

HANDS-ON EXERCISES

Data Acquisition,
Preparation, Processing

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OVERVIEW

- This module is basically where we do the ‘nitty-gritty’ part of the GIS training to come-up with final outputs
- You will learn how to obtain, create, manipulate, edit geospatial data by series of tools and commands
- The exercises will be done step by step, along with actual demonstration
- The exercises will make you “connect” the theoretical part of GIS to its actual applications

Because this module is a step-by-step process...

You need to do **GIS**!

- **G** – ive attention to details
- **I** – t's as easy as 1, 2, 3
- **S** – tay focused but relaxed

Data Acquisition

DATA SOURCES

```
graph TD; A[DATA SOURCES] --> B[Primary Data]; A --> C[Secondary Data]; B --> B1[-GPS readings]; B --> B2[-Google Earth captures]; B --> B3[-surveys, traverse]; C --> C1[-existing maps]; C --> C2[-digital maps (old maps, scanned maps)]; C --> C3[-topo maps];
```

Primary Data

- GPS readings
- Google Earth captures
- surveys, traverse

Secondary Data

- existing maps
- digital maps (old maps, scanned maps)
- topo maps

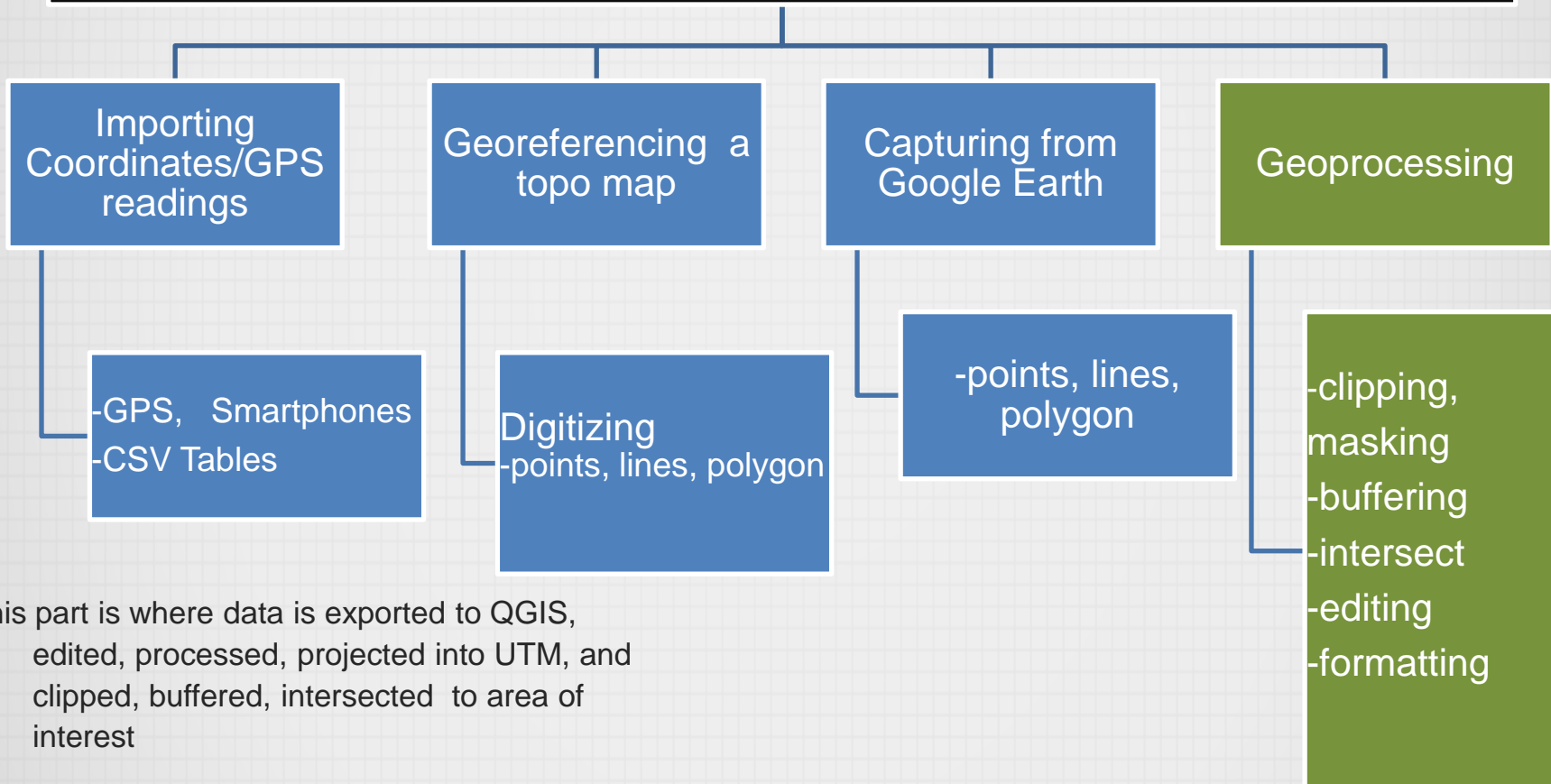
KEY WORDS

Primary Data

Secondary Data

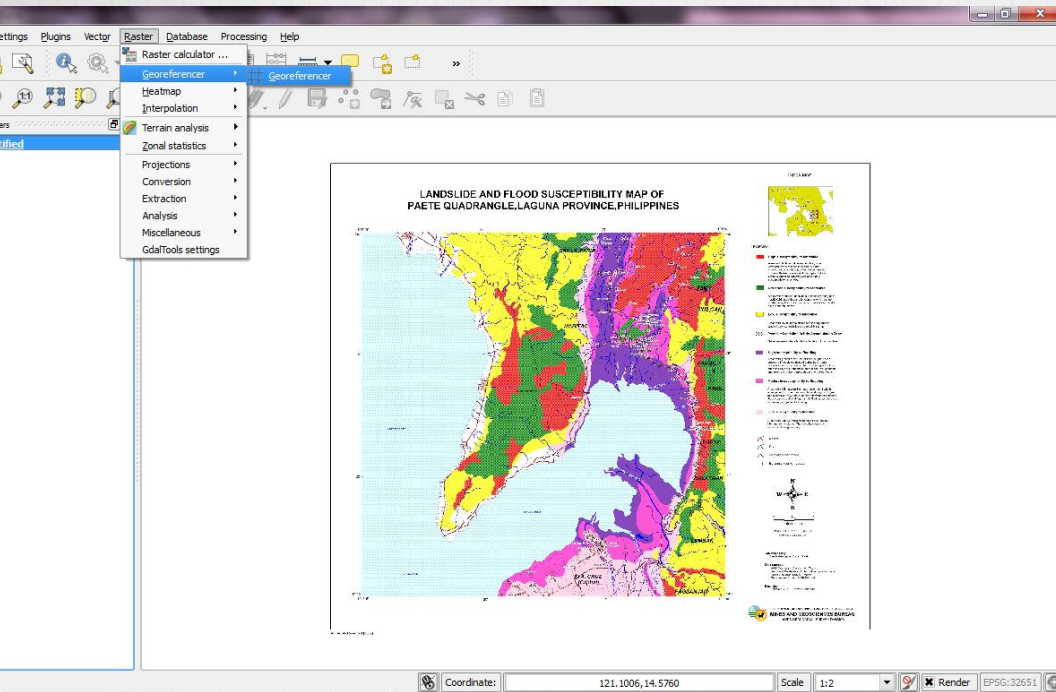
Data Capture, Preparation and Processing

DATA CAPTURE PREPARATION AND PROCESSING



EXER 1 GEOREFERENCING

WE WILL NOW TRANSFORM OUR SCANNED MAP TO A GIS MAP BY PUTTING ITS ACTUAL LOCATION ON EARTH!

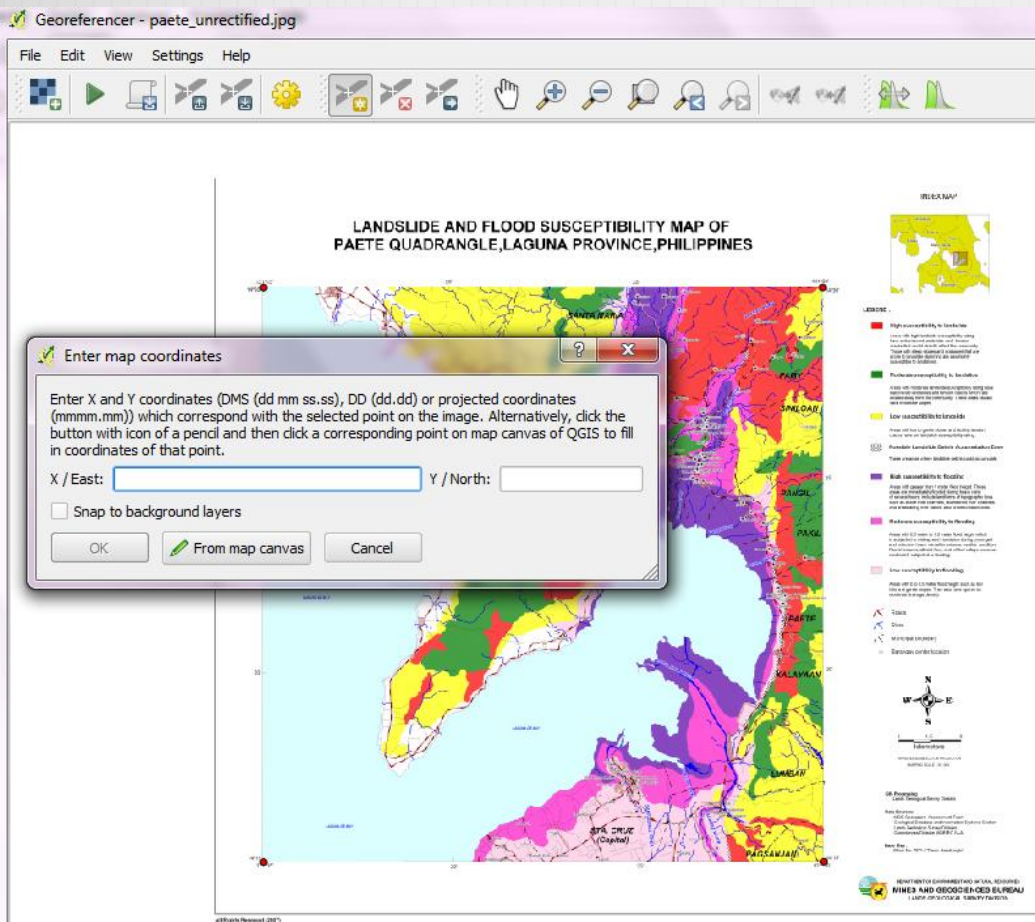


OBJECTIVE

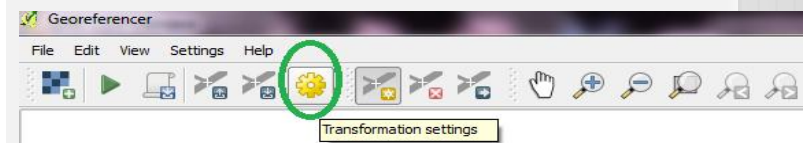
To georeference a scanned map to be used in digitizing

STEPS

1. Click Raster > Georeferencer
*it will open a new window
2. Click Open Raster and load the image

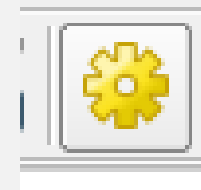


3. Click add points



4. Zoom to the coordinates and encode

5. Click Transformation settings



BE CAUTIOUS!

WE NEED DECIMAL DEGREES FORMAT OF COORDINATES,
EXAMINE THE TOPO MAP

coordinates_conversion - Microsoft Excel non-commercial use

Page Layout Formulas Data Review View

Calibri 11 A A

B I U Font

Wrap Text Alignment


General \$ % +.00 -.00 Number

Conditional Formatting Format as Table Cell Styles Styles

Insert Delete Format Cells

AutoSum Fill Clear Sort & Filter Editing

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
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 Transformation settings ? X


Transformation type: Linear ▼


Resampling method: Nearest neighbour ▼


Compression: NONE ▼

☐ Create world file

Output raster: 

Target SRS: EPSG:4326 

Generate pdf map: 

Generate pdf report: 

☐ Set Target Resolution

Horizontal ▲▼

Vertical ▲▼

☐ Use 0 for transparency when needed

☒ Load in QGIS when done

DEFAULT VALUES

SAVING DIRECTORY

COORDINATE SYSTEM

MARK THIS



NOTES AND TIPS

NOTE:

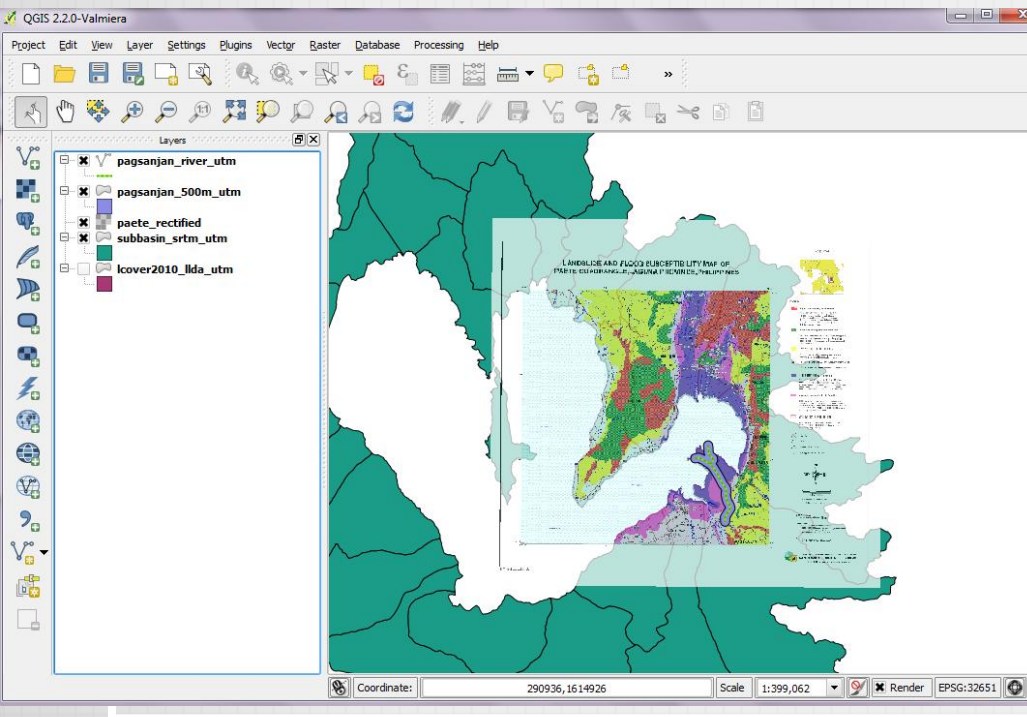
THERE CAN BE ERRORS FROM UPLOADING CONTROL POINTS, MOSTLY TYPOGRAPHICAL

TIP:

TO CHECK FOR THE CONSISTENCY OF THE GEOREFERENCED MAP, OPEN OTHER PROJECTED MAPS FOR COMPARISON

EXER 2 DIGITIZING

USING OUR NEWLY GEOREFERENCED MAP, WE WILL NOW
EXTRACT FEATURES FROM IT!



OBJECTIVE

To digitize polygons, lines, points from the georeferenced topo map

STEPS

1. Open georeferenced map
2. Click new shapefile layer
3. Select type
4. Zoom to area of interest



New Vector Layer

Type

☐ Point ☒ Line ☐ Polygon

EPSG:4326 - WGS 84 Specify CRS

New attribute

Name

Type Text data

Width Precision

Add to attributes list

Attributes list

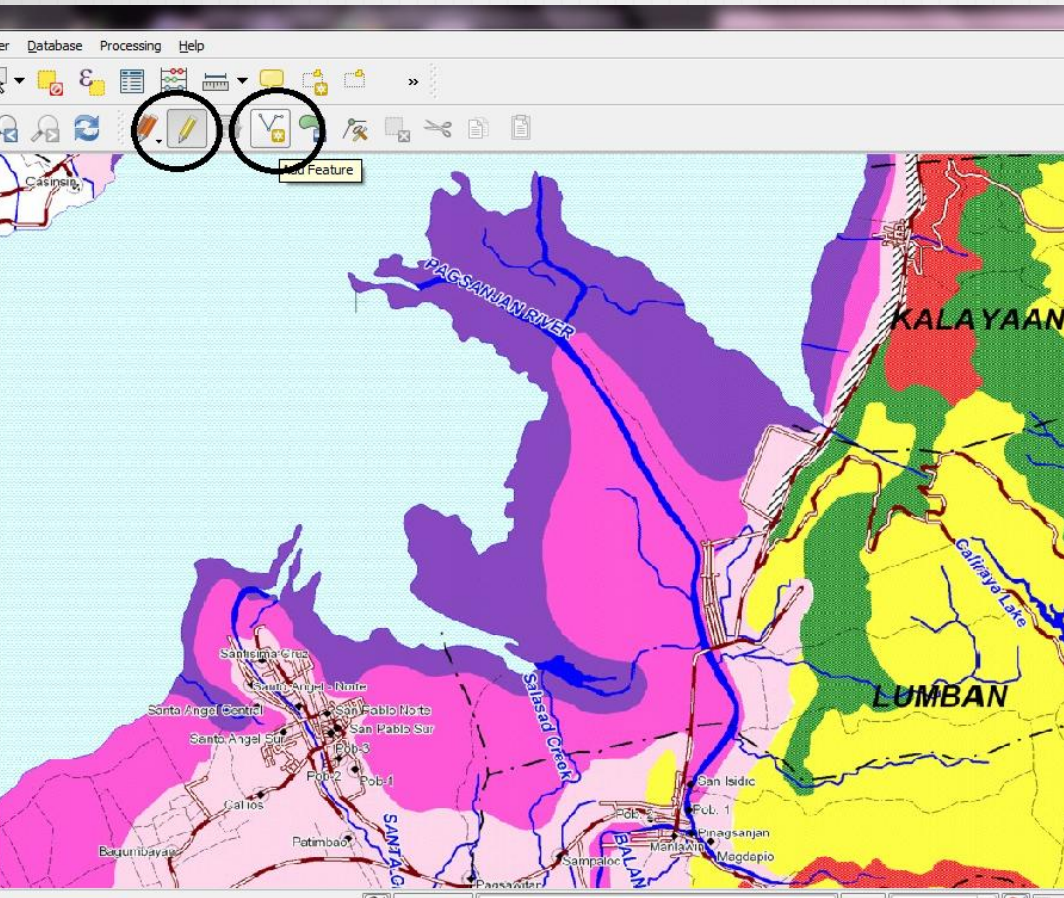
Name	Type	Width	Precision
id	Integer	10	

Remove attribute

OK Cancel Help

CHOOSE LINE IF YOU WILL
DIGITIZE RIVERS

CHOOSE UTM_ZONE51N



4. Click 'Toggle Editing'



5. Click 'Add Features'

6. Trace

7. Save edits

#Note

Digitizing is basically tracing the features from the base map

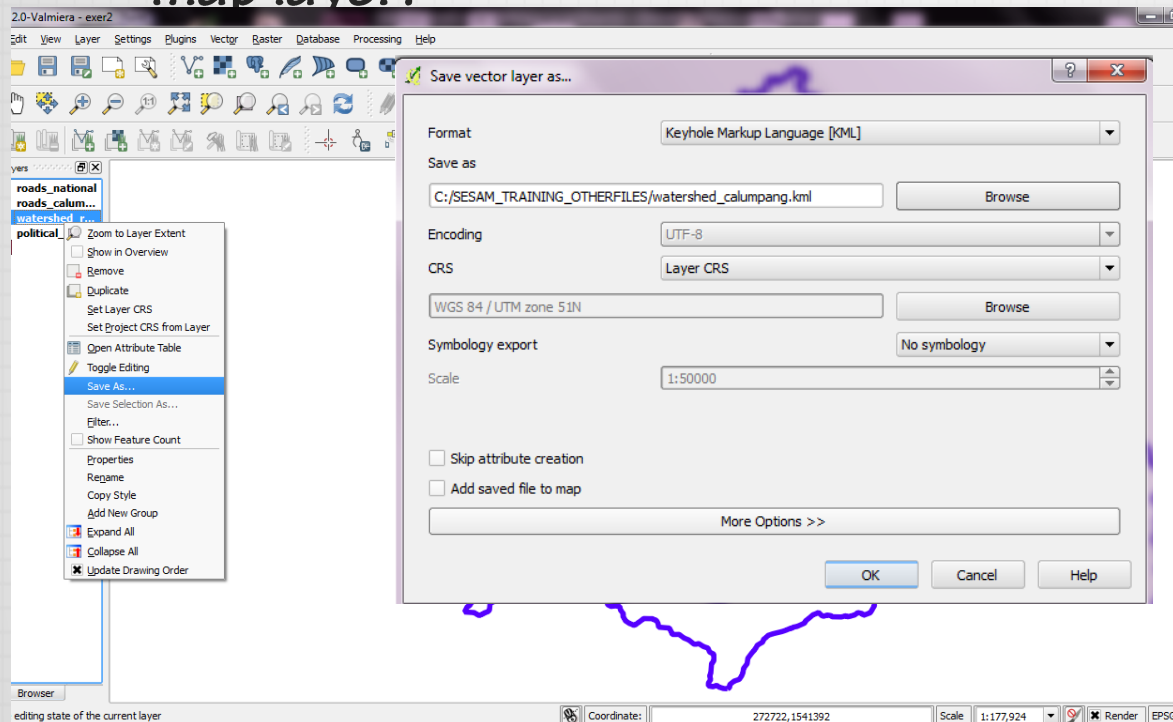
Tips:

Zoom as much as possible and stay focused, use a better mouse and try adjusting mouse cursor speed at the control panel

You can switch buttons to pan or zoom the map, just click again the 'add features' to get back from digitizing

EXER 3 CAPTURING FROM GOOGLE EARTH

Now, we will go to the globe to capture features and put it to our map layer!



OBJECTIVE

To obtain spatial features from Google Earth and import it to QGIS

STEPS

1. Save our area of interest as .kml

Resulting icon will be like this



2. Open it to Google Earth

CHOOSE KEYHOLE MARKUP
LANGUAGE (.KML/GOOGLE
EARTH FILE EXTENSION

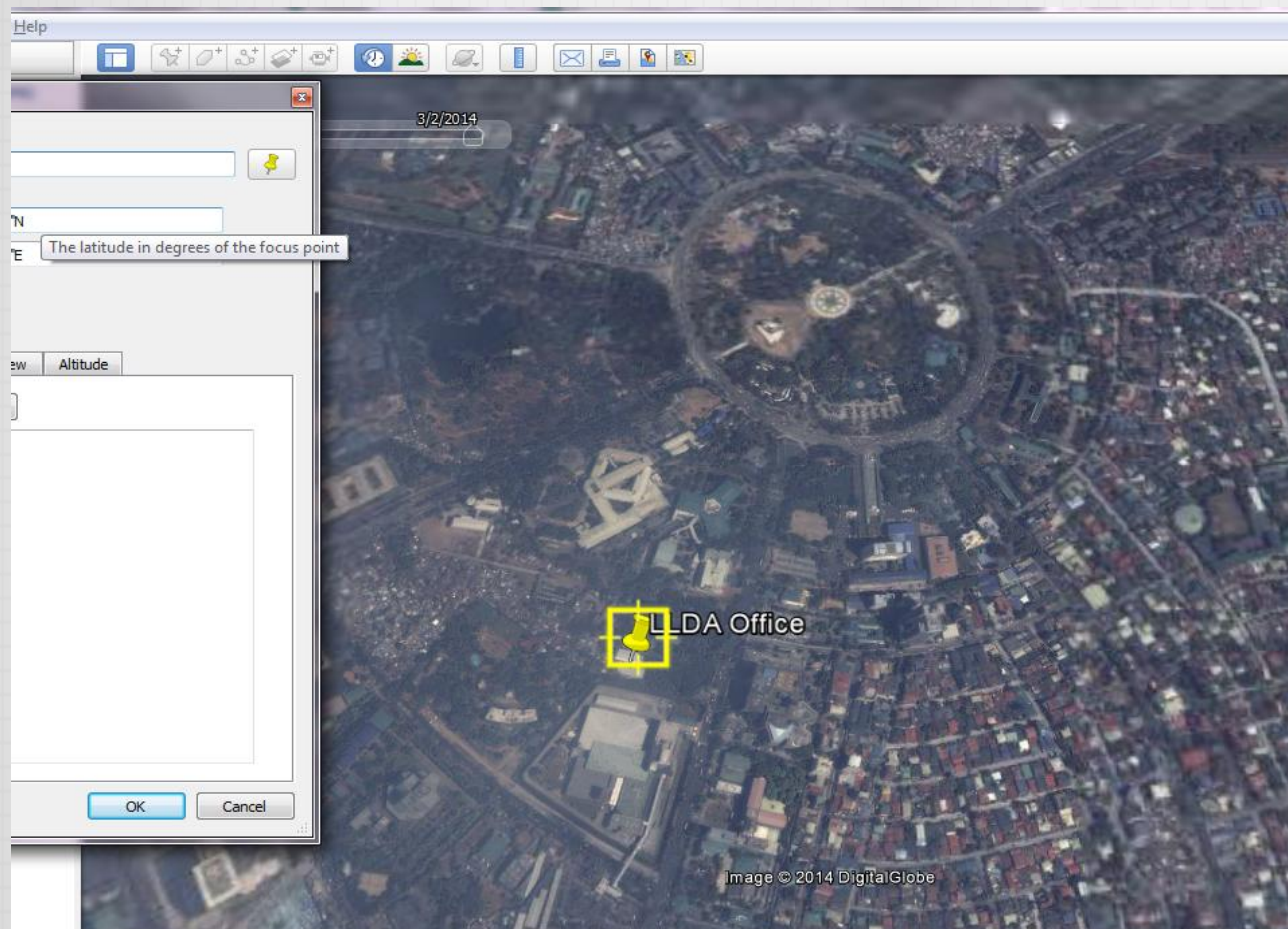
The screenshot shows the 'Save vector layer as...' dialog box with the following settings:

- Format:** ESRI Shapefile
- Save as:** [Empty text field] with a **Browse** button.
- Encoding:** UTF-8
- CRS:** Layer CRS, with a text field showing 'WGS 84 / UTM zone 51N' and a **Browse** button.
- Symbology export:** No symbology
- Scale:** 1:50000
- ☐ Skip attribute creation
- ☐ Add saved file to map
- More Options >>** button
- Buttons:** OK, Cancel, Help

Annotations with arrows point to the 'Format' dropdown, the 'Save as' 'Browse' button, and the 'CRS' 'Browse' button.

SAVING DIRECTORY

CRS



3. Navigate and zoom to area of interest

4. Add features



5. Save and open to QGIS

6. Save the kml as .shp by clicking 'save as' after right clicking the kml



#Note

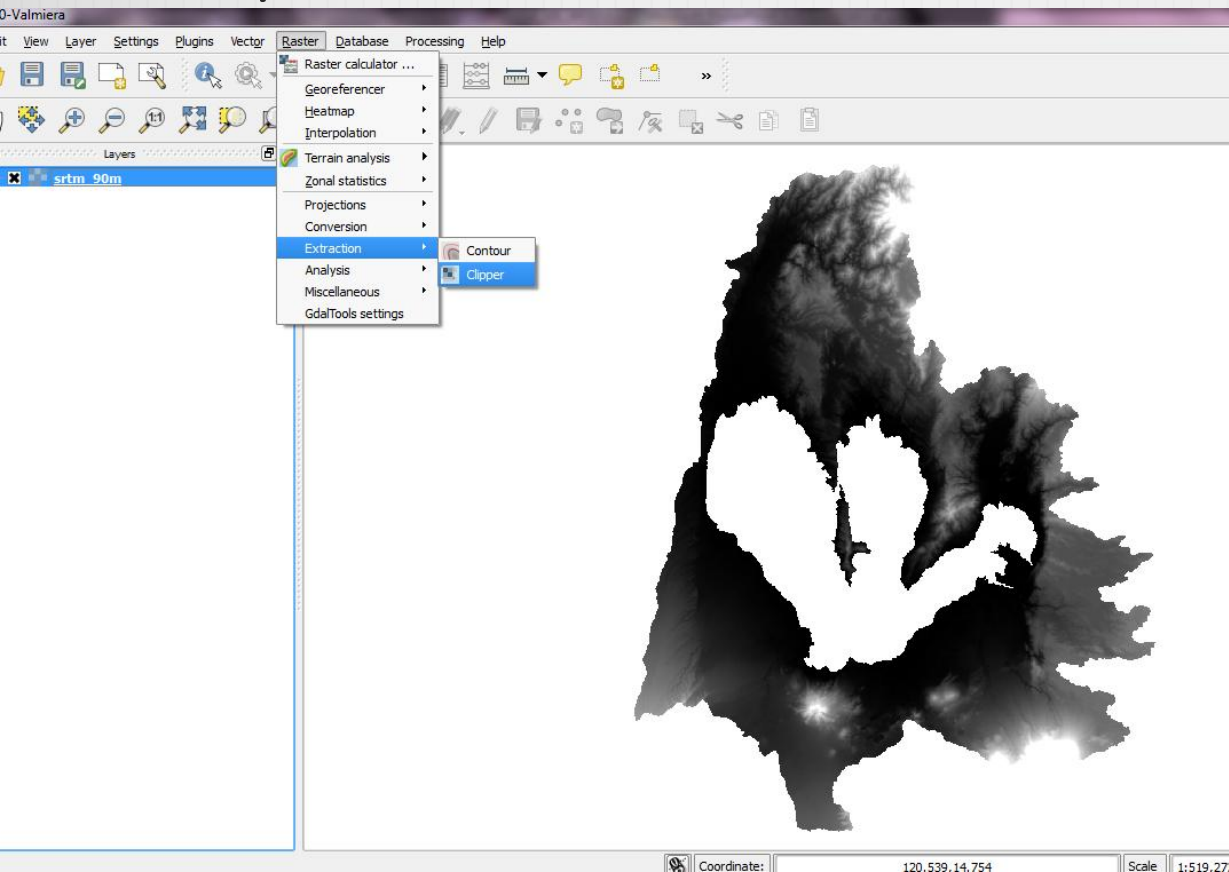
Captures from Google Earth are not yet projected into UTM

Tips:

Make it a practice to check and project every new entry

EXER 4a Clipping a Raster

Now that we have features, we will add more map layers to our project! Let's now clip some features from the surface! This time it's a raster

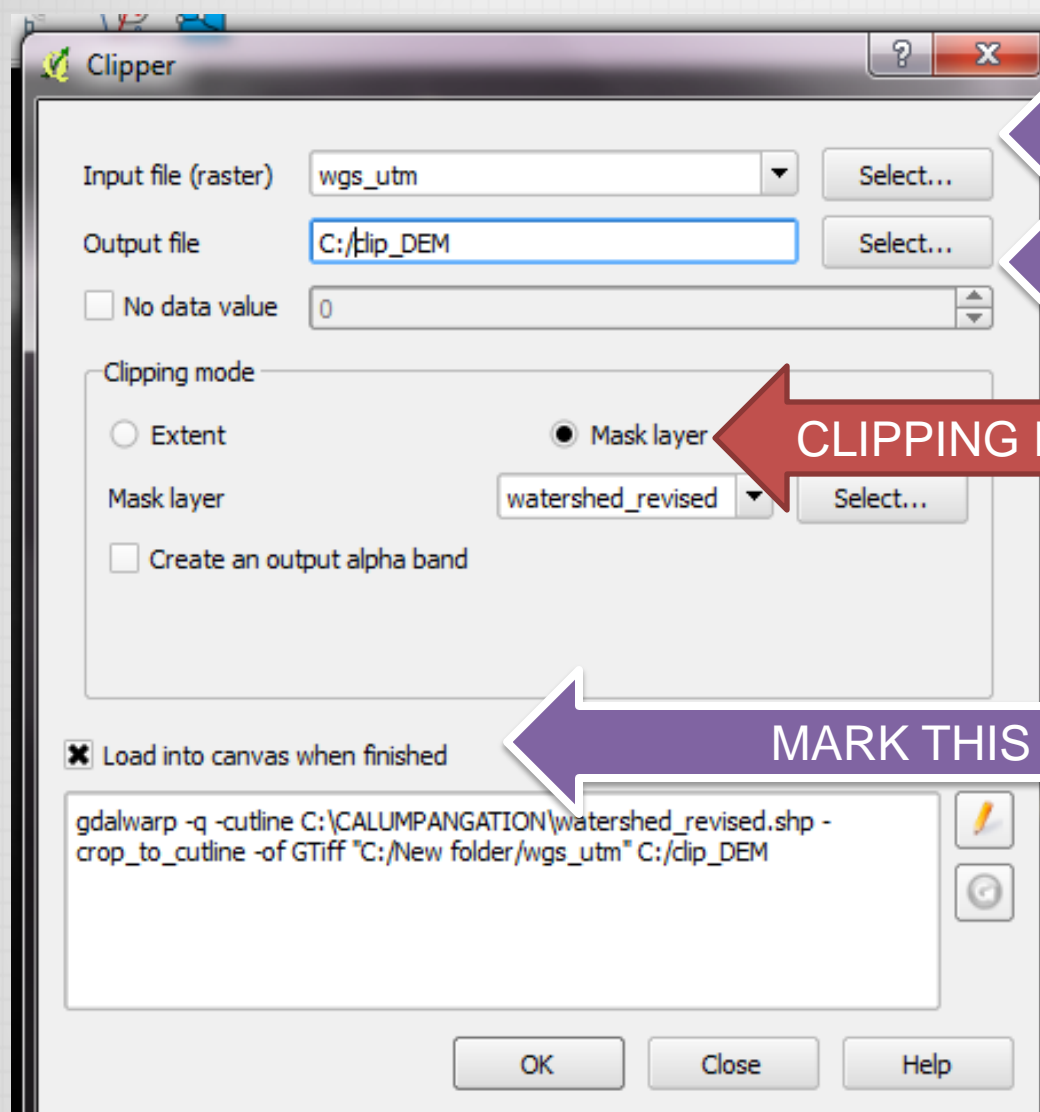


OBJECTIVE

To clip a DEM raster to the scale of interest

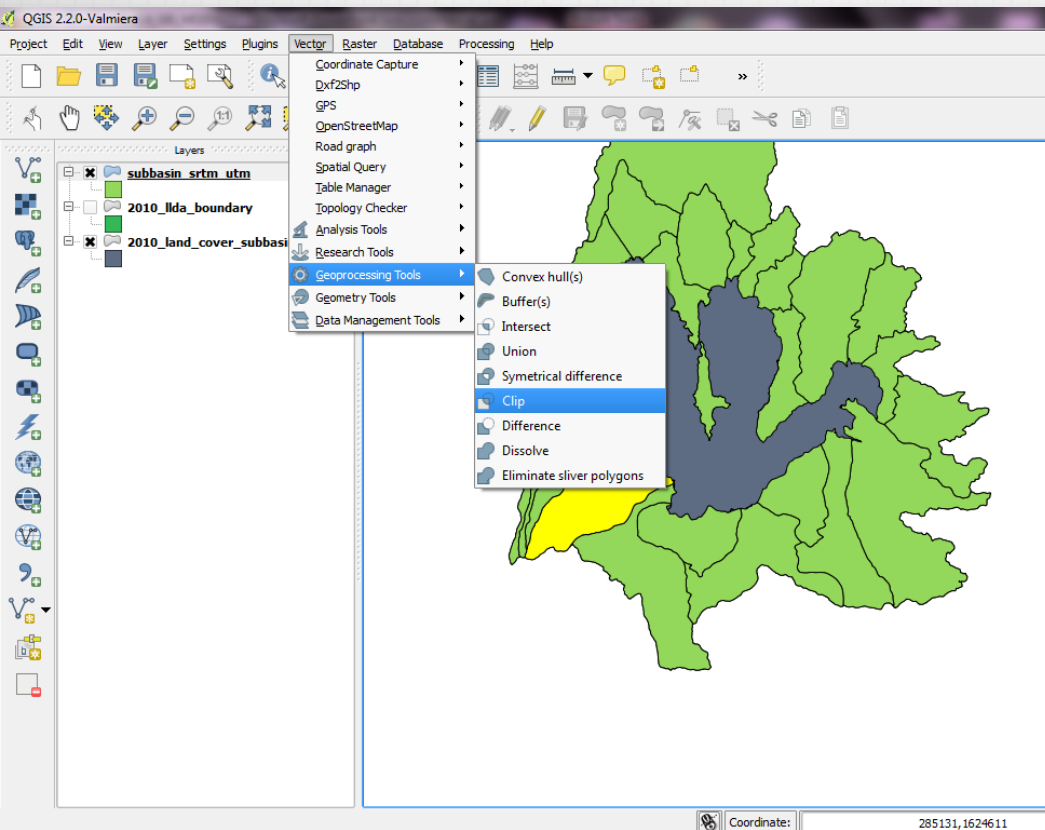
STEPS

1. Add DEM file
2. Click 'Raster',
Extraction, Clipper



EXER 4b Clipping a Vector

WE WILL BASICALLY DO THE SAME CLIPPING, THIS TIME IT IS A VECTOR FILE!



OBJECTIVE

To clip land cover map to area of interest

STEPS

1. Add vector files
2. Click Vector > Geoprocessing tools > Clip
3. Fill-in the clip window



Clip



Input vector layer

2010_land_cover_subbasin_extent



SOURCE OF FILE

☐ Use only selected features

Clip layer

subbasin_srtm_utm



AREA OF INTEREST

☒ Use only selected features

Output shapefile

Browse

☒ Add result to canvas

0%

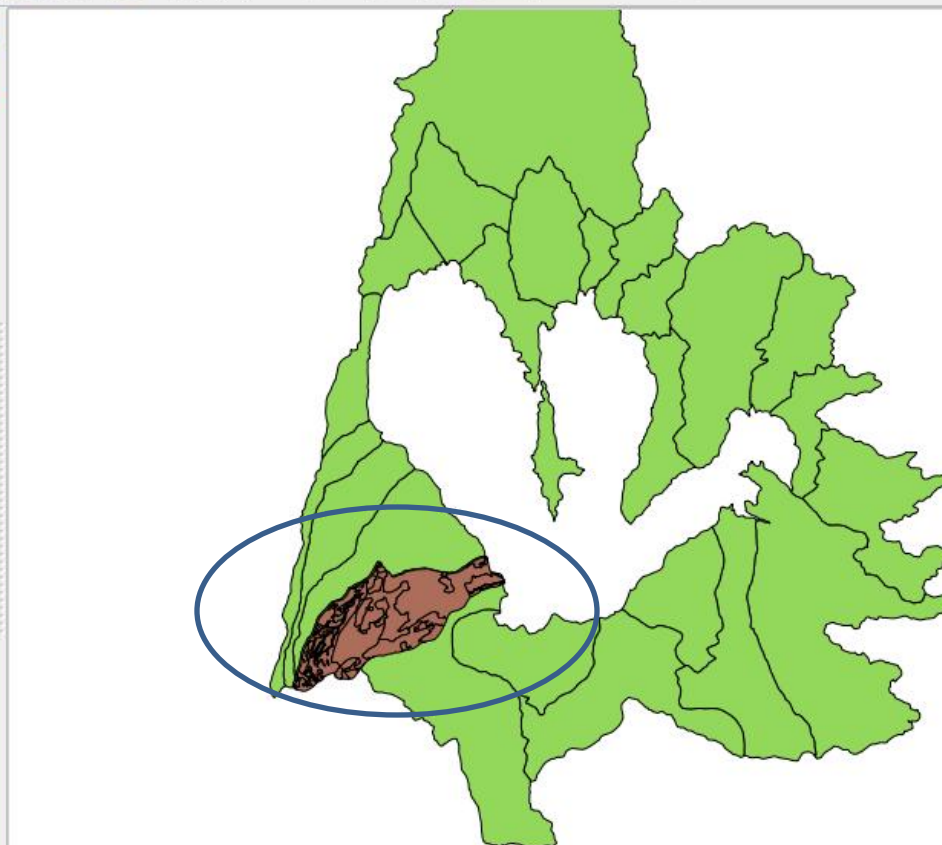
OK

Close



Layers

- ☒ sancristobal_lcover2010_clipped
- ☒ subbasin_srtm_utm
- ☐ 2010_llda_boundary
- ☐ 2010_land_cover_subbasin_extent



Toggles the editing state of the current layer

#Note:

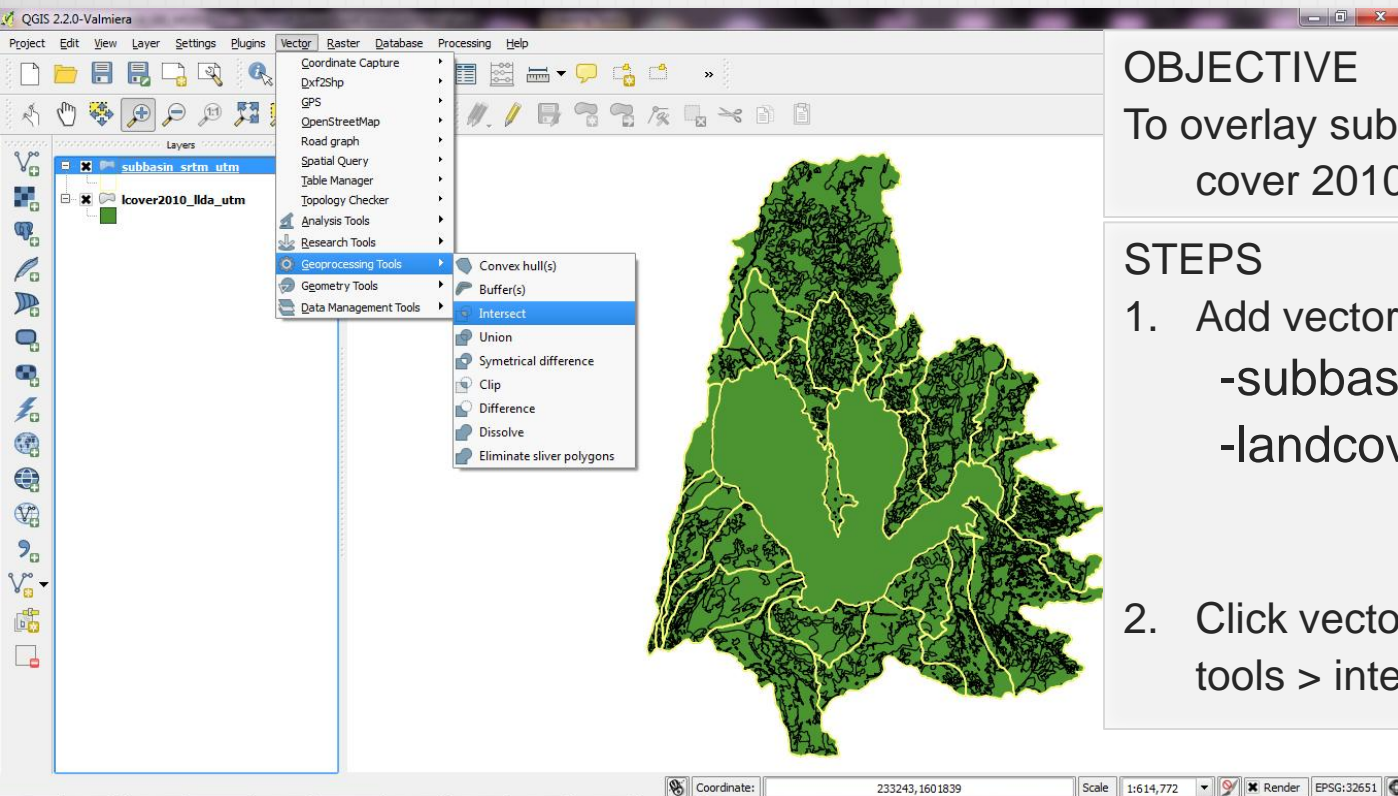
There are various raster processing from DEM including slope, elevation, contour, and so on

Tips:

Explore the 'terrain analysis and other raster commands

EXER 5 INTERSECTING

We will continue to add map layers to our scale of interest!
This time, we will **overlay** two features



OBJECTIVE

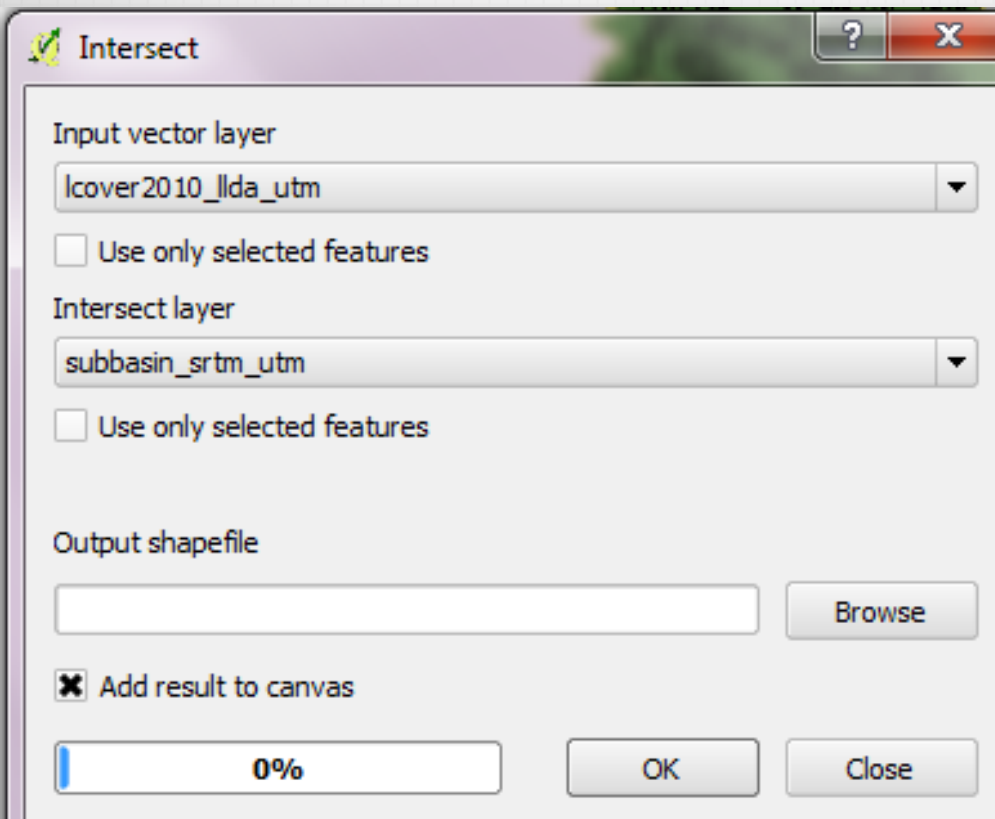
To overlay sub basins and land cover 2010

STEPS

1. Add vector files
 - subbasin_srtm_utm
 - landcover2010_llda_utm
2. Click vector > geoprocessing tools > intersect

2. Fill-in the intersect window

3. Save



Intersect

Input vector layer

lcover2010_llda_utm

☐ Use only selected features

Intersect layer

subbasin_srtm_utm

☐ Use only selected features

Output shapefile

Browse

☒ Add result to canvas

0%

OK Close

LAYER 1 (AREA OF INTEREST)

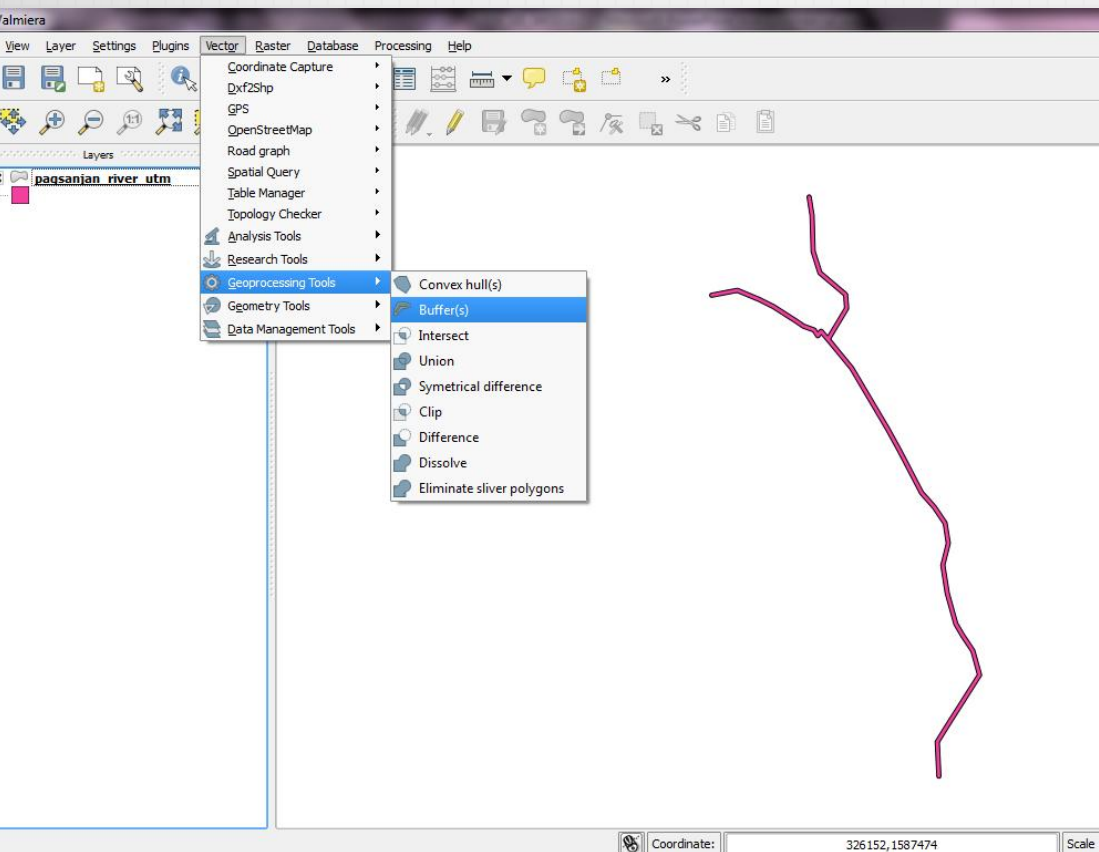
LAYER 2 (USUALLY LARGER SCOPE)

OUTPUT FILE DIRECTORY

EXER 6 BUFFERING

Buffering is creating easements from a line (i.e river) and perimeter. It is important in defining buffer zones for policy implementation and planning

Now, we will generate buffer zone from our main rivers!



OBJECTIVE

To create buffer of varying distances

STEPS

1. Open river of interest
2. Click Vector > Geoprocessing tool > Buffer

3. Fill the buffer window

Buffer(s)

Input vector layer
pagsanjan_river_utm

☐ Use only selected features

Segments to approximate: 5

☒ Buffer distance: 500

☐ Buffer distance field: id

☐ Dissolve buffer results

Output shapefile
[Empty field] [Browse]

☒ Add result to canvas

0% [OK] [Close]



River (or any) line or polygon

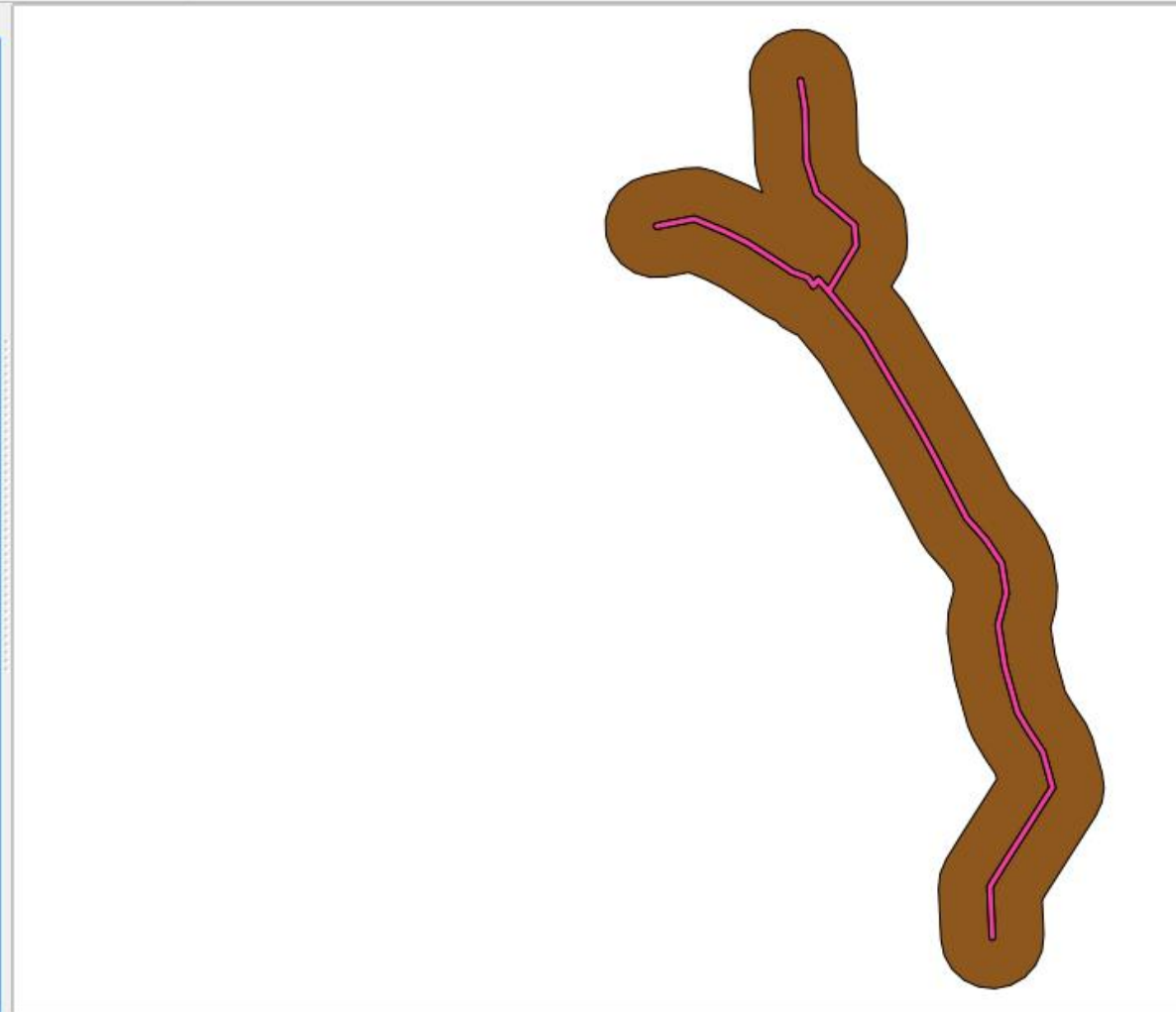
Buffer distance in meters

Directory of output file



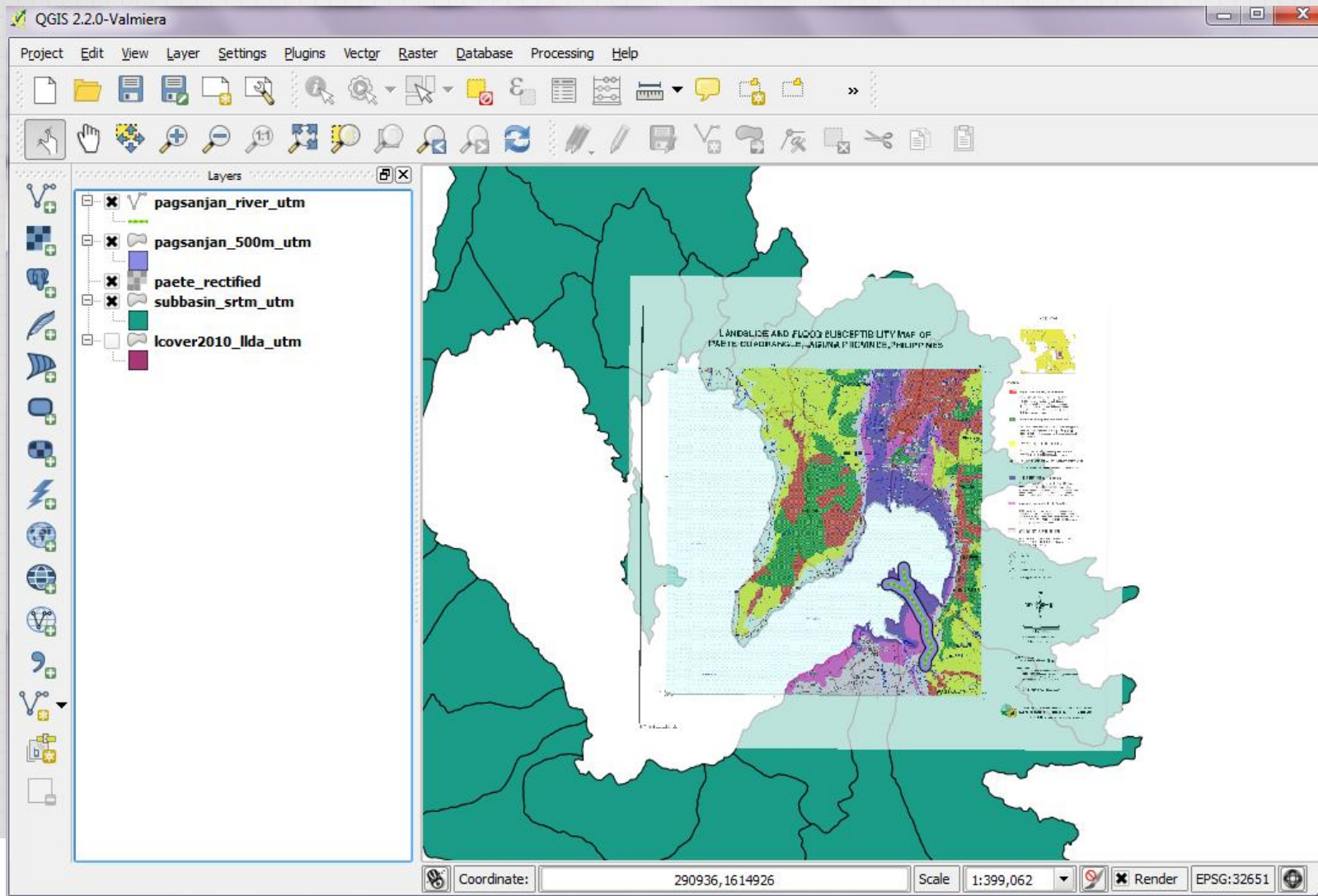
Layers

- ☒  pagsanjan_river_utm
- ☒  pagsanjan_buffer500m_utm



STEPS

4. Repeat this procedure for other buffer distance




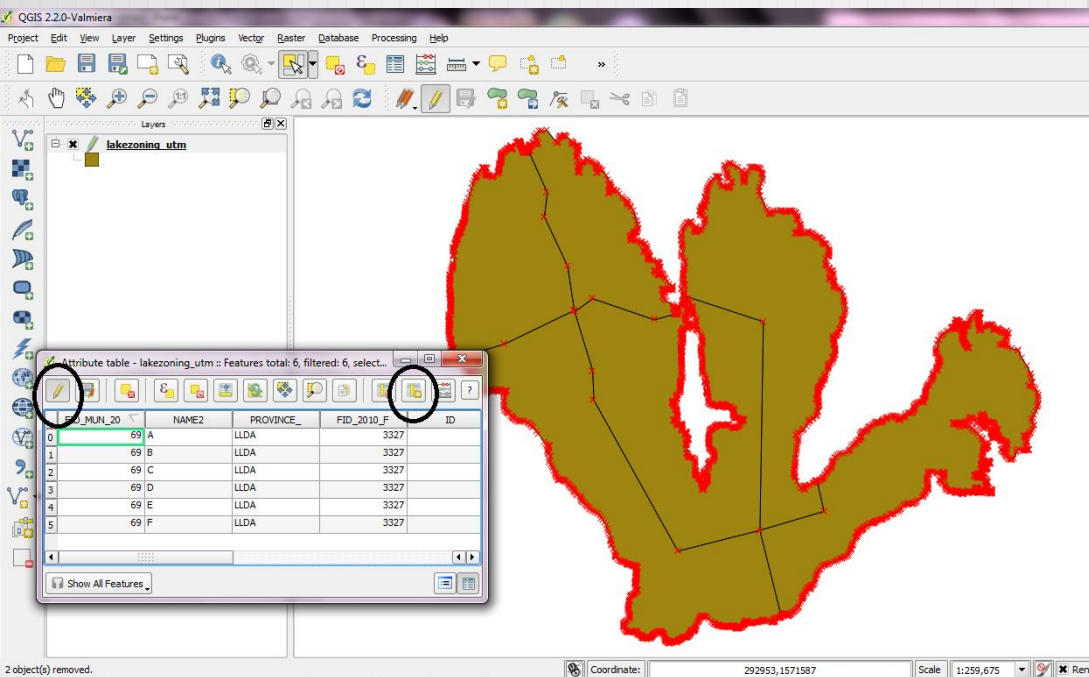
EXER 7 EDITING THE ATTRIBUTE TABLE

OBJECTIVE

To add data on lake and compute density of fish pens/cages

STEPS

1. Insert zoning map of LL
2. Open attribute table, toggle editing 
3. Add columns on number of fish pens, cages, ponds (if necessary)
4. Compute for its density



4. Add column (encode data on fisheries)



5. Save edits



Add column

Name:

Comment:

Type: ▼

integer

Width: ▲ ▼

OK Cancel

Added field/column

What to enter (whole number,
with decimal, text)

Length of character

Field calculator

☐ Only update selected features

☒ Create a new field ☐ Update existing field

Output field name:

Output field type:

Output field width: Precision:

Function list Selected function help

Search

- Color
- Geometry
 - xat
 - yat
 - \$area**
 - \$length
 - \$perimeter
 - \$x
 - \$y
 - \$geometry

\$area function
Returns the area size of the current feature.

Syntax
\$area

Arguments
None

Example

▼ Operators

= + - / * ^ || ()

Expression

$\$area / 10000$

Output preview: 55.5379709503174

OK Cancel Help

ADDING COLUMN FOR AREA

COMPUTING FOR AREA

COMPUTING FOR HECTARES
(default area is in sq.m)

#Note

Computed areas for a political entity (i.e. barangay, municipality, city, province) can vary from its official area

Tip:

Use the GIS computed area of political jurisdiction for computation purposes only to avoid inconsistencies of attributes

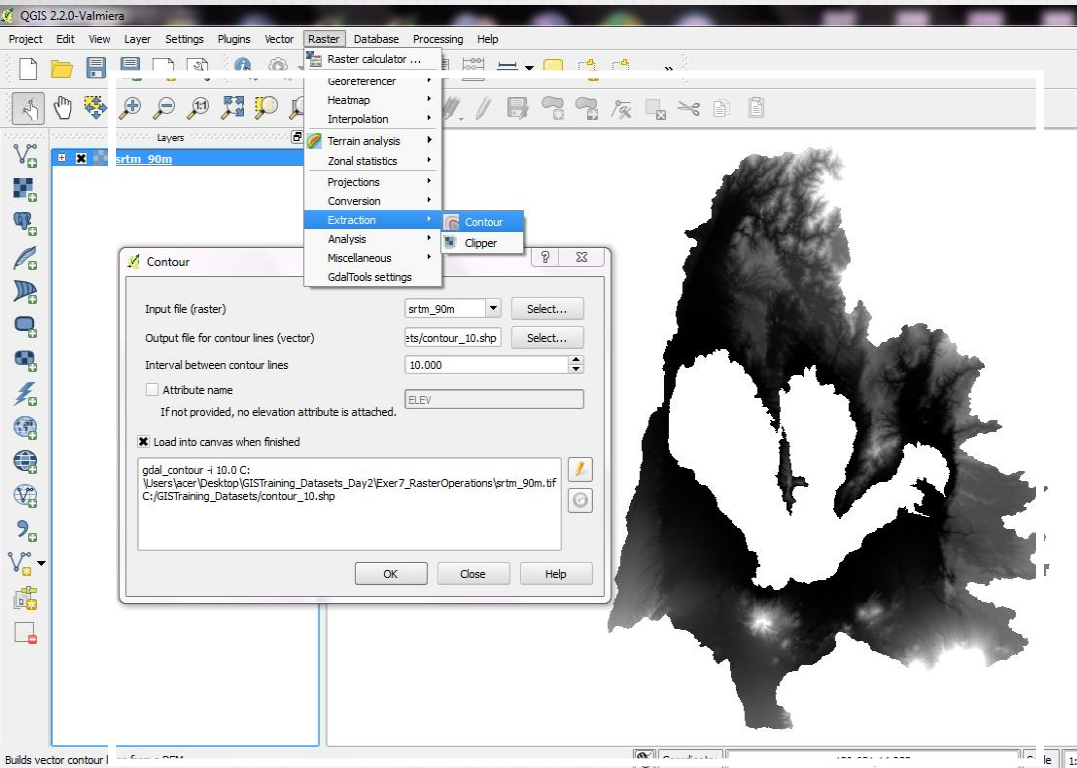
EXER 8 RASTER OPERATIONS

OBJECTIVE

To perform common raster operations from DEM

STEPS

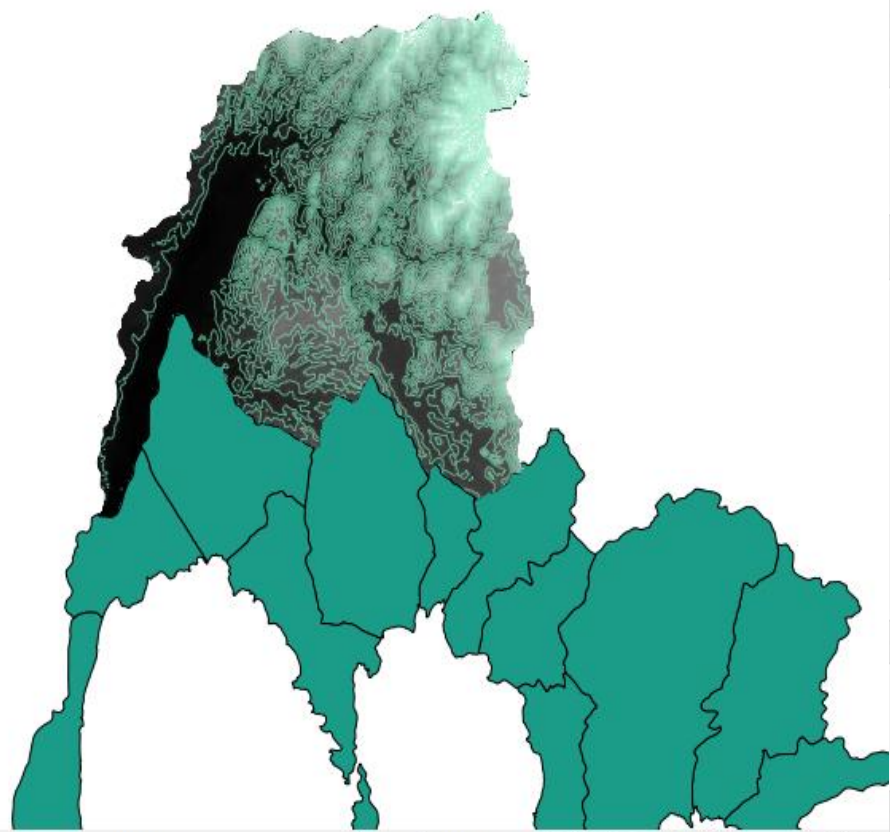
1. Insert srtm_90m
2. Create contours by clicking Raster > Extraction > Contour
3. Define contour interval and save





Layers

- marikina_50m_contour
- marikina_clipped_90m1
- elevation_marikina
- subbasin_srtm_utm



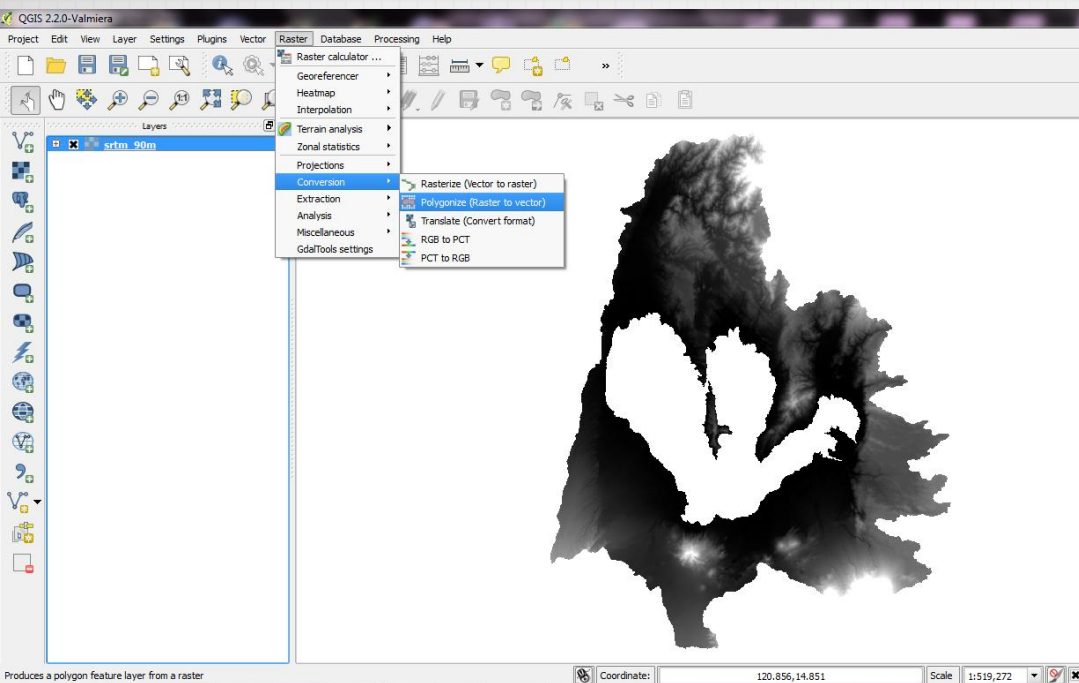
266334.45, 1591275.08 : 344256.24, 1650191.55

EXER 8 RASTER OPERATIONS

OBJECTIVE

To perform common raster operations from DEM

3. Convert into vector (polygon) by clicking Raster > Conversion > Polygonize



THANKS FOR YOUR TIME

