**Working with a geopackage (.gpkg) in QGIS**

The spatial information of the watherseds is likely stored as a shapefile (.shp) or a geodatabase (.gdb), or any other format (e.g., .geotiff). The JoeModelCE package (and app) uses the [geopackage](https://www.geopackage.org/) format (gpkg), which is an open format for geospatial information that describes a set of conventions for storing information within an SQLite database such as vector features, tile matrix sets of imagery and raster maps at various scales, attributes (non-spatial data) and extensions. As such, the user needs to convert the spatial information as a “geopackage” in order to upload it in the “Watershed Polygons” tab.

In the following lines there is a description of how to accomplish this task using the open-source geographic information system (GIS) software, QGIS.

* **Convert existing format into “.gpkg”**

1. Once QGIS is open, drag the file to QGIS workspace.

Graphical user interface, application, Word

Description automatically generated

1. Once the data is displayed on the workspace click on “Edit” 🡺 “select” 🡺 “select features”

Graphical user interface, map

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1. Zoom in to the area of study and look for “select features” button on the in the toolbar menu, and pressing “ctrl/cmd” + “click” select the polygons you need.

Map

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1. Once the polygons are selected go to “layer” tab and click on “save as” 🡺 a new window is displayed, select or simply verify “geopackage” (from the drop-down menu) and fill in the required information (give a proper name and location where the file is going to be saved), “check” [✓] “save only selected features” and select the default CRS: “EPSG:4326 – WGS84”. Finally, click “OK”.

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1. Well done! The data is now saved as a geopackage (.gpkg) ready to be edited (see next section) and then uploaded to the Watershed Polygons” tab on the app or to Rstudio.

* **Edit/customize the “.gpkg”**

1. Once the data is in a .gpkg format and are already loaded in QGIS, locate the layer on the “layers” panel and right click 🡺 ”Open Attribute Table”. A window with the table is displayed, and it shows all the information stored in the geopackage, e.g., name of the rivers, watershades, object identifier, etc.

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Graphical user interface, text, application

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1. The “fid” column corresponds to the “HUC\_ID” on the excel spreadsheet, as such you can change it to match names. To do that, on the top ribbon click on the “Toolbox” icon (wrench). In the processing tool window (that pops up on the left), locate the “Reactor fields” and then double click on the “Field name” to be changed (e.g., fid to HUC\_ID).

Graphical user interface, application

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1. A “temporary” layer (“Refactored” as default) is created (see the “Layers” panel on left), open the attribute table to confirm the name(s) changed. Then remove the original layer (right click on the original layer 🡺 “Remove layer”). Keep only the temporary layer.

Graphical user interface, application

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1. Save/overwrite the “temporary” layer as a geopackage. On the top/most menu click on “Layers” 🡺 a window pops-up “Save vector layer as:” select “Geopackage” in the drop/down menu🡺 To save it, browse to the same directory where the original/previously saved geopackage is located (from previous section) 🡺 Overwrite the file by selecting it. Once you click on save, the layer will appear on the workspace. You can now remove the “temporary” layer named “Refactored”.

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1. By default, the field identifier, “fid” is created again in the overwritten layer. Use the “Drop field(s)” tool on the “Processing tool” menu (click on the wrench again). And save/overwrite the file one more time.