Create Custom Map with *QGIS* Print Layout

EXERCISE

University of Victoria | Libraries

Understand *QGIS* interface

*your interface may look different

Menu Bar

Toolbar

Layers Panel

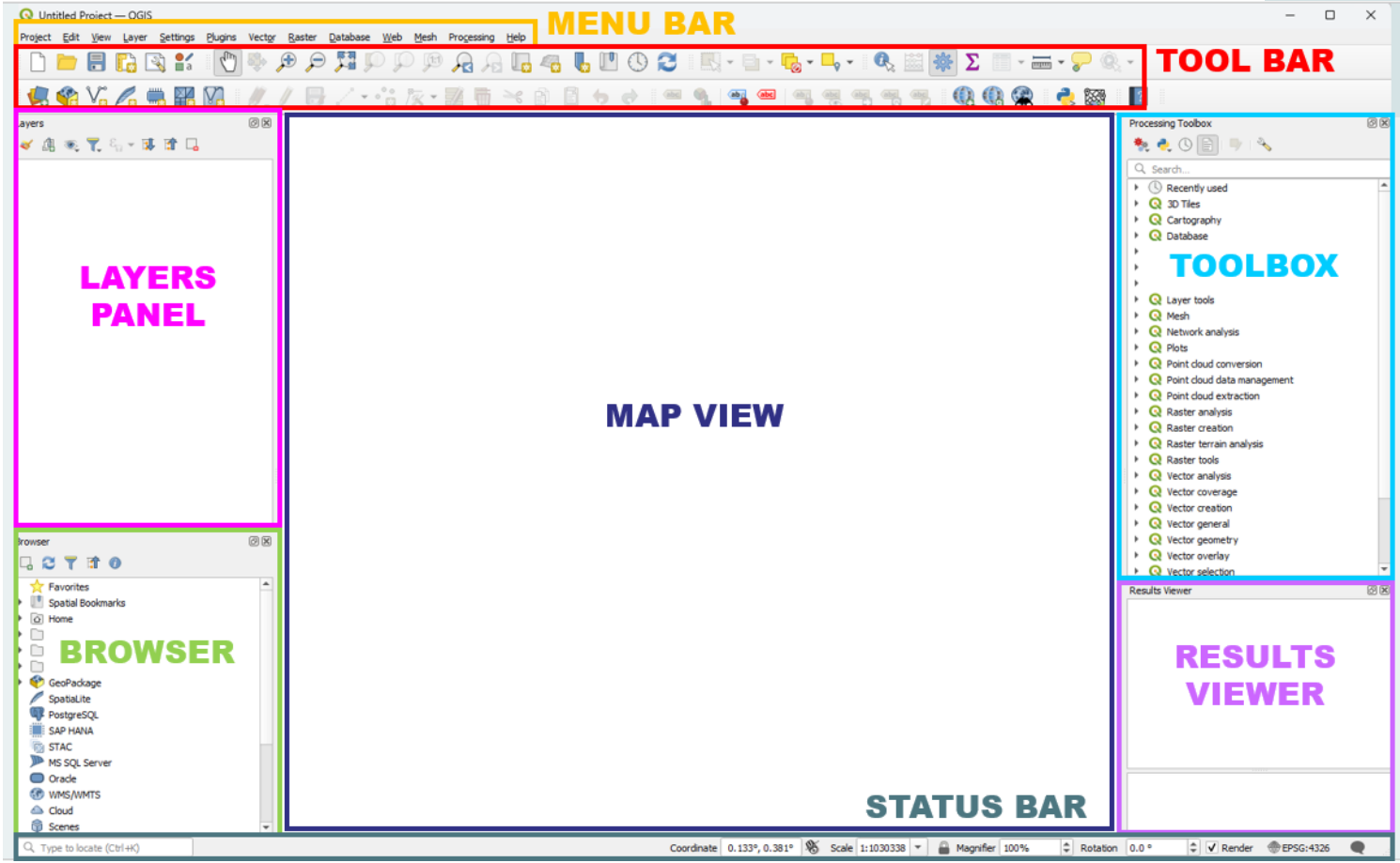
Browser

Map View

Status Bar

Toolbox

Results Viewer



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:

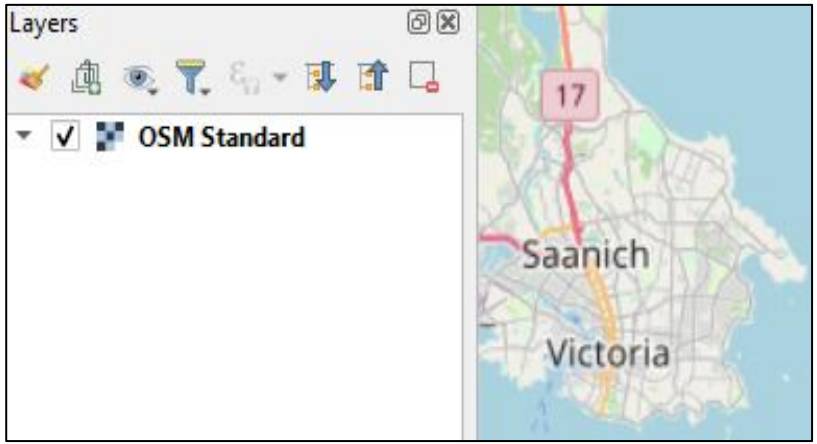
Contains icons for frequently used tools, such as Add Data, Pan, Zoom, Identify, etc.

Quick access to essential operations.

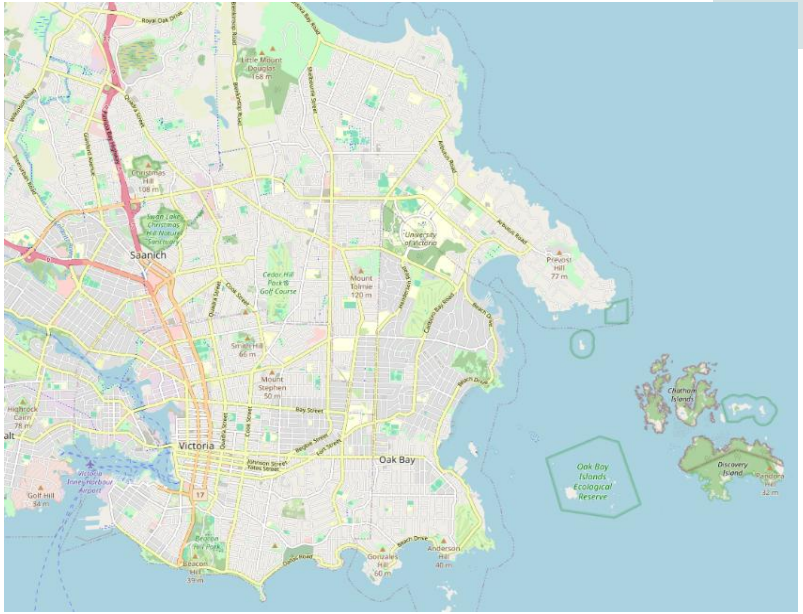
Layers Panel:

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

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



Understand *QGIS* interface



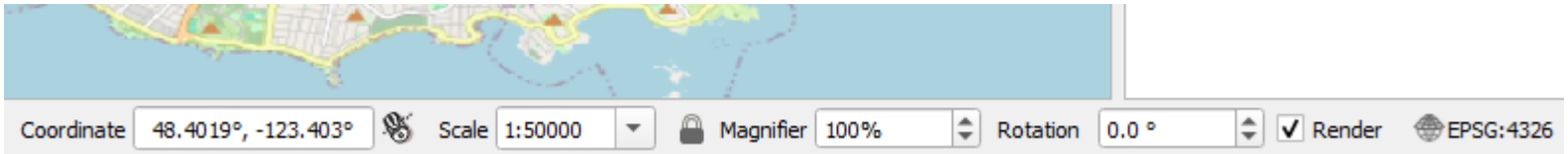
Map View:

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

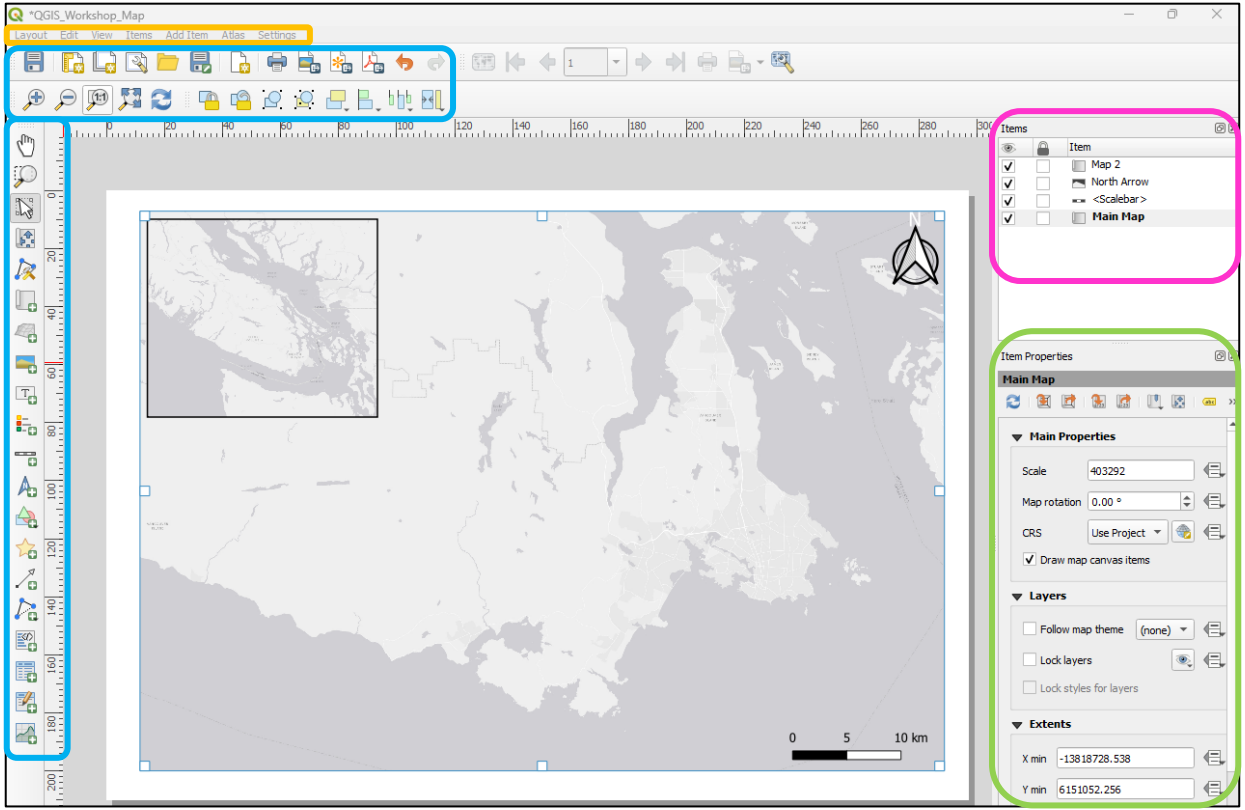
Print Layout interface

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

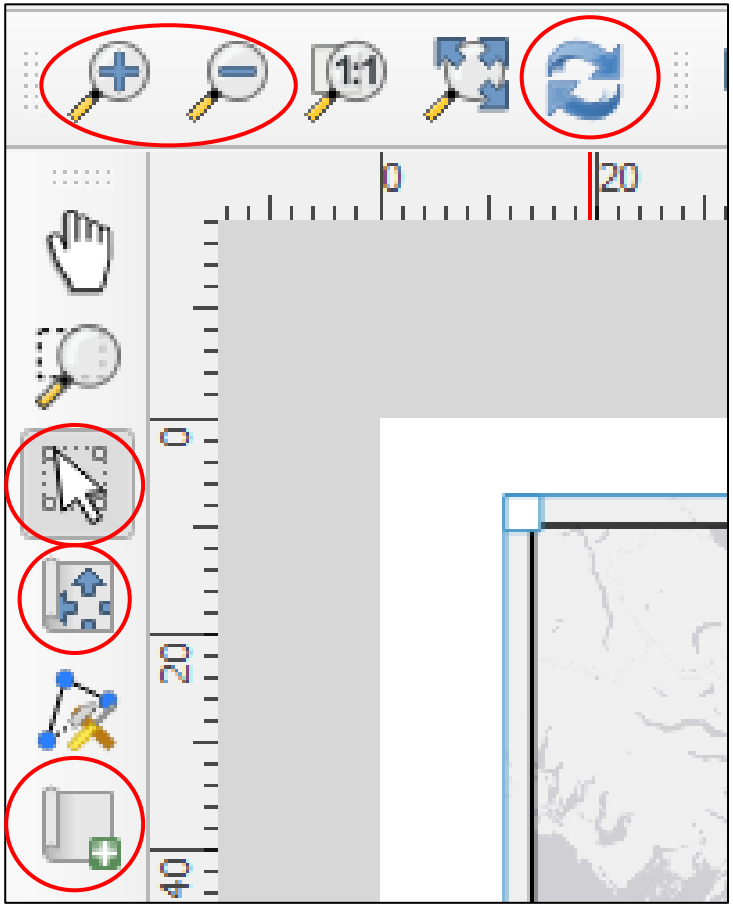
***Toolbar(s)*:** essential tools - save, open, export, zoom, add items, select/move item, etc.

Item Panel: list of items on the map – toggle view on and off, lock item, change item name, rearrange items

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

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

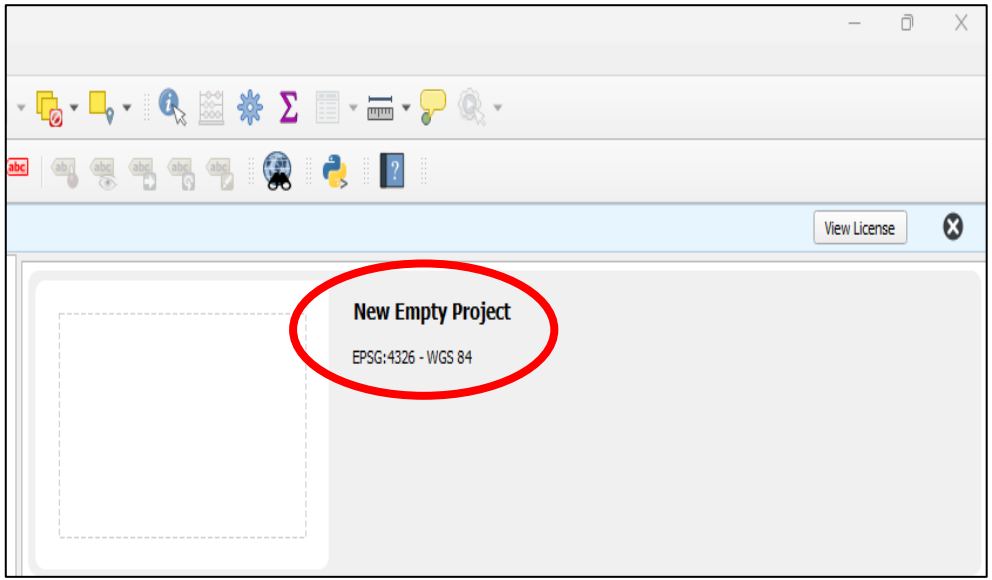
Start *QGIS* *(if you haven't already)*

Download workshop data

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

Open QGIS (your version may be different)

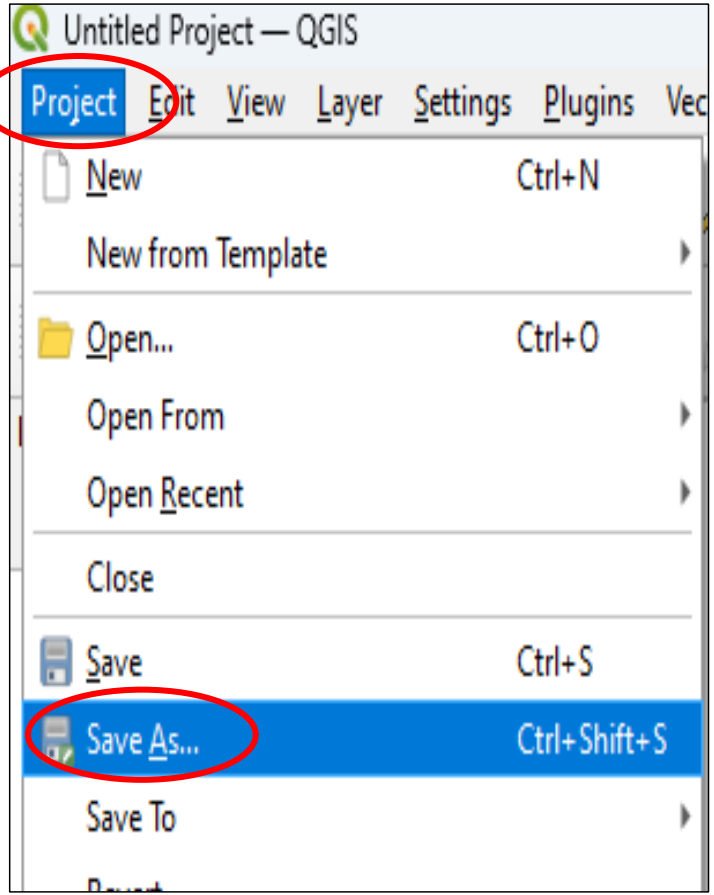
- Double click on *New Empty Project*



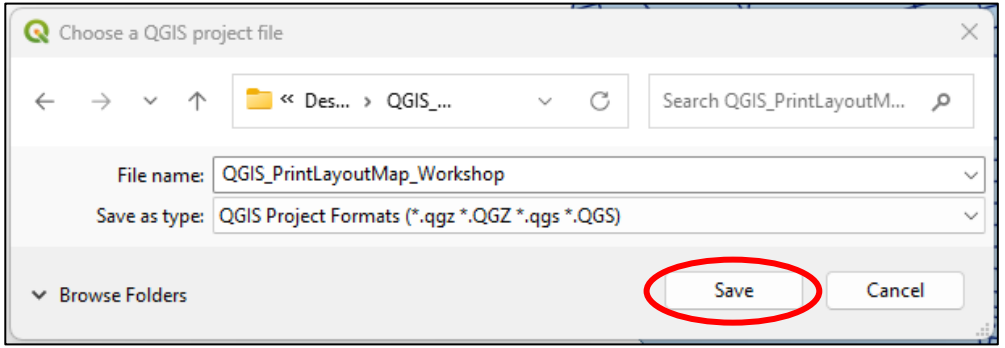
Note: New *QGIS* projects open with Geographic Coordinate System (GCS) **EPSG:4326**

Activity #1

Save new project

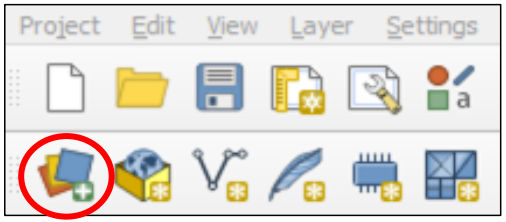


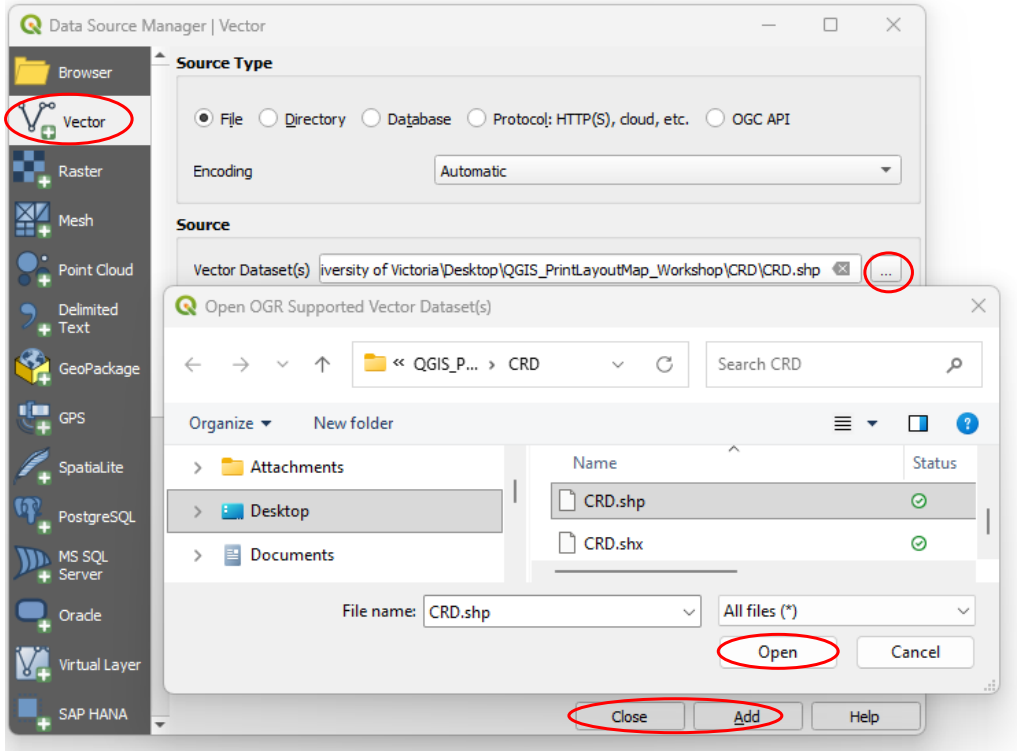
- In *QGIS* Menu Bar, select *Project* then *Save As*
- Name your project "**QGIS_PrintLayoutMap_Workshop**"
- Save your project as **.qgz** to where you can find it



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

Add CRD polygon shapefile

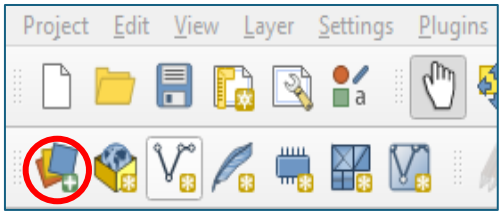




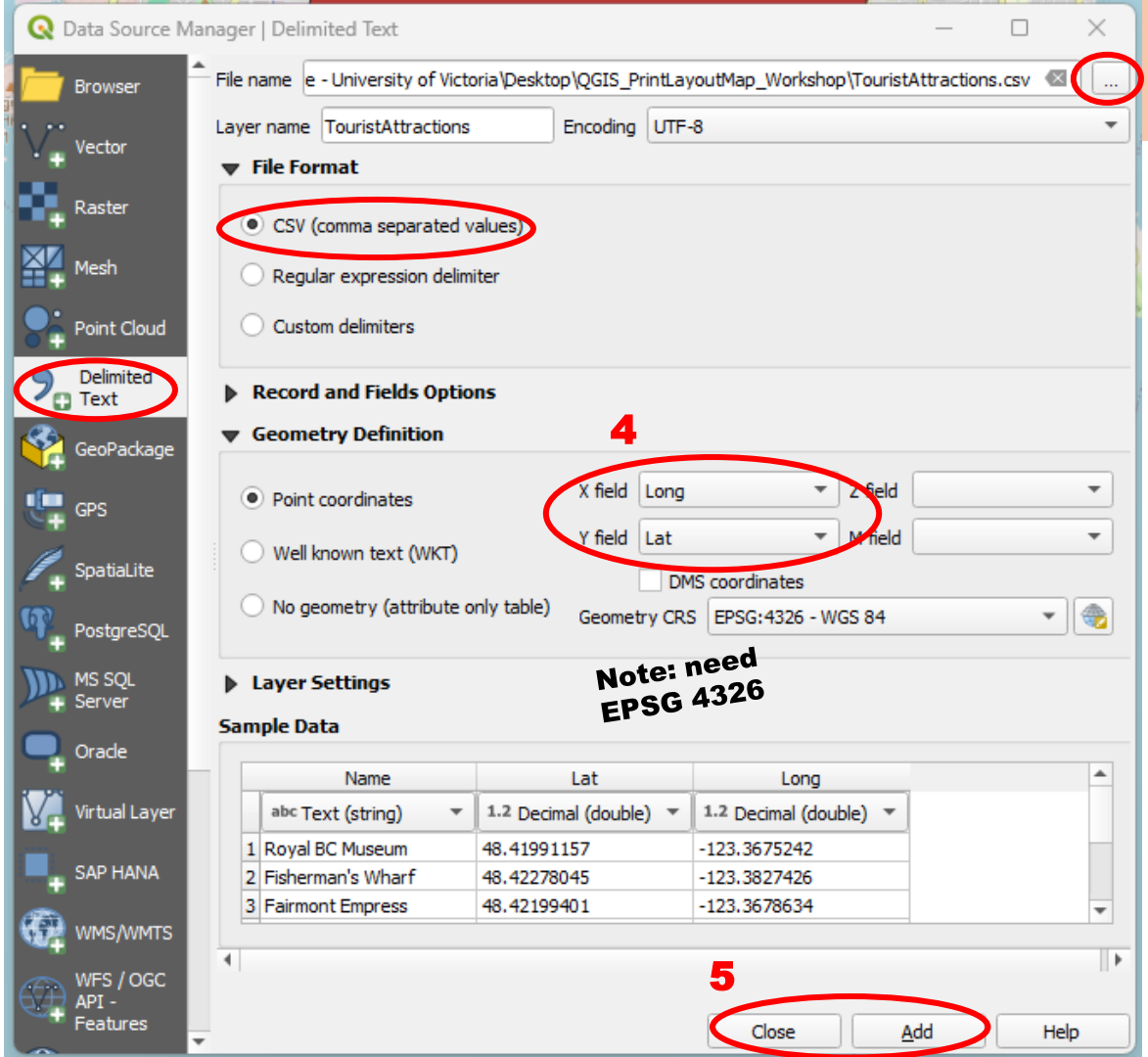
- Select *Open Data Source Manager* 
- Select the *Vector* tab
- Under the *Source* heading click the 
- Navigate to workshop data
- Select **CRD.shp**, Open
- **Add** and **Close**

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**



CHECK IN #1

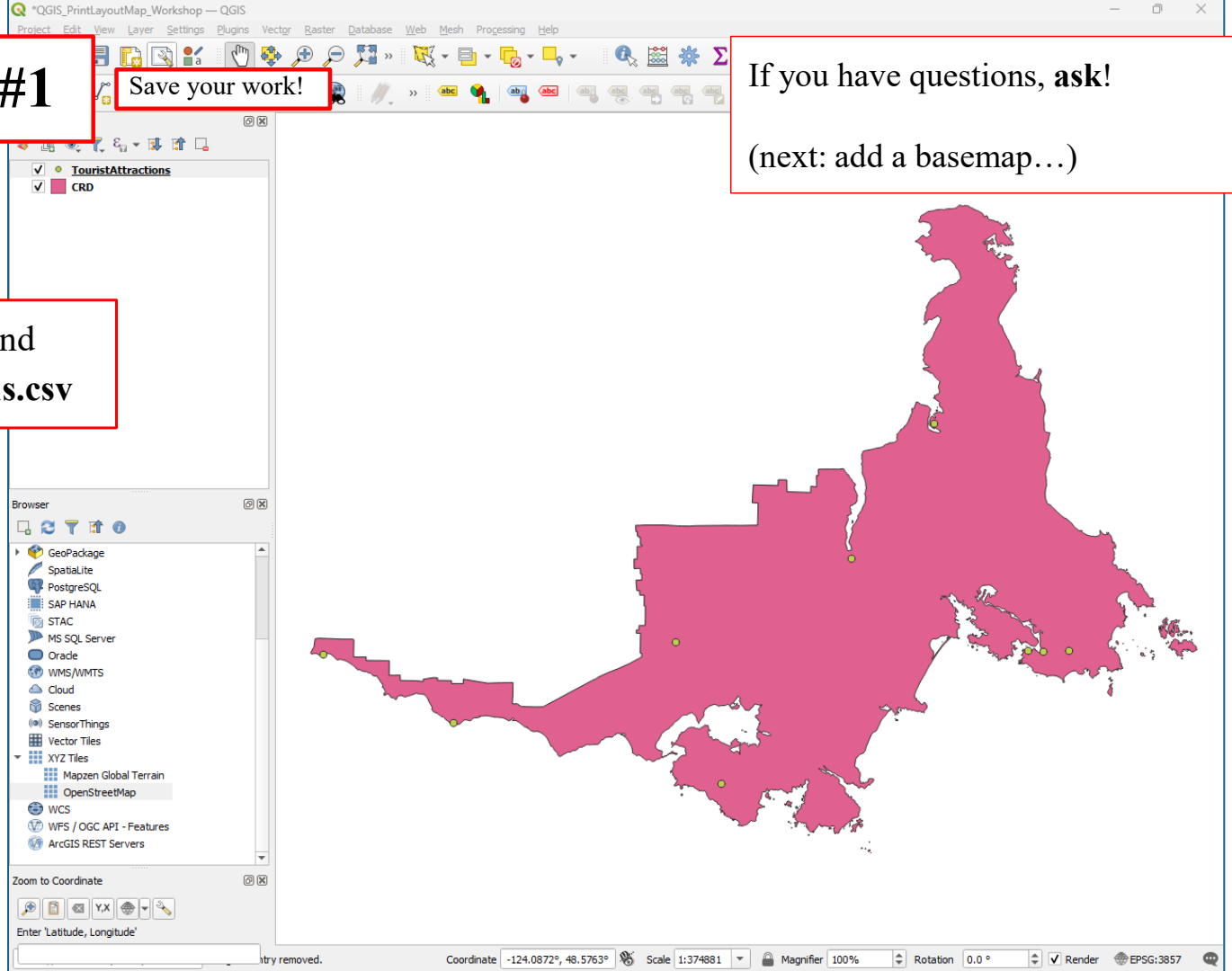
Save your work!

If you have questions, **ask**!

(next: add a basemap…)

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

Note: your colours might be different

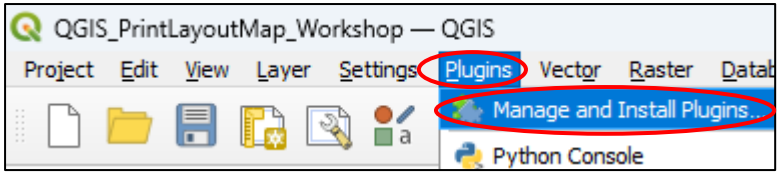


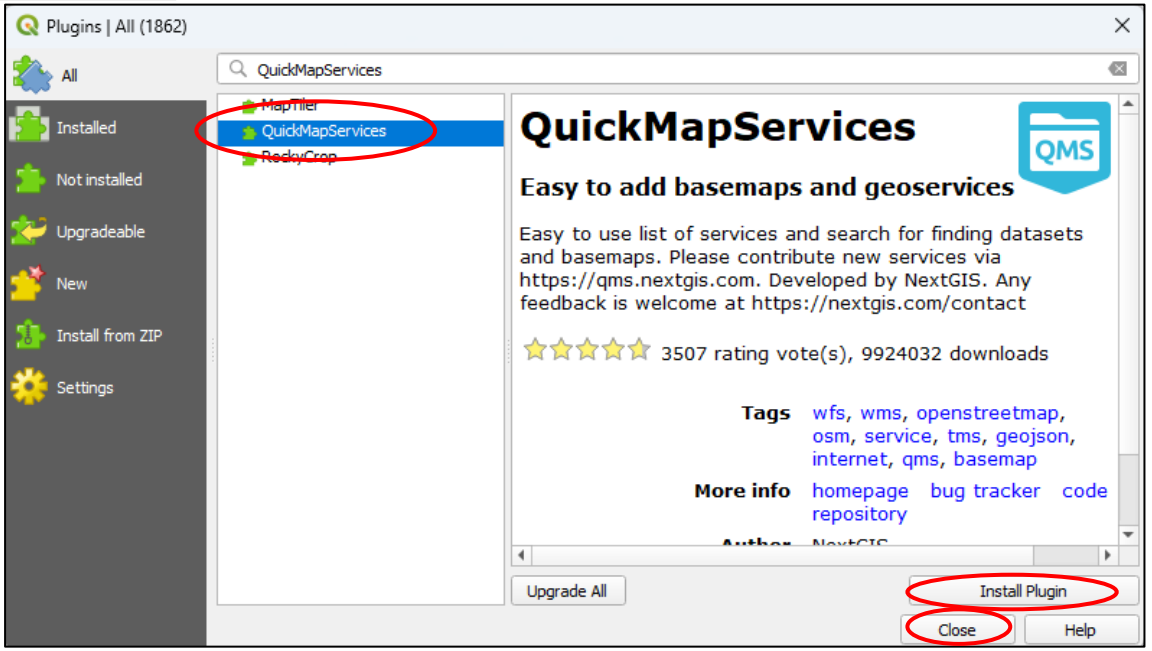
Activity #2

Add *QuickMapServices* plugin

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

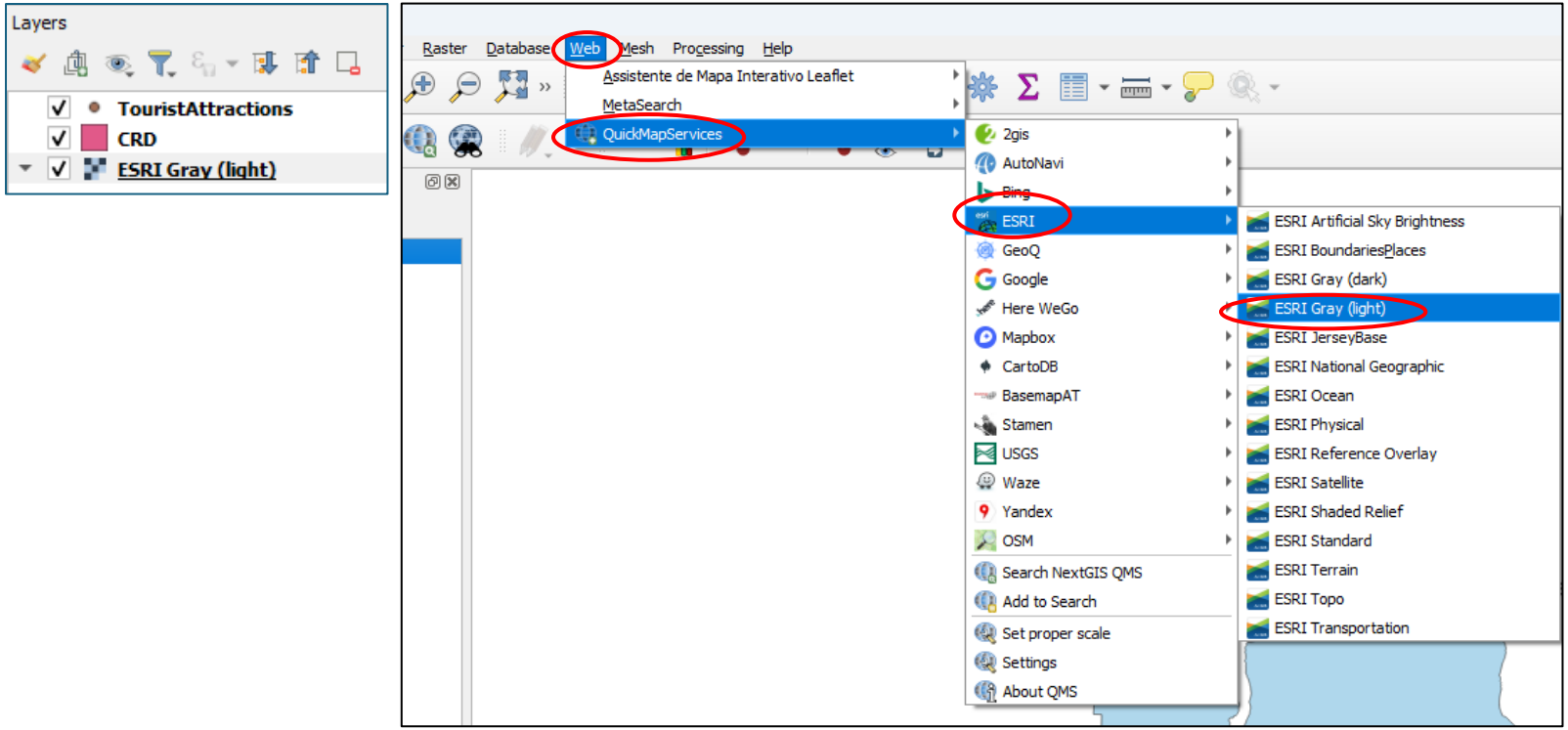
- In the *Menu* bar, select *Plugins,* then then *Manage and Install Plugin*
- Type “QuickMapServices”, select it, then *Install Plugin* and **close**





Add a basemap

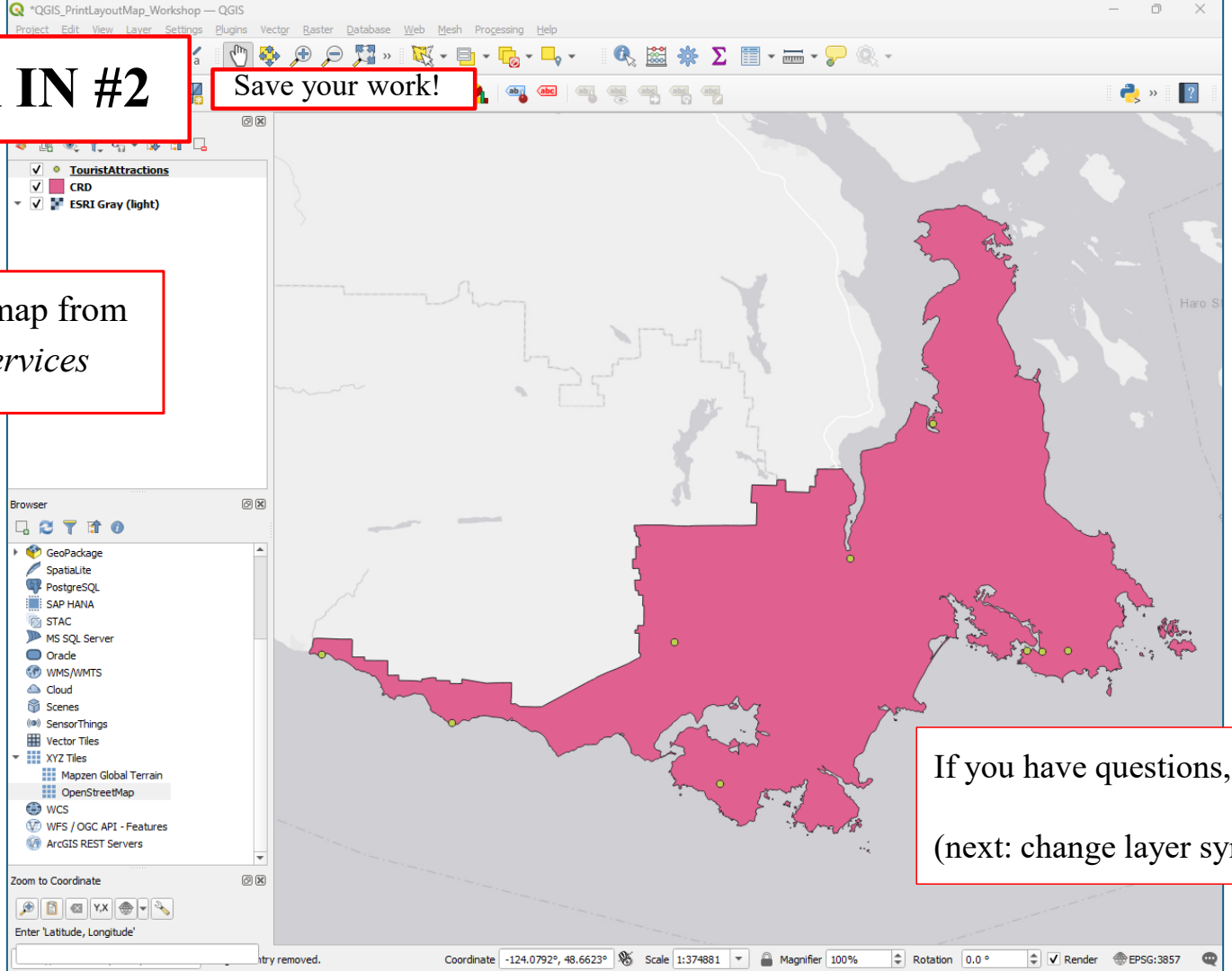
- In the *Menu* bar, select *Web,* then *QuickMapServices,* then *ESRI*, then *ESRI Gray (light)*
  - If you do not see the many map options go to *Web*, then *QuickMapServices,* then *Settings*, and under *More Services*, select *Get contributed pack* and **ok**
- In *Layers,* make sure *ESRI Gray (light)*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



CHECK IN #2

Save your work!

- Added basemap from *QuickMapServices*



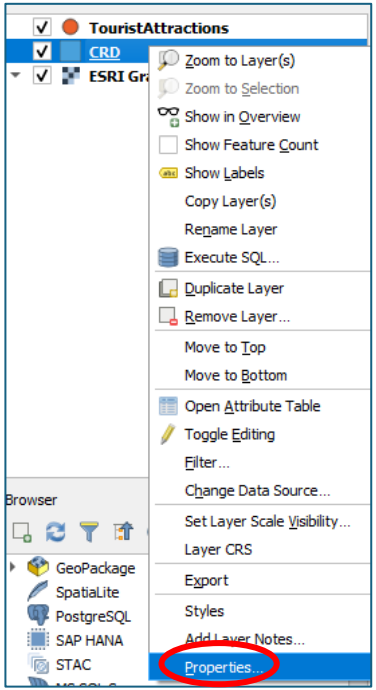
If you have questions, **ask**!

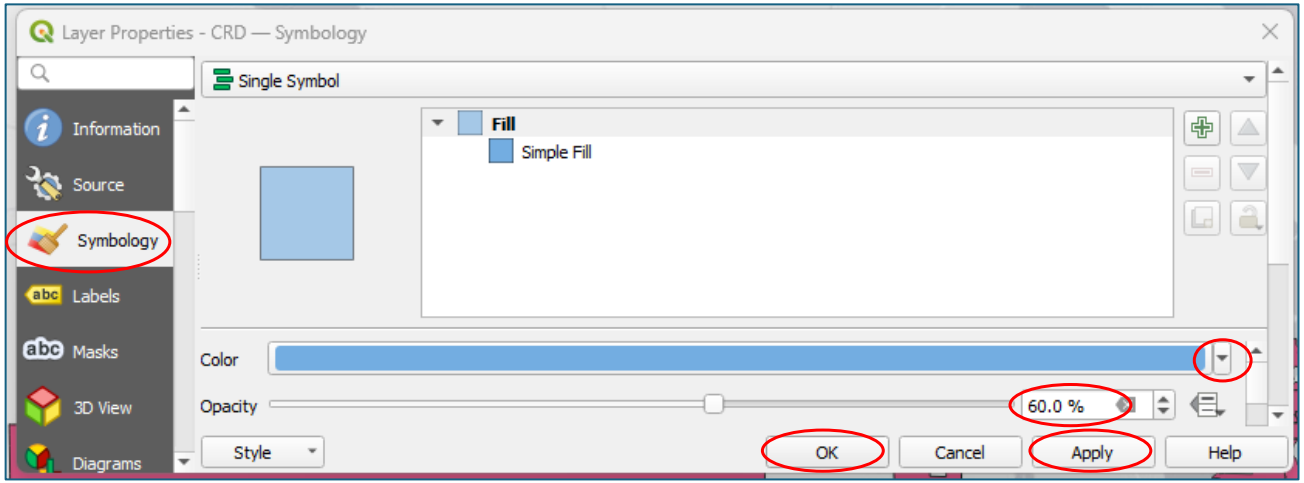
(next: change layer symbology…)

Activity #3

Change CRD.shp symbology

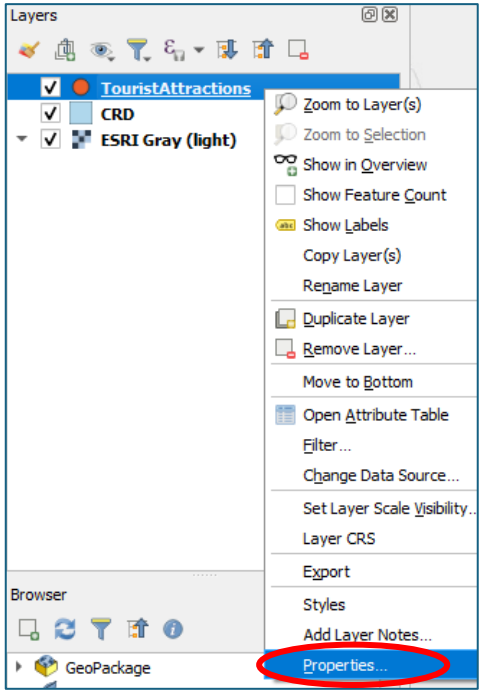
- In the *Layers* panel right click **CRD**
- Select *Properties* and then *Symbology*
- With *Colour* field, click the arrow and use colour palette to select colour of your choice
- Set *Opacity* to 60%
- **Apply** and **OK**

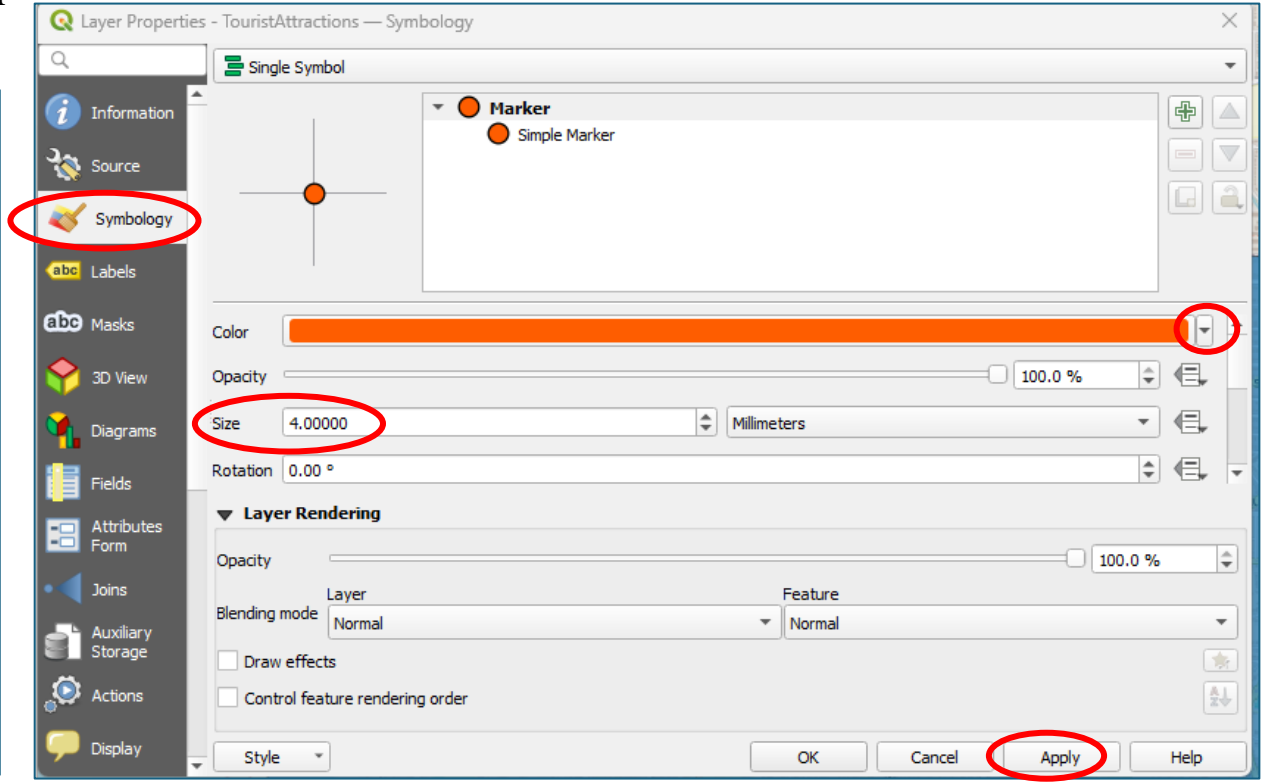




Change TouristAttractions.csv symbology

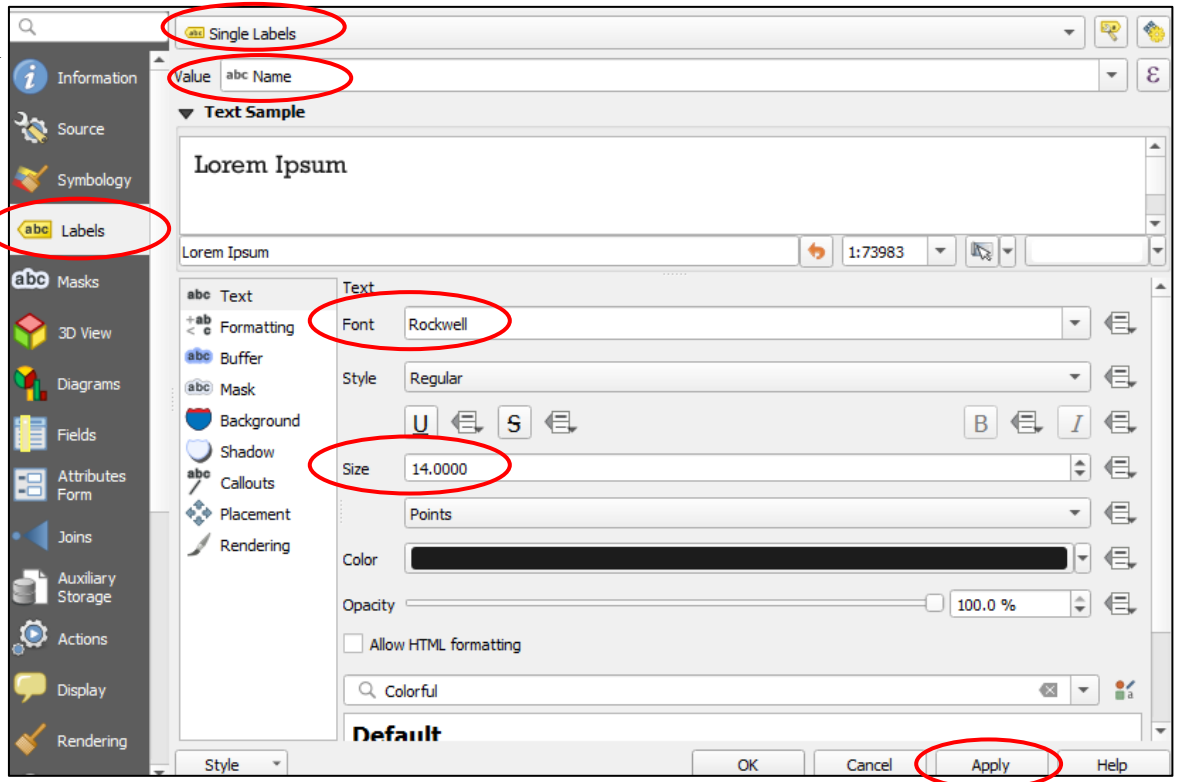
- In the *Layers* panel right click **TouristAttractions**
- Select *Properties* and then *Symbology*
- Change *Size* to 4.0
- Change *Colour* to a visible colour
- click **Apply** but not OK yet





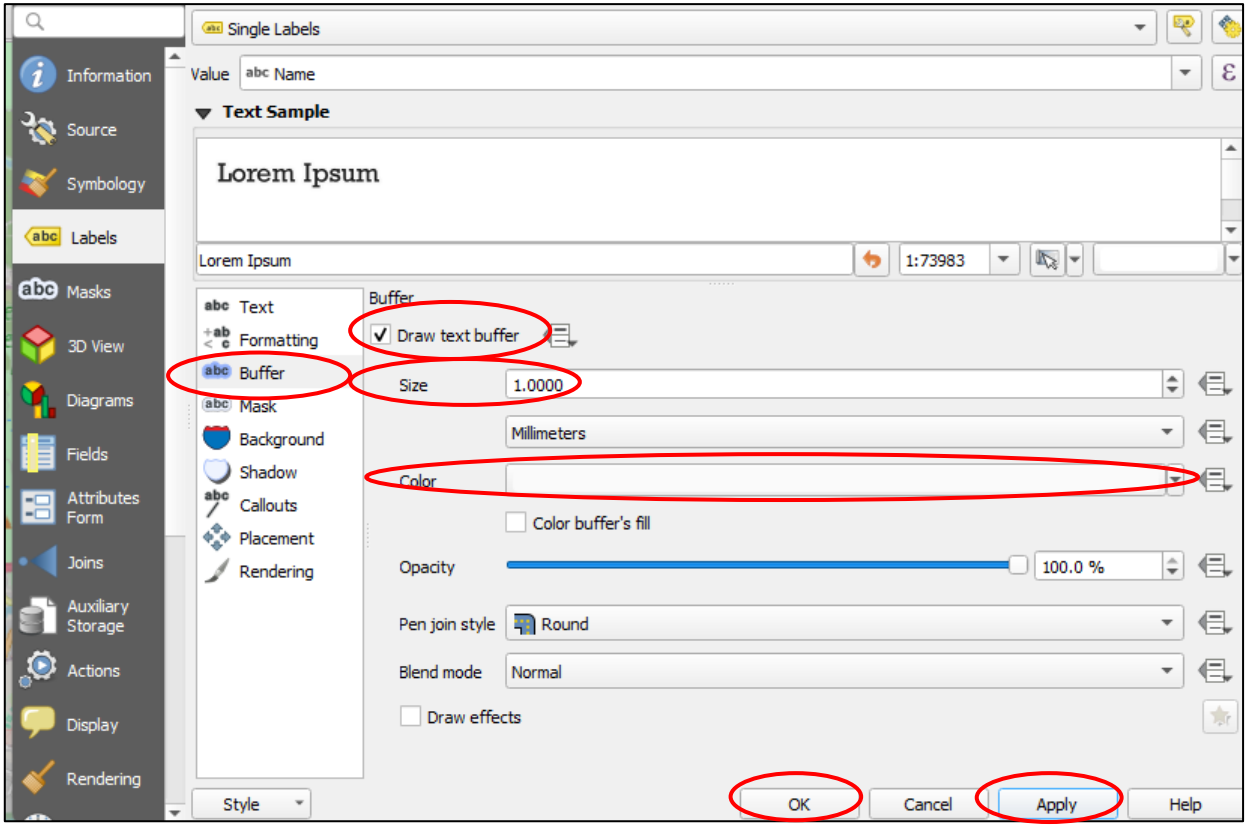
Label TouristAttractions.csv

- 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)

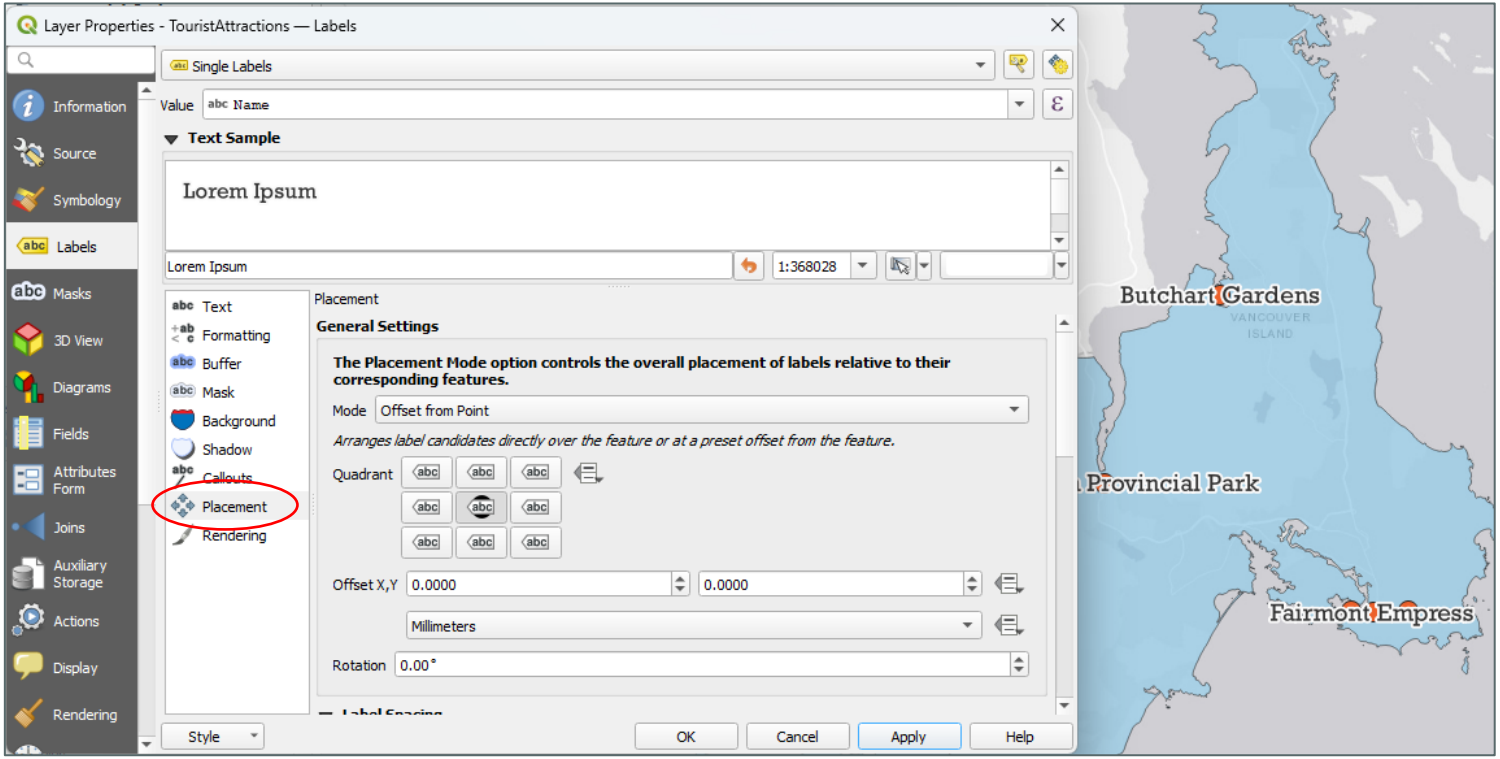
- While still in *Labels,* select “Buffer”
- Check “Draw text buffer” box
- *Size* 1.0 and *Colour* white
- **Apply** and **OK**



can also change *Placement* of Labels to be offset from points,

have Labels stacked instead of a long string, change location of labels…etc…

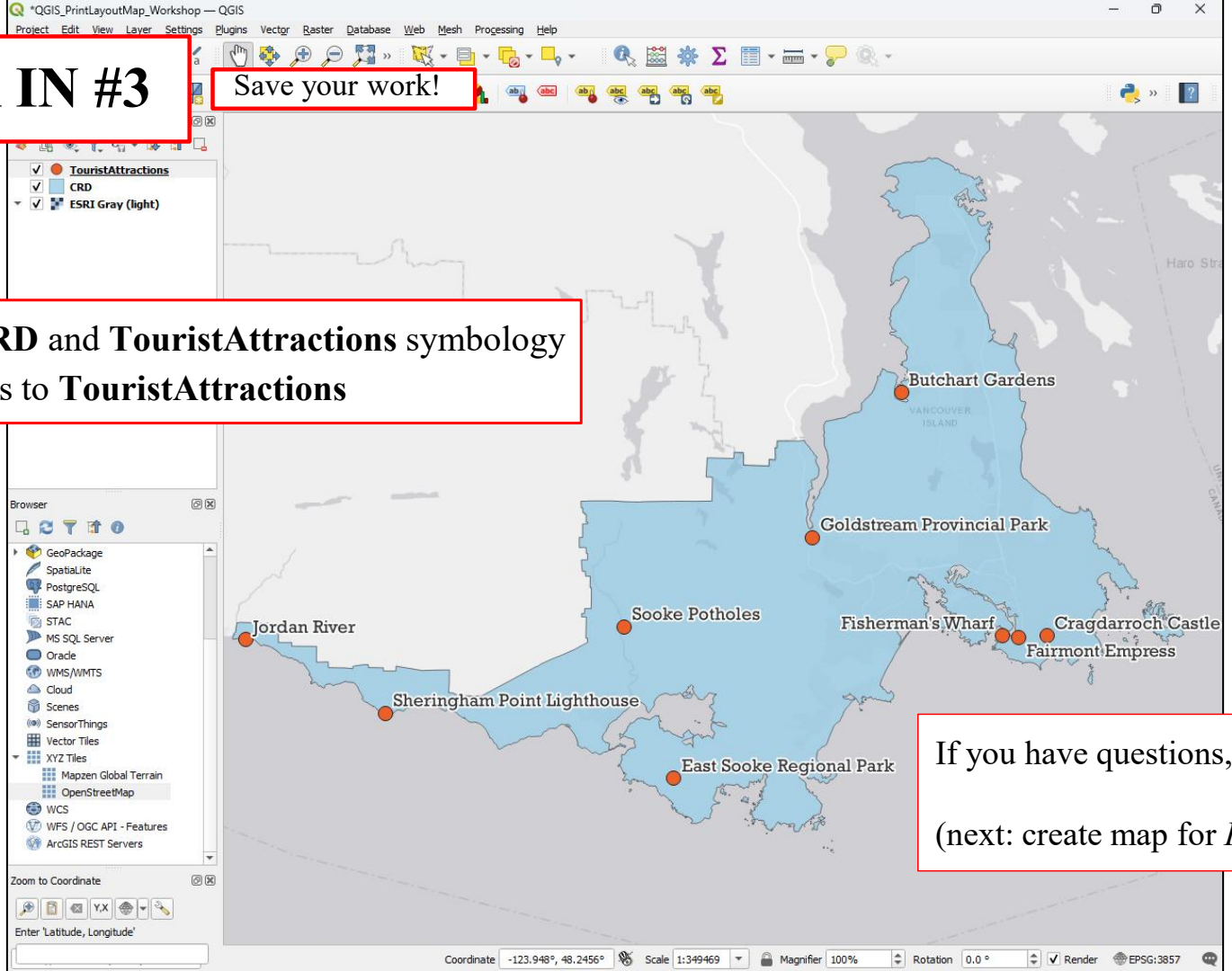
But won't today…



CHECK IN #3

Save your work!

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

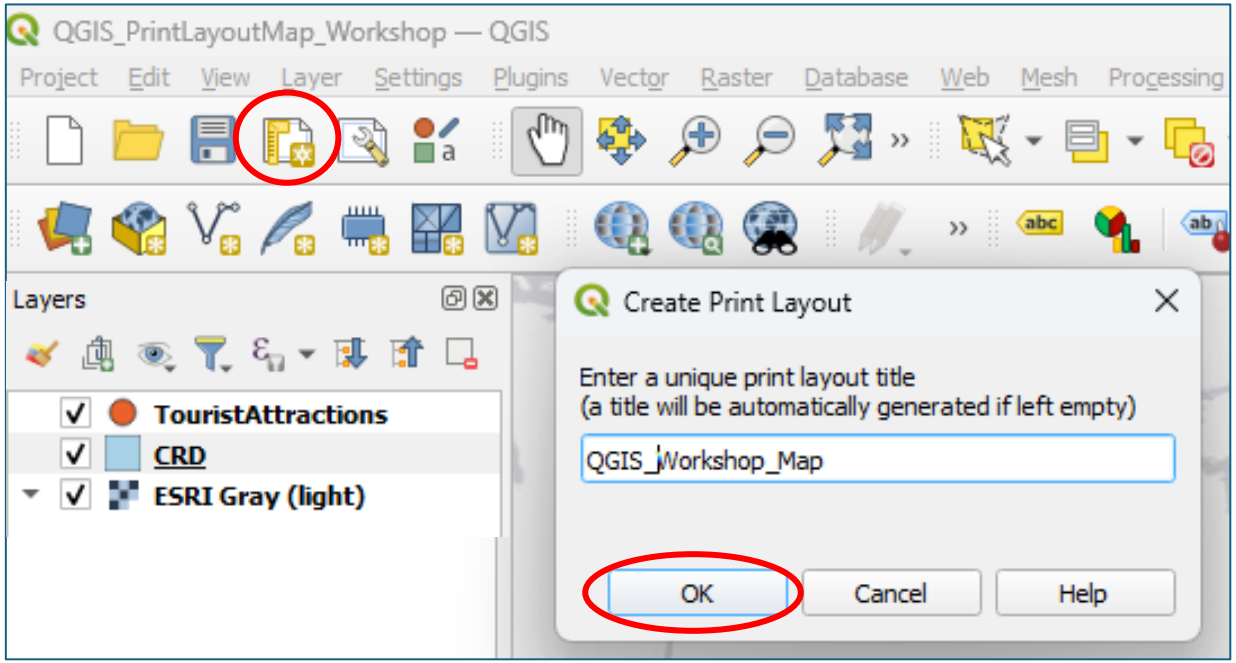


If you have questions, **ask**!

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

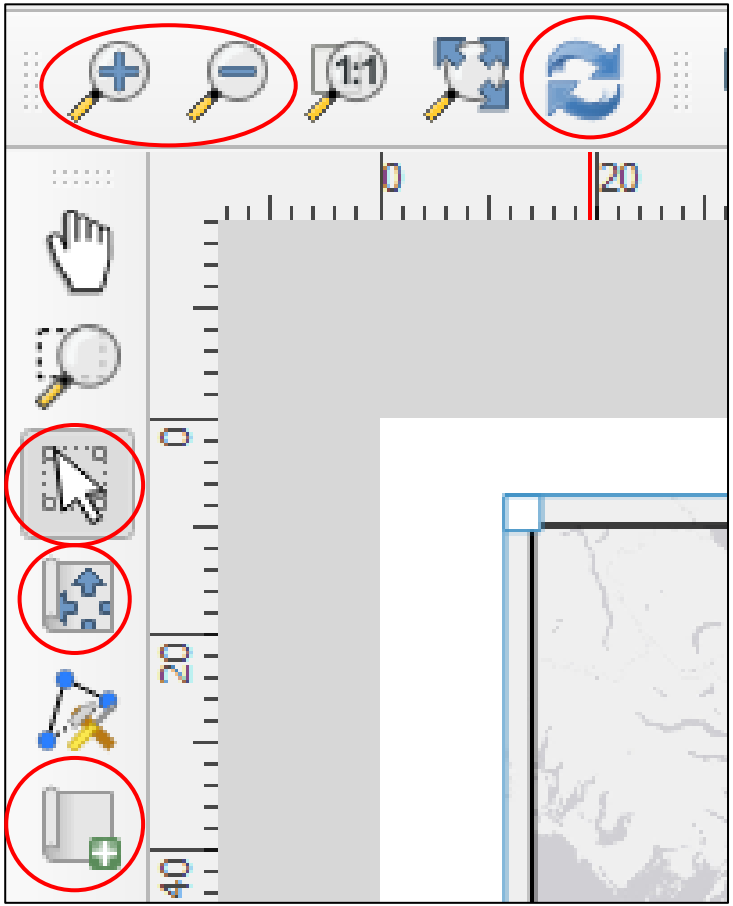
Activity #4

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*

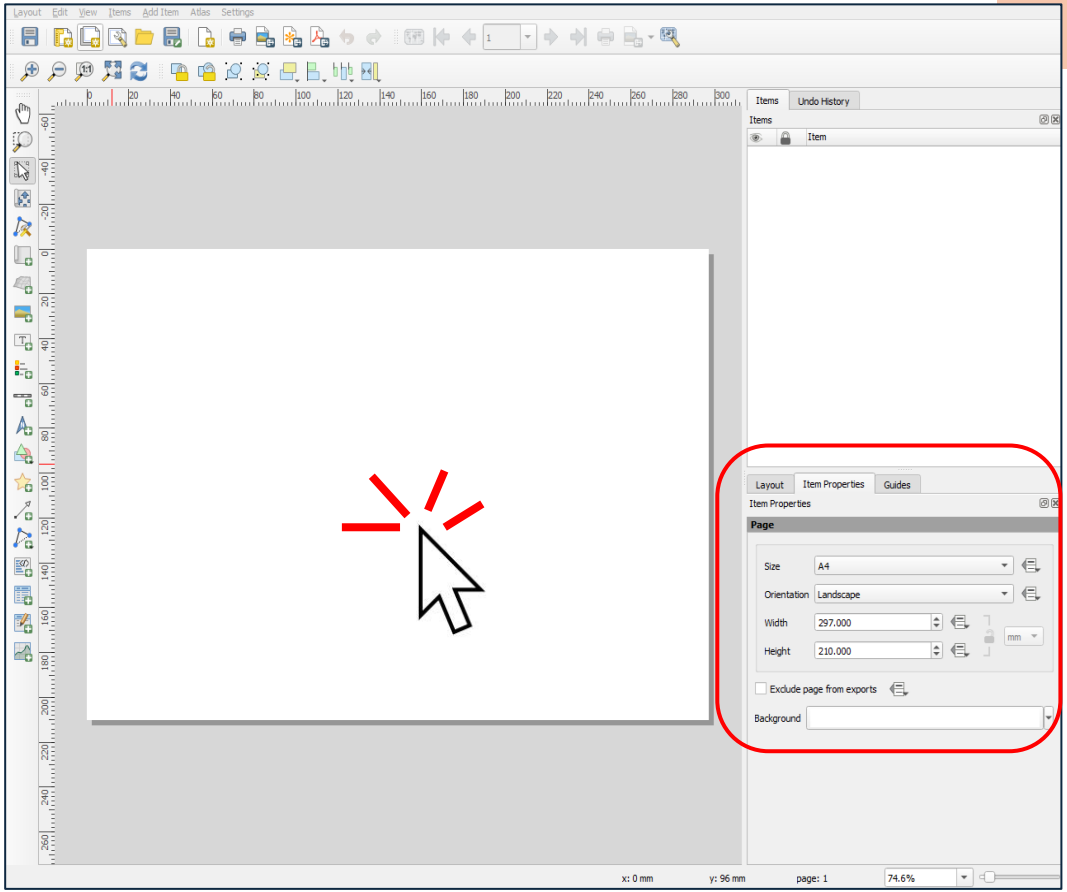
Move Item Content: move the map itself

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

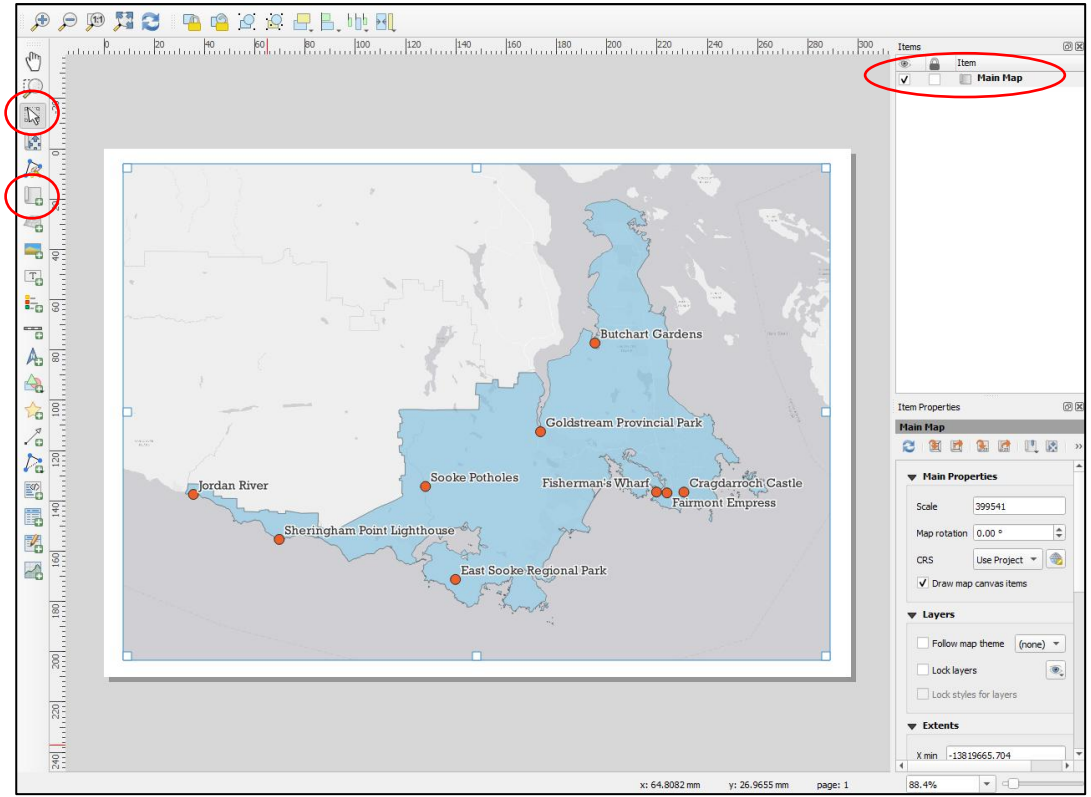
Add map: add map to print layout: click and drag to draw map on white sheet

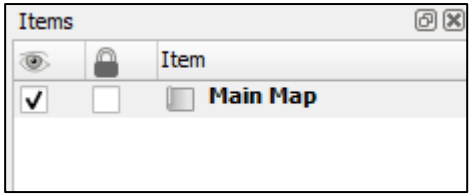
- *Print Layout* will open in a new window
- Can go back and forth between main *QGIS* window and *Print Layout* window
- Can change page size, orientation, background, etc. by **clicking on white ccanvas** and viewing *Item Properties*
    - Leave as default: A4, Landscape, white background



Add Map

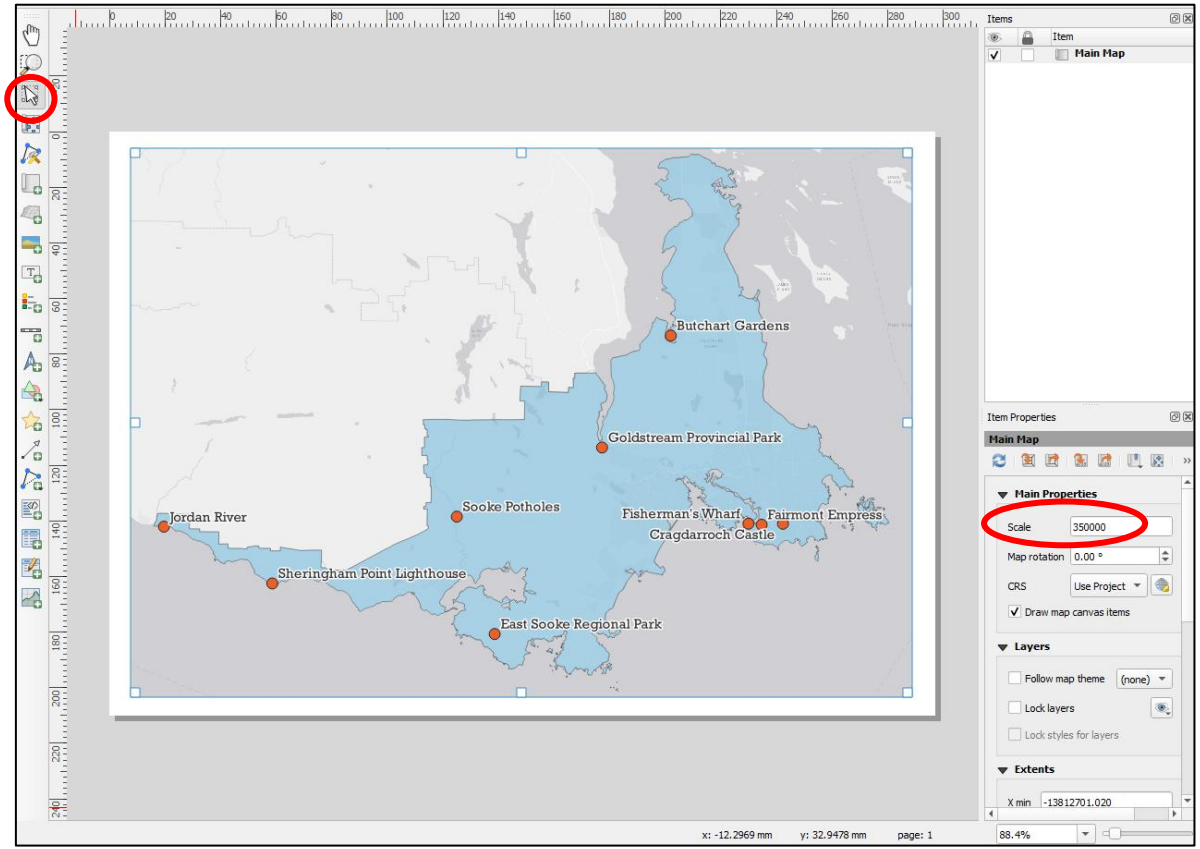
- In the *Toolbar,* select *Add Map*  and click and drag to draw the map over the print layout, leaving some space at the edges
- Under *Items*, double-click on **Map 1** text and rename to **"Main Map"**





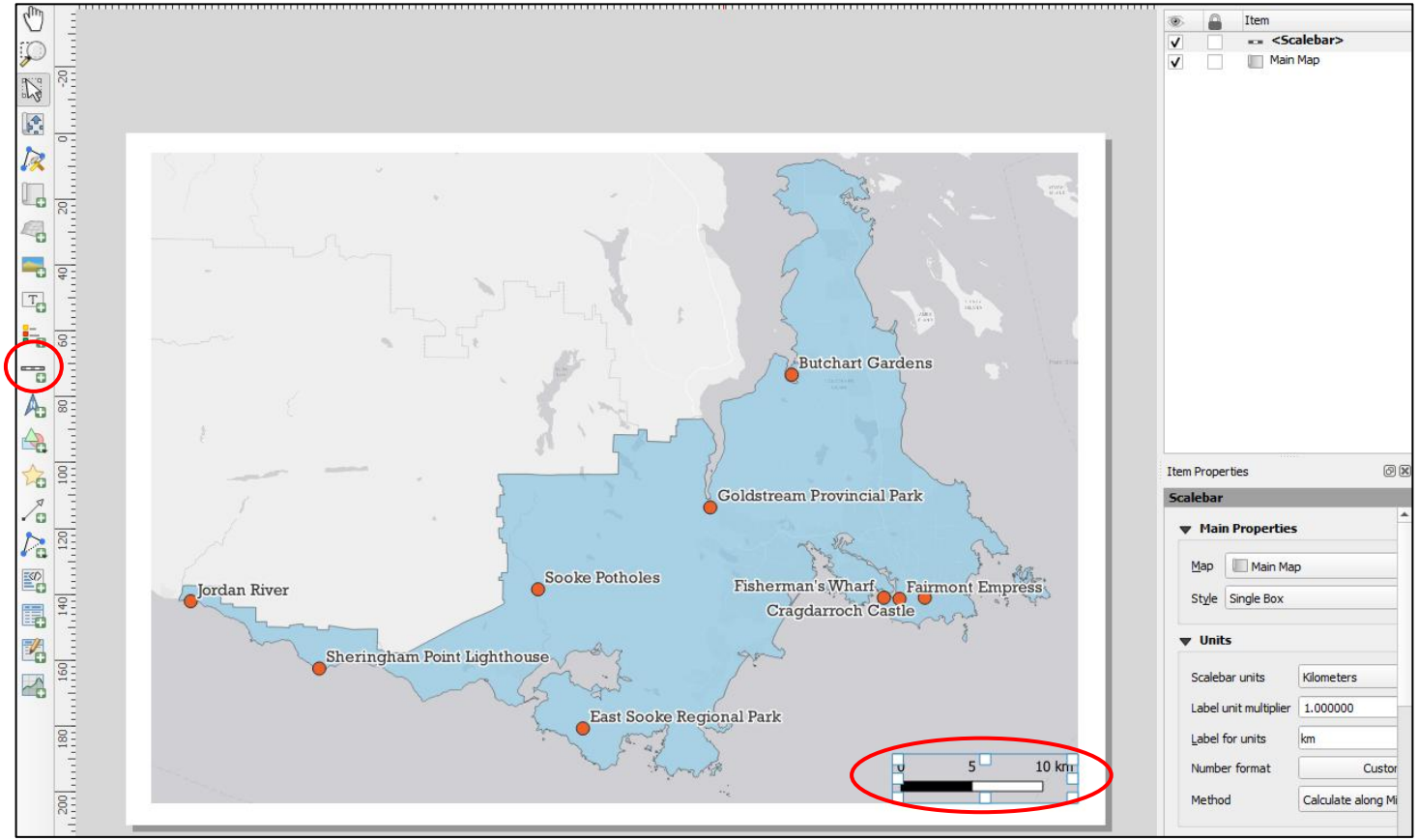
Change Scale

- 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



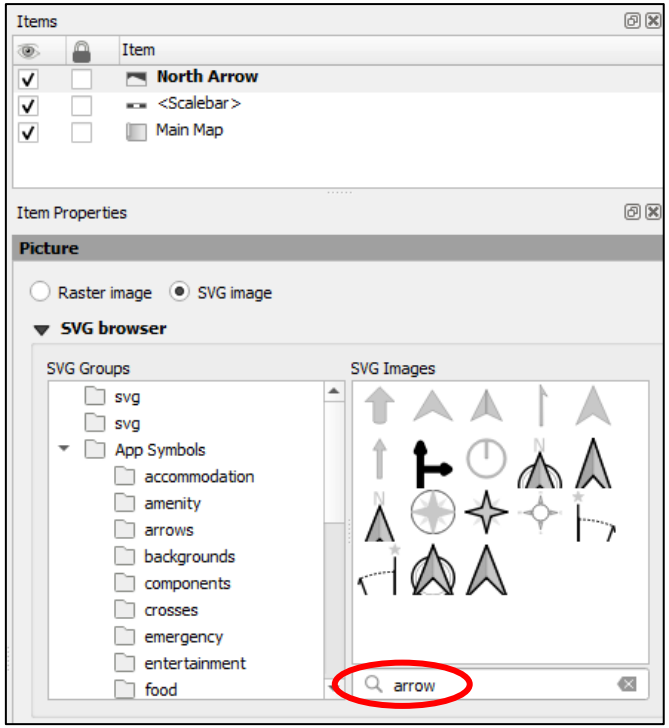
Add scale bar

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



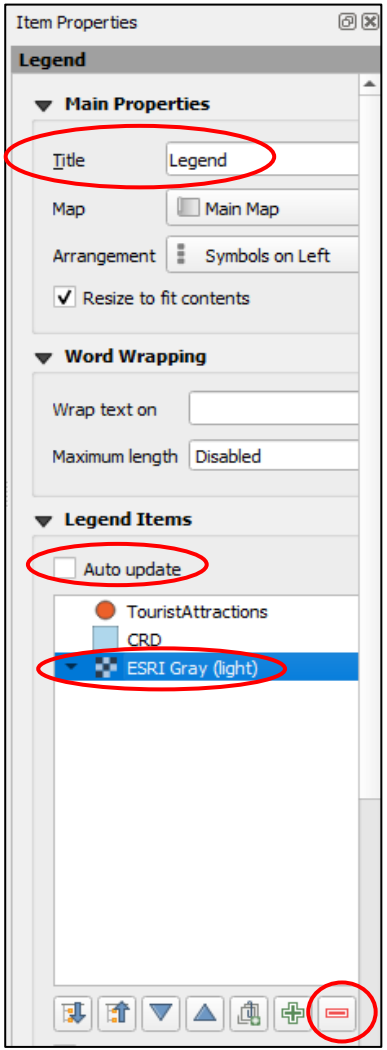
Add north arrow

- 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.



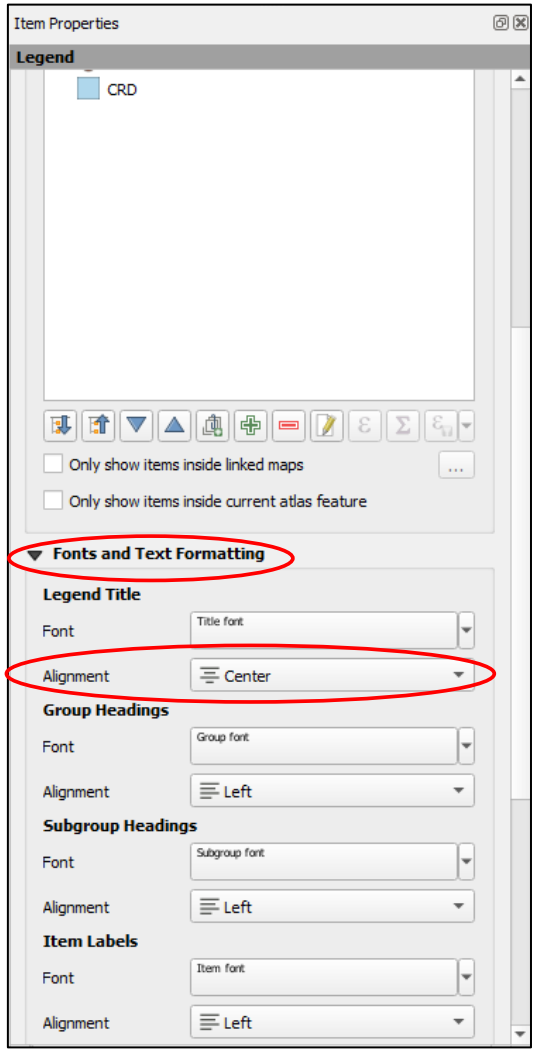
Add legend

- 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



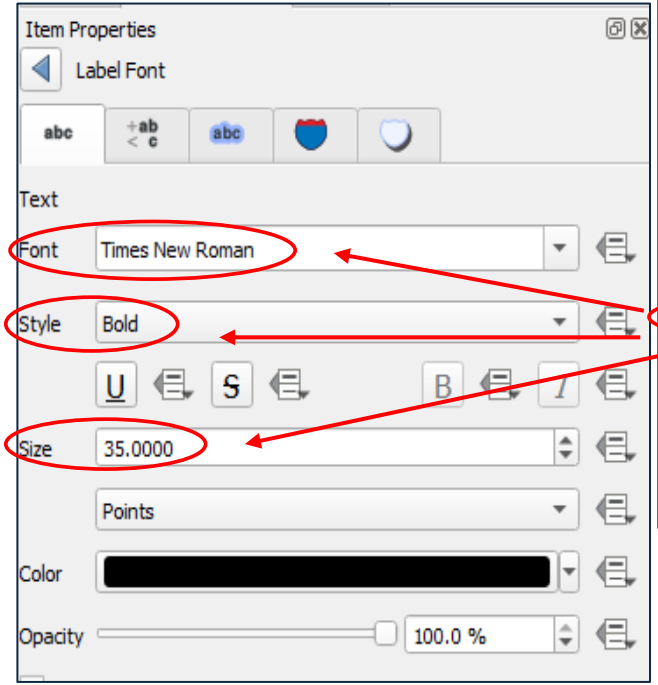
Change Legend alignment

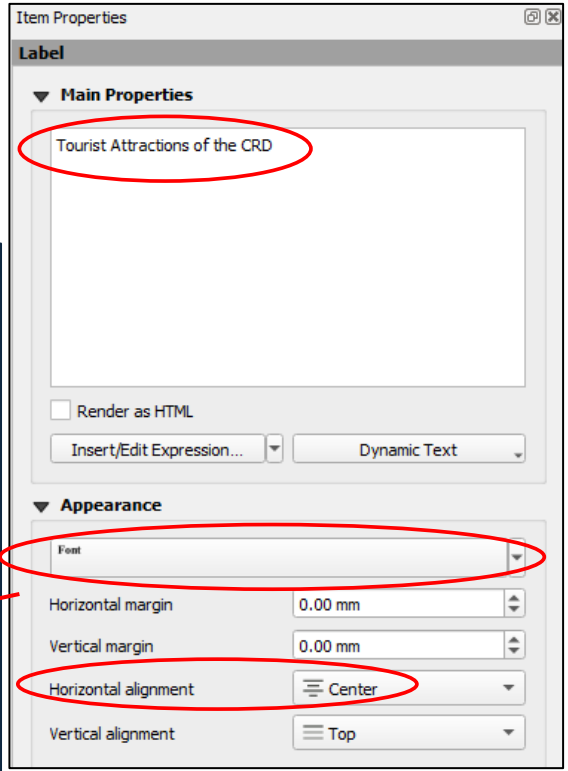
- Under *Fonts and Text Formatting* and *Legend Title,* change *Alignment* to “Center”
- Many options to change fonts, size, alignments, etc.



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.



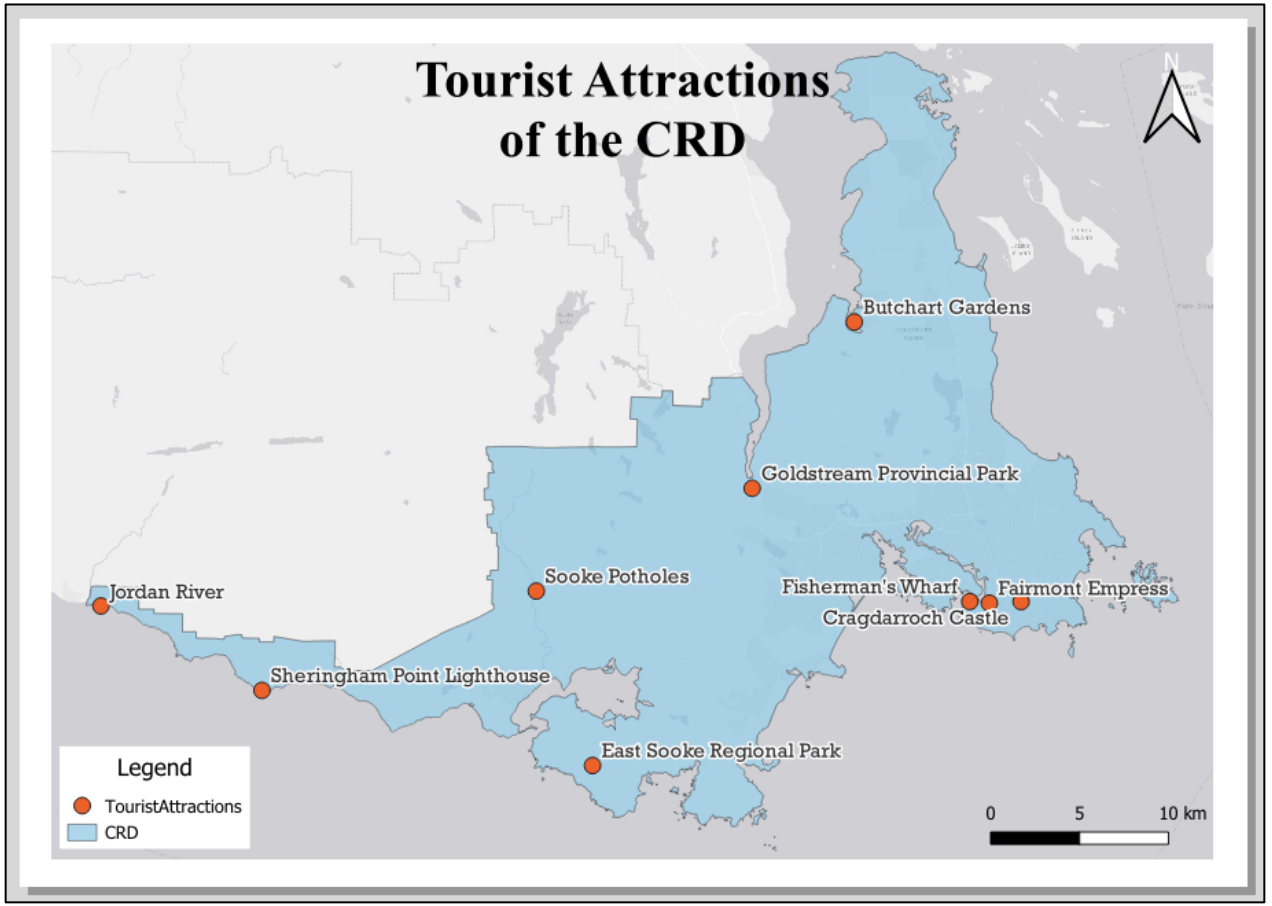


CHECK IN #4

Save your work!

Added:

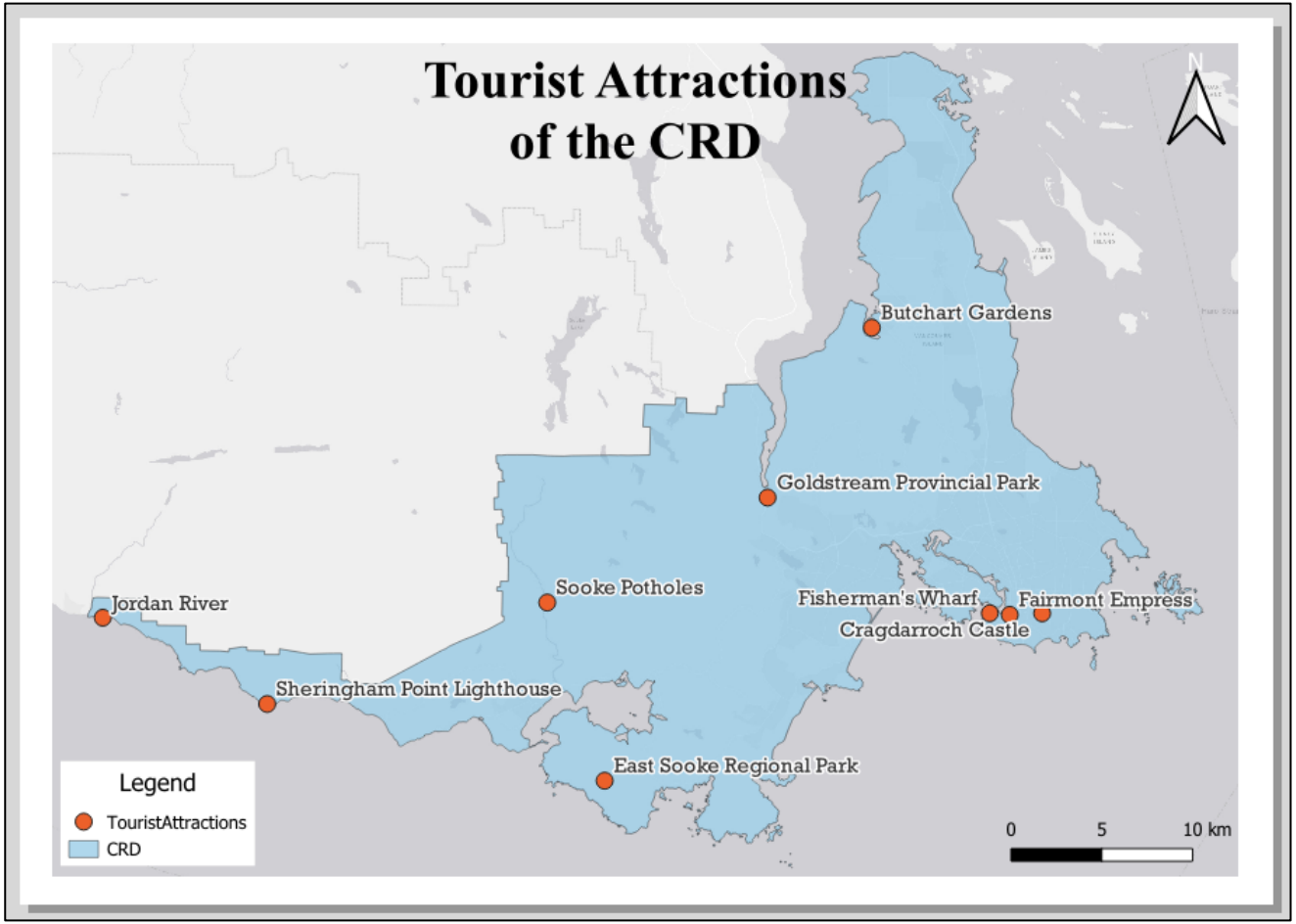
- Scale bar
- North arrow
- Legend
- Title



Congratulations!

Next: add overview inset map… if desired…

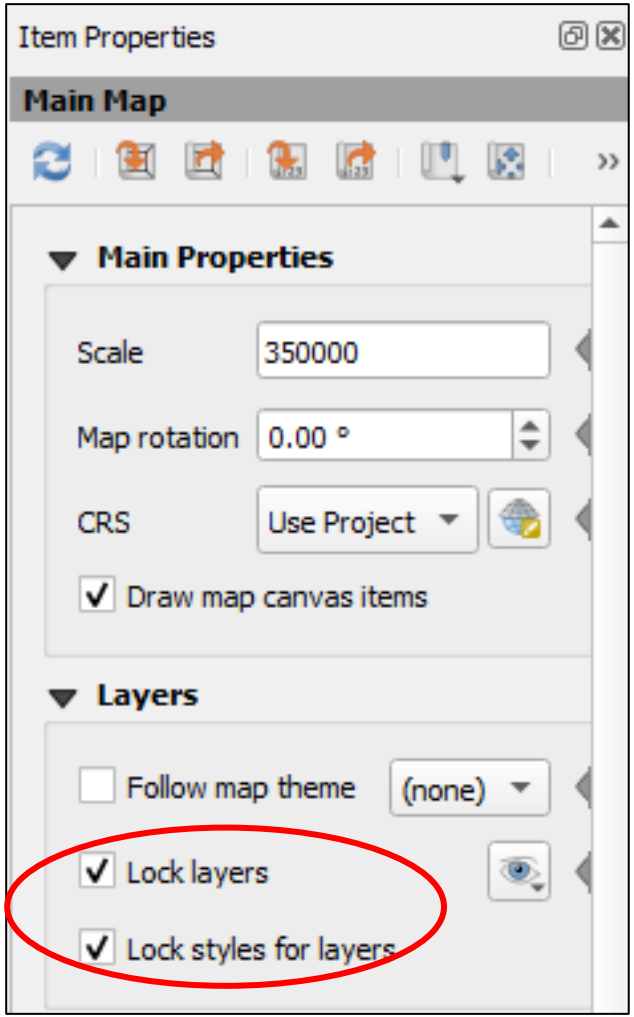
If not, skip to “Export Map” (Activity #8, slide 55)



Activity #5

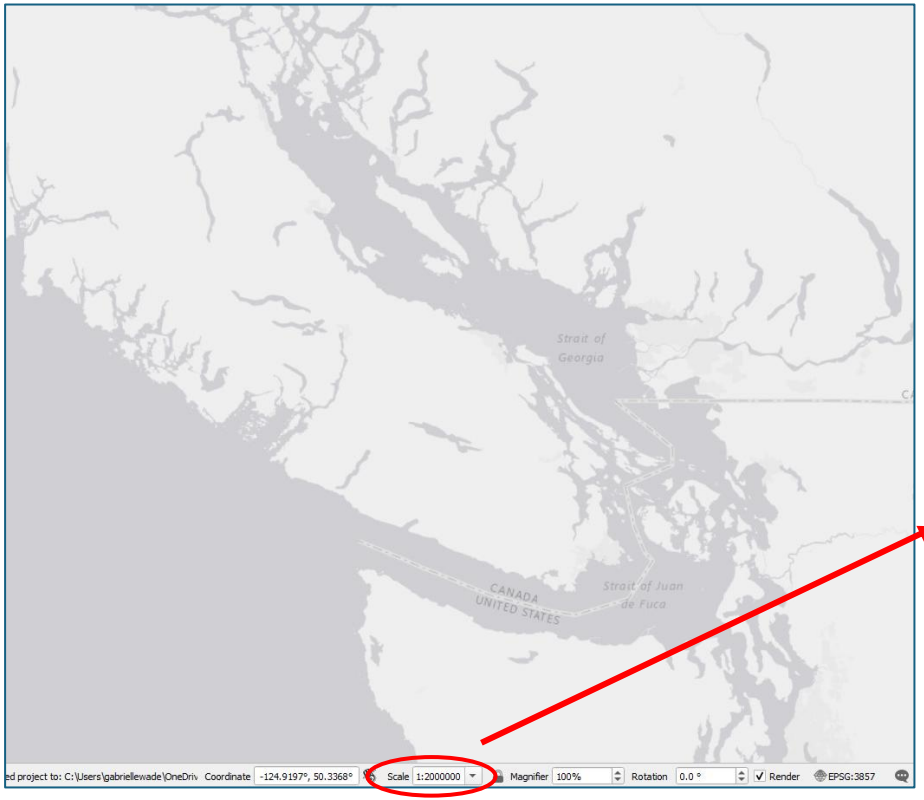
Lock map

- 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



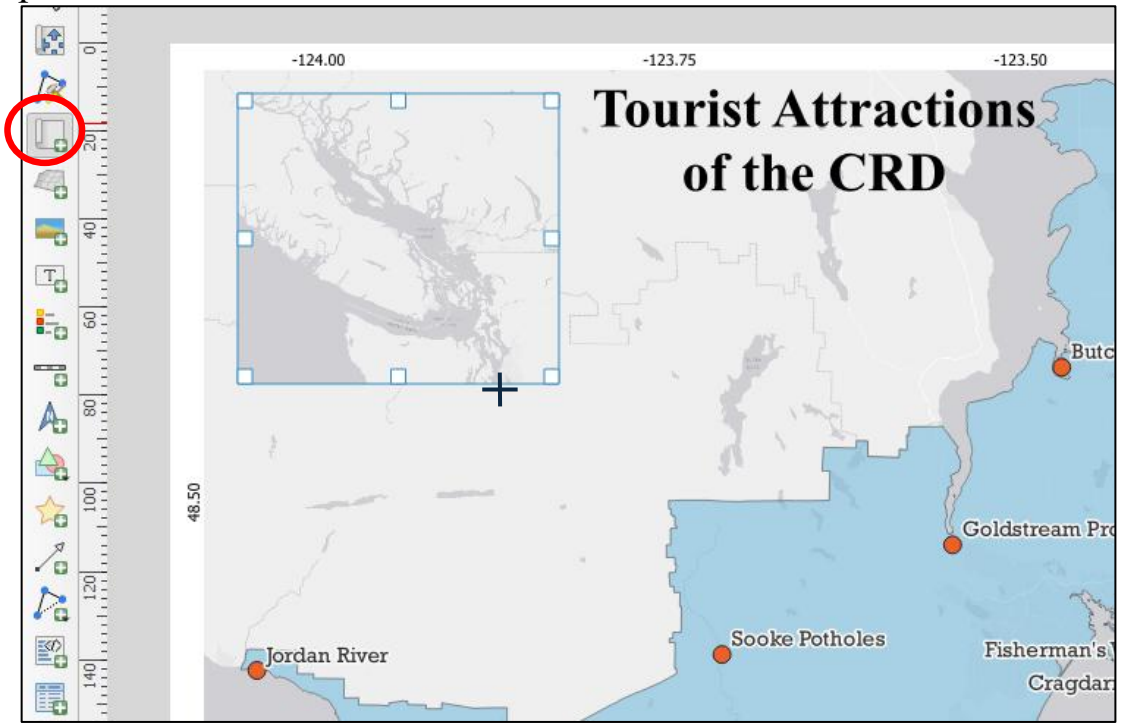
Set map to overview layout

- 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



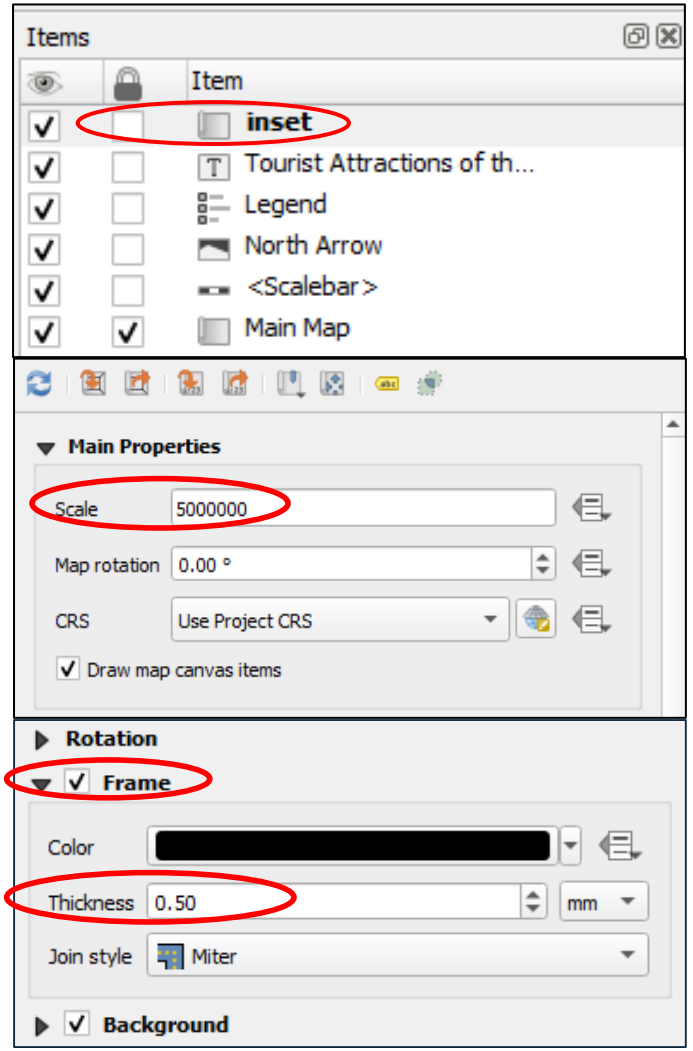
Set map to overview layout

- 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



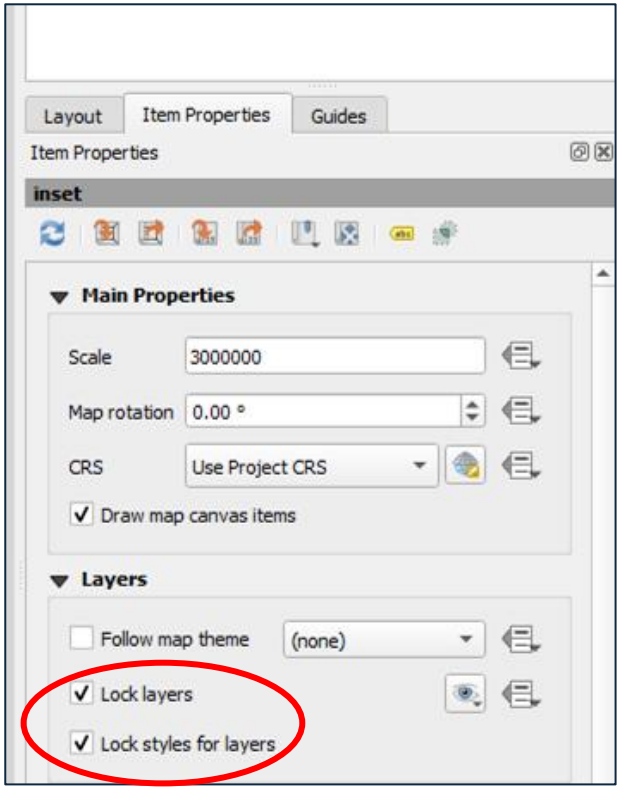
View Item

- 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:



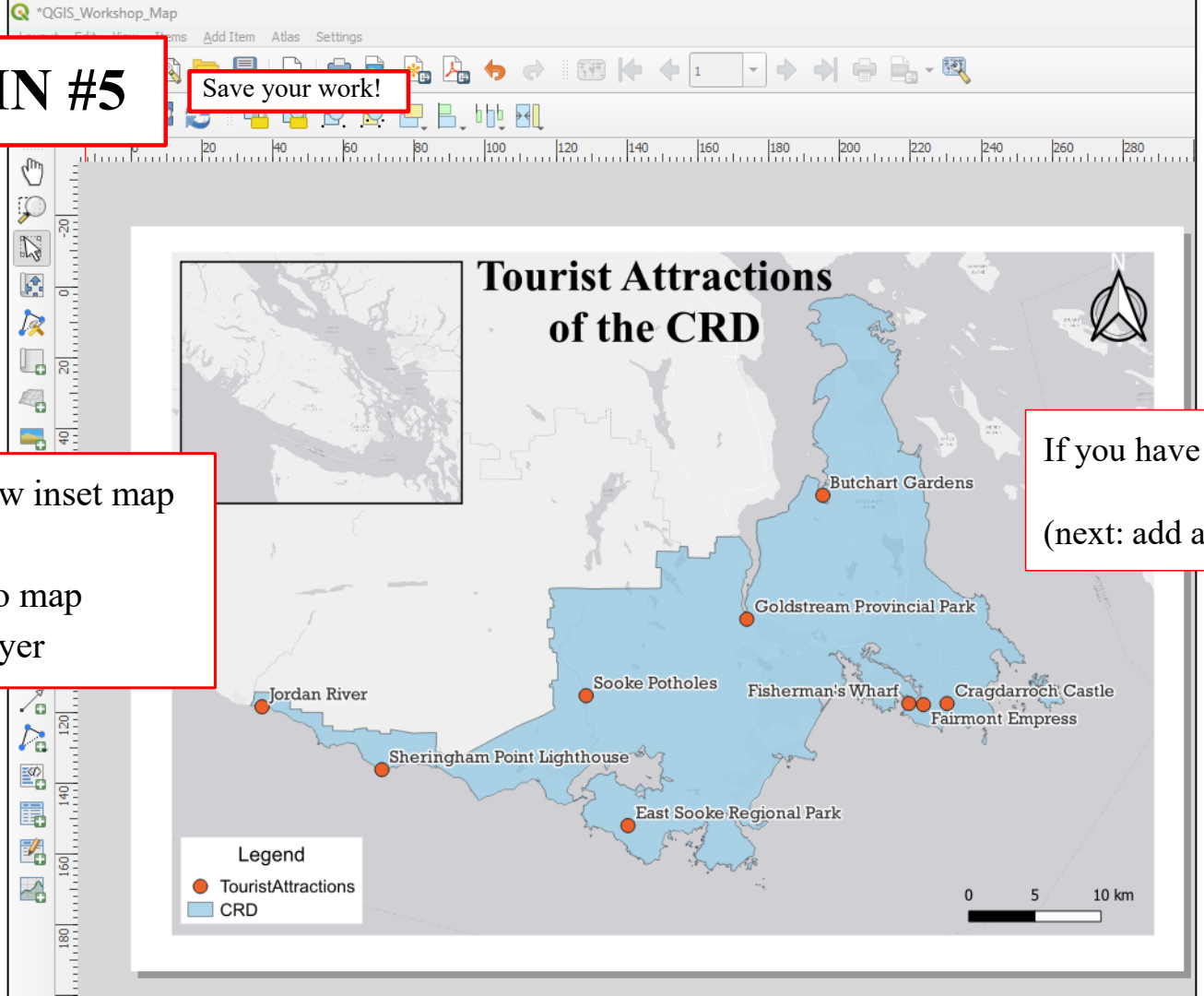
Lock layer

- 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**!

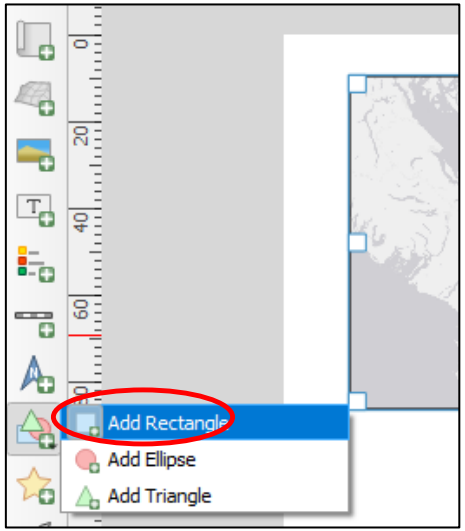
(next: add a shape…)

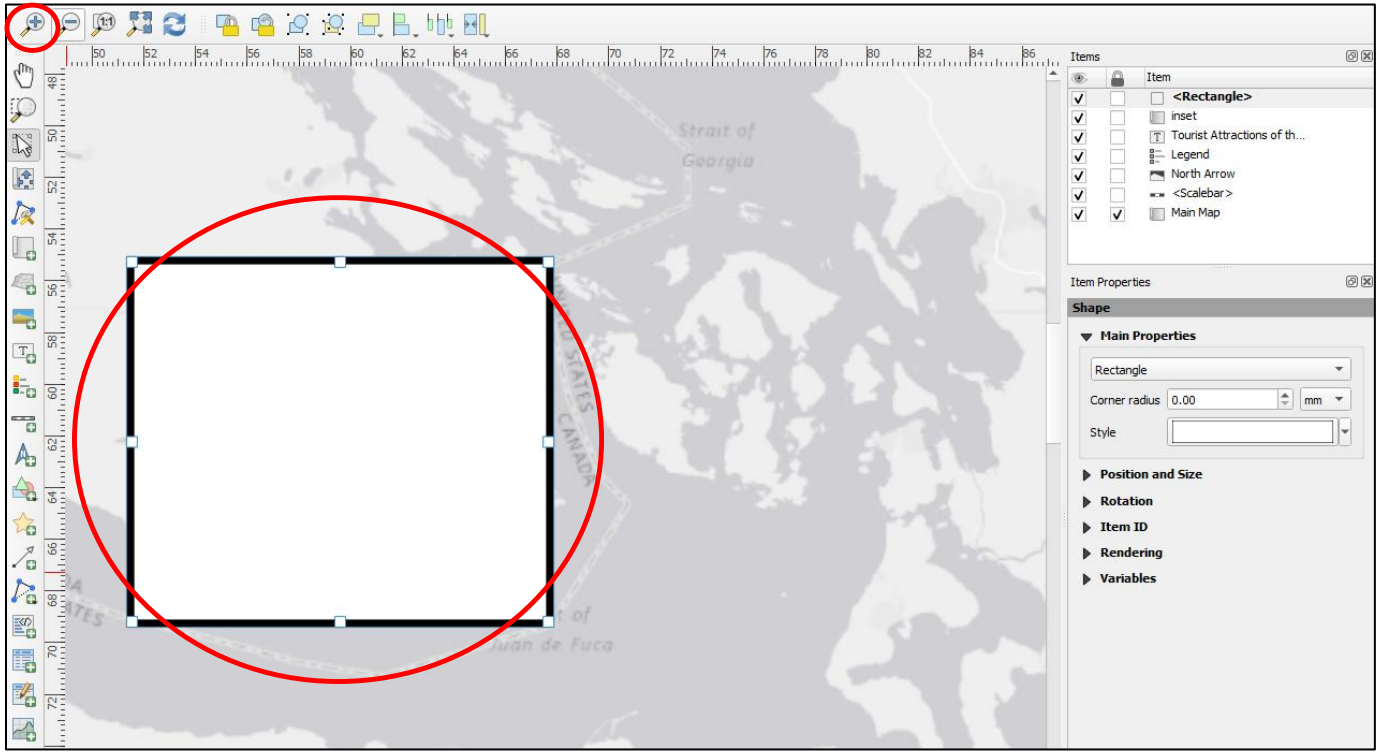
Activity #6

Add shape

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

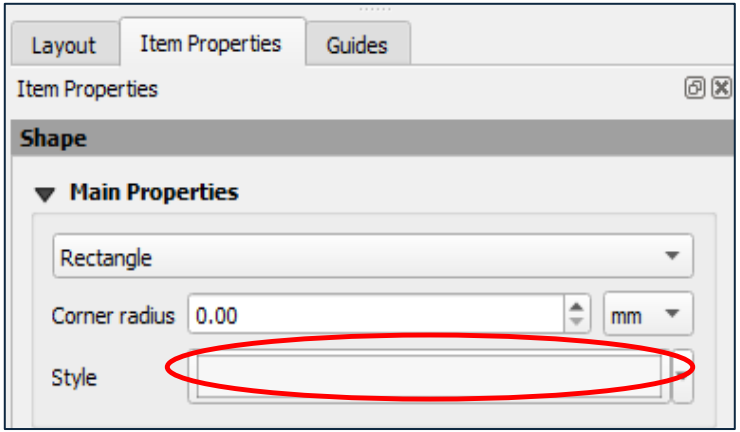
- Select *Add shape* tool and *Add Rectangle*
- Use *Zoom* to zoom the layout
- Click and drag to draw rectangle around the study area

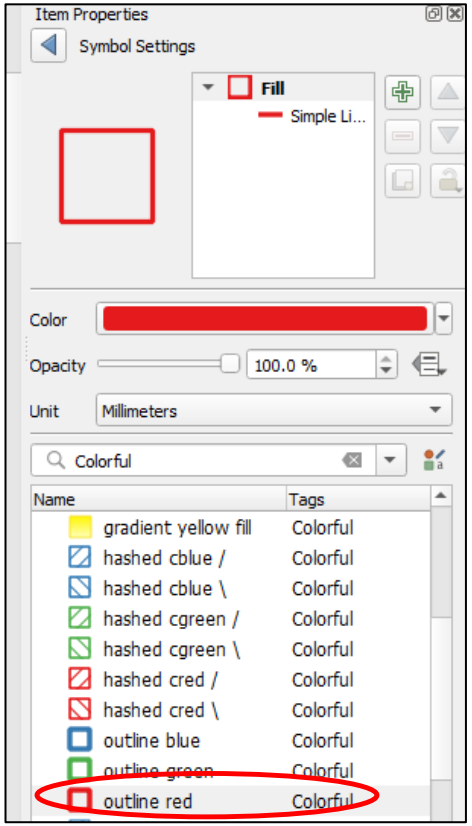


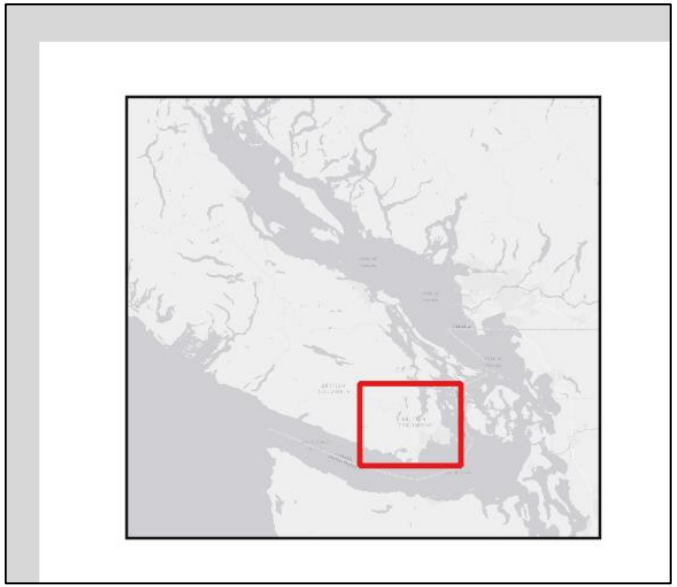


Change shape symbology

- 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.

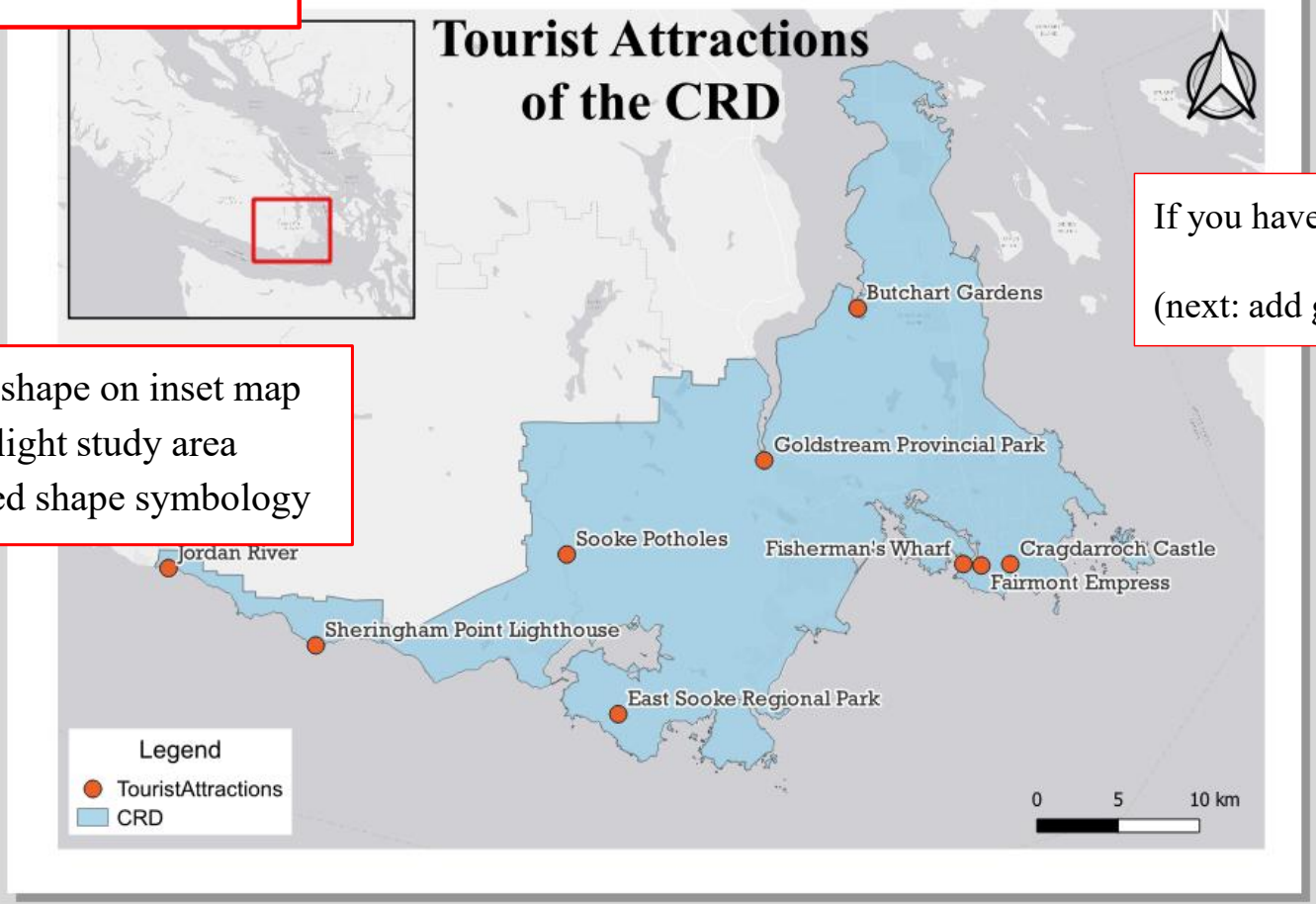






CHECK IN #6

Save your work!



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

If you have questions, **ask**!

(next: add grid/coordinates…)

Items

		Item
✓		Tourist Attractions of th...
✓		<Rectangle>
✓		Map 2
✓		Legend
✓		North Arrow
✓		<Scalebar>
✓		Main Map

Item Properties

Congratulations!

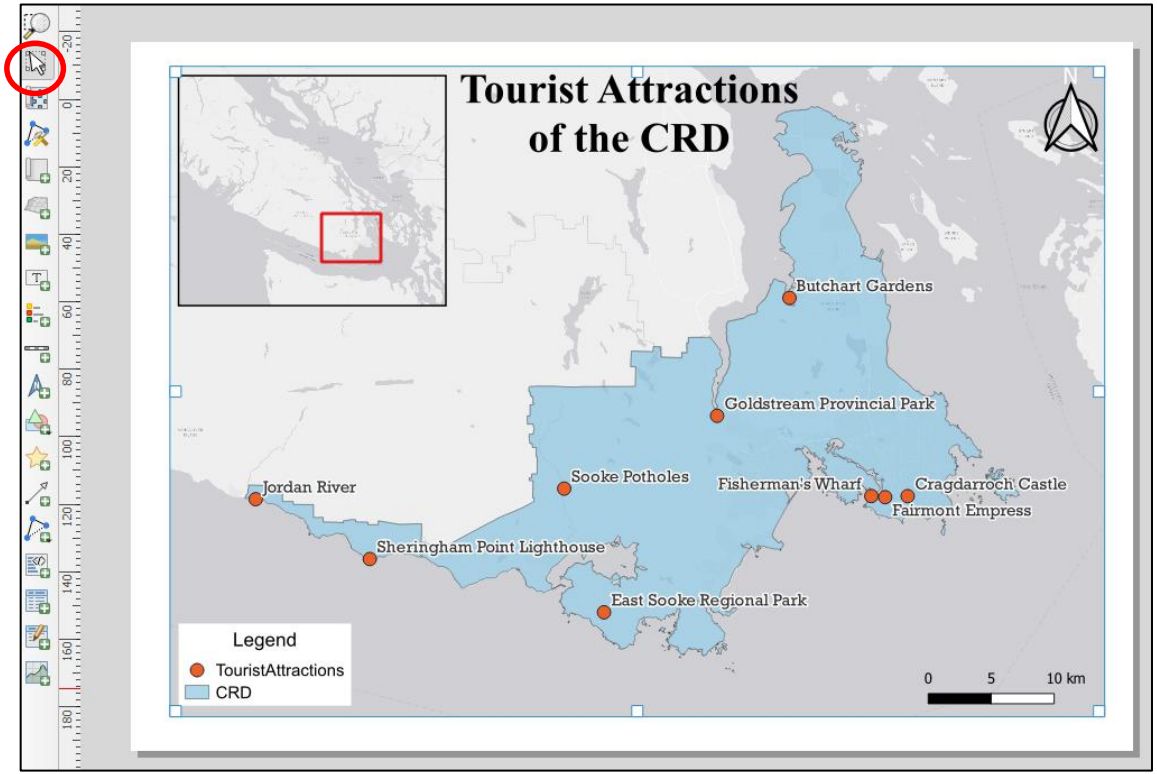
Next: add grid coordinates … if desired…

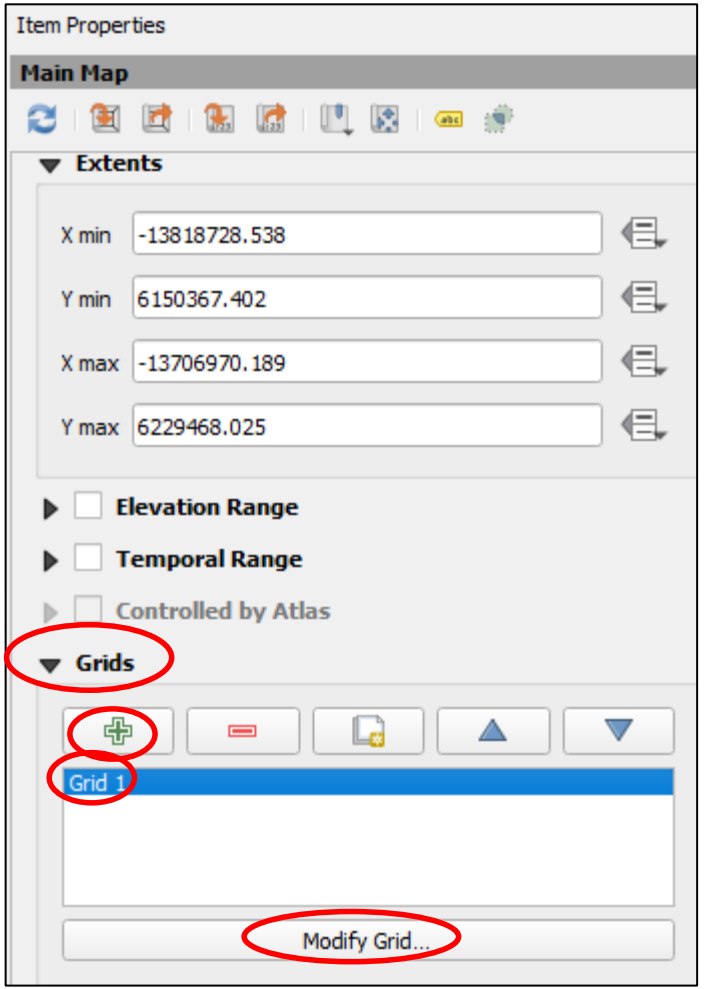
If not, skip to “Export Map” (Activity #8, slide 55)

Activity #7

Add grid and coordinates

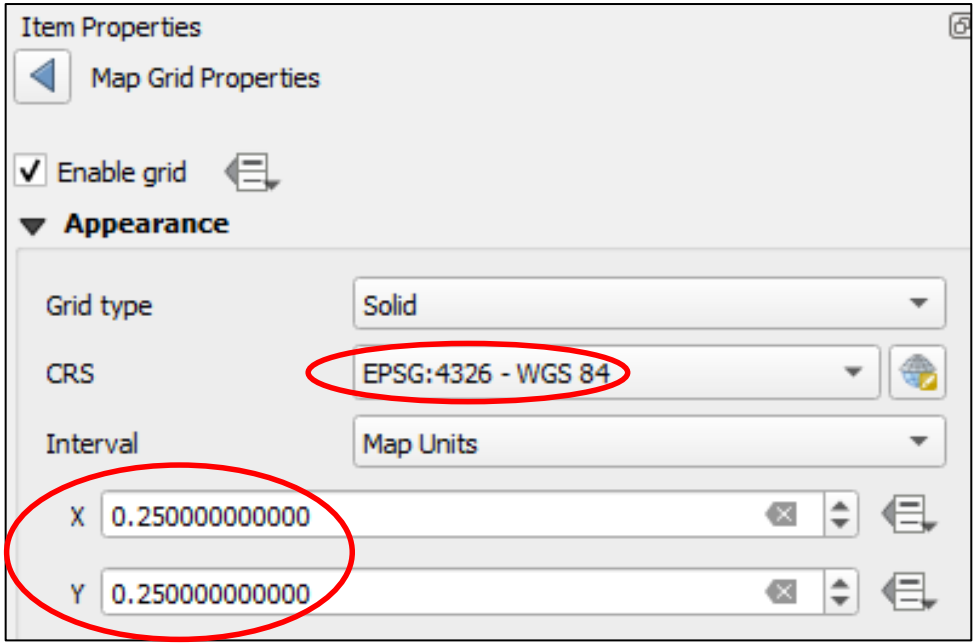
- With *Select* tool , click main map to open its *Item Properties*
- Under *Item Properties*, scroll down and expand *Grids*
- Click plus button, then select **Grid 1** and *Modify Grid*





Add map grid

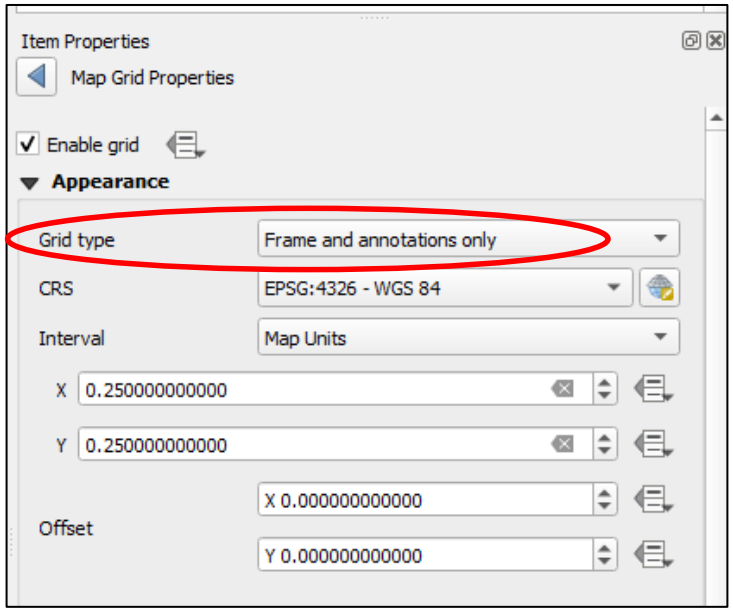
- For *CRS*, use drop-down to change to **EPSG: 4236 – WGS 84**
- For *Interval*, change X and Y to 0.25
  - this means that there will be a grid line for every 0.25 degrees of latitude/longitude

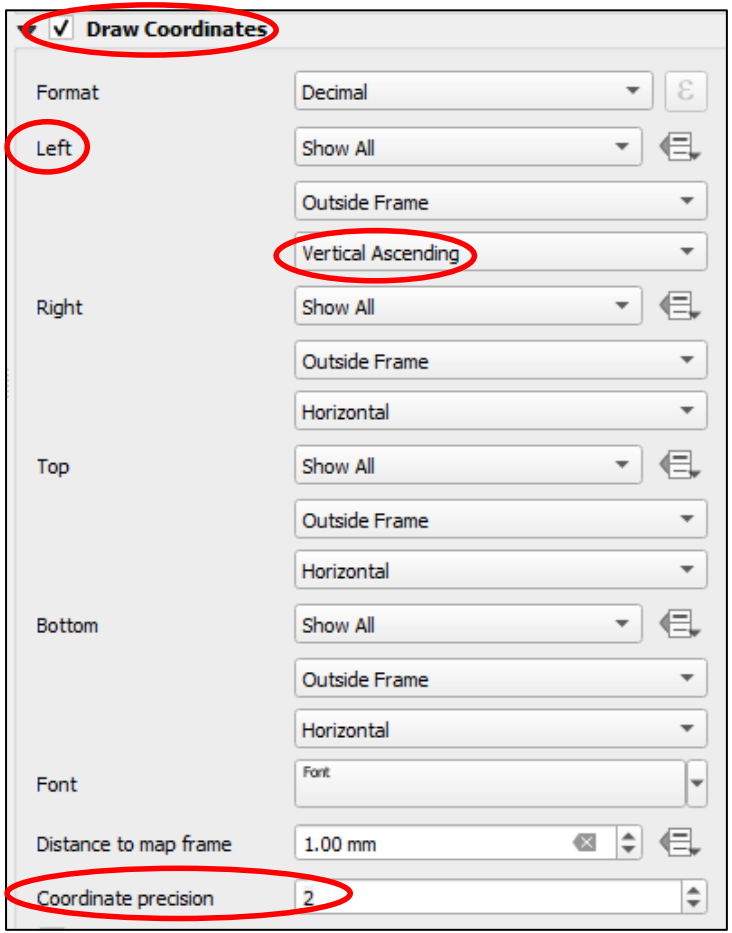


Add map coordinate annotations

- 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**

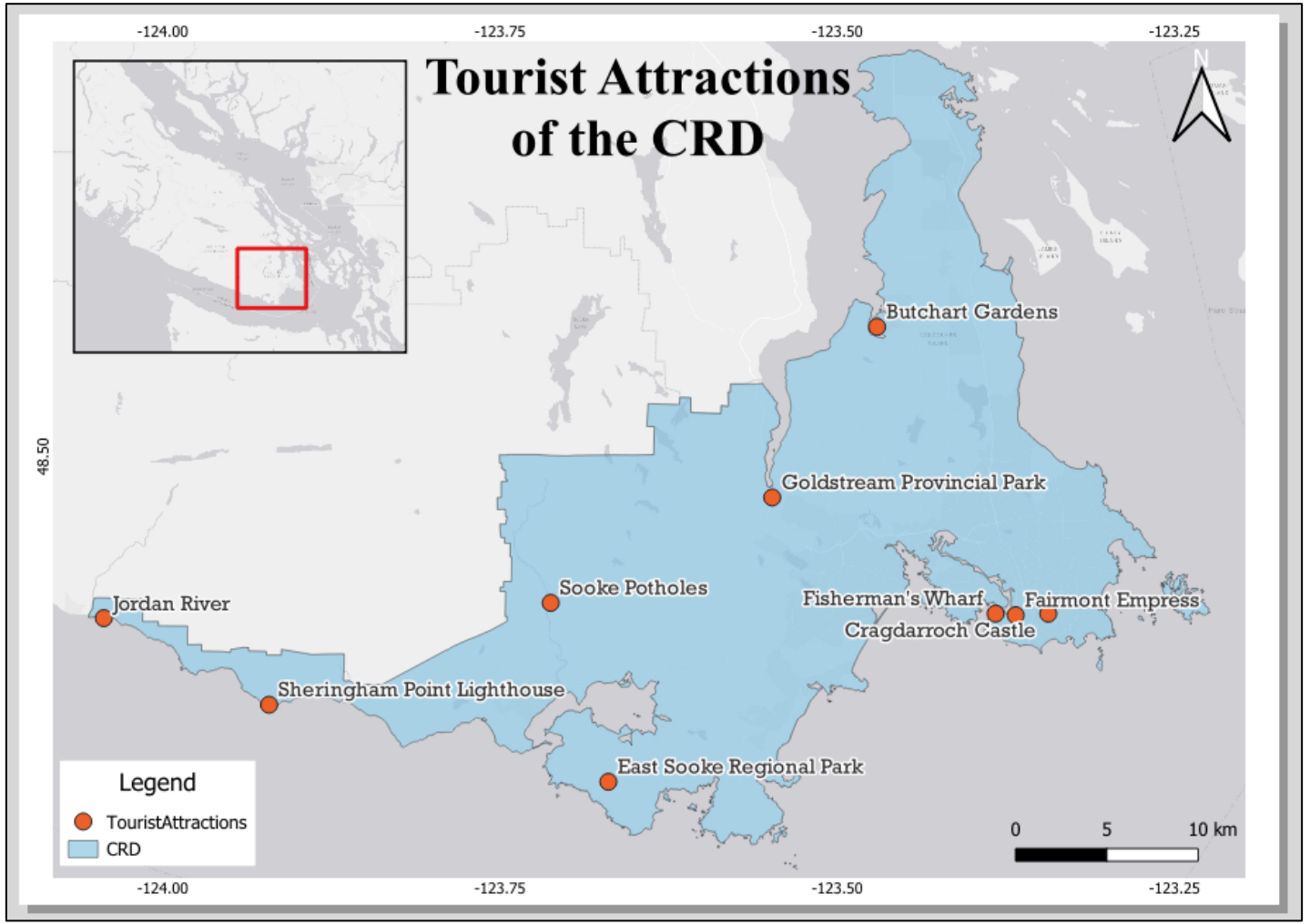
lots of option to have coordinates only on some sides, with small tick, etc





Congratulations!

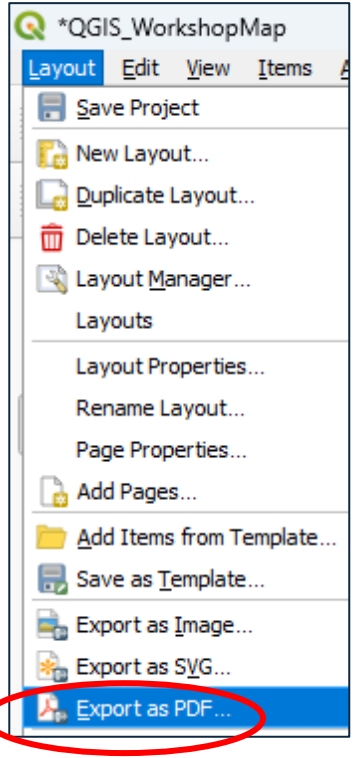
Next: export map

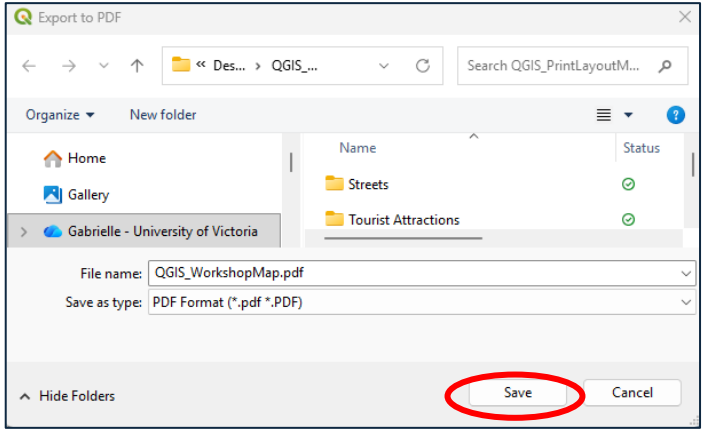


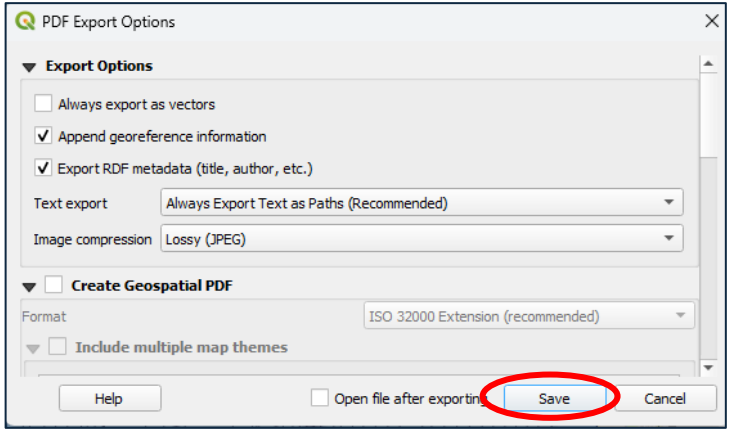
Activity #8

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), or KULA Geospatial Assistant (jeronimo.elenes@gmail.com)

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