Coordinate Reference System and QGIS

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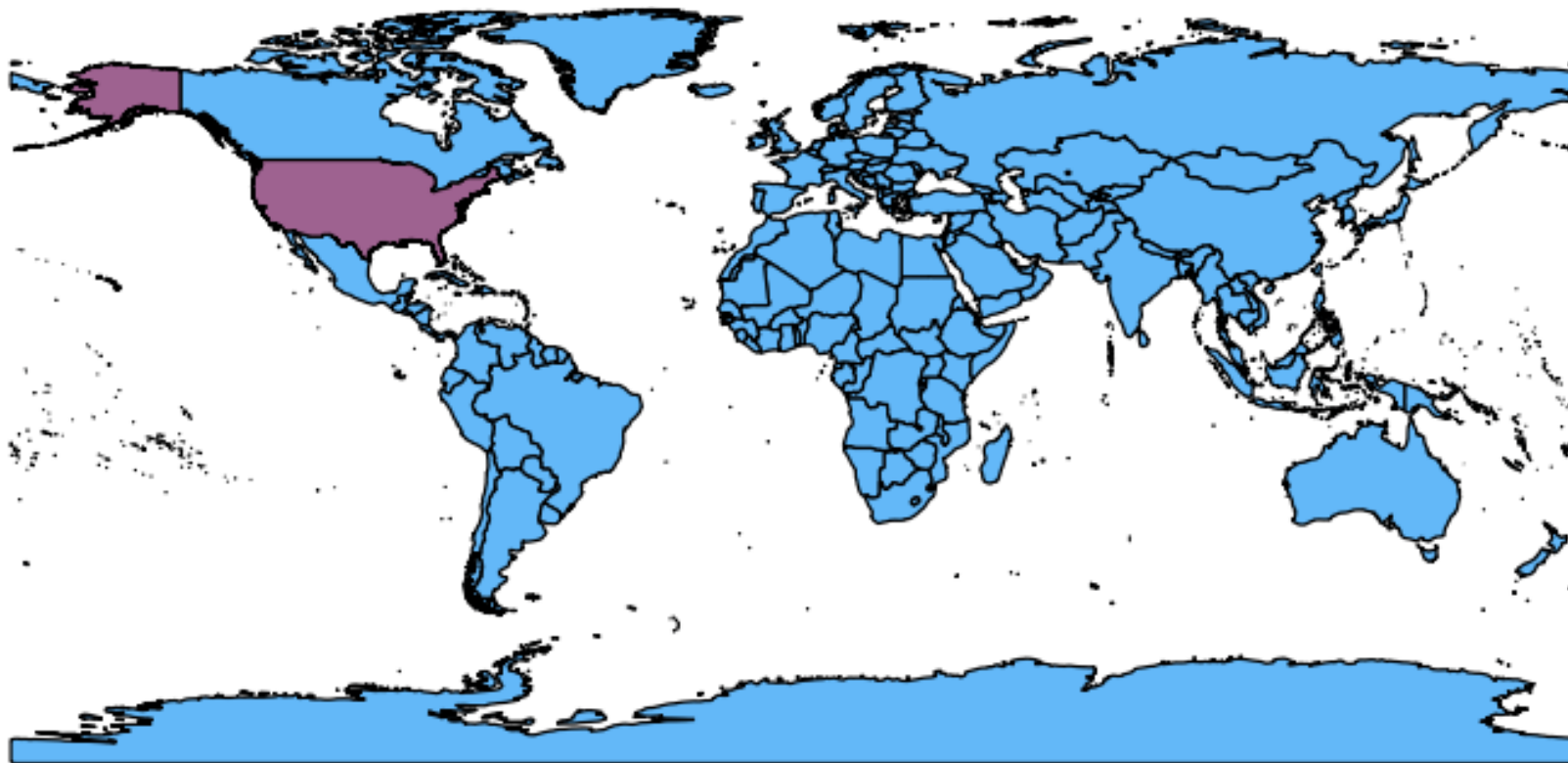World Organisation for Animal Health

OIE Headquarters

Overview

- Coordinates Reference System (CRS) in QGIS
- How to know CRS in a layer?
- Set CRS
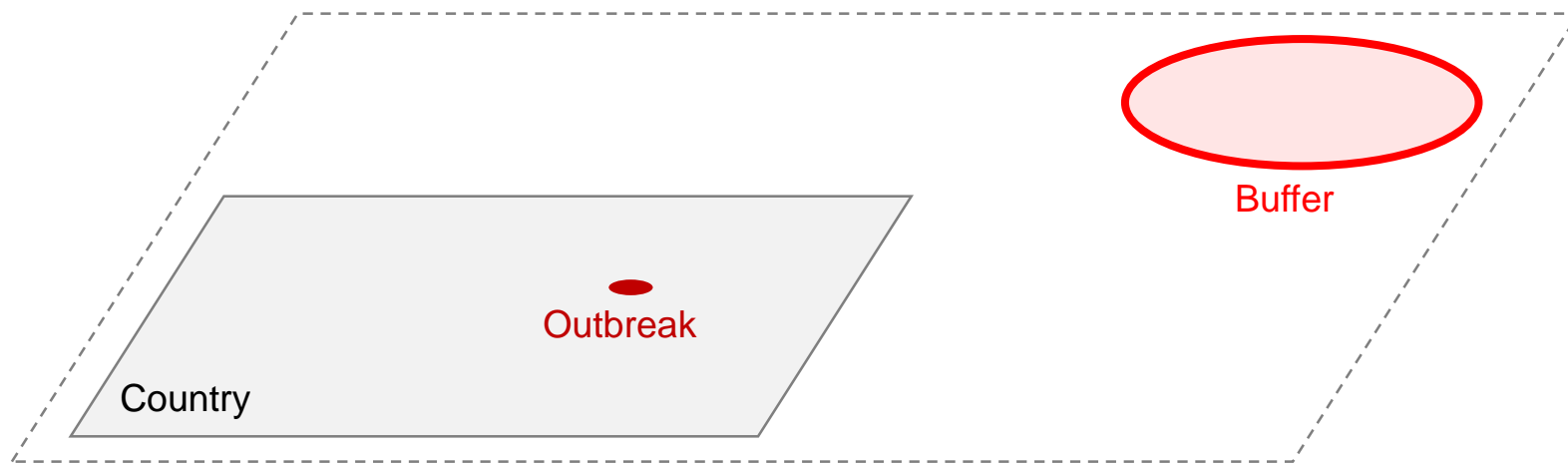- On-the-fly-reprojection

Coordinates Reference System (CRS) in QGIS

Display data in the space that represent the «earth surface»

Different layers with wrong / absent / (*different*) CRSs
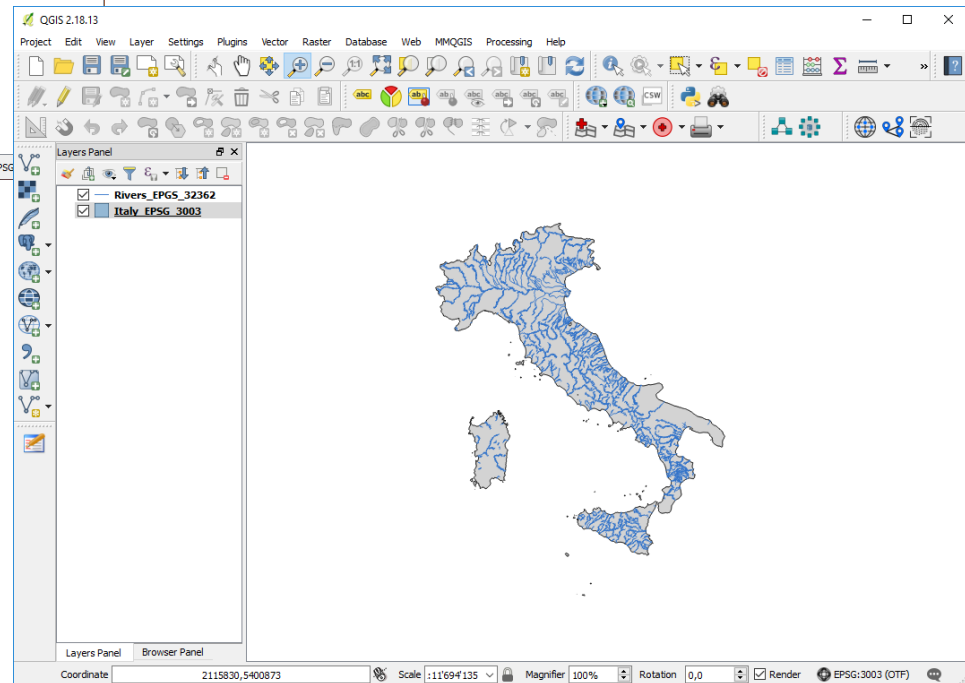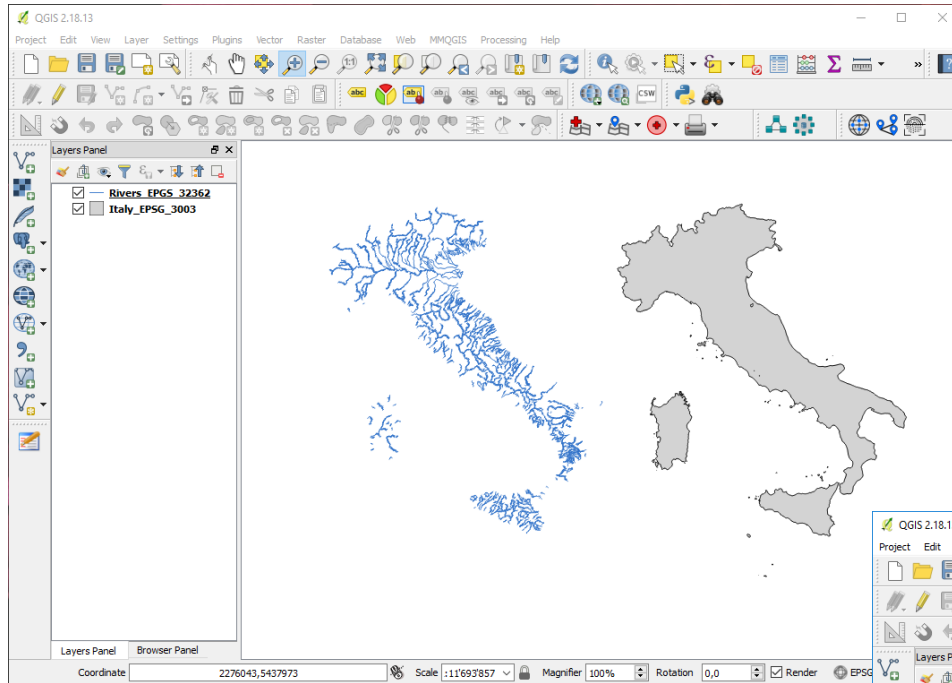**generate problems**

CRS problems

DATA
Project CRS ≠ Layer CRS
Layer 1 CRS ≠ Layer 2 CRS
Wrong CRS for Layer
No CRS for Layer

PROBLEMS:
Visualization
Spatial operation
Measures

CRS problems

How to know CRS in a layer?

- You are the data owner or the data producer
  - you know everything about it -

- You receive data from others
  - they know everything about it and they have to tells you -

Spatial Reference are MANDATORY to work with GIS

All spatial information MUST be present in the
METADATA

Metadata

Metadata

General

Storage type of this layer

ESRI Shapefile

Description of this provider

OGR data provider (compiled against GDAL/OGR library version 2.1.3, running against GDAL/OGR library version 2.1.3)

Source for this layer

X:\gis\Corsi\Corso GIS Cina 2017\presentazioni\day3_20180314\practical_exercise\data\es2\Veneto_Province.shp

Geometry type of the features in this layer

Polygon (WKB type: "Polygon")

The number of features in this layer

1049

Capabilities of this layer

Add Features, Delete Features, Change Attribute Values, Add Attributes, Delete Attributes, Rename Attributes, Create Spatial Index, Create Attribute Indexes, Fast Access to Features at ID, Change Geometries
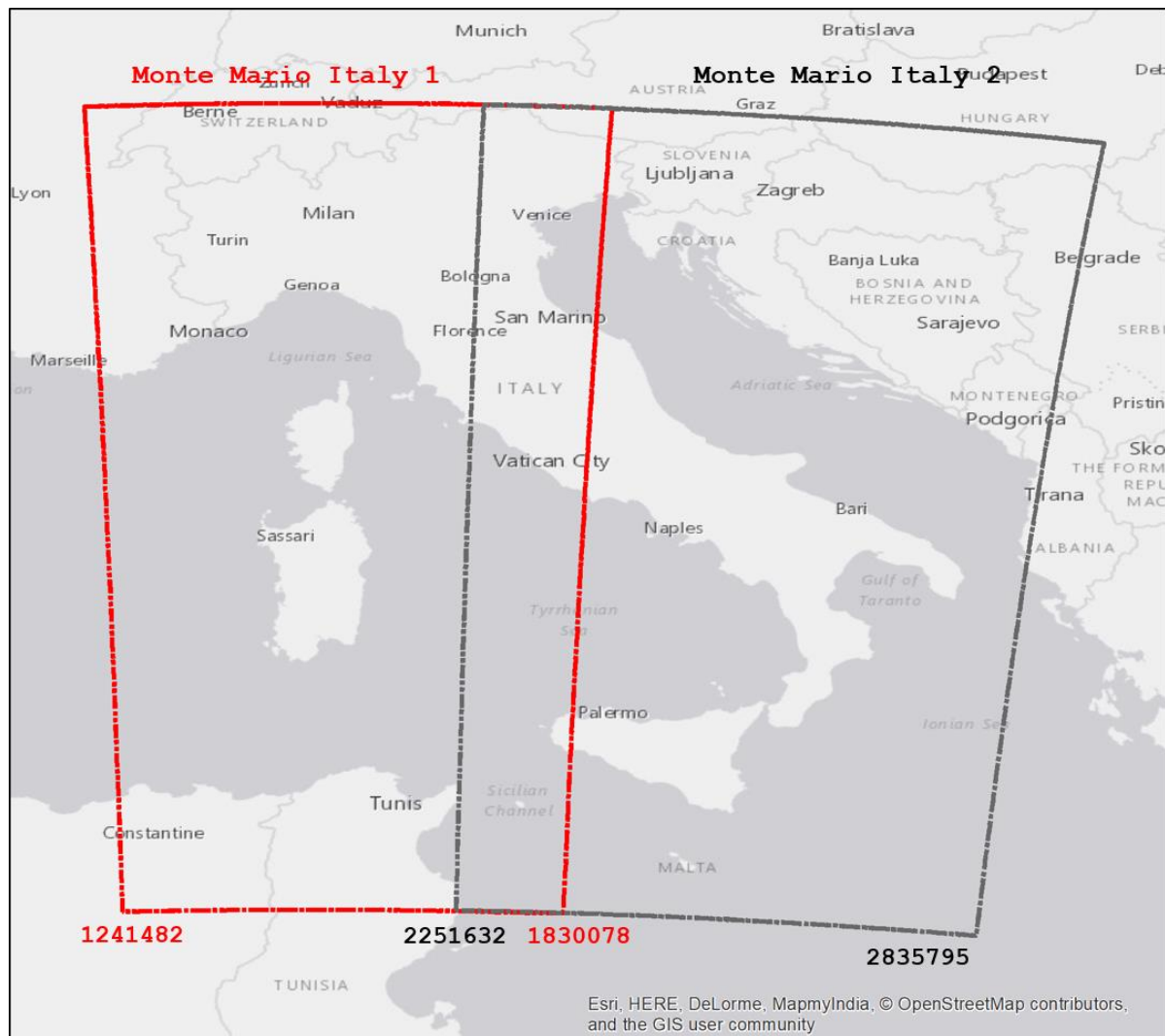
Extents

In layer spatial reference system units

xMin,yMin 1632269.35,4975250.49 : xMax,yMax 1804141.90,5102550.03

Layer Spatial Reference System

+proj=tmerc +lat_0=0 +lon_0=9 +k=0.9996 +x_0=1500000 +y_0=0 +ellps=intl +towgs84=-104.1,-49.1,-9.9,0.971,-2.917,0.714,-11.68 +units=m +no_defs
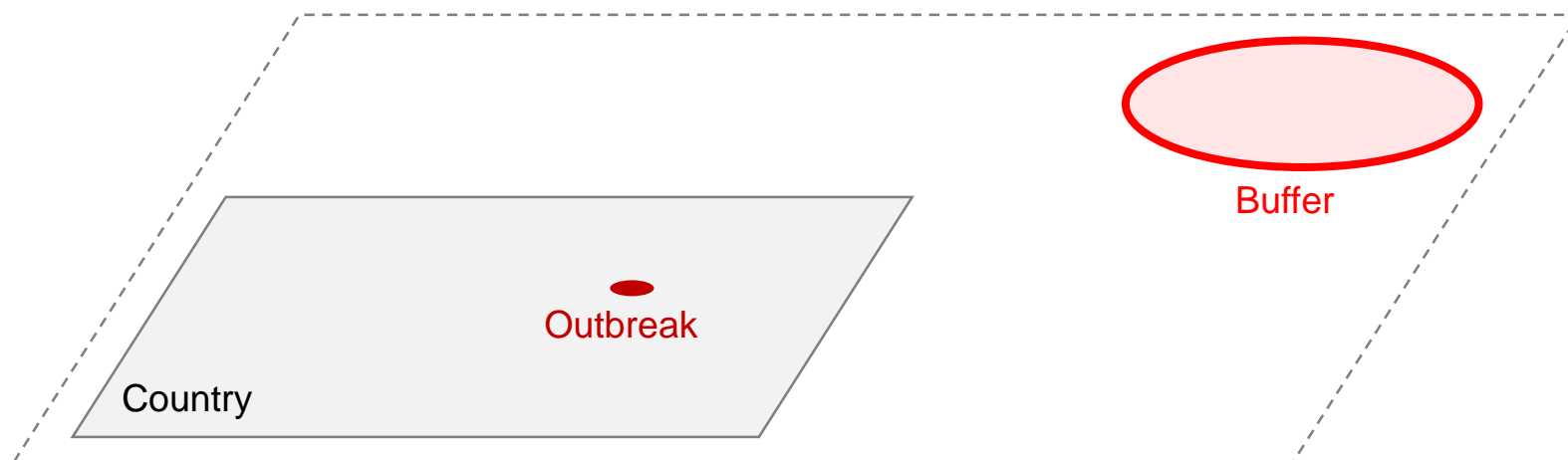
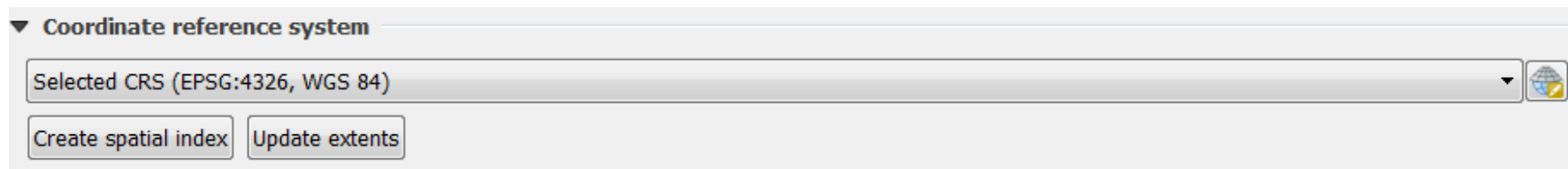# CRS example – Monte Mario Italy 1

CRS example – WGS84

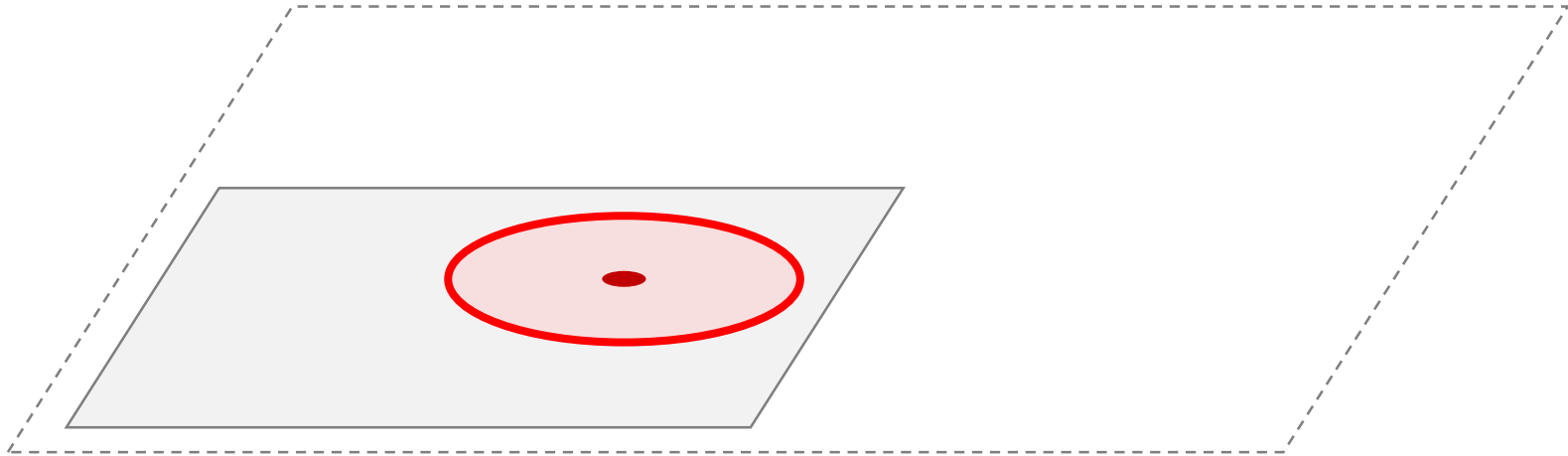# Fix CRS problems

Display data with a CRS in a map with a different CRS

Buffer

Outbreak

Country

Select the layer and set the CRS

▼ **Coordinate reference system**

Selected CRS (EPSG:4326, WGS 84) ▼

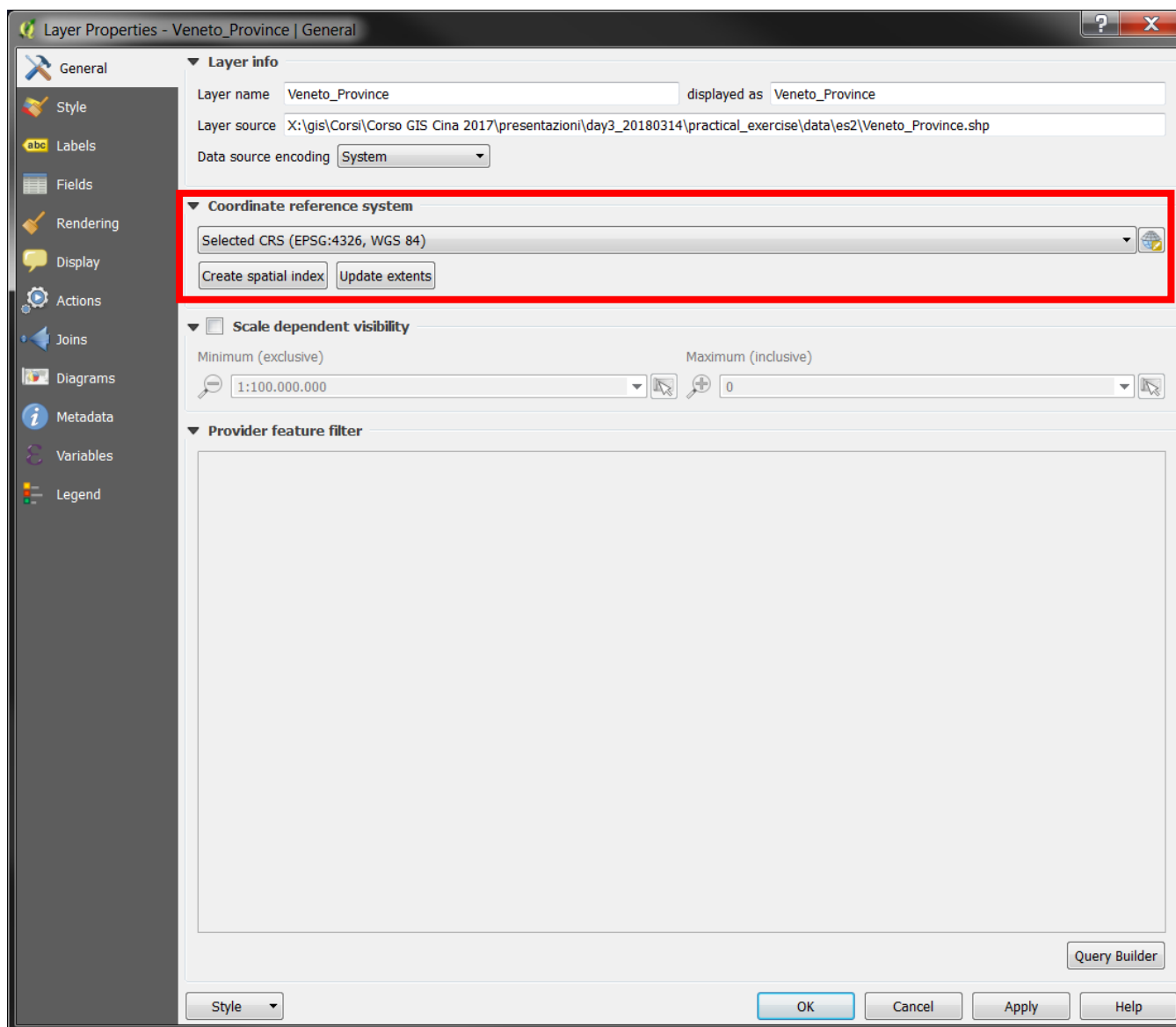Create spatial index   Update extents

Reprojection

Change the CRS → Change the way to display data

- all features are reprojected, but original data doesn't change
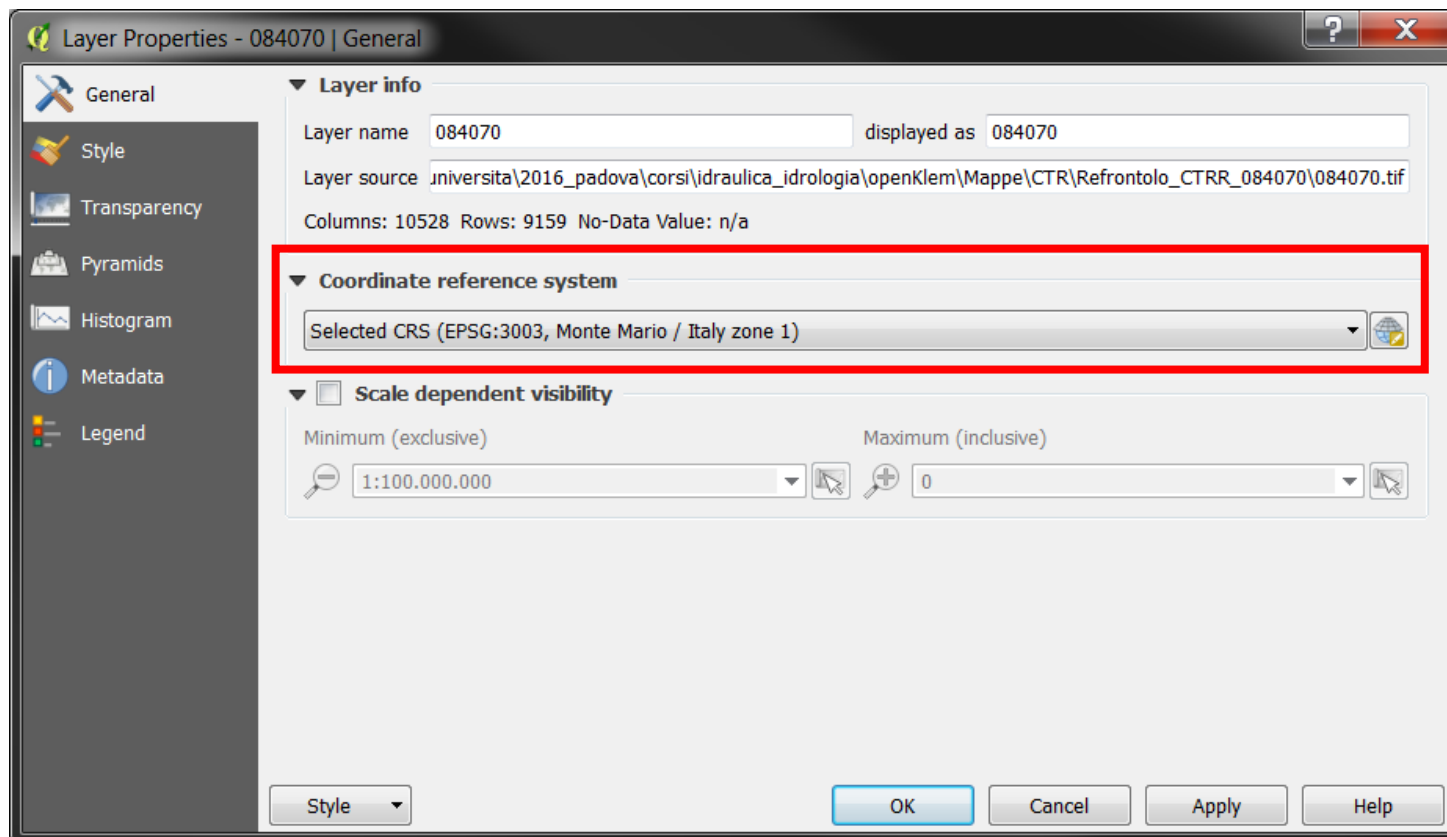- to save data in new CRS you must save them in a new file

Coordinates Reference System (CRS) in QGIS

- Project CRS
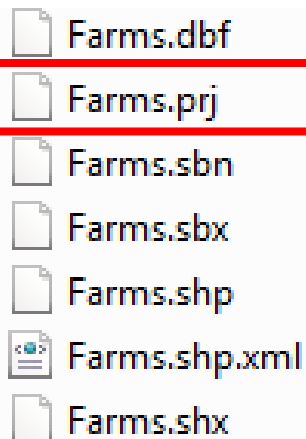- Single Layer CRS

Set CRS – Single vector layer
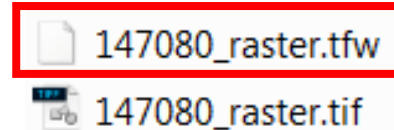
Set CRS – Single raster layer

CRS in .shp and .tif

Shape file

Farms.dbf
Farms.prj
Farms.sbn
Farms.sbx
Farms.shp
Farms.shp.xml
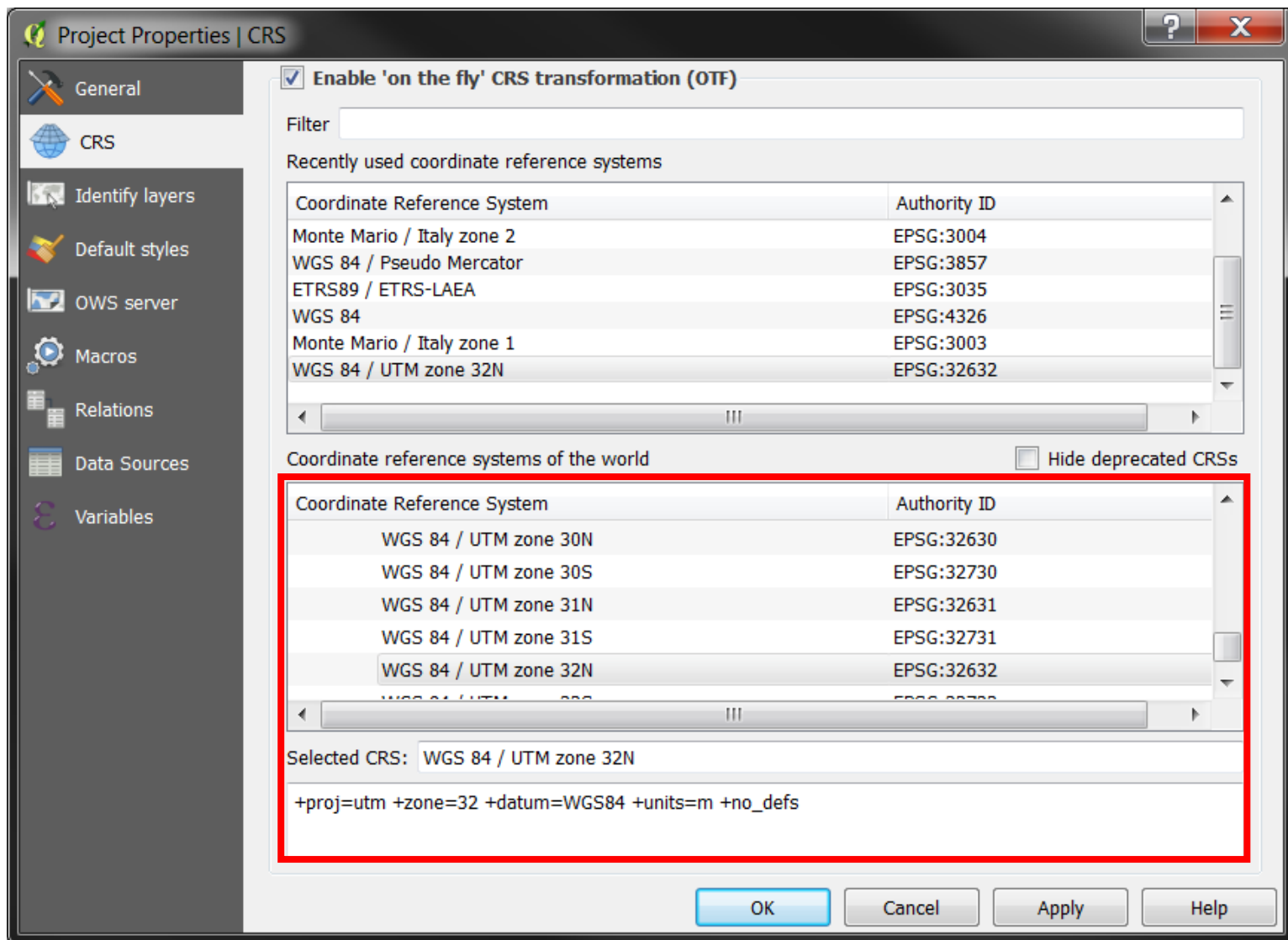Farms.shx

Raster file

147080_raster.tfw
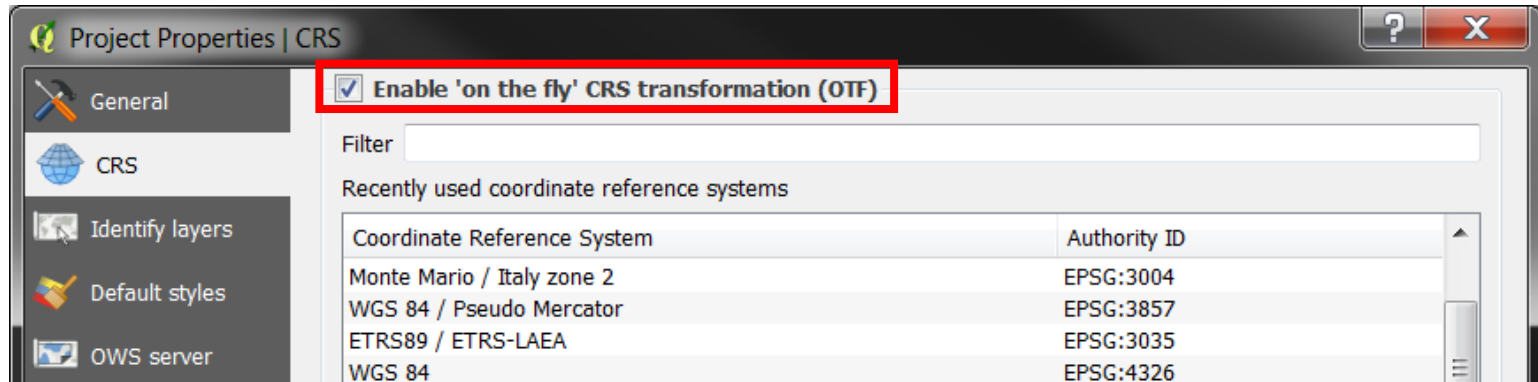147080_raster.tif

CRS management in vector and raster
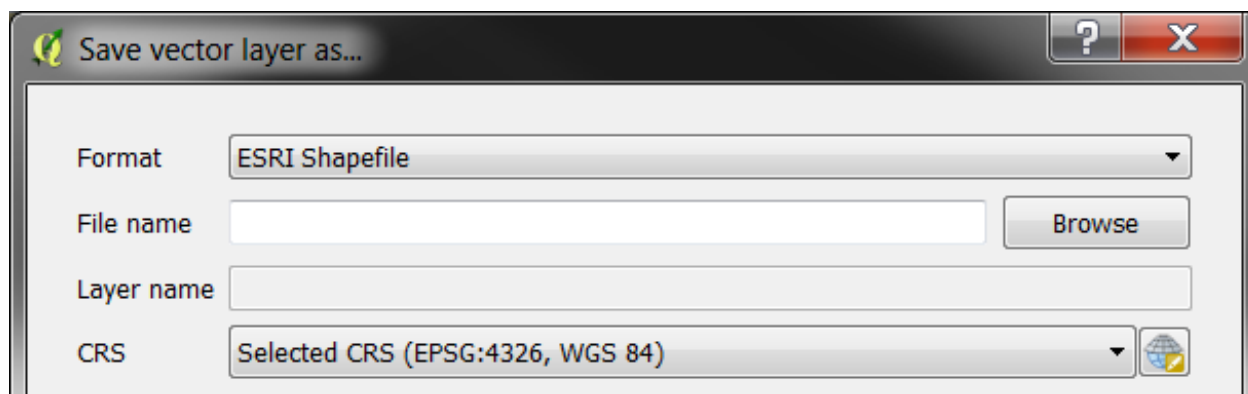are quite different

Set CRS – QGIS Project

On-the-fly Reprojection

- Helps to automatically display data in the right CRS
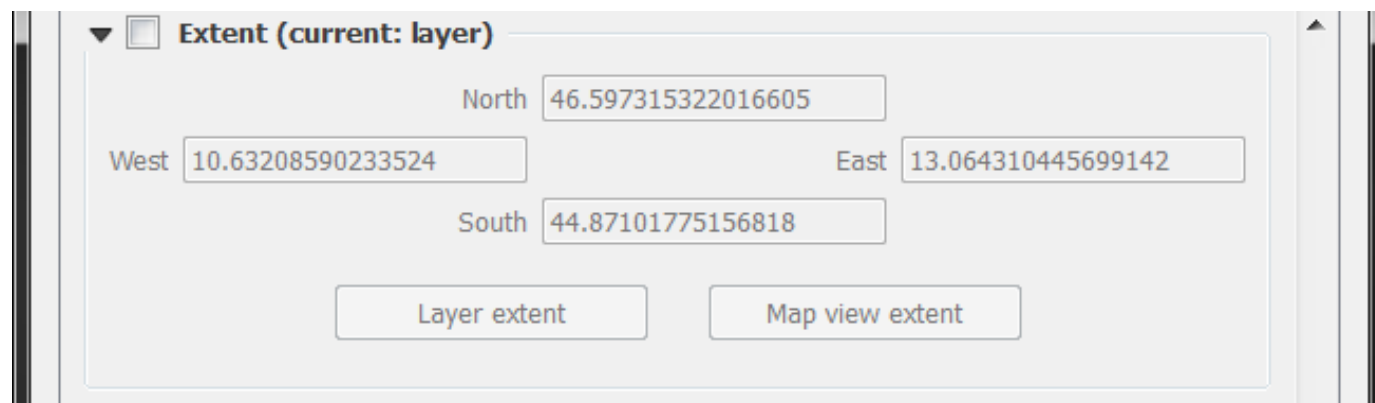- if the layer doesn't have CRS, it automatically use WGS84

Save data with different projection

- Save layer

Coordinates Reference System (CRS) in QGIS

- QGIS automatically set the CRS to the first layer CRS loaded
- If none CRS is defined, WGS84 is setted by default
- It is possible to change CRS everytime you need, and data will be reprojected

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- If its possible work with layer with the **same CRS**
- If you need to evaluate distances or areas, use a CRS in planimetric projection (*metric*)

Practical exercise (3.4)

3_4_ex_crs.docx

objectives

- Verify CRS
- Manage CRS