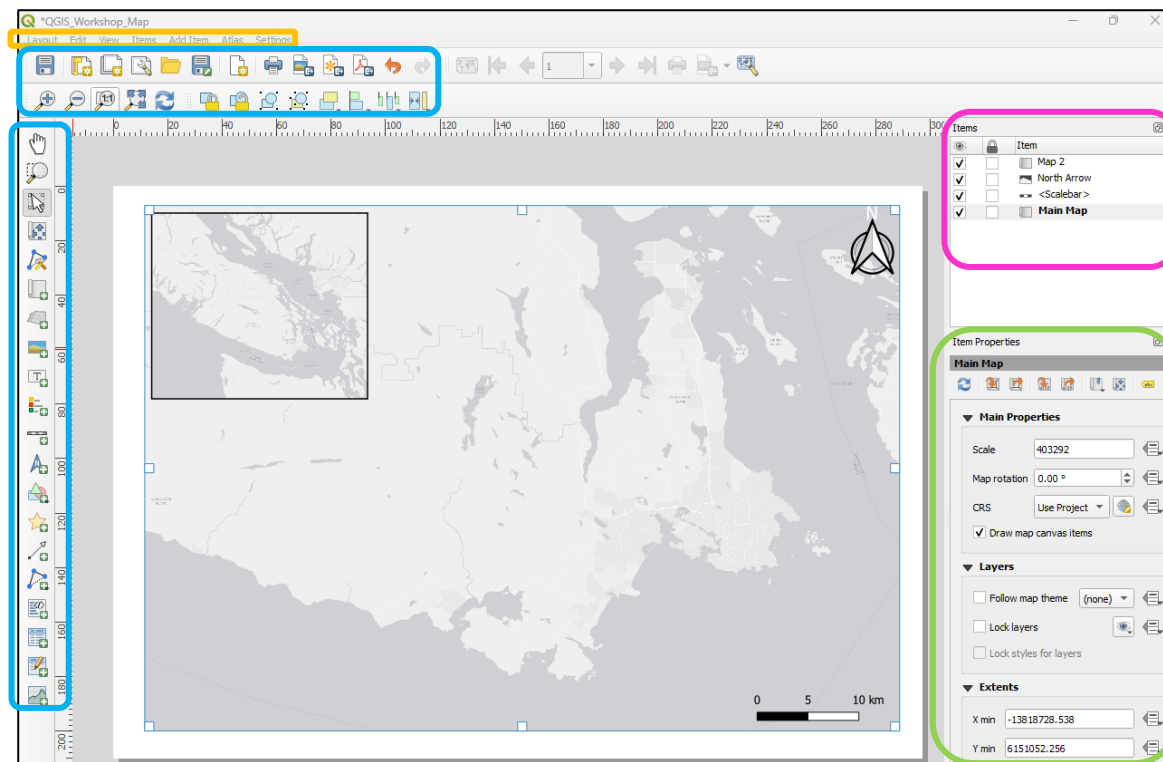
Print Layout interface

Menu Bar: Layout (save, templates, export, etc.), Add Item, Settings, etc.

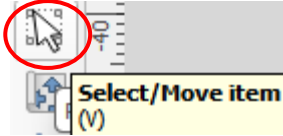
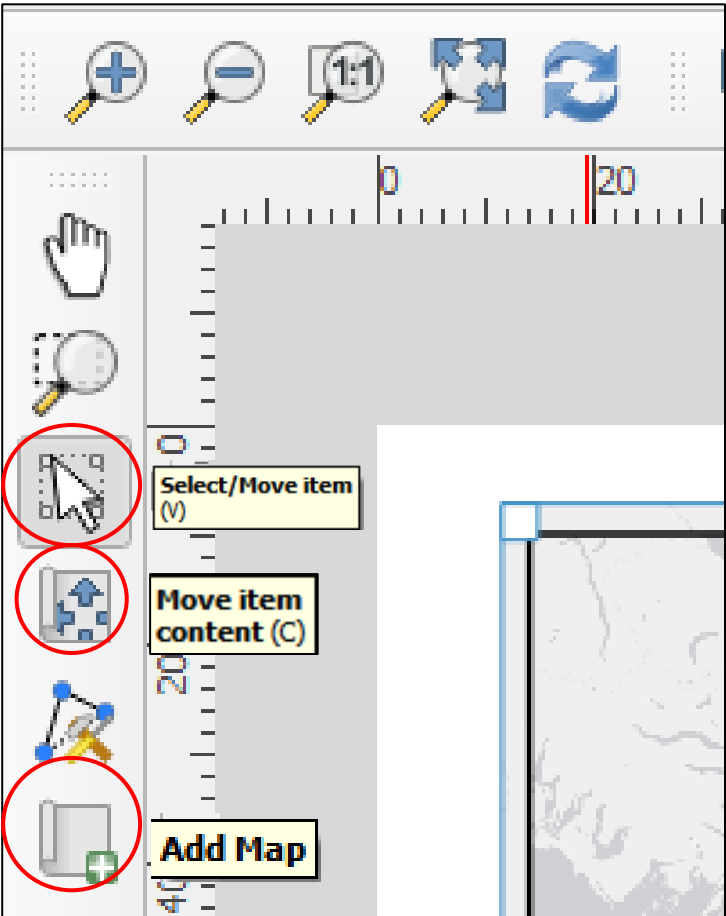
Toolbar(s): essential tools - save, open, export, zoom, add items, select/move item, etc.

Item Panel: items on the map – toggle on and off, lock item, change item name, rearrange items
select item from the *Item Panel* to see its properties

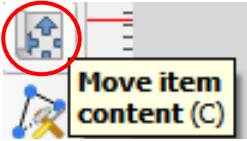
Item Properties: properties of selected item— many options for changing scales, fonts,, borders/frames, units, etc.



Print Layout interface: tools



Select/Move Item: move items in the print layout, opens the selected items' *Item Properties*



Move Item Content: move the map itself



Add map to print layout:
click and drag to draw map on white canvas

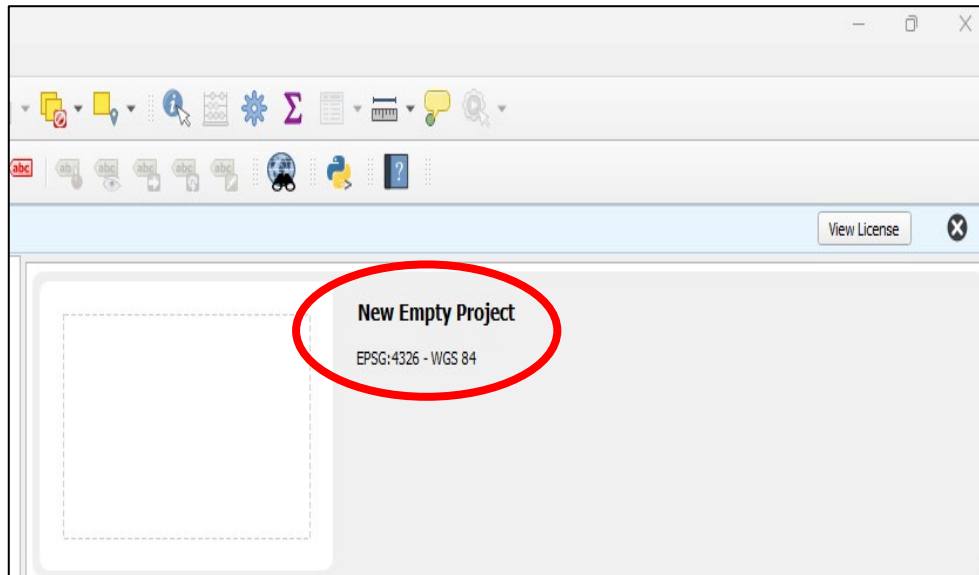
Start *QGIS* (if you haven't already)

Download workshop data

- Extract /unzip the .zip file
- Save it where you can find it...

Open *QGIS* (your version may be different)

- Double click on *New Empty Project*

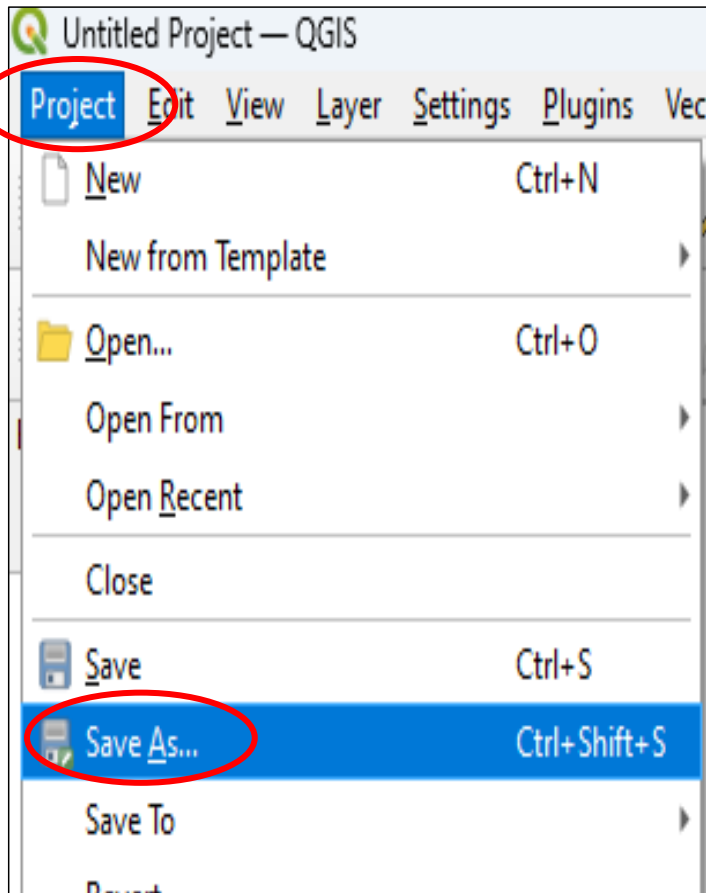


Note: New *QGIS* projects open with Geographic Coordinate System (GCS) **EPSG:4326**

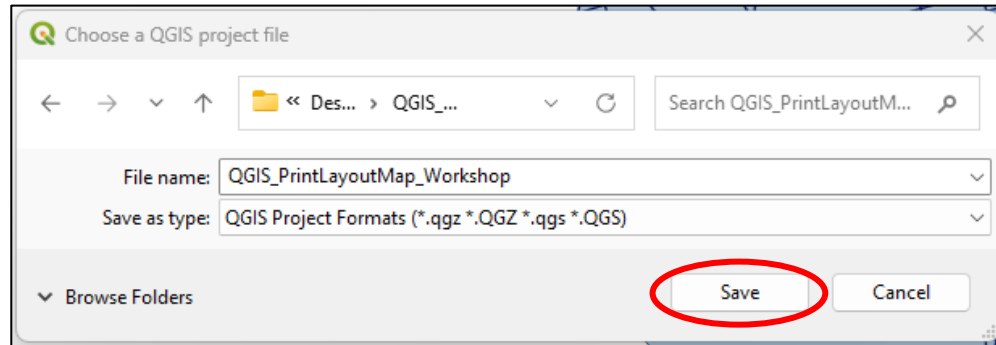
Activity #1



Save new project

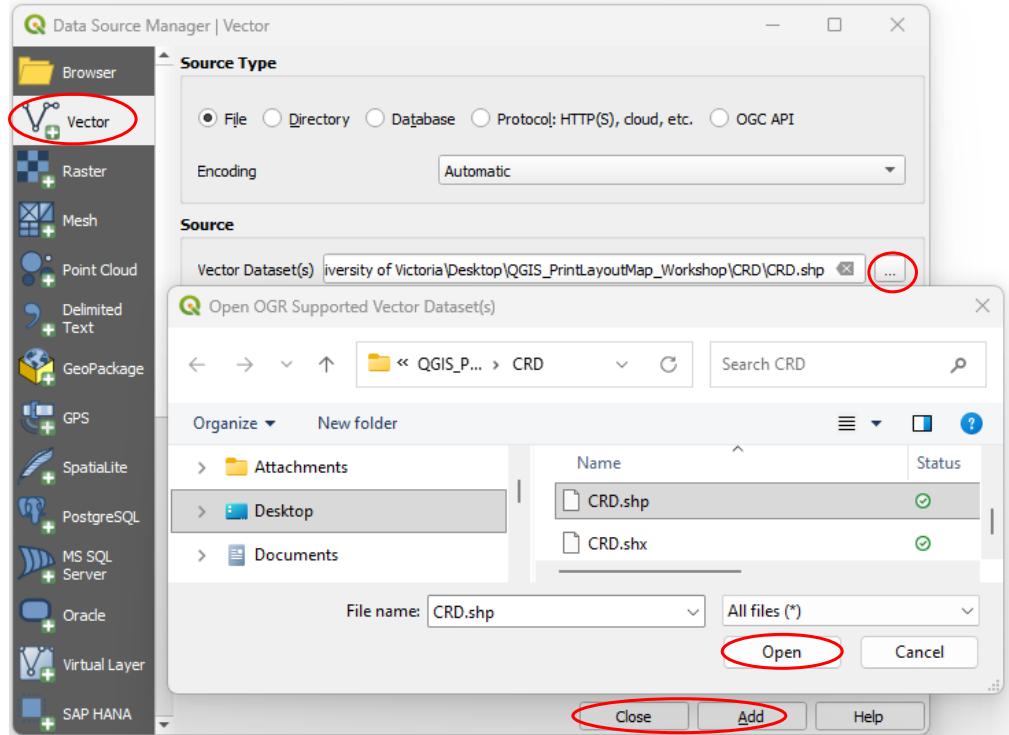
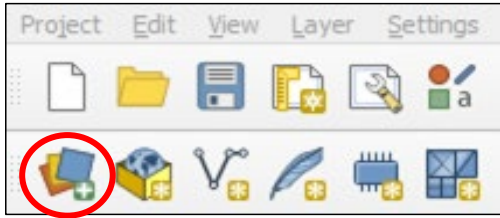




- In *QGIS* Menu Bar, select *Project* then *Save As*
- Name your project “**QGIS_PrintLayoutMap_Workshop**”
- Save your project as **.qgz** to where you can find it



Note: .qgz is the project file format for *QGIS*

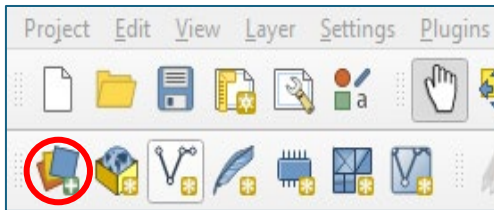
Add CRD polygon shapefile



- Select *Open Data Source Manager* 
- Select the *Vector* tab
- Under the *Source* heading click the 
- Navigate to workshop data
- Select **CRD.shp**, Open
- **Add and Close**

Add TouristAttractions.csv

- Open *Data Source Manager*



- Select *Delimited Text*
- Navigate to workshop data
- Select and Open **TouristAttractions.csv**

- Set X field as “Long”
and Y field as “Lat”
- **Add** (if a warning pops up, press OK)
then **Close**

The screenshot shows the 'Data Source Manager | Delimited Text' dialog box. The file name is 'e - University of Victoria\Desktop\QGIS_PrintLayoutMap_Workshop\TouristAttractions.csv'. The layer name is 'TouristAttractions' and the encoding is 'UTF-8'. The 'File Format' section has 'CSV (comma separated values)' selected. The 'Record and Fields Options' section is expanded. The 'Geometry Definition' section has 'Point coordinates' selected, with the X field set to 'Long' and the Y field set to 'Lat'. The 'Layer Settings' section is expanded, showing 'Sample Data' with a table of 3 rows. A note says 'Note: need EPSG 4326'. The 'Close' and 'Add' buttons are circled in red.

File name: e - University of Victoria\Desktop\QGIS_PrintLayoutMap_Workshop\TouristAttractions.csv

Layer name: TouristAttractions Encoding: UTF-8

File Format

- CSV (comma separated values)
- Regular expression delimiter
- Custom delimiters

Record and Fields Options

Geometry Definition

- Point coordinates
- Well known text (WKT)
- No geometry (attribute only table)

X field: Long Y field: Lat

DMS coordinates

Geometry CRS: EPSG:4326 - WGS 84

Layer Settings

Sample Data

	Name	Lat	Long
	abc Text (string)	1.2 Decimal (double)	1.2 Decimal (double)
1	Royal BC Museum	48.41991157	-123.3675242
2	Fisherman's Wharf	48.42278045	-123.3827426
3	Fairmont Empress	48.42199401	-123.3678634

Note: need EPSG 4326

Close Add Help

CHECK IN #1

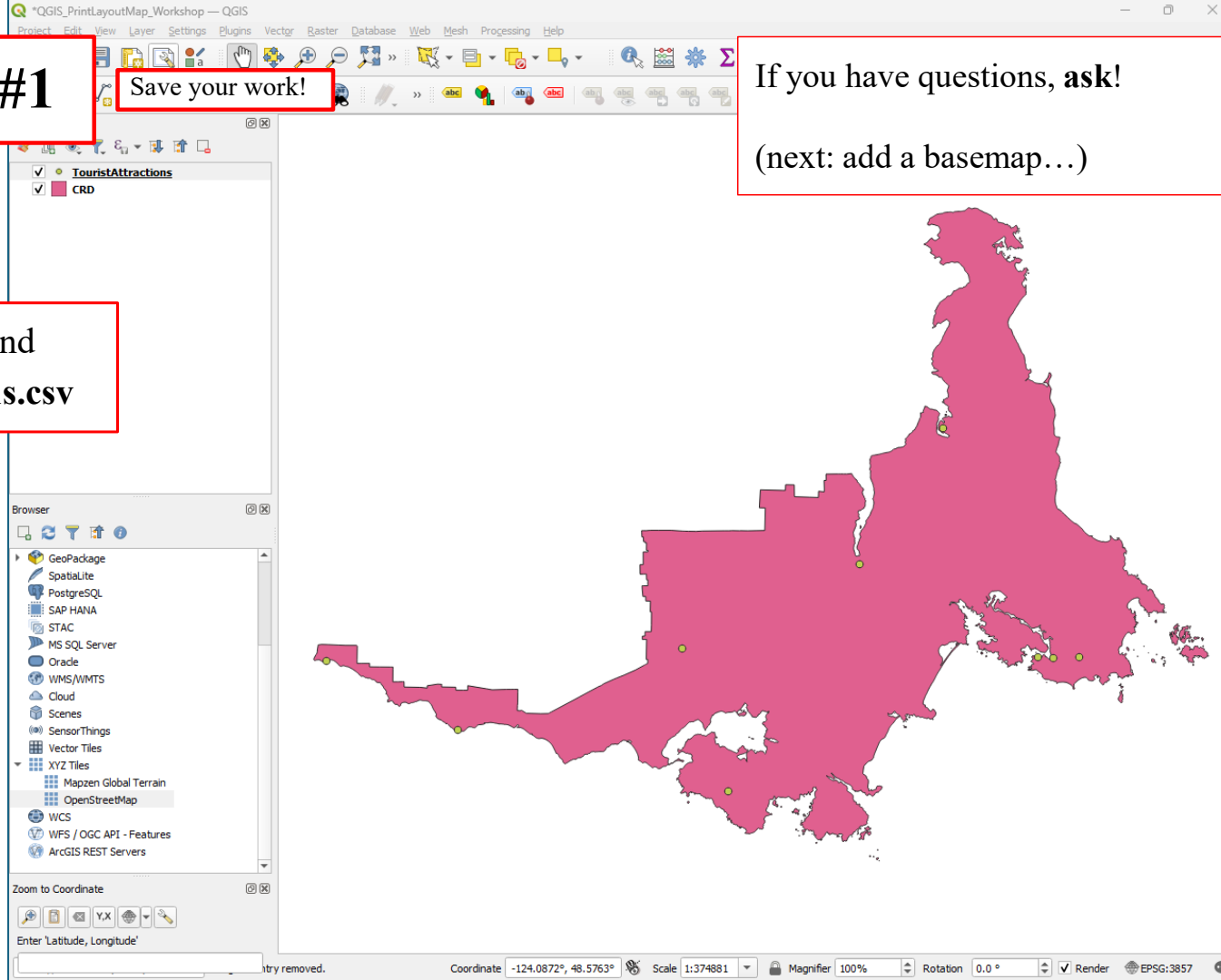
Save your work!

If you have questions, ask!

(next: add a basemap...)

- Added **CRD.shp** and **TouristAttractions.csv**

Note: your colours might be different



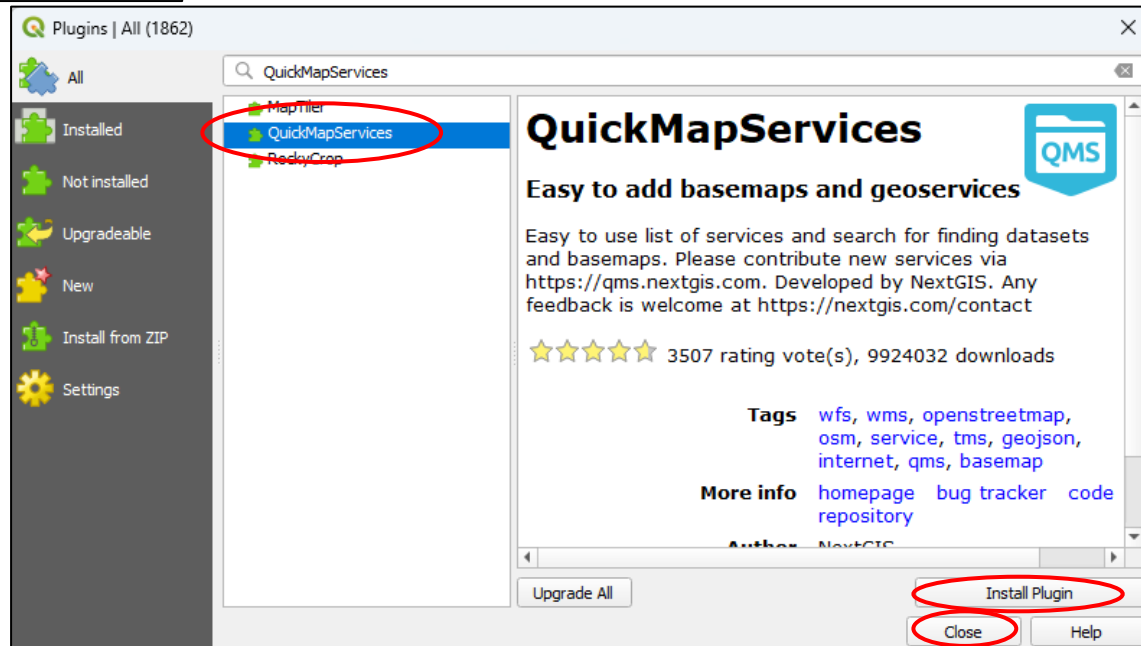
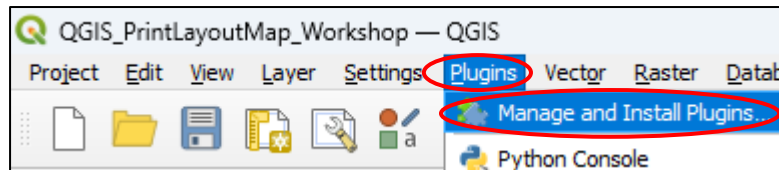
Activity #2



Add *QuickMapServices* plugin

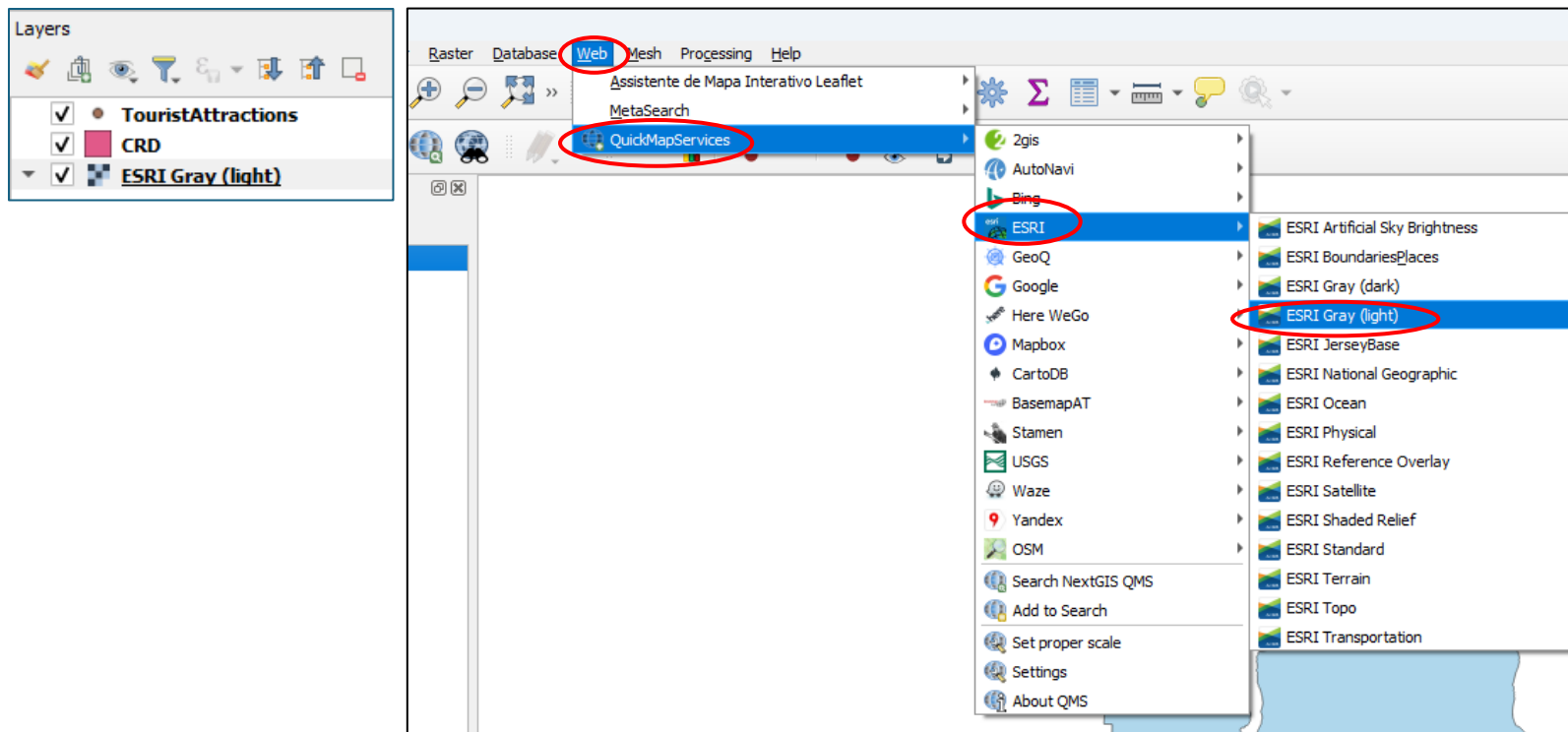
Add a **basemap** for location context; get many basemap options *QuickMapServices*

- In the *Menu* bar, select *Plugins*, then then *Manage and Install Plugin*
- Type “QuickMapServices”, select it, then *Install Plugin* and **close**



Add a basemap

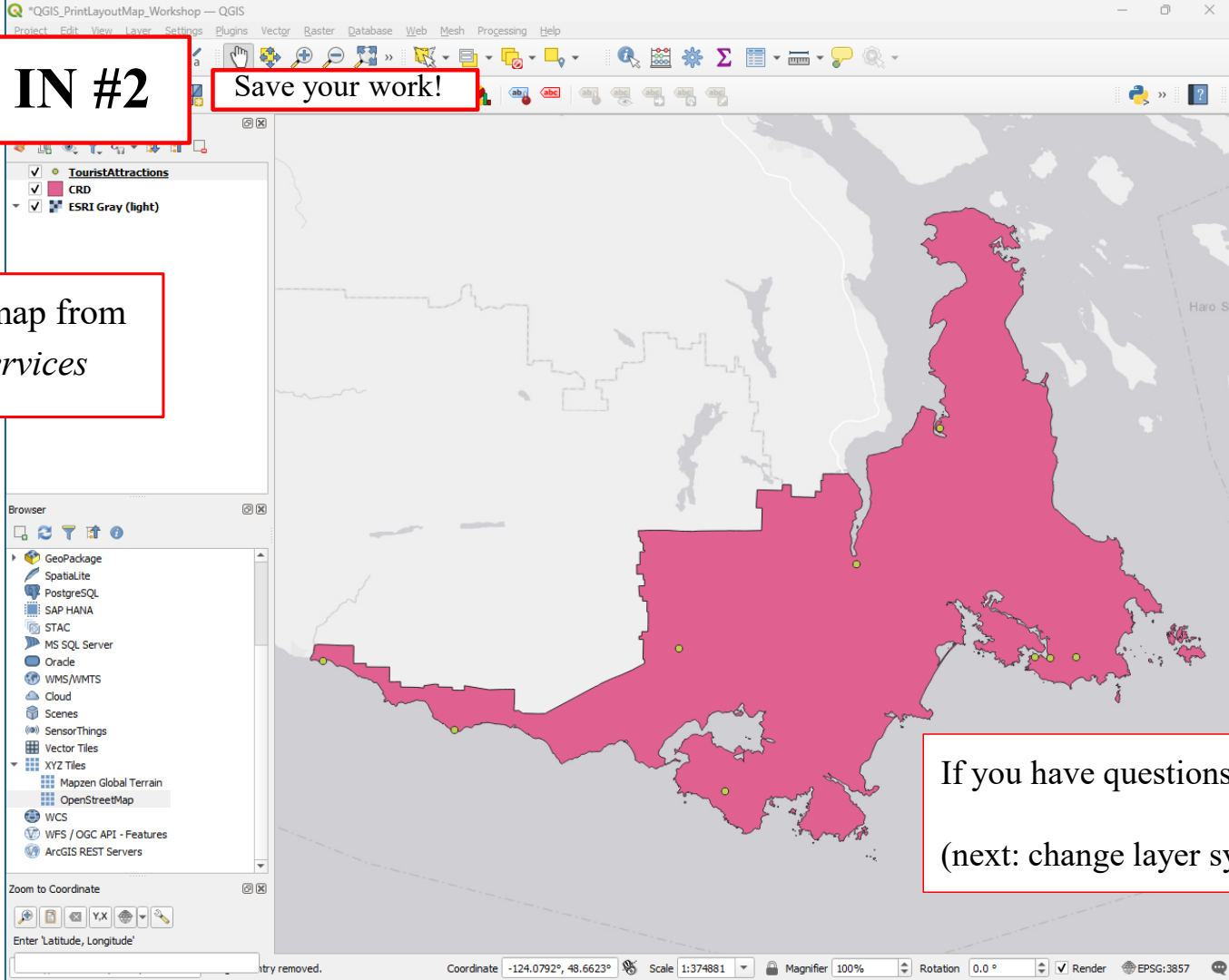
- In the *Menu bar*, select *Web*, then *QuickMapServices*, then *ESRI*, then *ESRI Gray (light)*
 - If you do not see the many map options go to *Web*, then *QuickMapServices*, then *Settings*, and under *More Services*, select *Get contributed pack* and **ok**
- In *Layers*, make sure *ESRI Gray (light)* basemap is below **TouristAttractions** and **CRD**



CHECK IN #2

Save your work!

- Added basemap from *QuickMapServices*



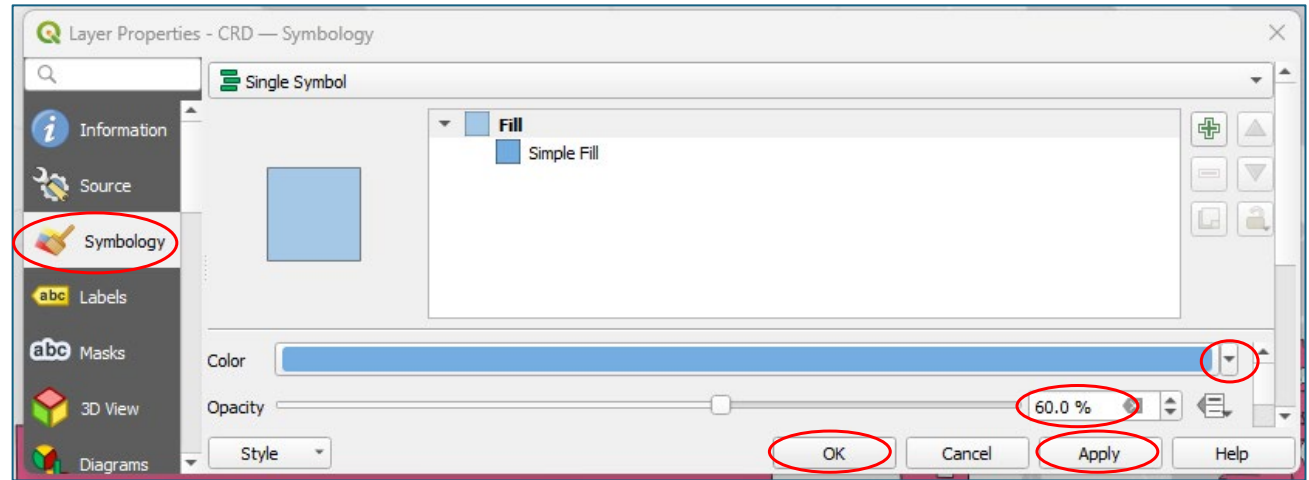
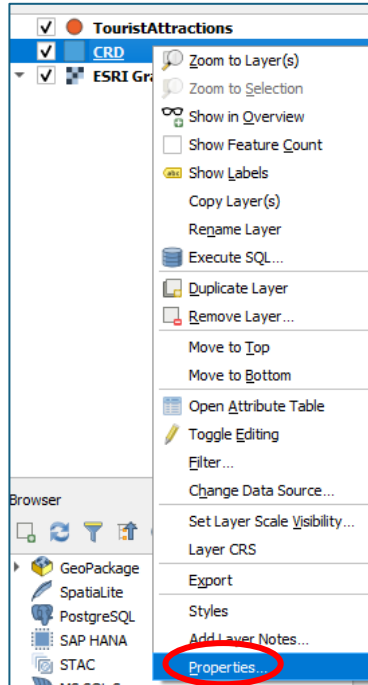
If you have questions, **ask!**
(next: change layer symbology...)

Activity #3



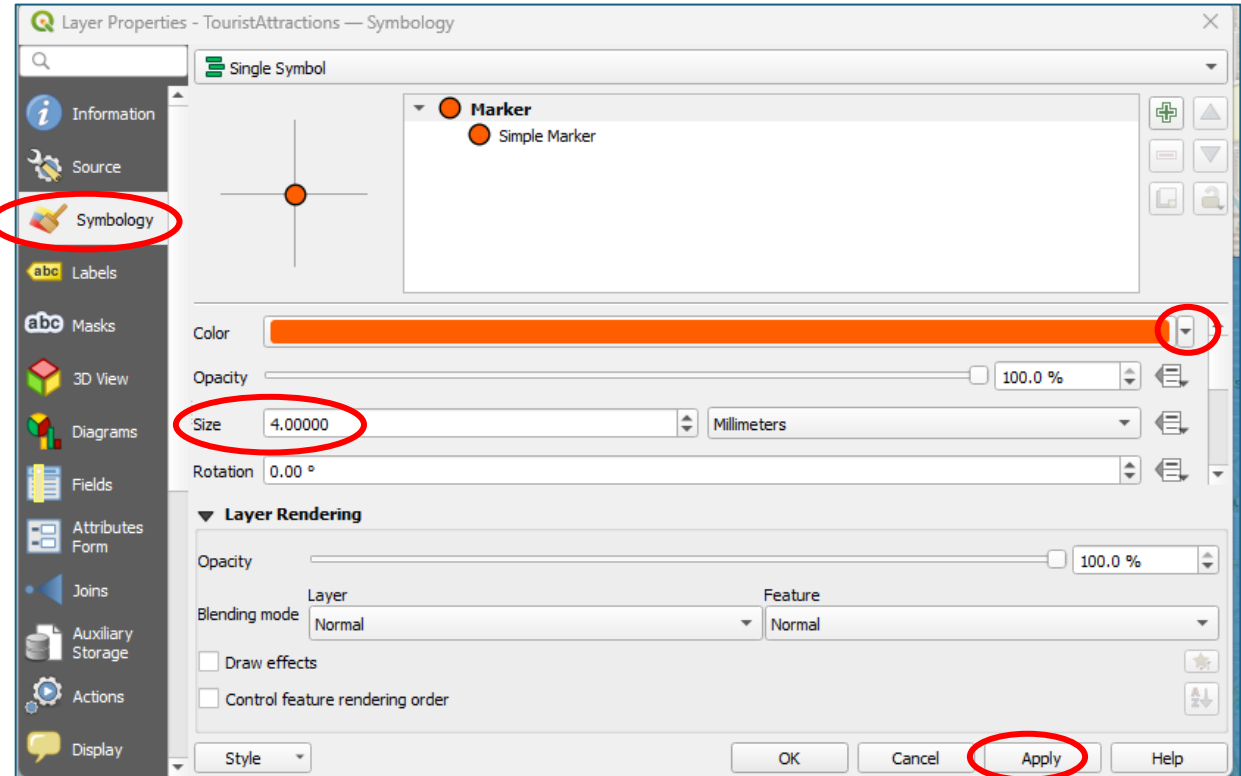
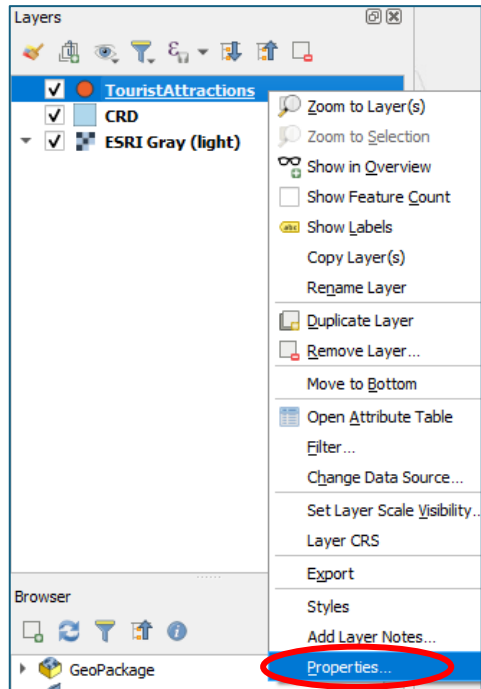
Change CRD.shp symbology

- In the *Layers* panel right click **CRD**
- Select *Properties* and then *Symbology*
- With *Colour* field, click the arrow and use colour palette to select colour of your choice
- Set *Opacity* to 60%
- **Apply** and **OK**



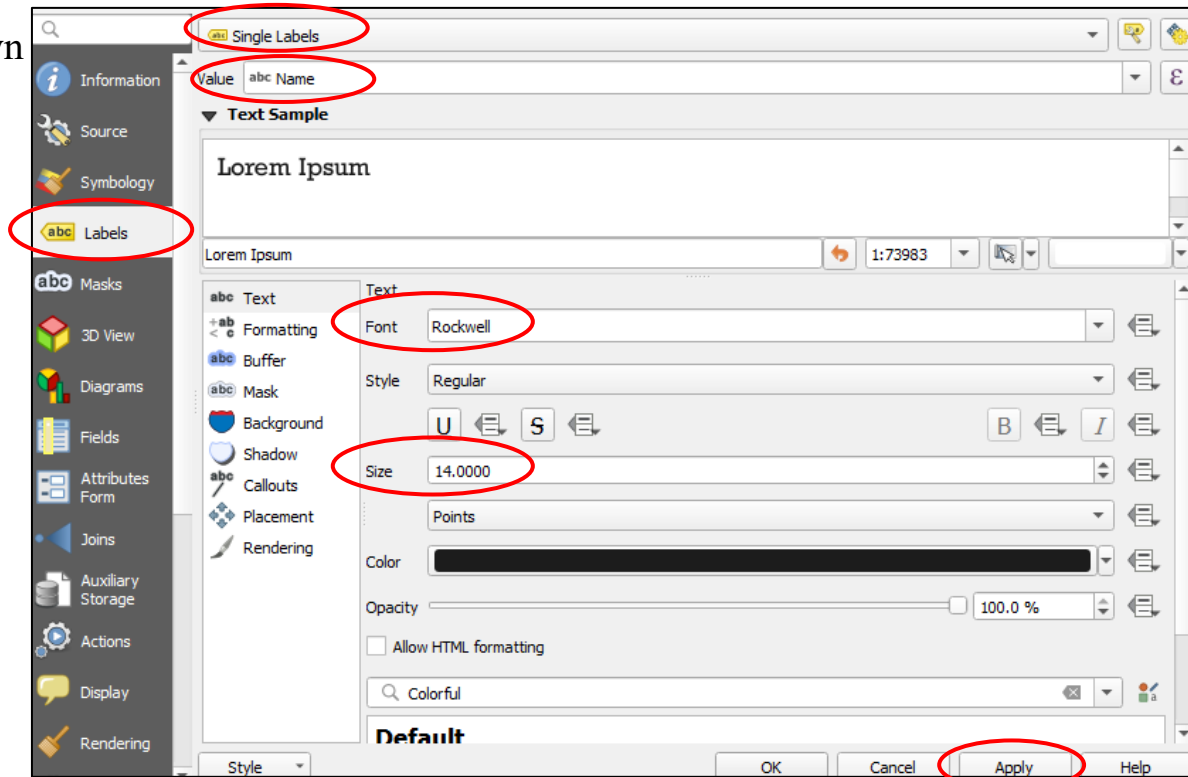
Change TouristAttractions.csv symbology

- In the *Layers* panel right click **TouristAttractions**
- Select *Properties* and then *Symbology*
- Change *Size* to 4.0
- Change *Colour* to a visible colour
- click **Apply** but not OK yet



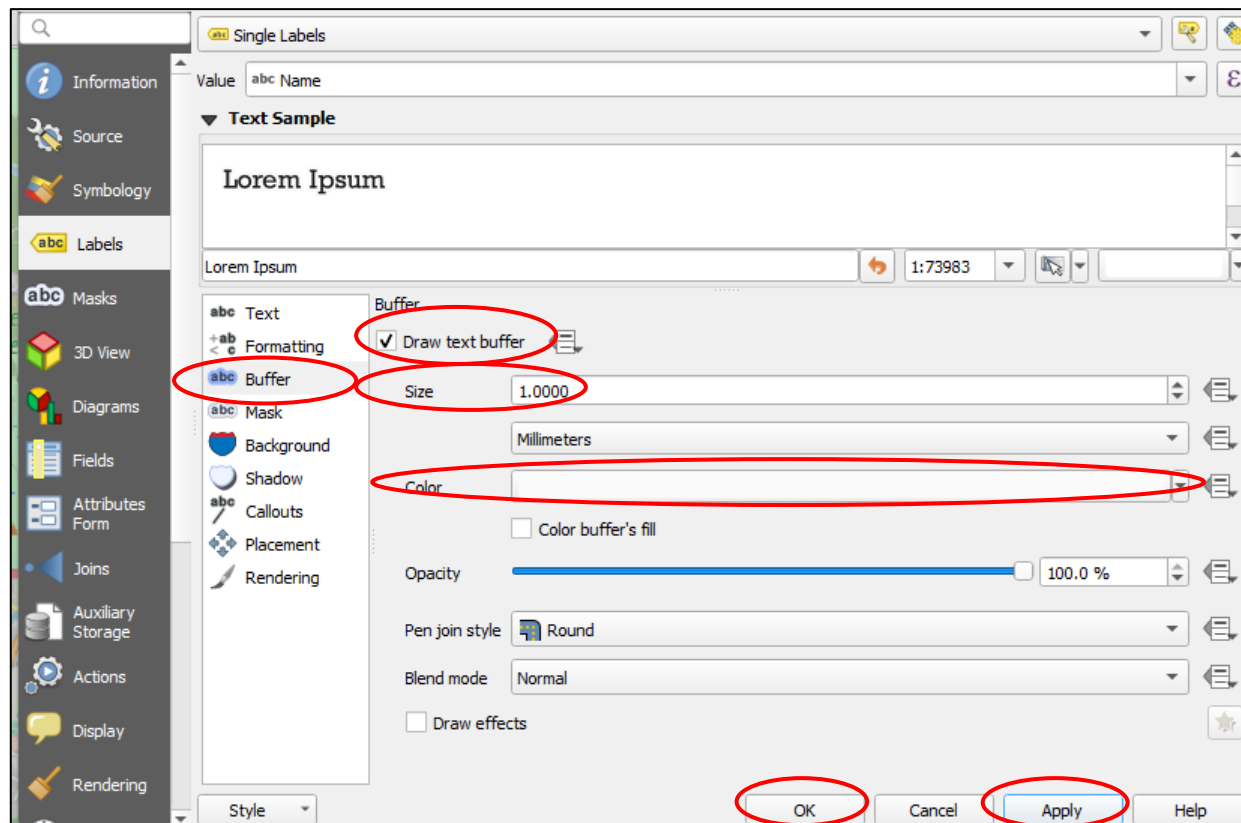
Label TouristAttractions.csv

- While still in *Properties*, select *Labels* tab
- Select “Single Labels” from the drop-down
- *Value* should be “Name”
- Change *Font* and *Size* if desired
- *Colour* should be black
- **Apply** but not OK yet



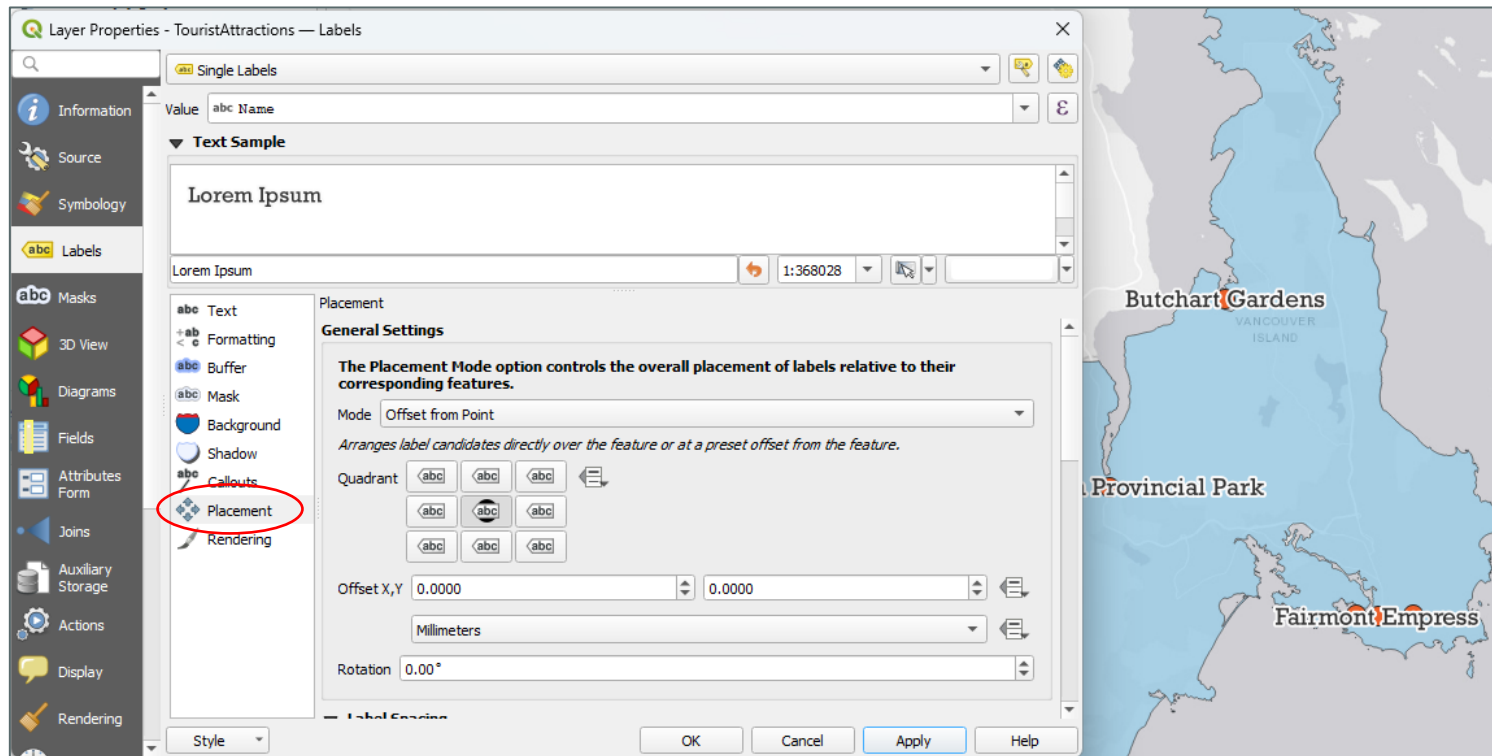
Buffer labels (for Locations.csv)

- While still in *Labels*, select “Buffer”
- Check “Draw text buffer” box
- *Size* 1.0 and *Colour* white
- **Apply** and **OK**



can also change *Placement* of Labels to be offset from points,
have Labels stacked instead of a long string, change location of labels...etc...

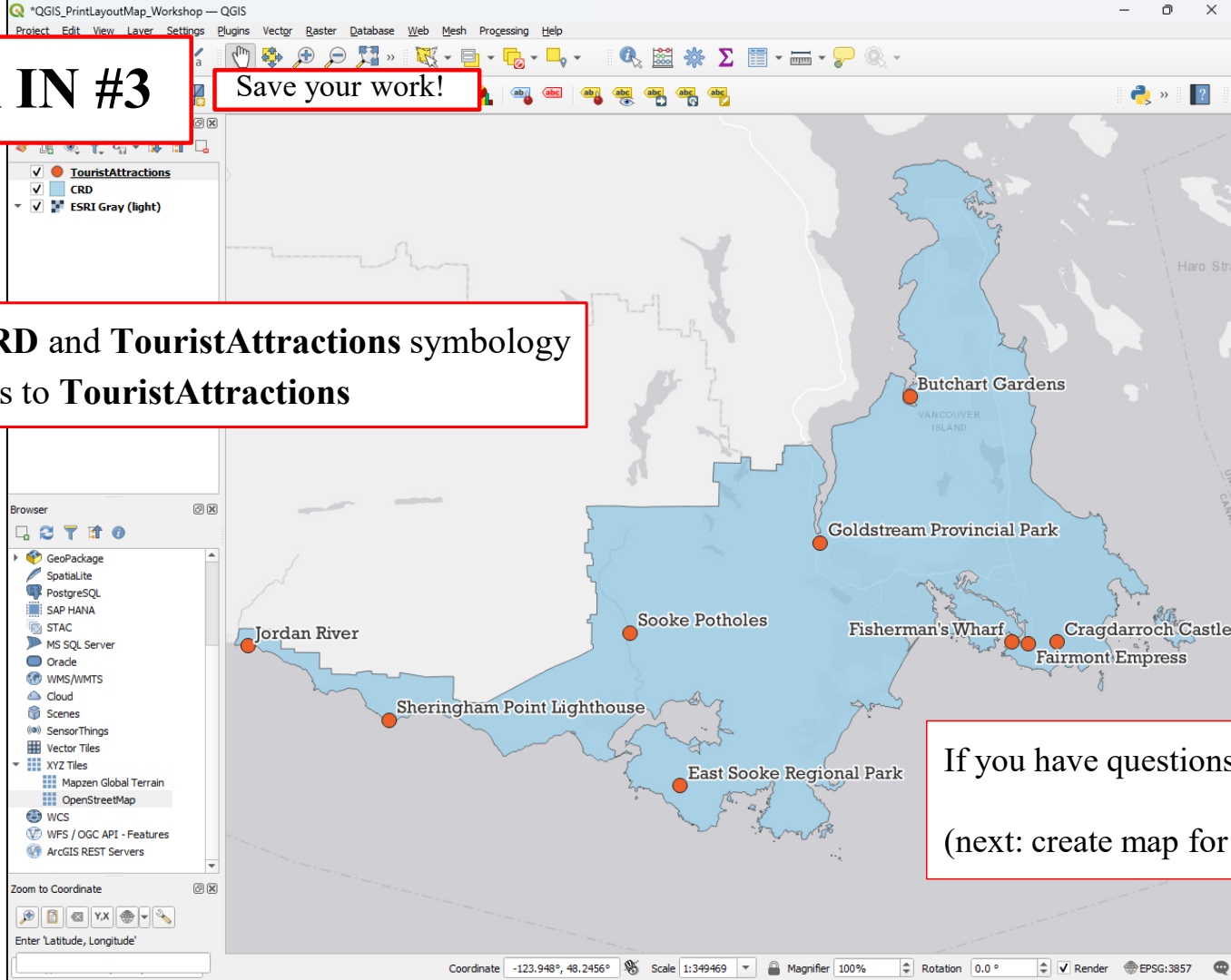
But won't today...



CHECK IN #3

Save your work!

- Changed **CRD** and **TouristAttractions** symbology
- Added labels to **TouristAttractions**



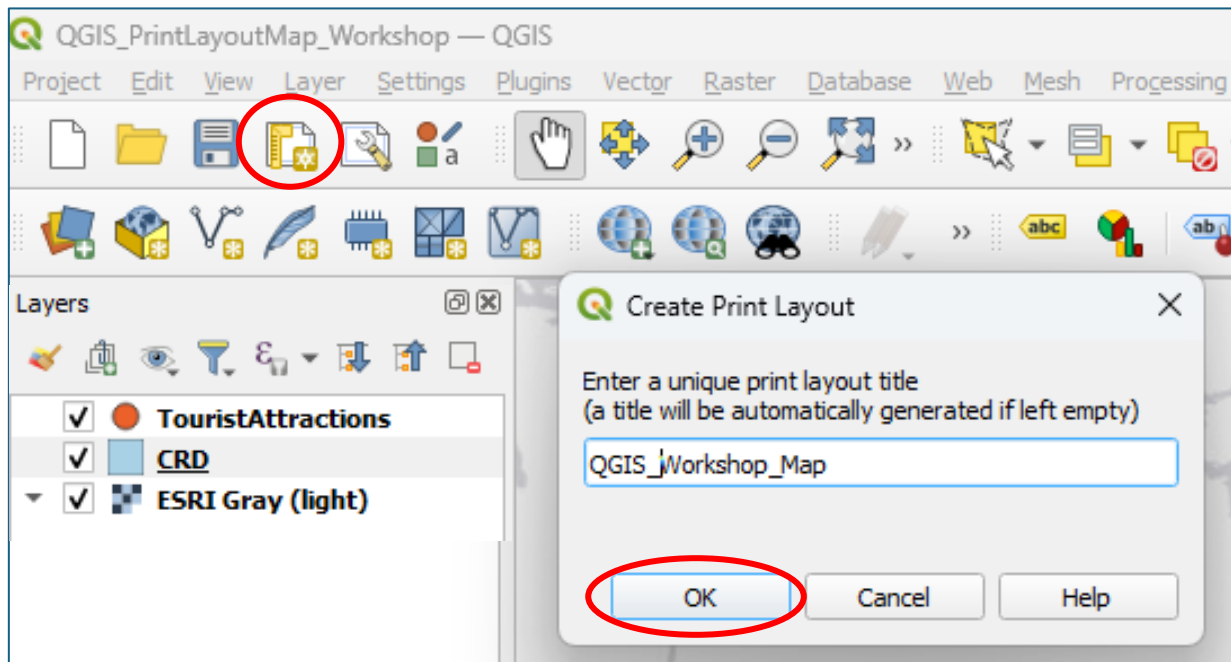
If you have questions, **ask!**


(next: create map for *Print Layout*...)

Activity #4

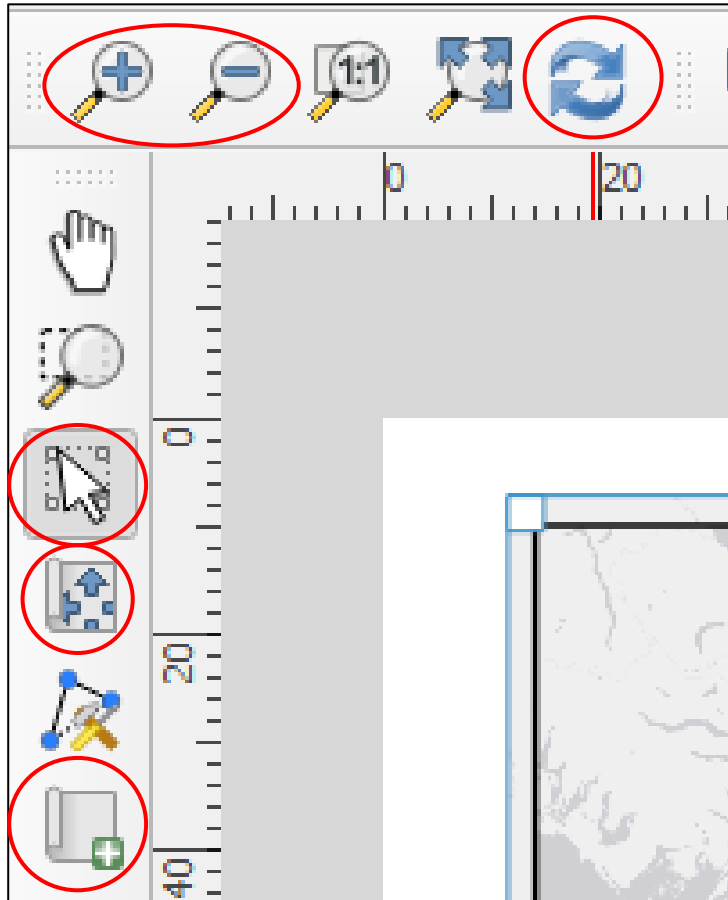


Generate new print layout



- In *QGIS* Menu Bar, select *New Print Layout* 
- Name your layout
“**QGIS_Workshop_Map**”
- **OK**

Print Layout interface: tools



Select/Move Item: move items in the print layout, opens the selected items' *Item Properties*



Move Item Content: move the map itself



Zoom: Not too useful as it Zooms in/out print layout (but not map(s)!)

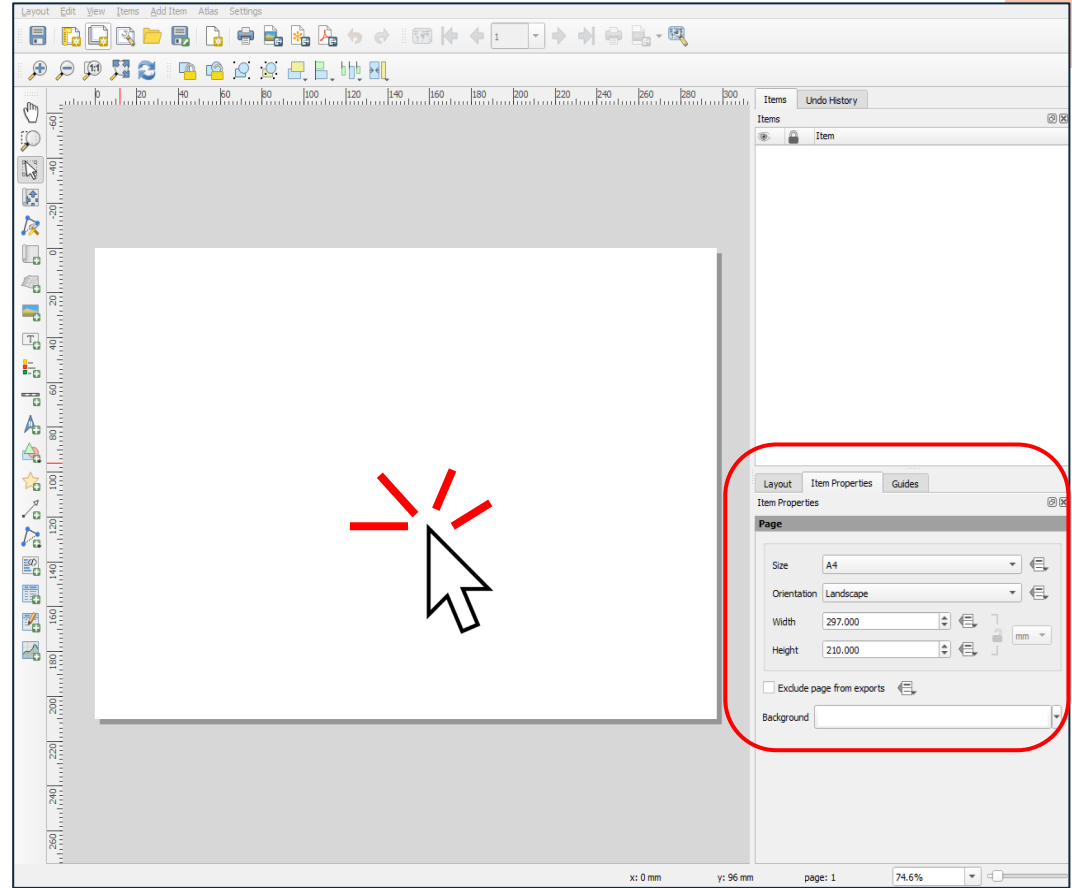


Refresh: refresh print layout map to match main *QGIS* window




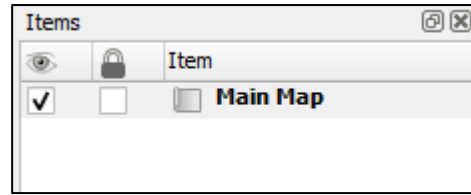
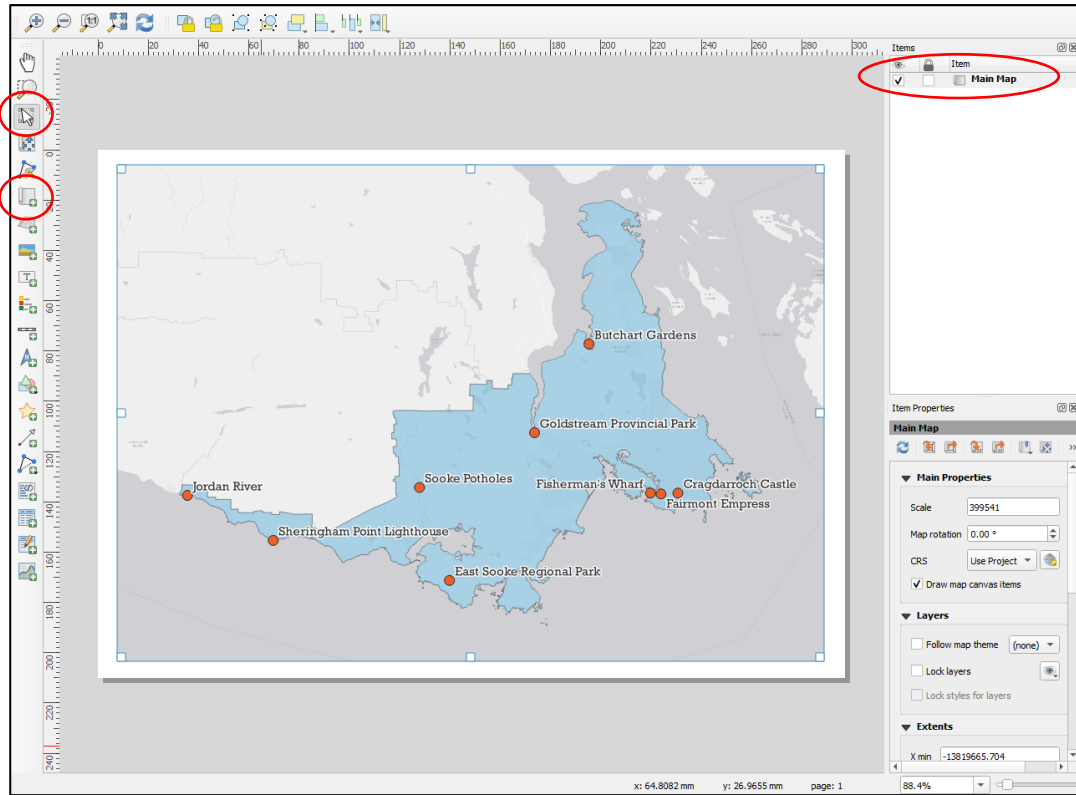
Add map: add map to print layout:
click and drag to draw map on white sheet

- *Print Layout* will open in a new window
- Can go back and forth between main *QGIS* window and *Print Layout* window
- Can change page size, orientation, background, etc. by **clicking on white canvas** and viewing *Item Properties*
 - Leave as default: A4, Landscape, white background



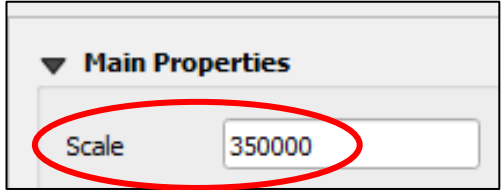
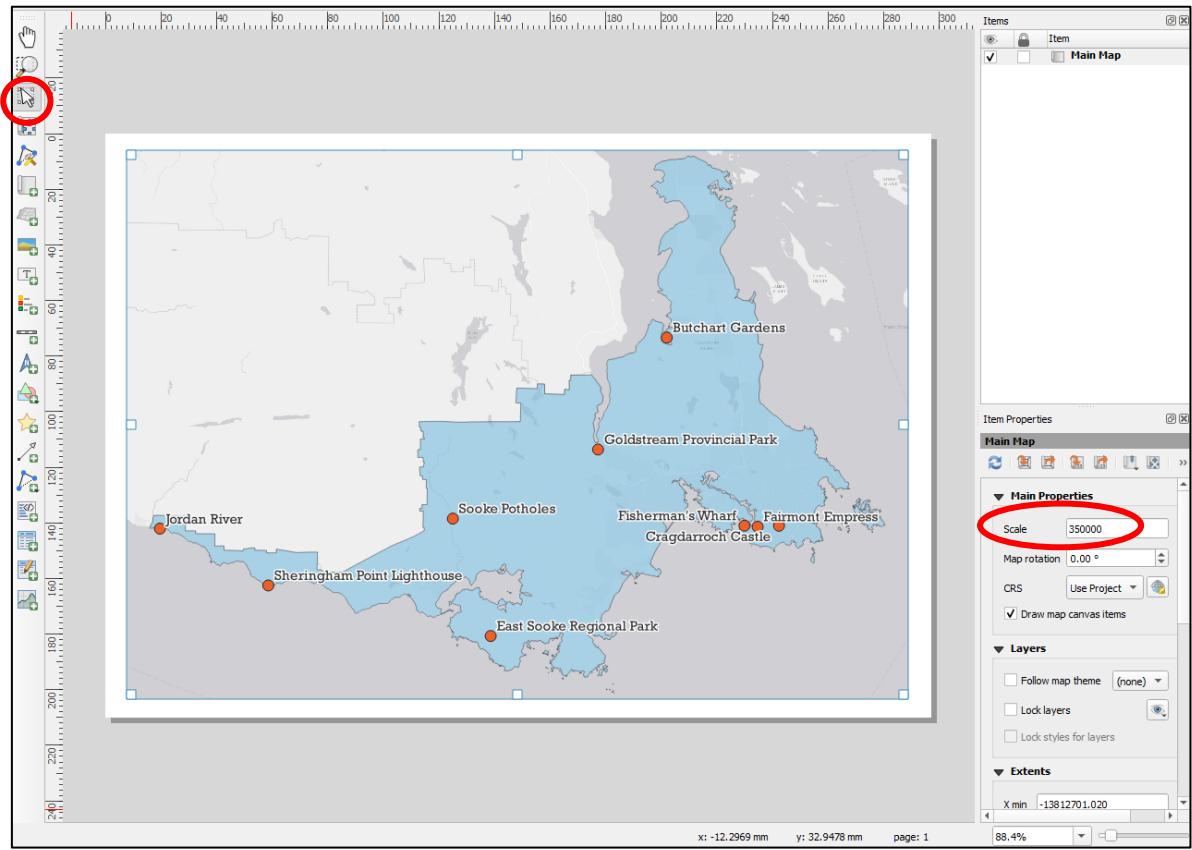
Add Map

- In the *Toolbar*, select *Add Map*  and click and drag to draw the map over the white canvas, leaving some space at the edges
- Under *Items*, double-click on **Map 1** text and rename to **“Main Map”**




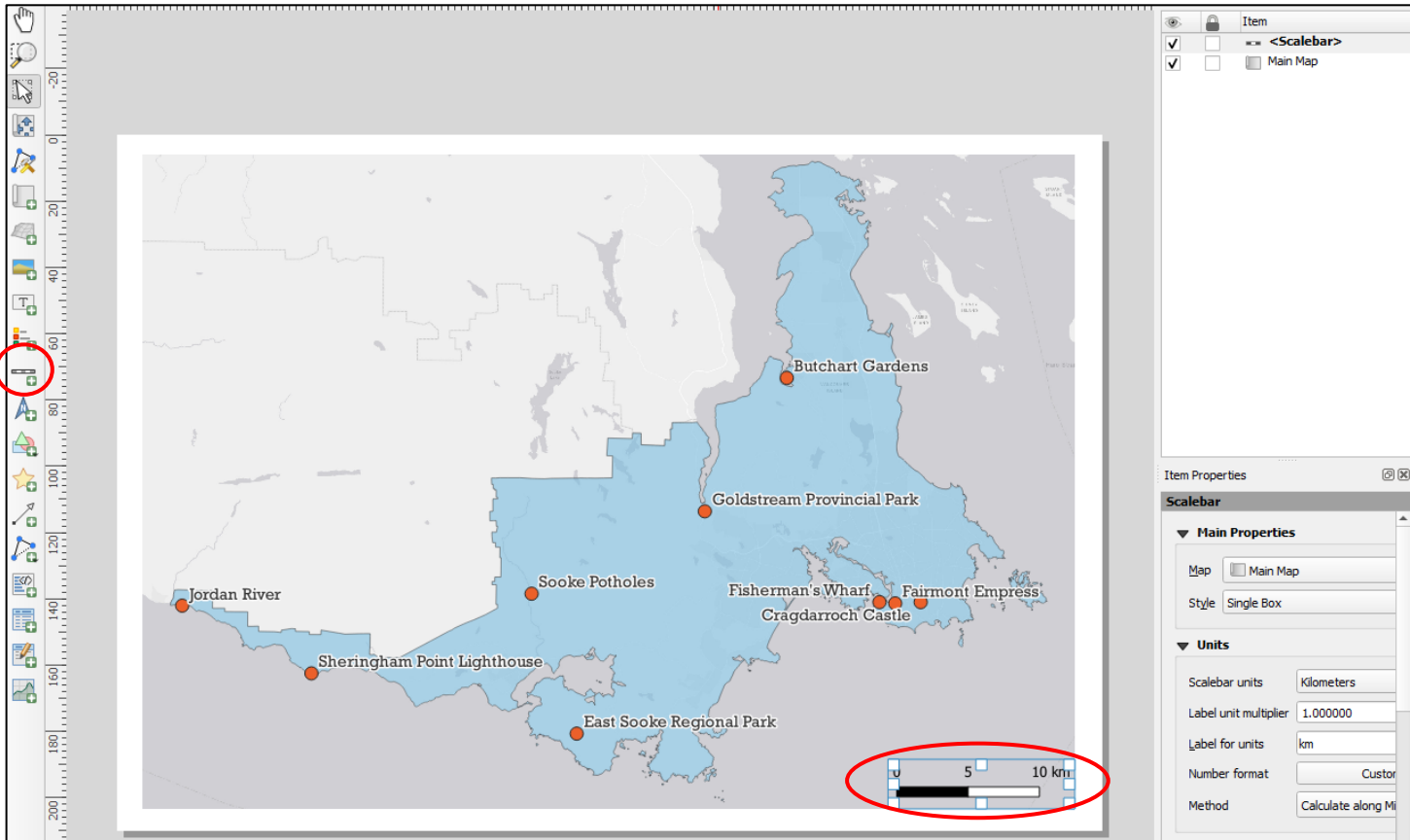
Change Scale

- Under *Item Properties* and *Main Properties*, change *Scale* to 350000
- Can also zoom in and out of map view using *Move Item Content* in toolbar




Add scale bar

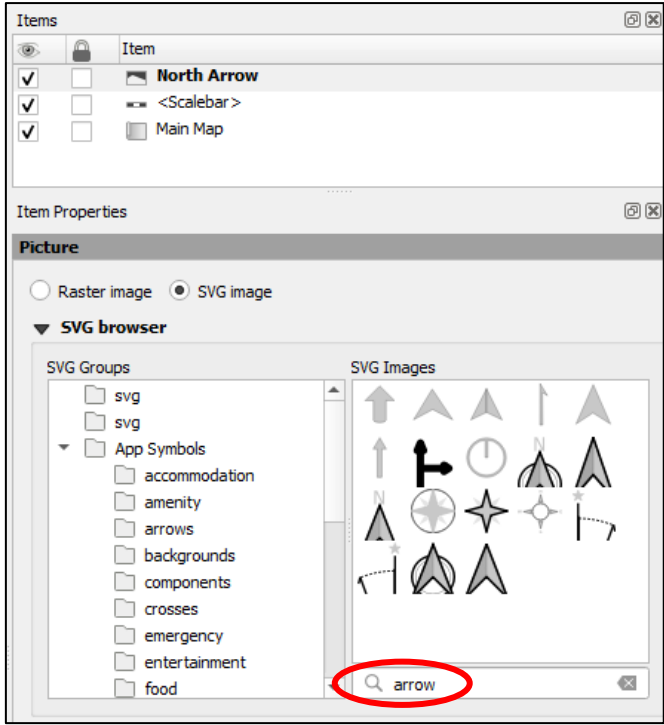
- Select *Add Scale Bar* , click and draw in bottom right corner
- Could have many customizations - labels, margins, position of labels, colour, etc.




The screenshot displays a GIS application interface. On the left is a vertical toolbar with various icons; the 'Add Scale Bar' icon is circled in red. The main map window shows a map of Sooke, BC, with several locations marked: Jordan River, Sheringham Point Lighthouse, Sooke Potholes, East Sooke Regional Park, Butchart Gardens, Goldstream Provincial Park, Fisherman's Wharf, Cragdarroch Castle, and Fairmont Empress. A scale bar is positioned in the bottom right corner of the map, also circled in red, showing a scale from 0 to 10 kilometers with a 5 km marker. On the right side, the 'Item Properties' panel is open, showing the 'Scalebar' properties. Under 'Main Properties', the 'Map' is set to 'Main Map' and the 'Style' is 'Single Box'. Under 'Units', the 'Scalebar units' are set to 'Kilometers', the 'Label unit multiplier' is '1.000000', the 'Label for units' is 'km', and the 'Method' is 'Calculate along Mi'.

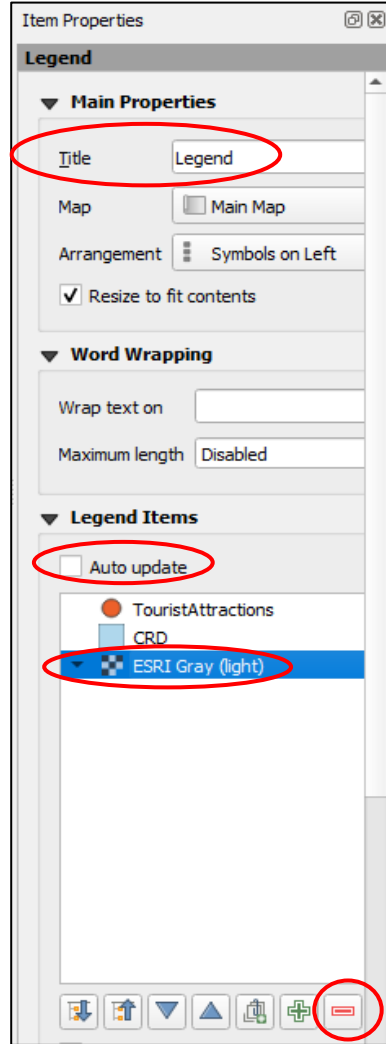
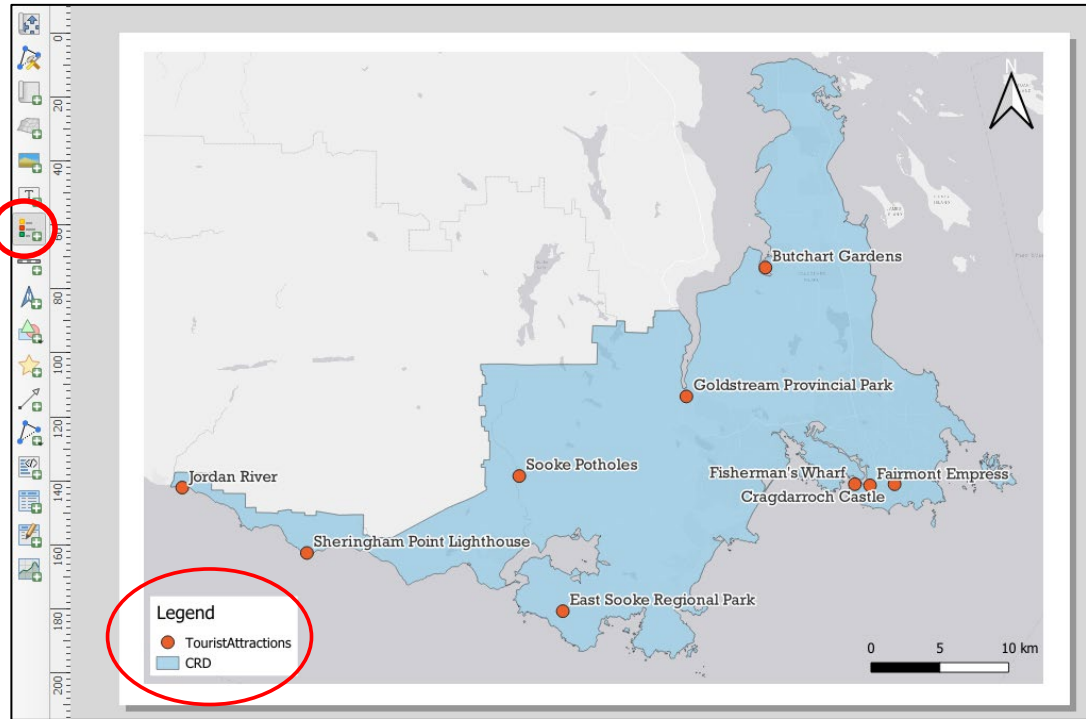
Add north arrow

- Select *Add North Arrow*,  click and draw on upper right corner of **Main Map**
- In *Item Properties* under *SVG Images*, search “arrow”
- Can choose between many options; can also customize fill colour, stroke colour, etc.



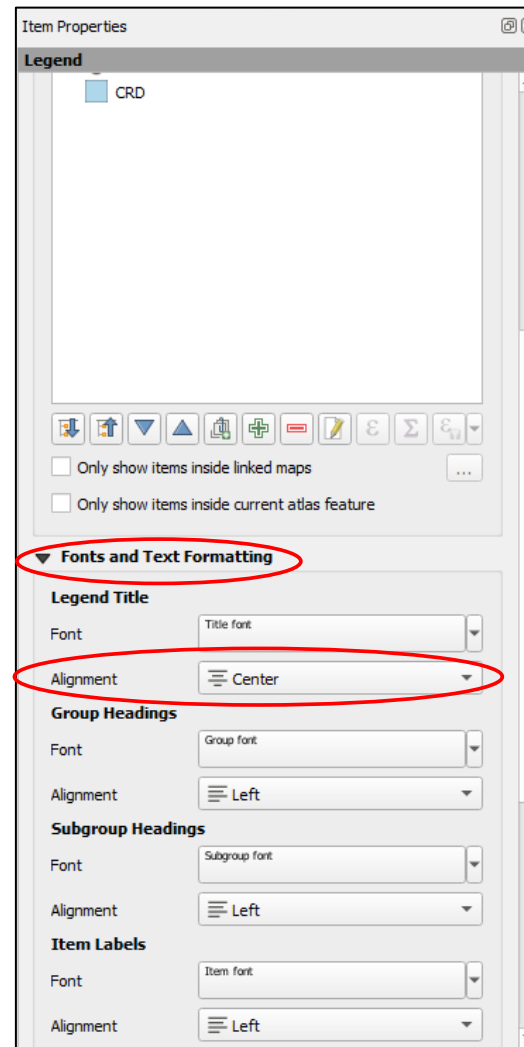
Add legend

- Select *Add Legend*,  click and draw in bottom left corner
- In *Item Properties*, under *Main Properties*, type “Legend” as *Title*
- Under *Legend Items*, uncheck “Auto update”
- Select **ESRI Gray (light)** and click the minus button to remove it from the legend




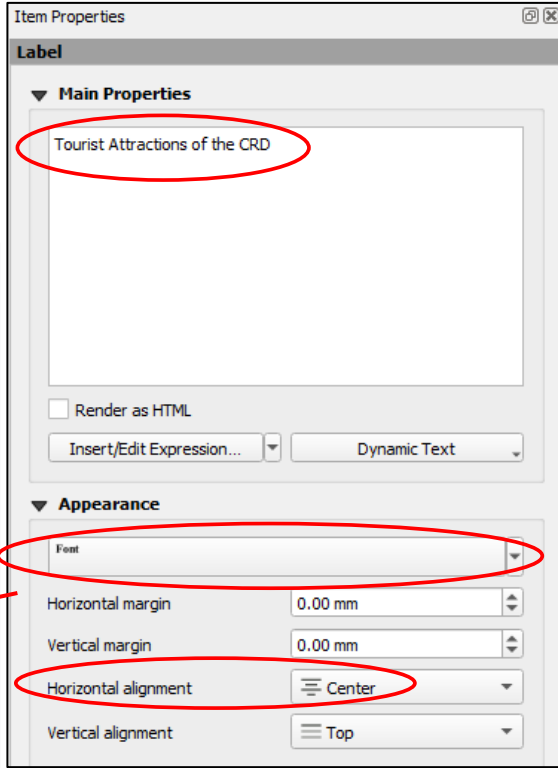
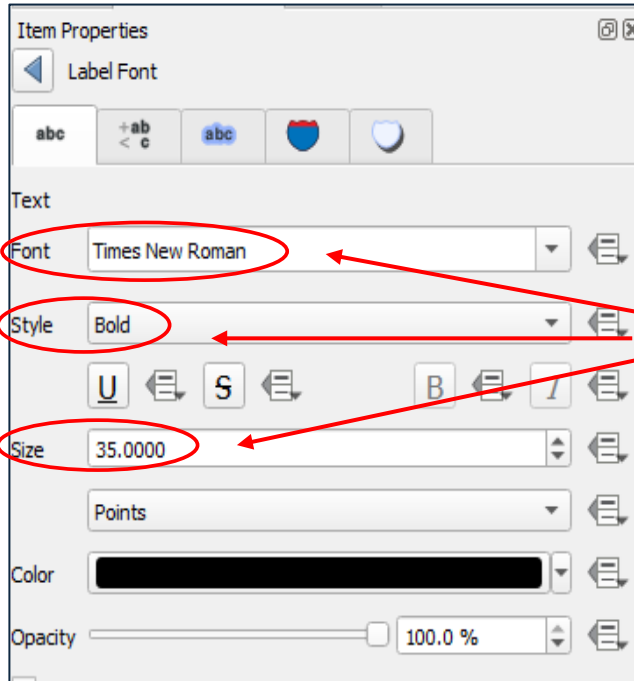
Change Legend alignment

- Under *Fonts and Text Formatting* and *Legend Title*, change *Alignment* to “Center”
- Many options to change fonts, size, alignments, etc.



Add Title

- Select *Add Label* , draw text box in top middle
- In *Item Properties* replace default text with “Tourist Attractions of the CRD”
- Under *Appearance*, change *Horizontal alignment* to “Centre”
- Click *Font* box and can change font, size, colour, etc.



CHECK IN #4

Save your work!

Added:

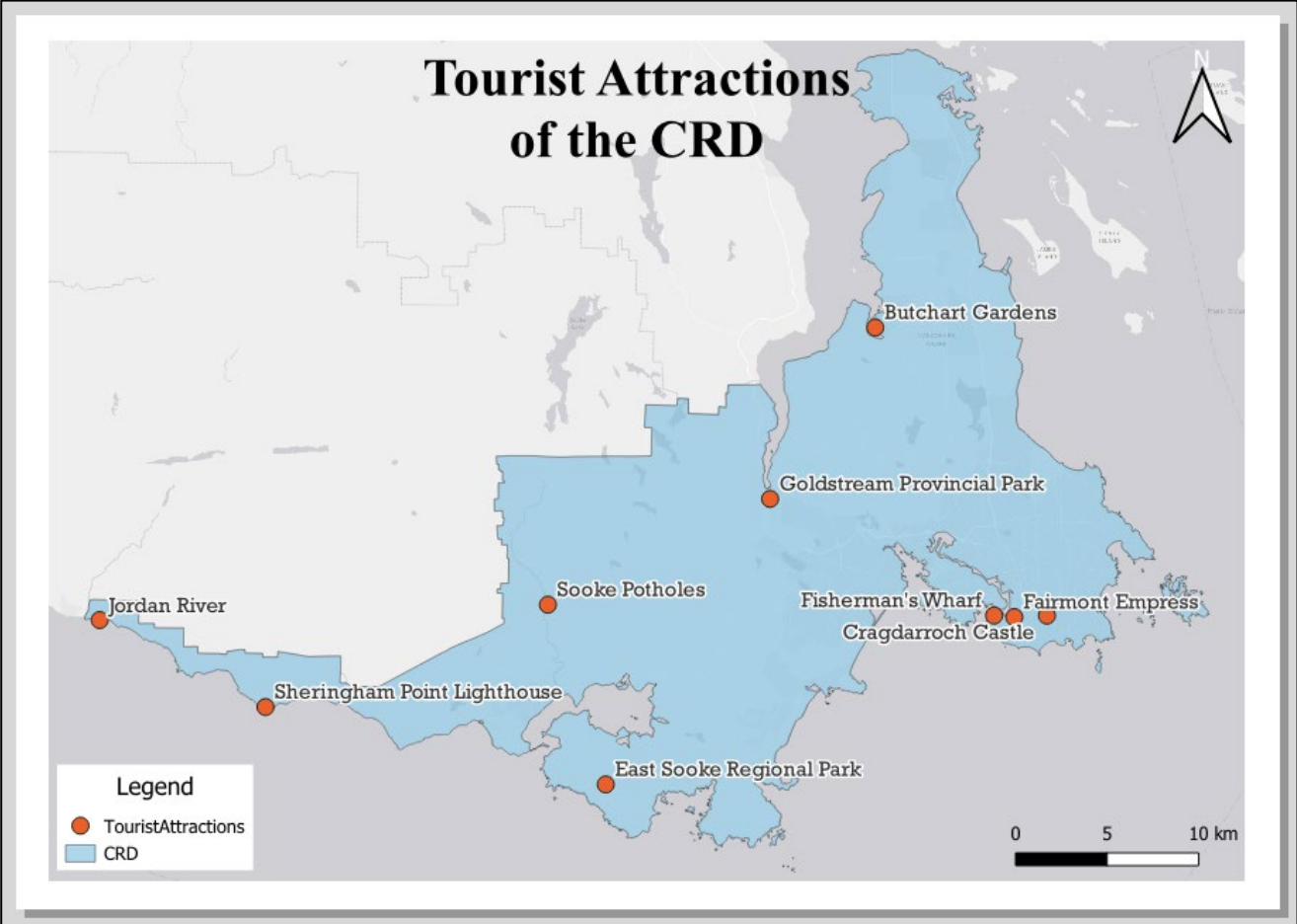
- Scale bar
- North arrow
- Legend
- Title



Congratulations!

Next: add overview inset map... if desired...


If not, skip to “Export Map” (Activity #8, slide 55)

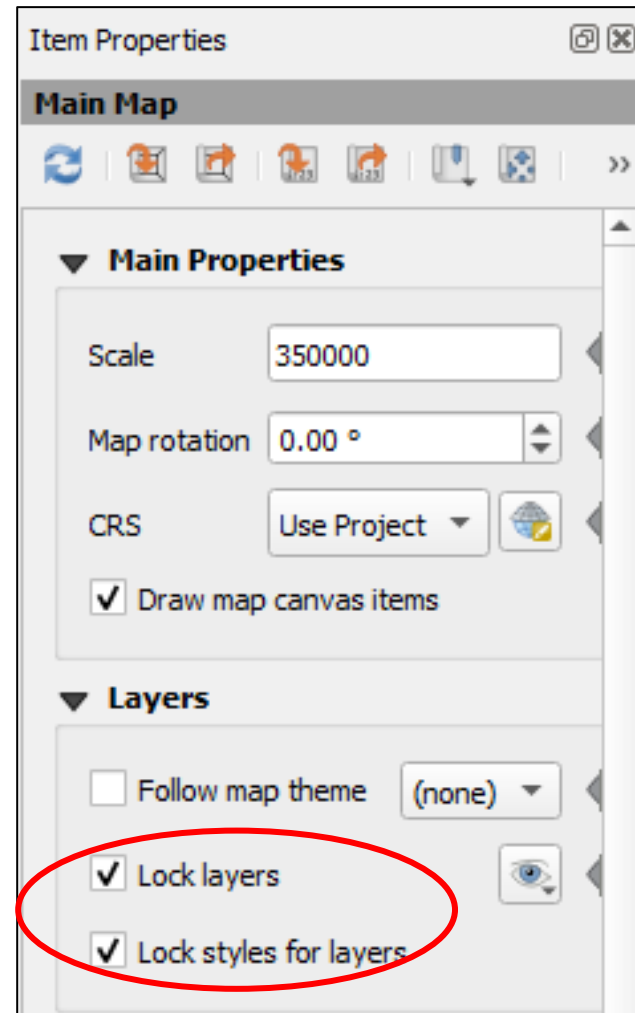


Activity #5



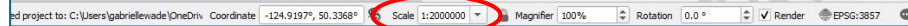
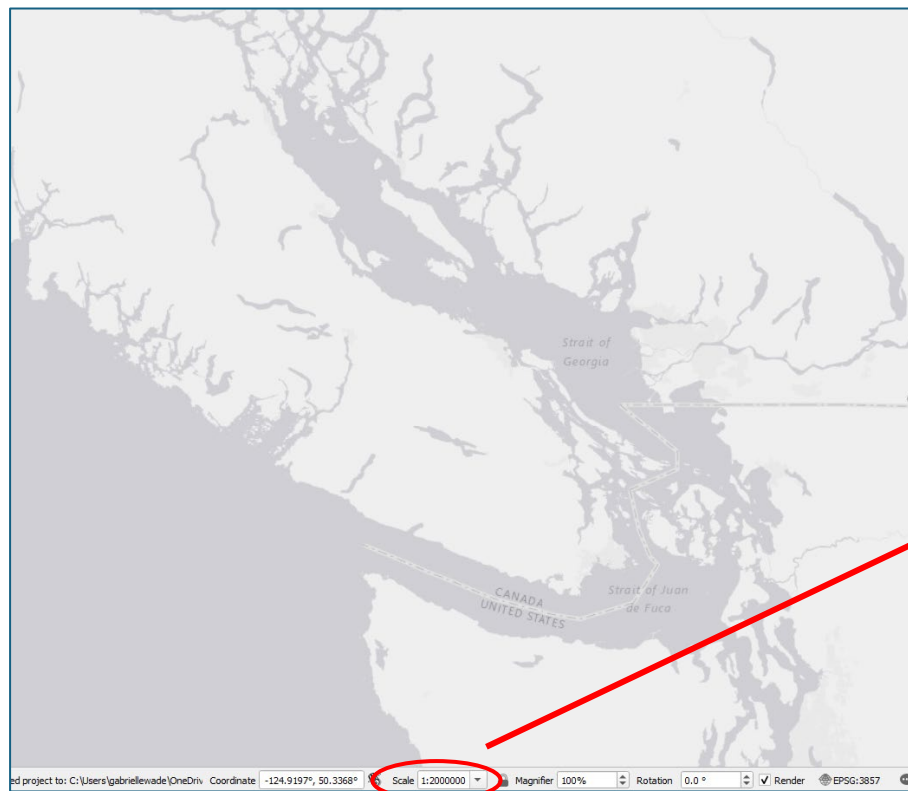
Lock map

- With **Main Map** selected , under *Item Properties* and *Layers*, check “Lock layers” and “Lock styles for layers”
 - This will prevent the map from being changed as we add overview inset map



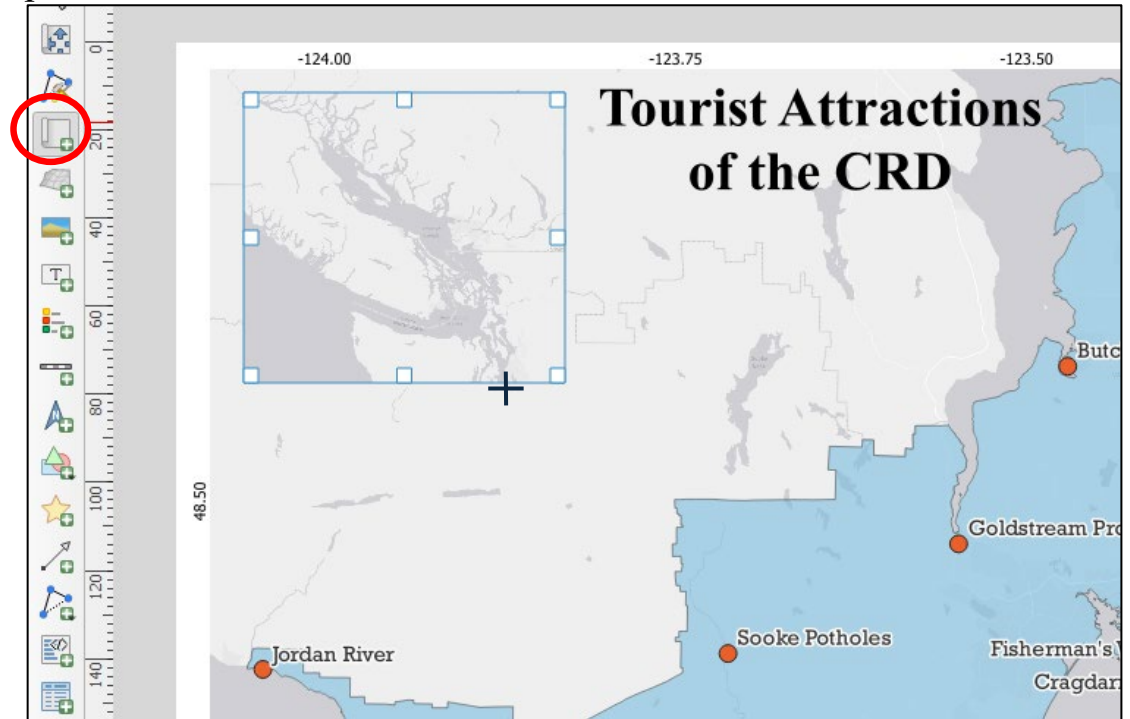
Set map to overview layout

- Minimize *Print Layout* window & return to main *QGIS* window; uncheck all layers except for **ESRI Gray (light)**
- In the *Status Bar*, change scale to 1:2,000,000




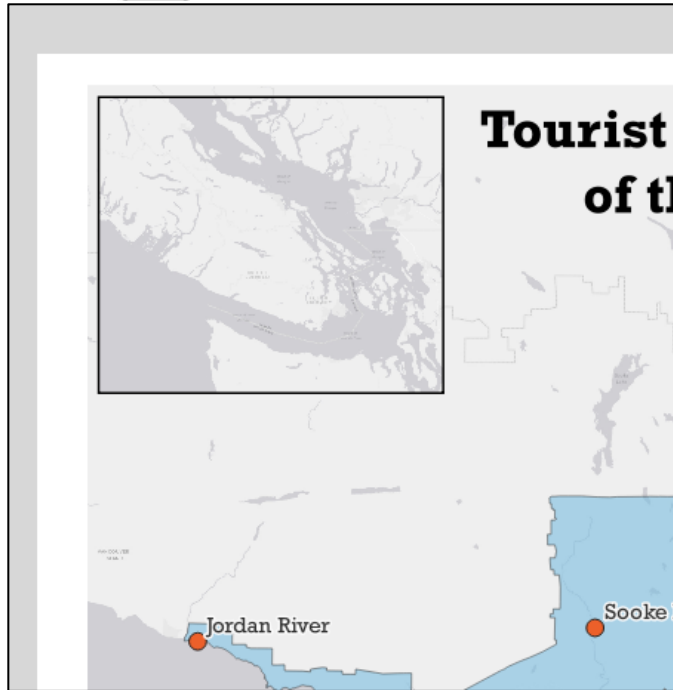
Set map to overview layout

- In the *Toolbar*, select *Add Map* and click and drag to draw square in top left corner of map
- This will be our **overview/inset map**:
Overview maps provide wider locational context to maps



View Item

- Under *Items*, double-click on **Map 2** text and rename to “inset”
- Under *Item Properties* change *Scale* to **5000000**
- Scroll down and check *Frame*; leave colour as black change thickness to 0.5
- Use *Move Item Content*  to reposition map as below:

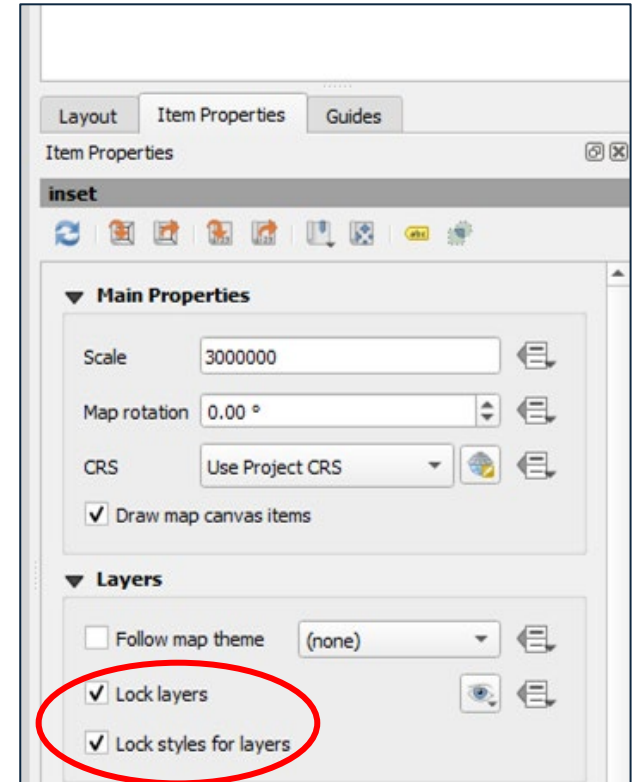
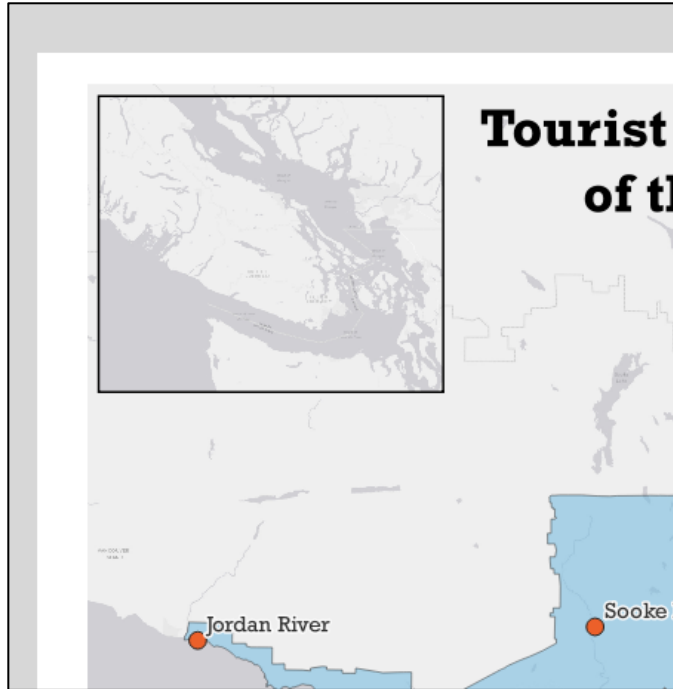


The screenshot shows the QGIS interface with the 'Items' panel on the left and the 'Item Properties' panel on the right. The 'Items' panel lists several items, with 'inset' selected and circled in red. The 'Item Properties' panel shows the following settings:

- Main Properties:**
 - Scale: 5000000 (circled in red)
 - Map rotation: 0.00 °
 - CRS: Use Project CRS
 - Draw map canvas items
- Rotation:**
 - Frame** (circled in red)
 - Color: Black
 - Thickness: 0.50 (circled in red)
 - Join style: Miter
- Background:**
 - Background

Lock layer

- Under *Item Properties* and *Layers*, check “Lock layers” and “Lock styles for layers”
 - This will prevent layer from being changed as we add to the print layout



CHECK IN #5

Save your work!

- Added overview inset map to print layout
- Added frame to map
- Locked map layer

If you have questions, **ask!**
(next: add a shape...)




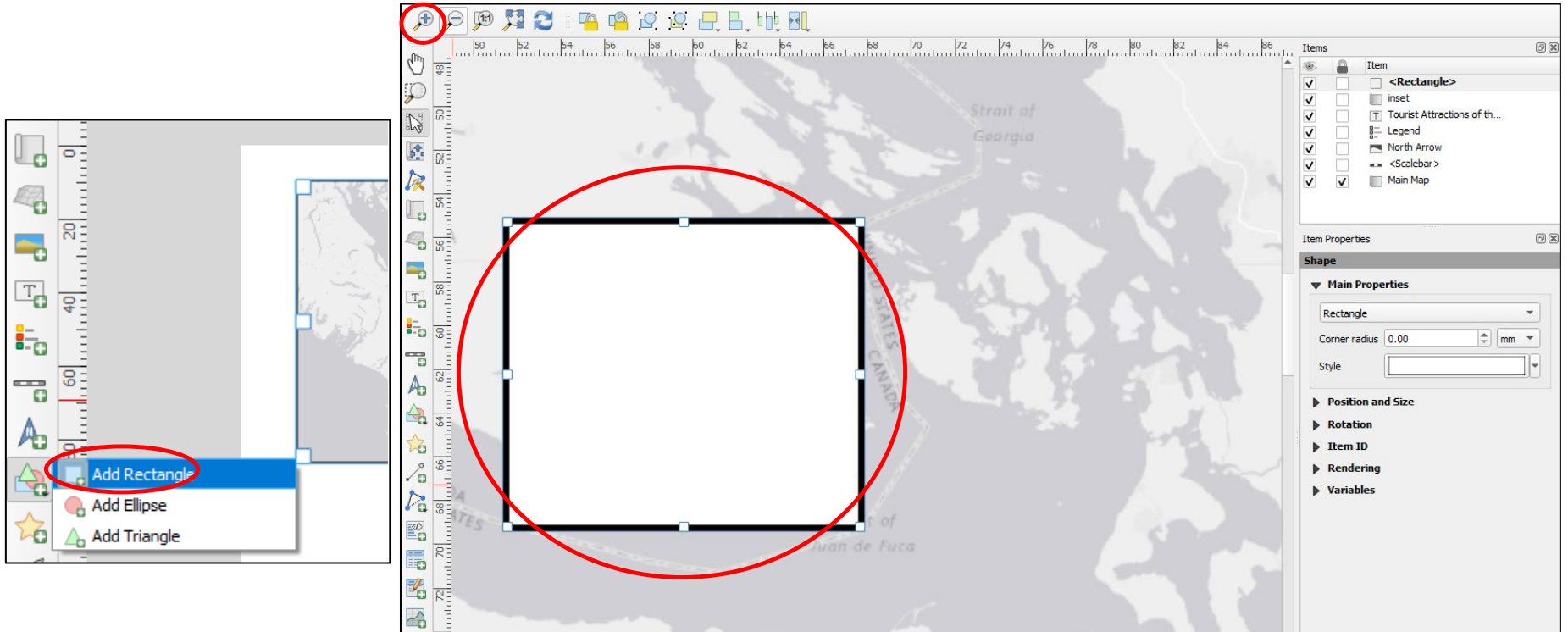
Activity #6



Add shape

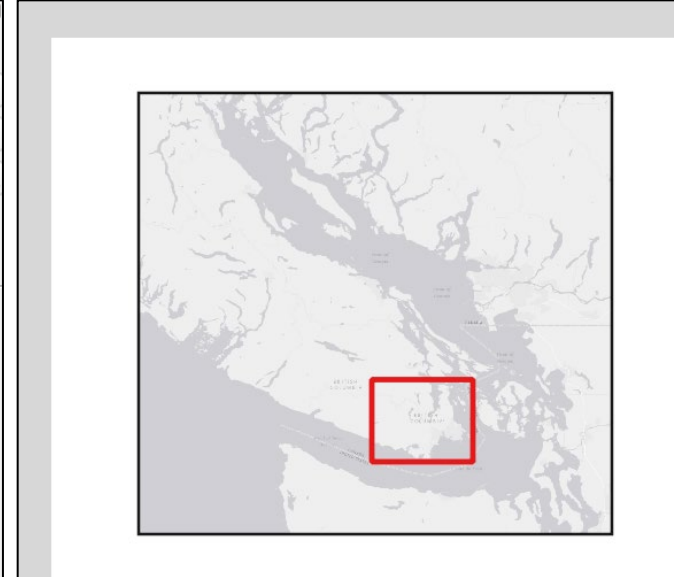
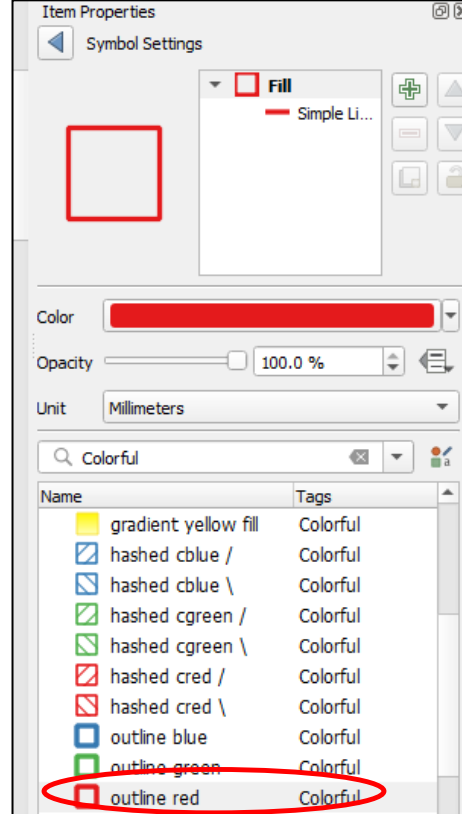
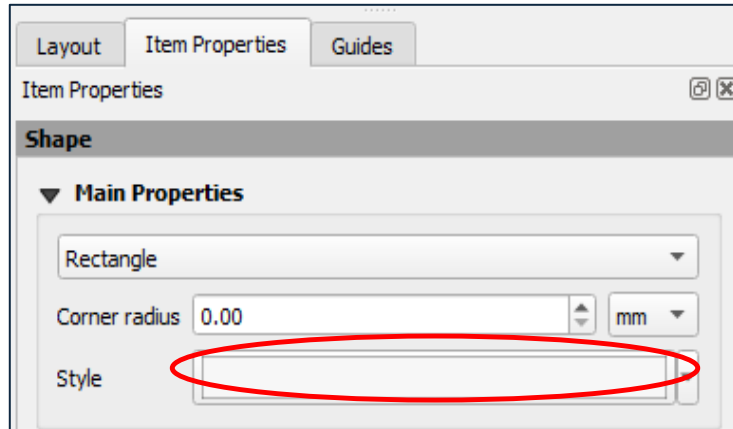
Highlight on our inset map where study area is – draw a rectangle around the CRD

- Select *Add shape* tool and *Add Rectangle*
- Use *Zoom*  to zoom the layout
- Click and drag to draw rectangle around the study area



Change shape symbology

- Under *Shape*, click on *Style* tab
- Under *Fill*, scroll down through pre-made symbols and find “outline red”
 - Outline already comes with transparent fill.. Lots of options for colours, line thickness, etc.



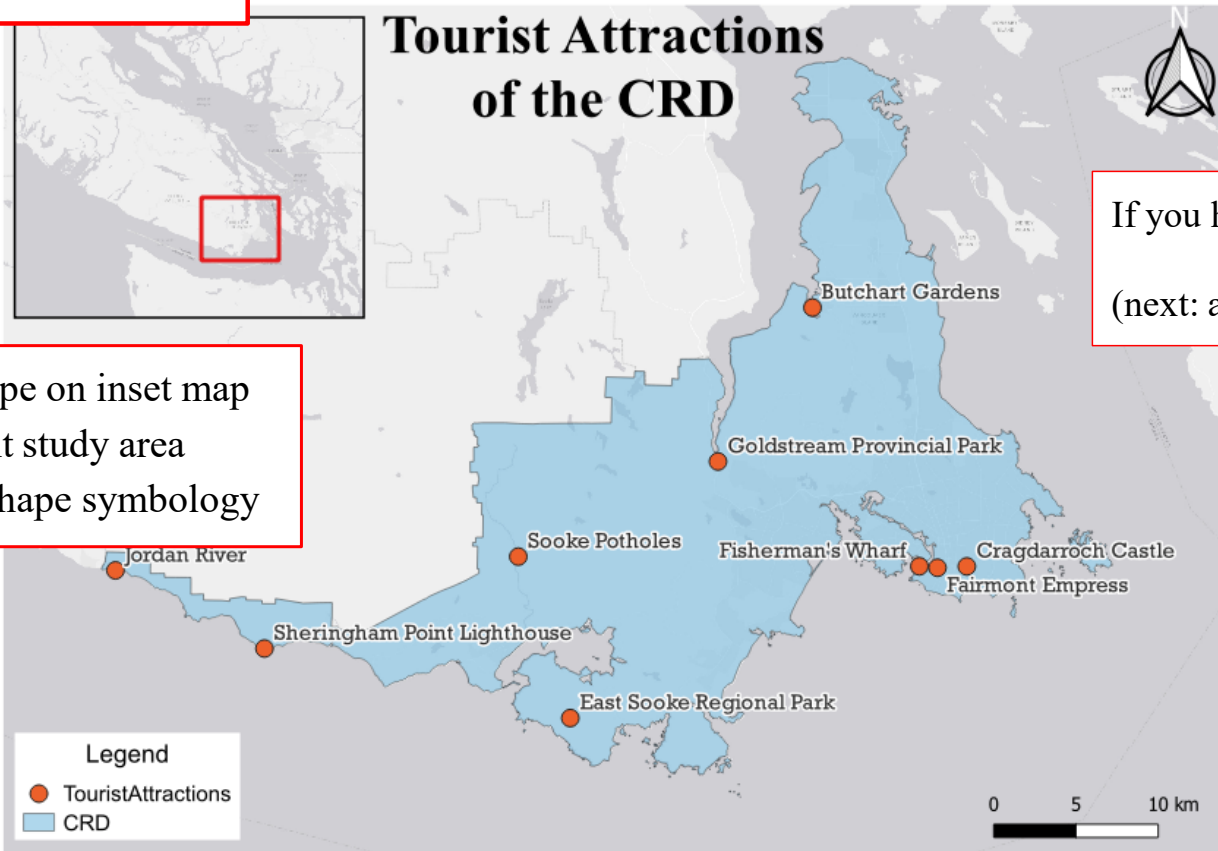
CHECK IN #6

Save your work!

Tourist Attractions of the CRD



- Added shape on inset map to highlight study area
- Changed shape symbology



If you have questions, **ask!**
(next: add grid/coordinates...)

Items	
<input checked="" type="checkbox"/>	<input type="checkbox"/> Tourist Attractions of th...
<input checked="" type="checkbox"/>	<input type="checkbox"/> <Rectangle>
<input checked="" type="checkbox"/>	<input type="checkbox"/> Map 2
<input checked="" type="checkbox"/>	<input type="checkbox"/> Legend
<input checked="" type="checkbox"/>	<input type="checkbox"/> North Arrow
<input checked="" type="checkbox"/>	<input type="checkbox"/> <Scalebar>
<input checked="" type="checkbox"/>	<input type="checkbox"/> Main Map

Item Properties

Congratulations!

Next: add grid coordinates
... if desired...


If not, skip to “Export Map”
(Activity #8, slide 55)

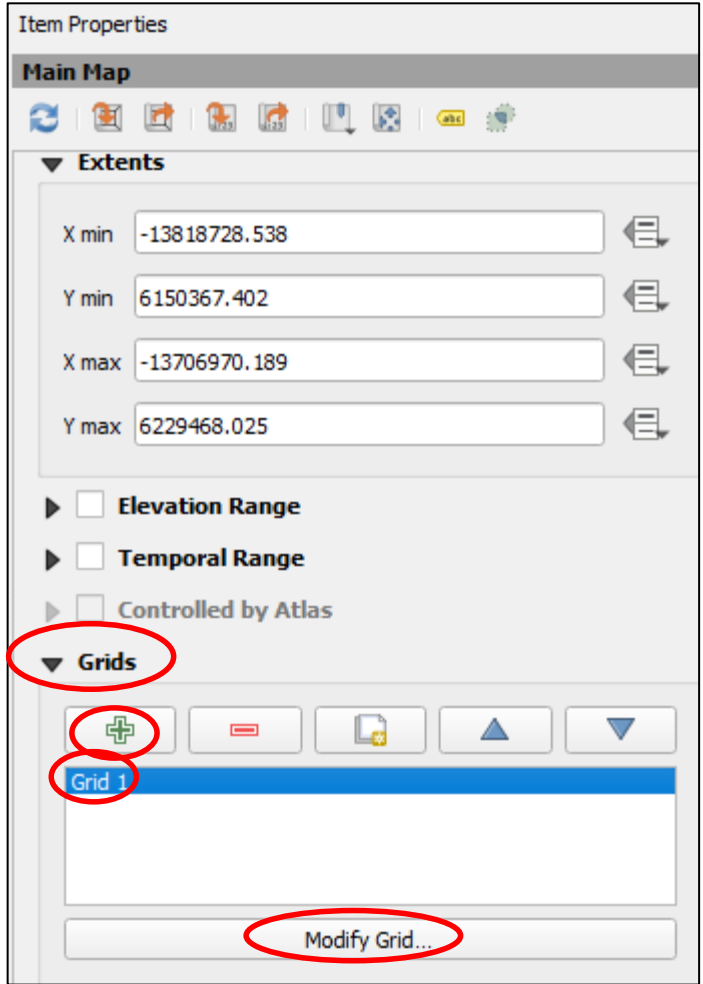
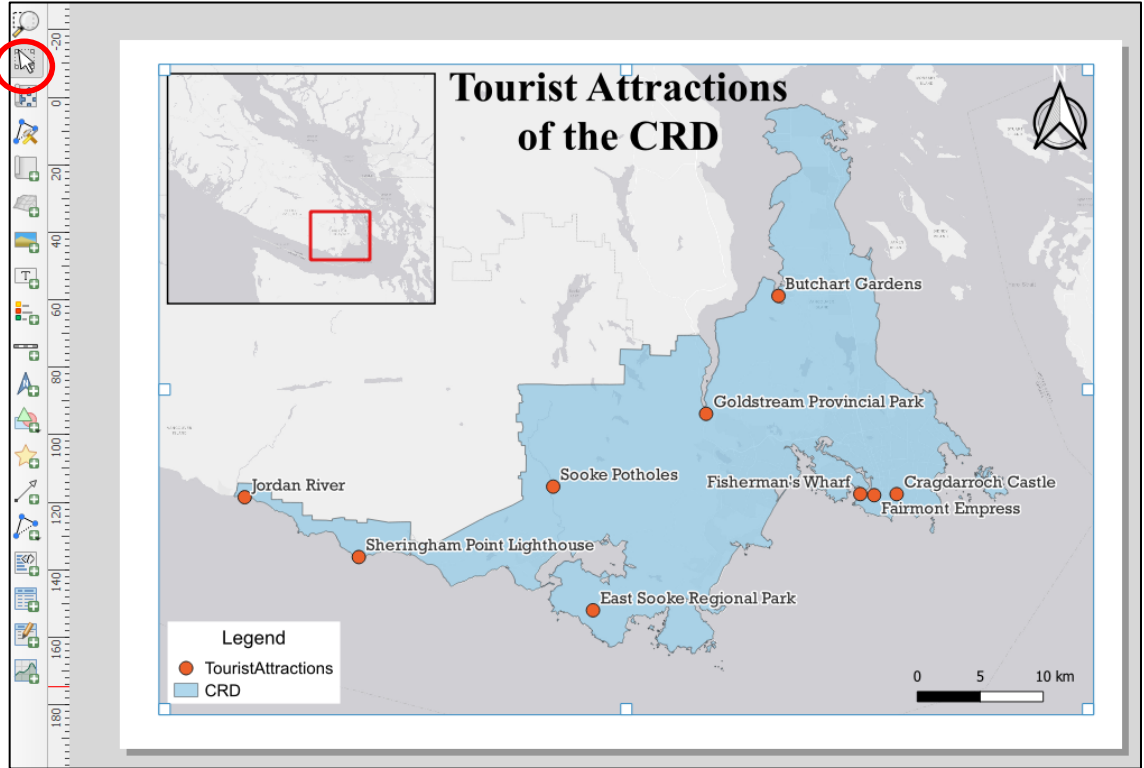


Activity #7



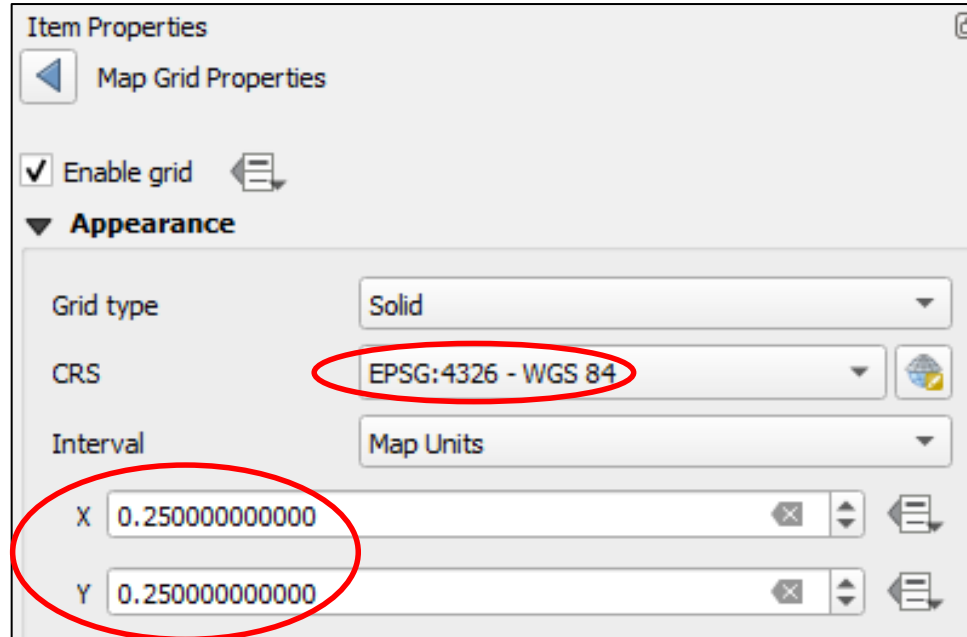
Add grid and coordinates

- With *Select* tool  , click main map to open its *Item Properties*
- Under *Item Properties*, scroll down and expand *Grids*
- Click plus button, then select **Grid 1** and *Modify Grid*



Add map grid

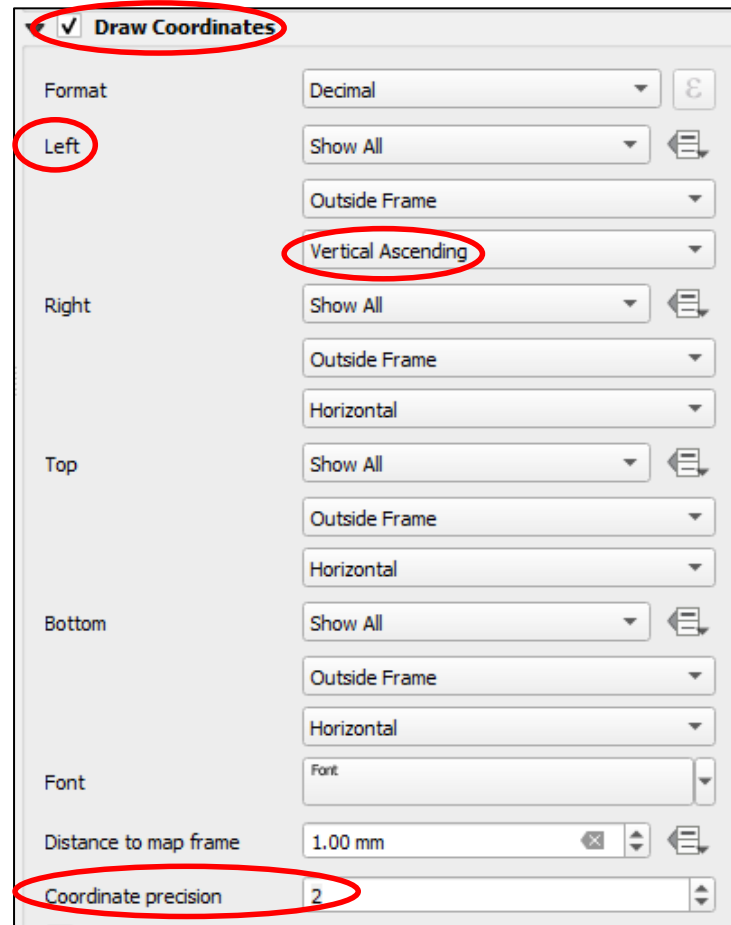
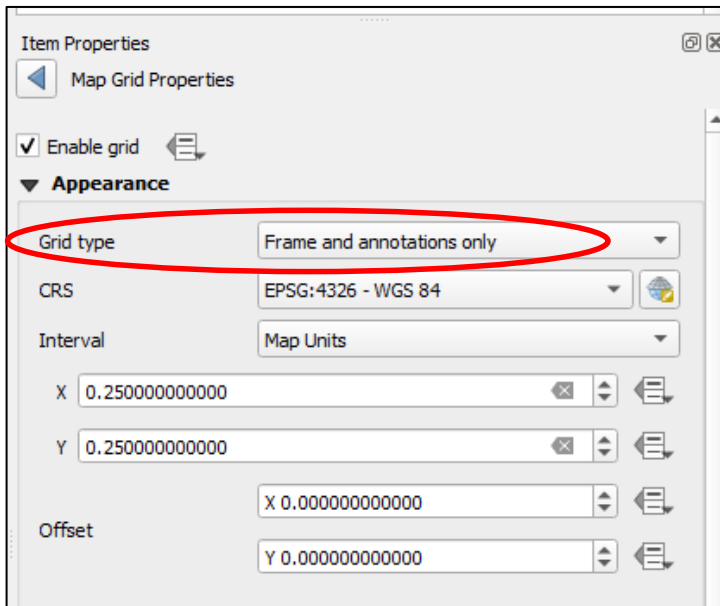
- For *CRS*, use drop-down to change to **EPSG: 4236 – WGS 84**
- For *Interval*, change X and Y to 0.25
 - this means that there will be a grid line for every 0.25 degrees of latitude/longitude



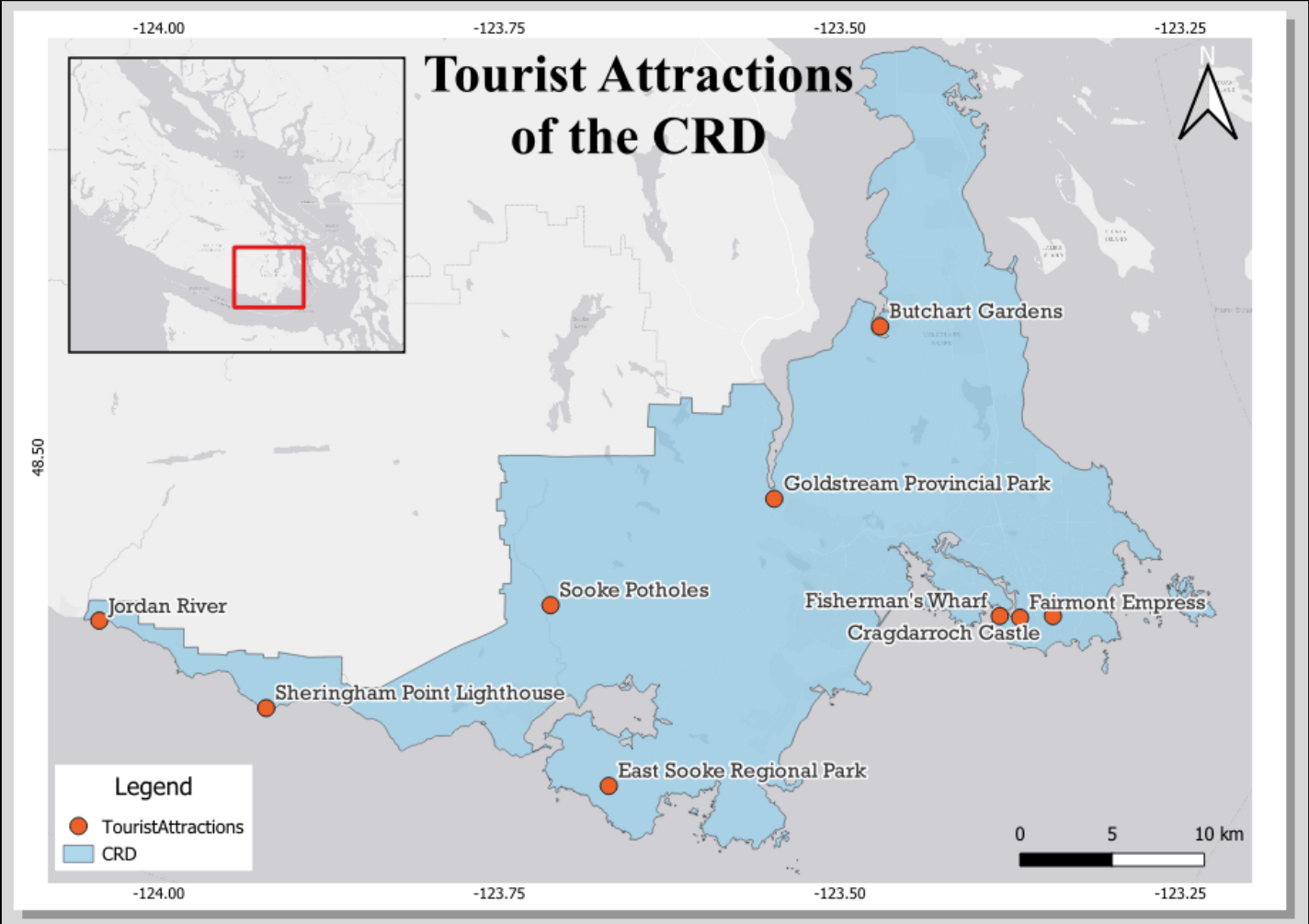
Add map coordinate annotations

- Under *Appearance* and *Grid type*, use drop-down to change to “Frame and annotations only” – we don’t want the grid lines on our final map, but want the coordinates along the outside
- Scroll down and check *Draw Coordinates*
- For *Left*, change “Horizontal” drop-down to “Vertical Ascending”
- Change *Coordinate precision* to 2

lots of option to have coordinates only on some sides, with small tick, etc



Congratulations!



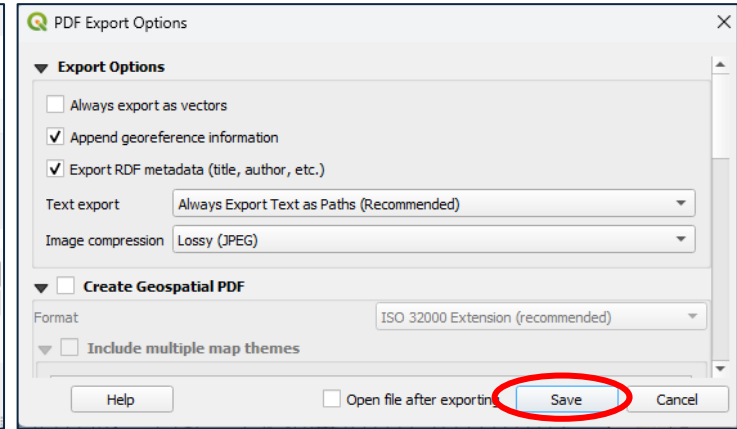
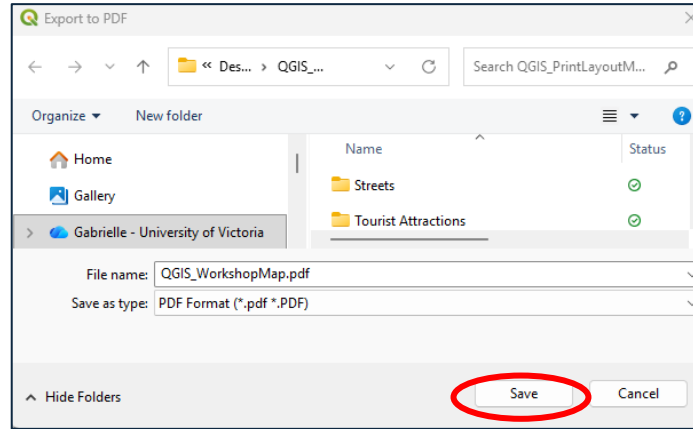
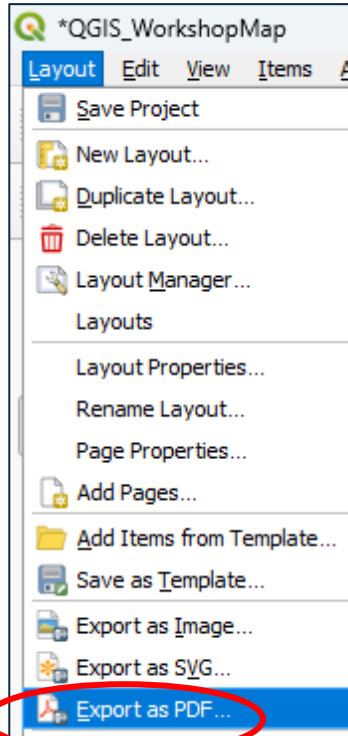
Next: export map

Activity #8



Export map

- Select *Layout* then *Export as PDF*
 - Can also *Export as image...* not today
- Save as “QGIS_WorkshopMap.pdf”
- Keep options as default, **Save**



Congratulations!

You can:

- Load polygon shapefile and locations csv
- Navigate and use main features of *Print Layout*
- Create and export custom map using *QGIS* map layout



Resources going forward:



QGIS – used in workshop today:

- QGIS Tutorials & Tips: <https://www.qgistutorials.com/>
- QGIS Training Manual: https://docs.qgis.org/3.40/en/docs/training_manual/index.html
- QGIS User Guide: https://docs.qgis.org/3.40/en/docs/user_manual/index.html

Find data:

- Geospatial Data Guide: <http://libguides.uvic.ca/geospatialdata>

Questions or problems:

UVic Geospatial Librarian (danielbm@uvic.ca)

YCW Geospatial Intern (gabriellewade@uvic.ca)

UVic full semester GIS courses in the Department of Geography:

- GEOG222 – Intro to Maps and GIS
- GEOG328 – GIS Analysis

GIS Skills and Mapping Micro-certificate (36 hours)

- <https://continuingstudies.uvic.ca/science-and-the-environment/programs/gis-skills-and-mapping>

