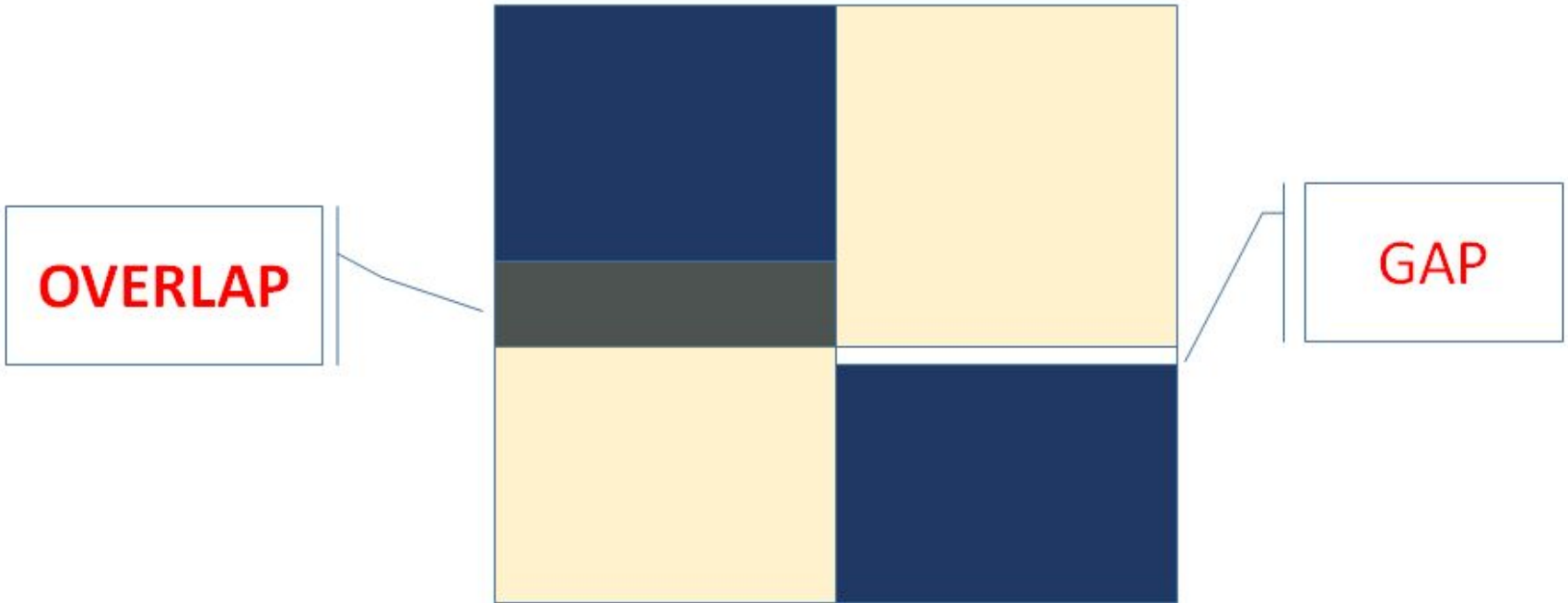
Kiosk: Topology

Sample data from Lebanon

Reminder:

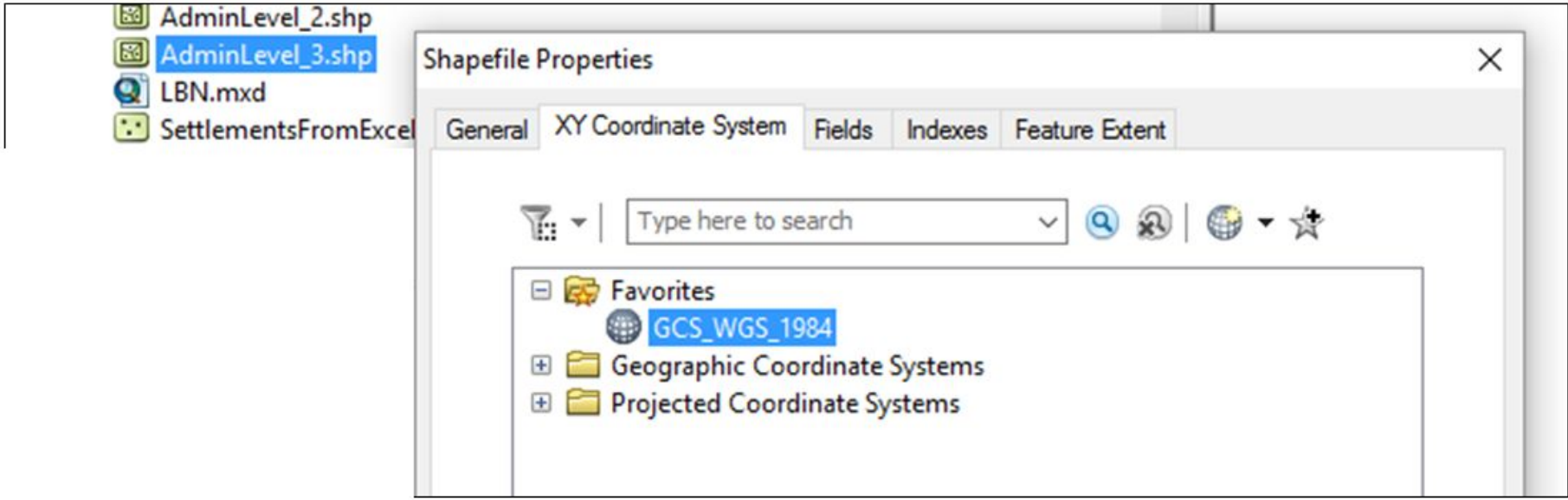
Topology: refers to errors within a SINGLE dataset. Generally overlapping boundaries, or gaps between shared boundaries



1. Look at data properties in ArcCatalog

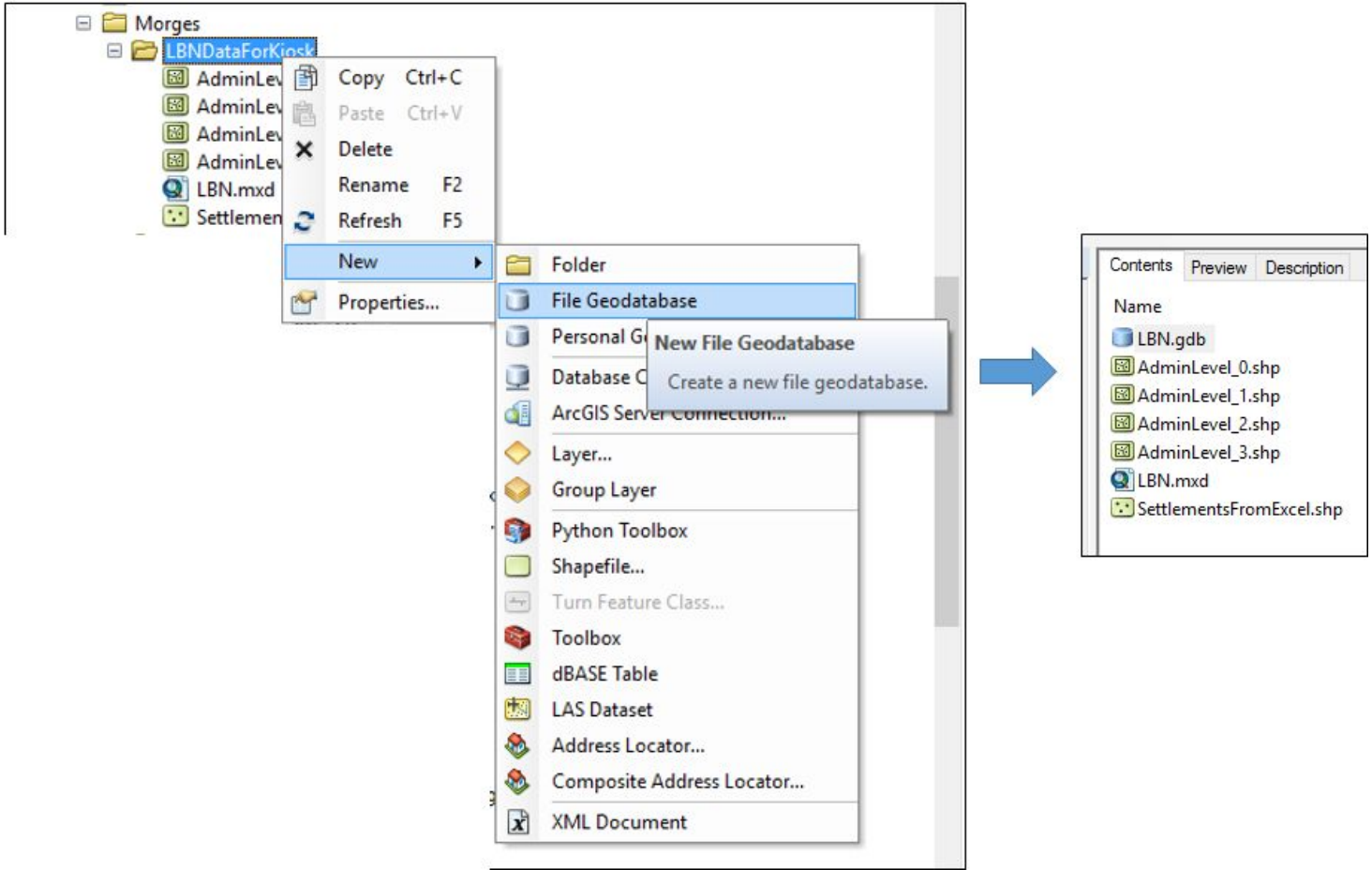
Make sure projection is defined

Undefined projections will cause issues in cluster tolerances
and lead to negative results



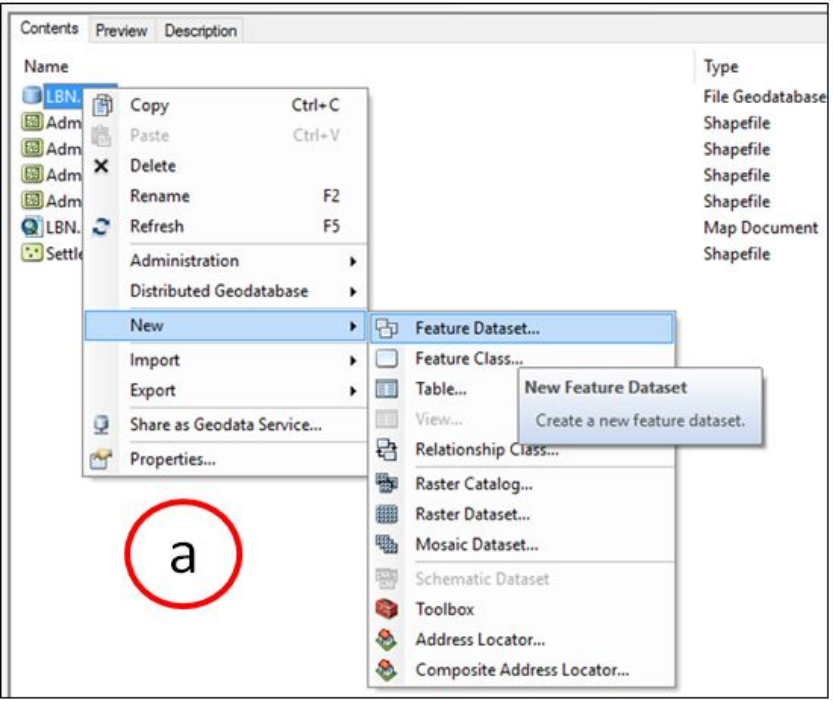
2. Create GDB

Create a new file geodatabase

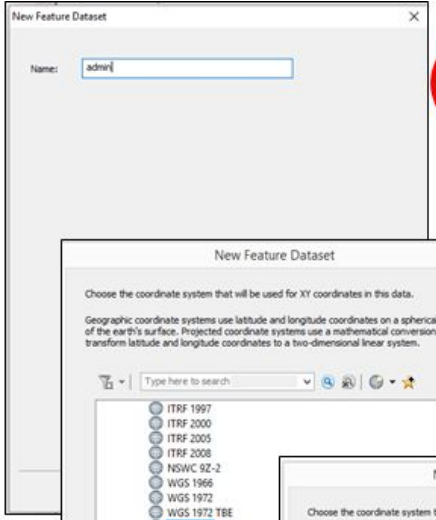


4. Create FD

Create a new Feature Dataset

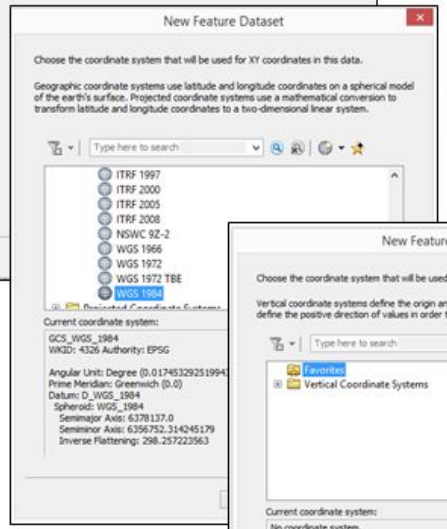


a



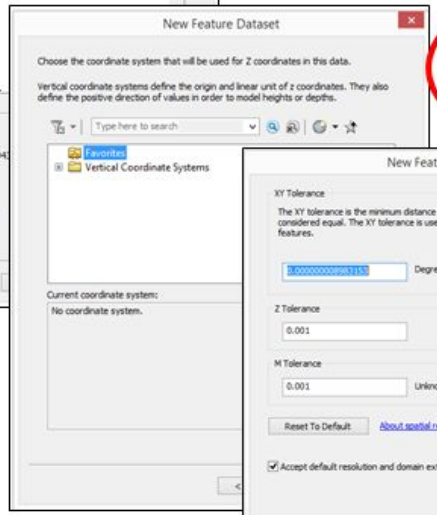
b

Name FD



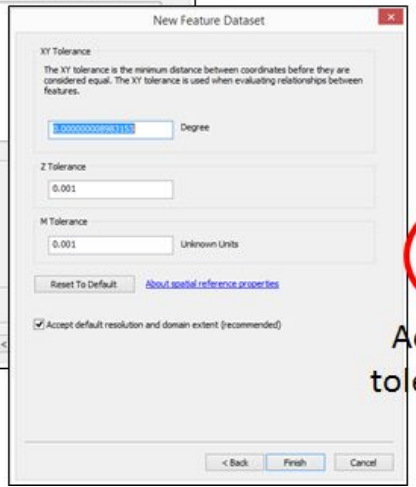
c

Same projection as input data



d

Z values are not an issue

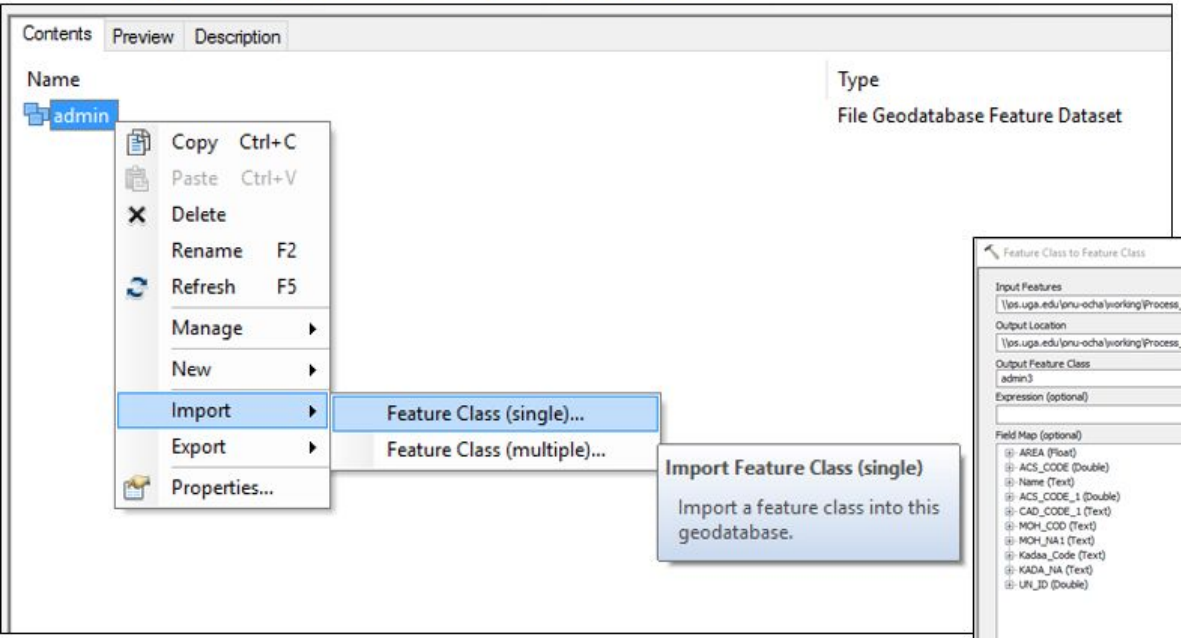


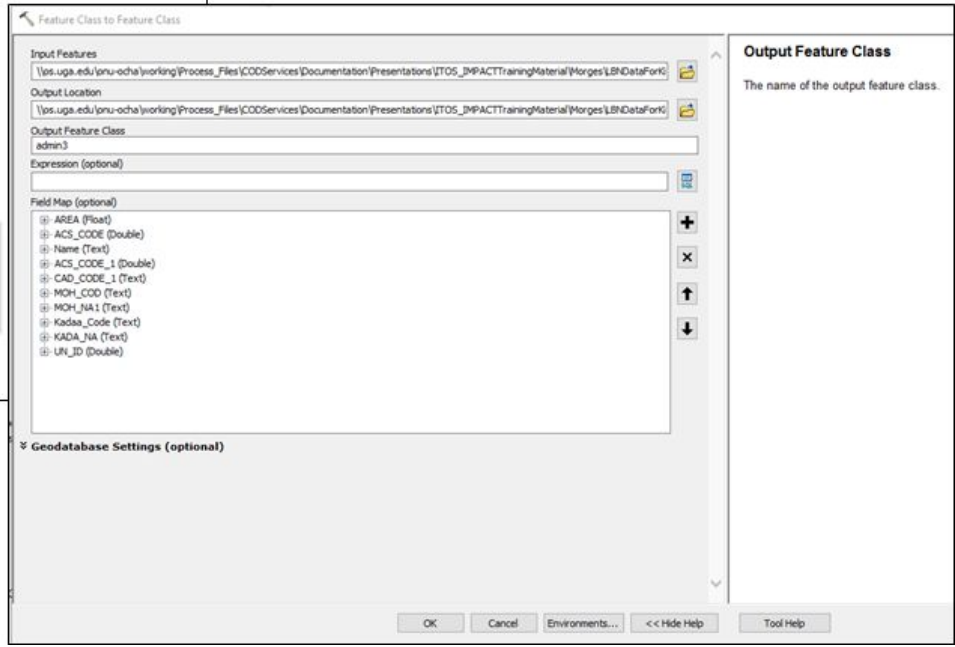
e

Accept tolerance

4. Import data to FD

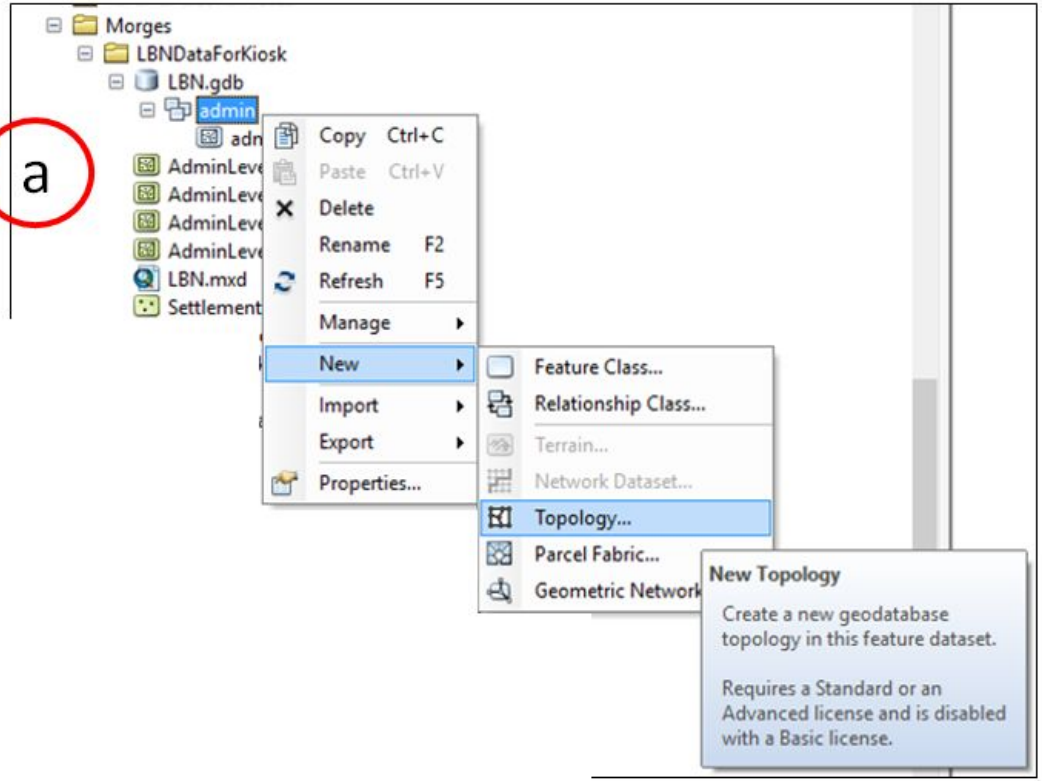
Import shapefile into new Feature Dataset



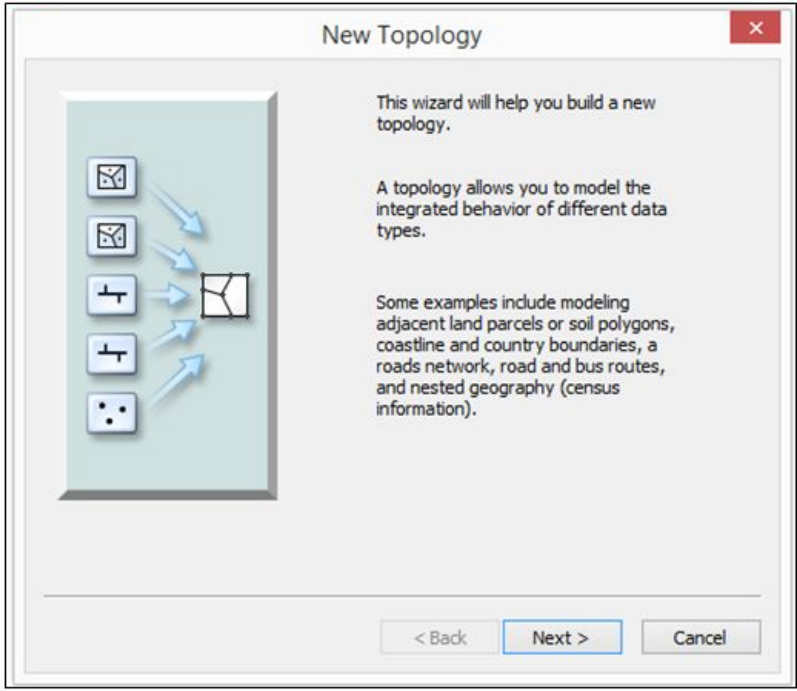


5. Create topology layer in FD

a

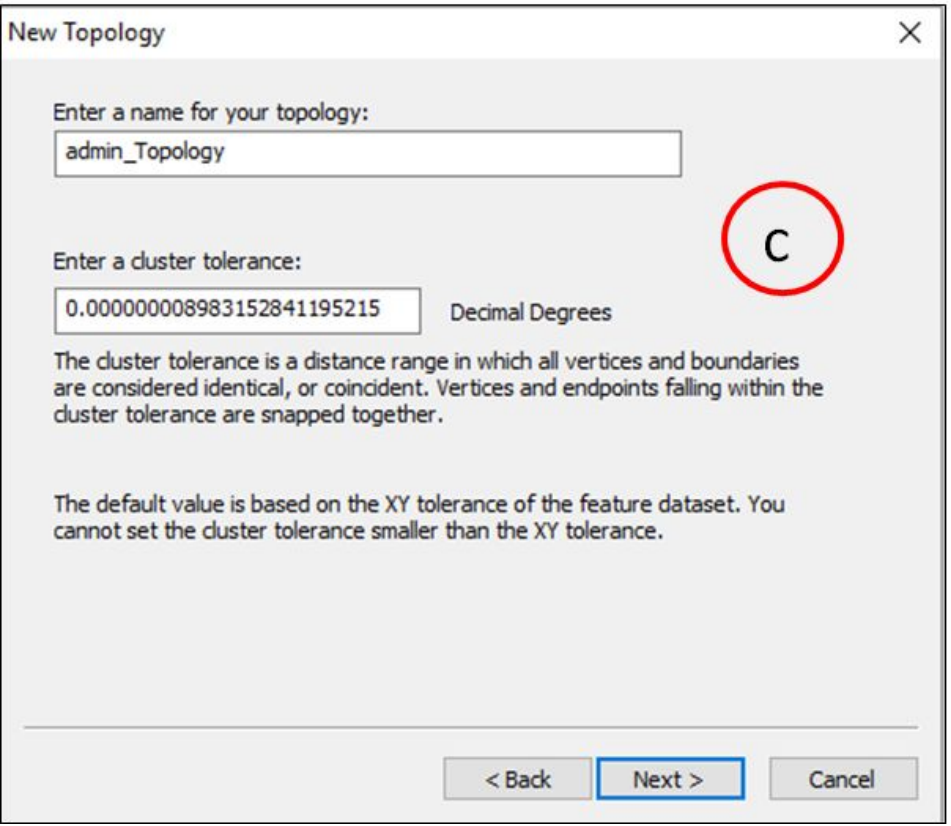


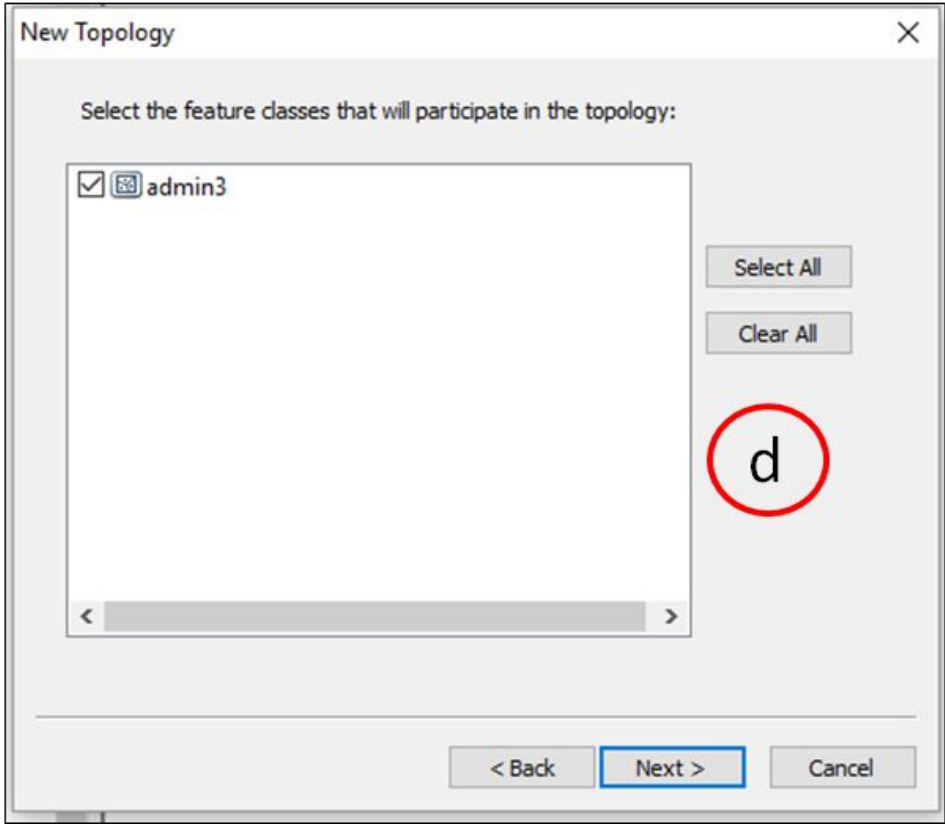
b



Set tolerances, select layers

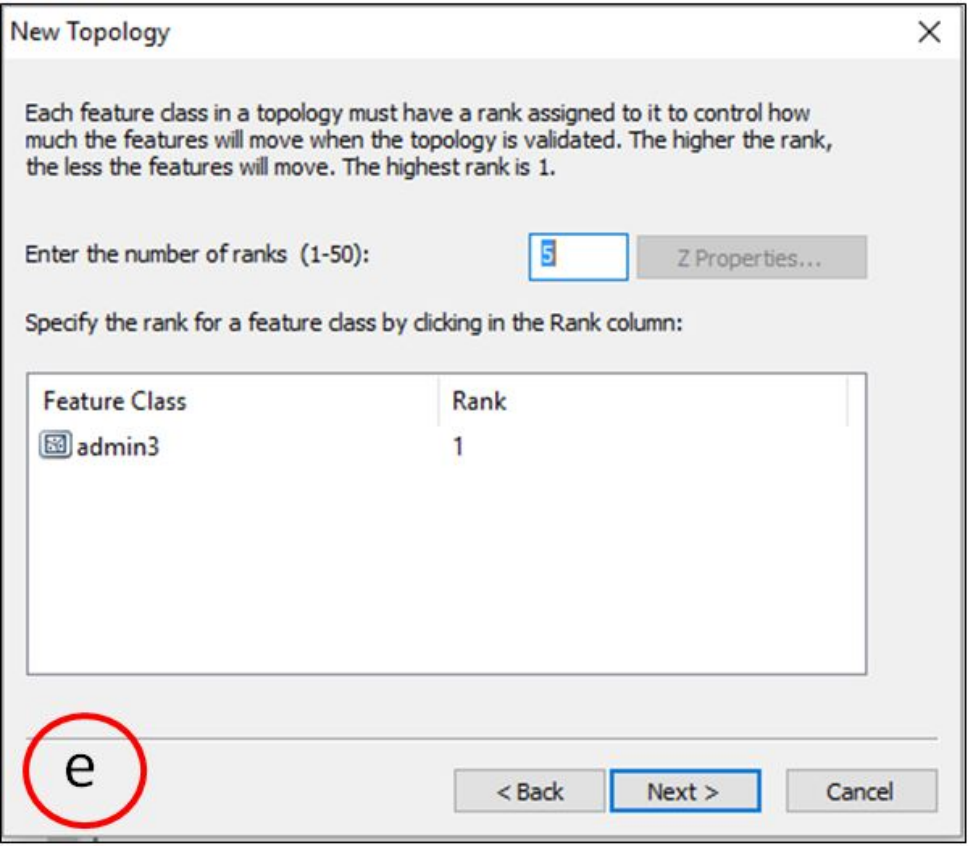
If projection is defined you can accept tolerances

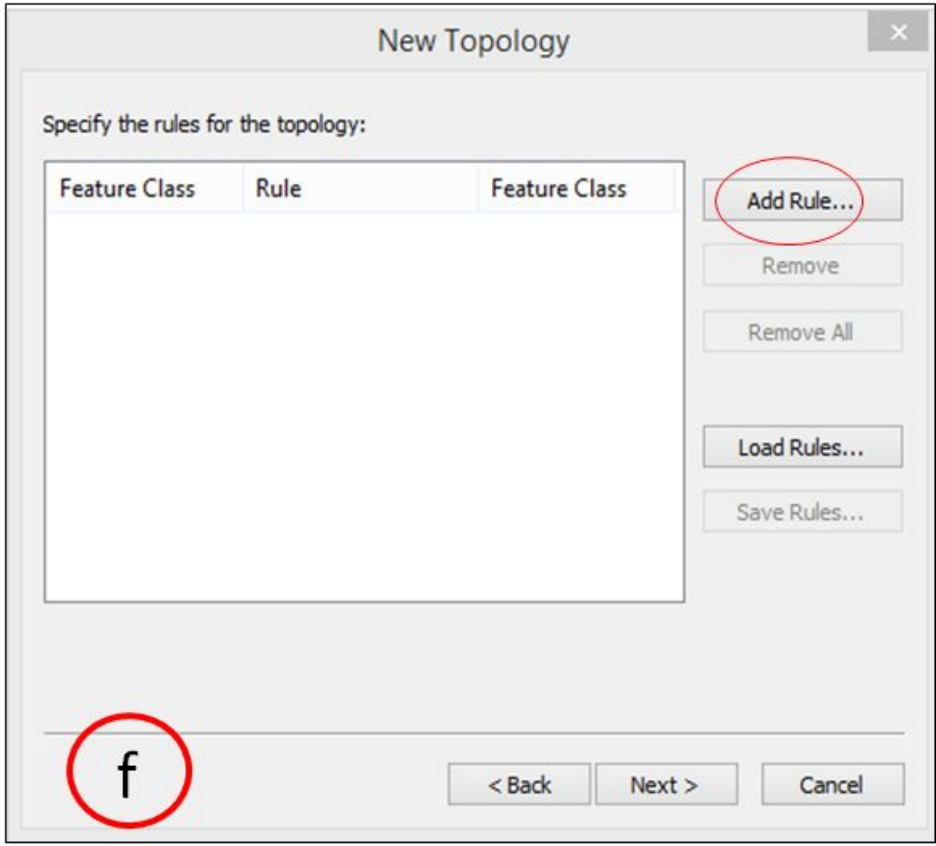




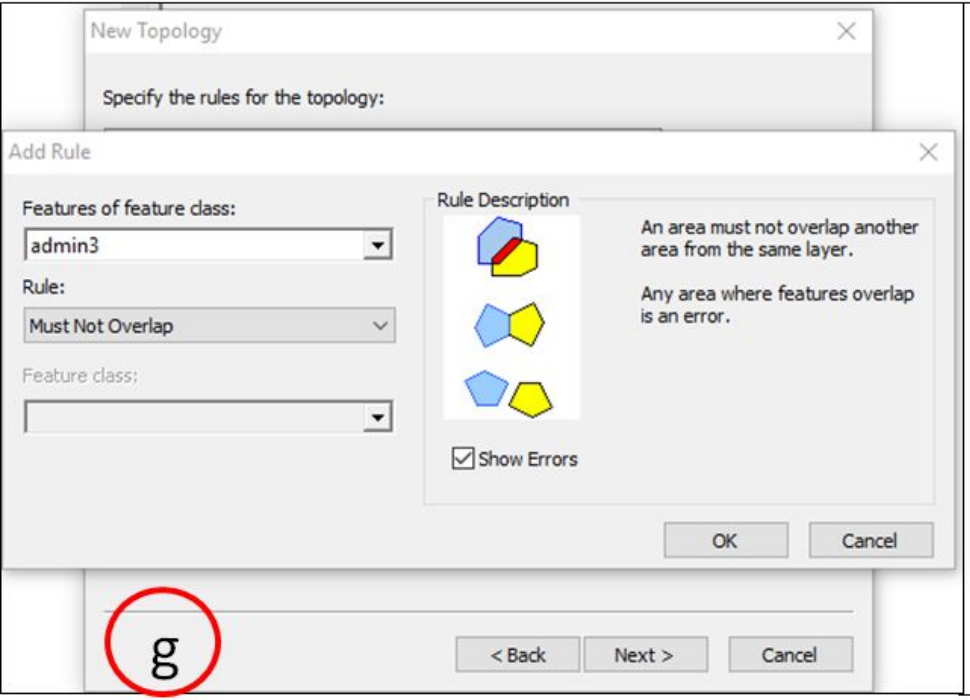
Rank data, add rules

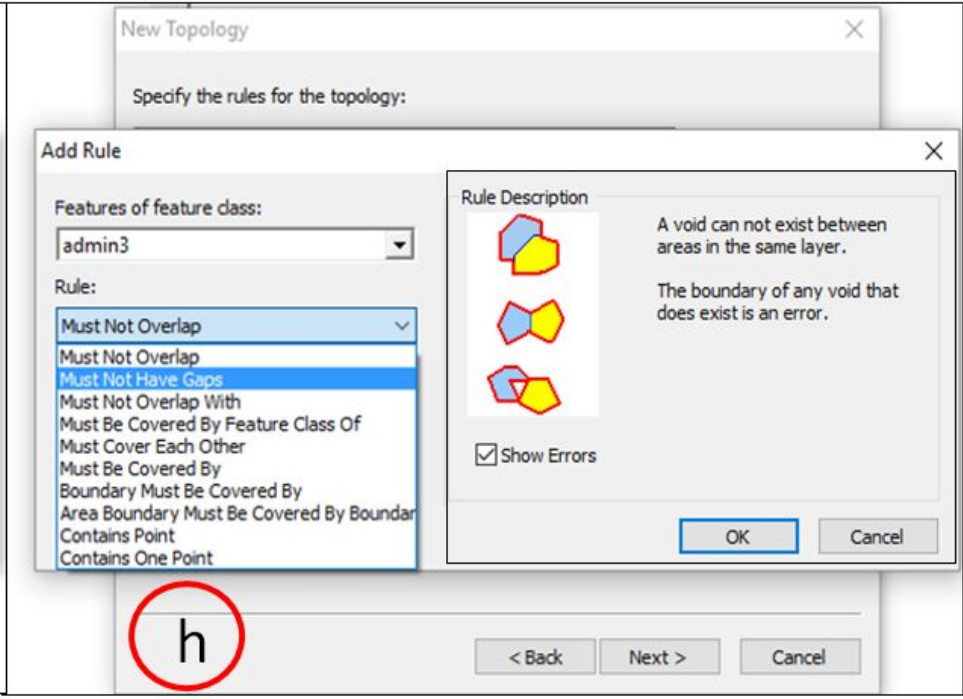
You don’t need to rank data if you are only working with a single layer



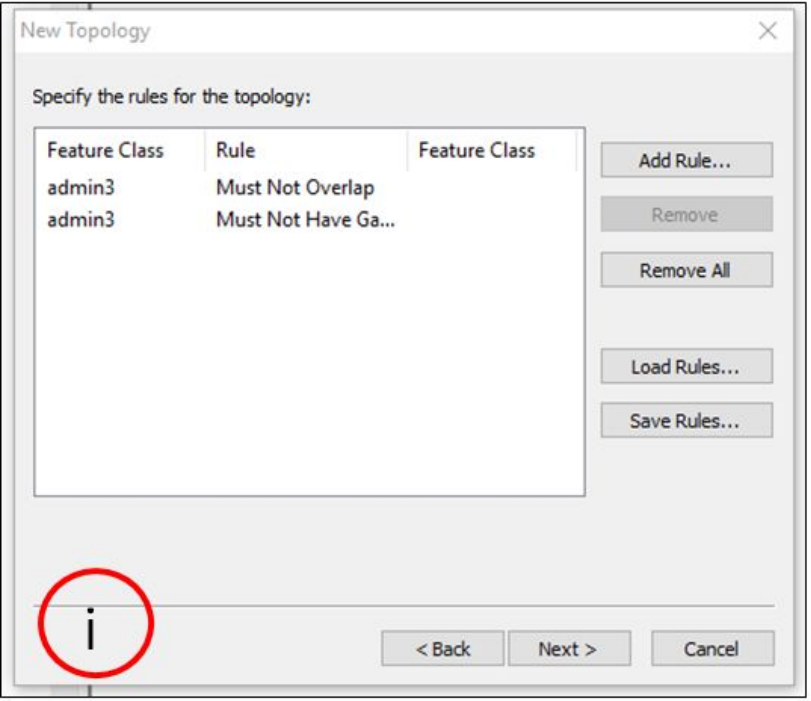


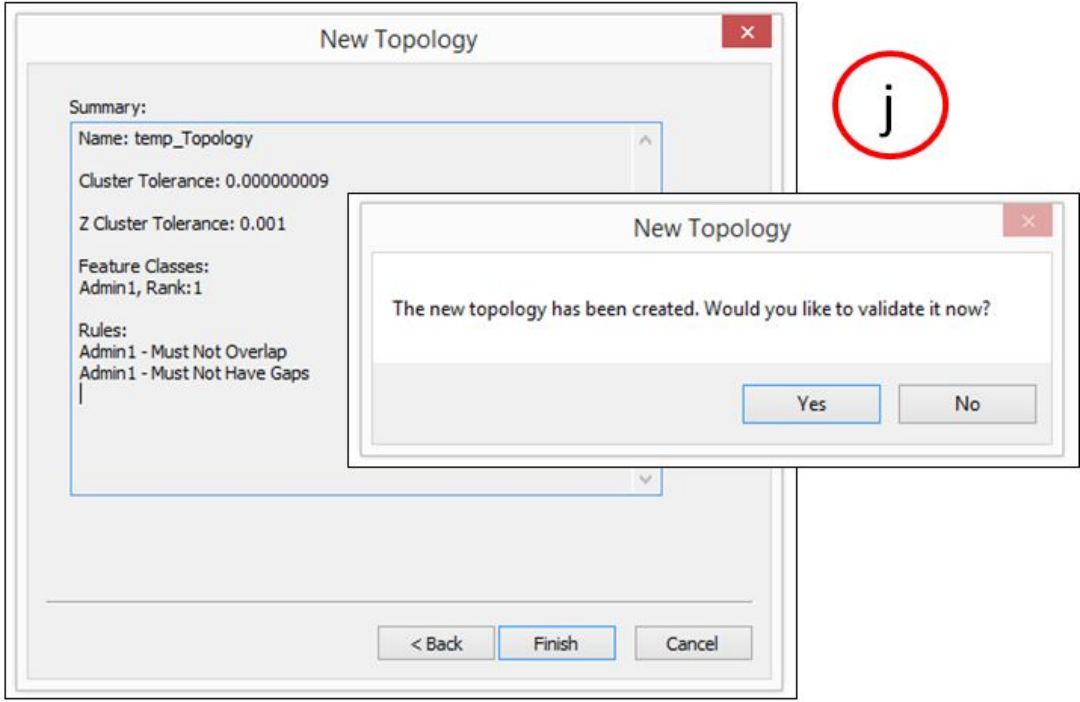
Add 2 rules: must not overlap or gap



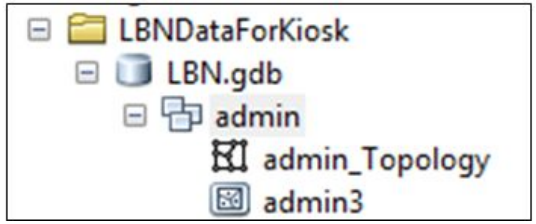


Review rules, validate



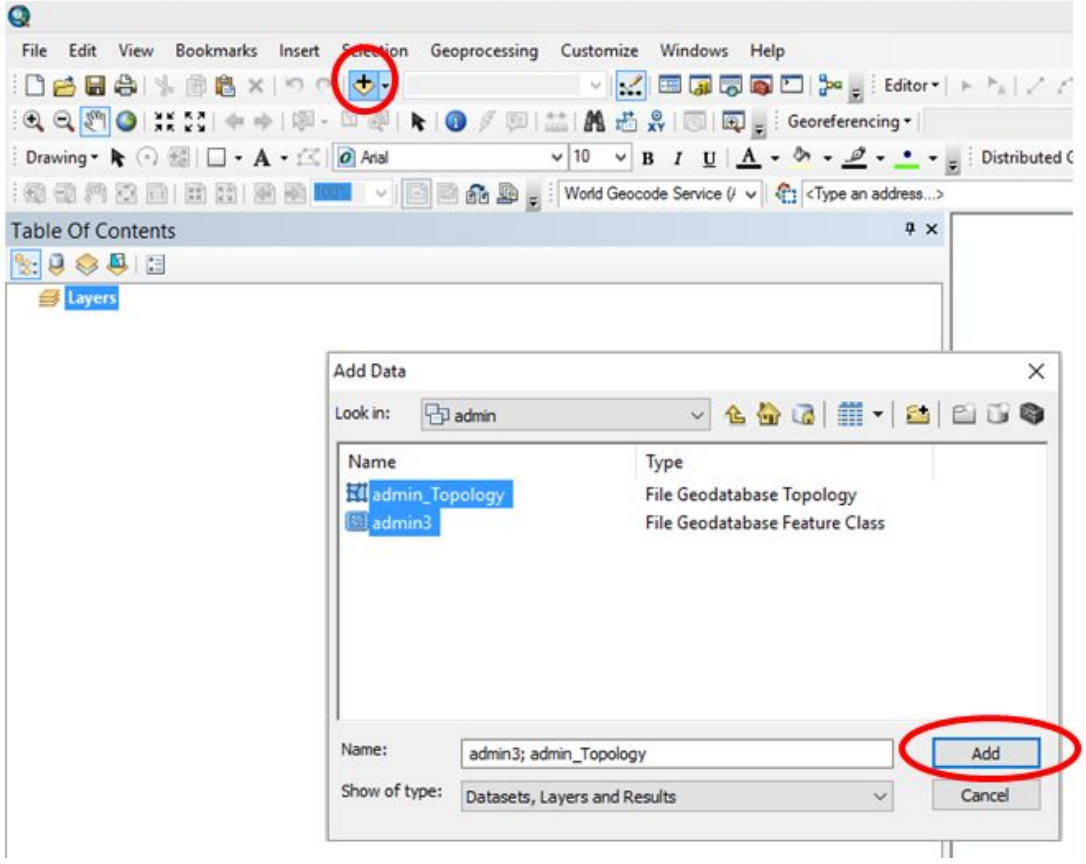


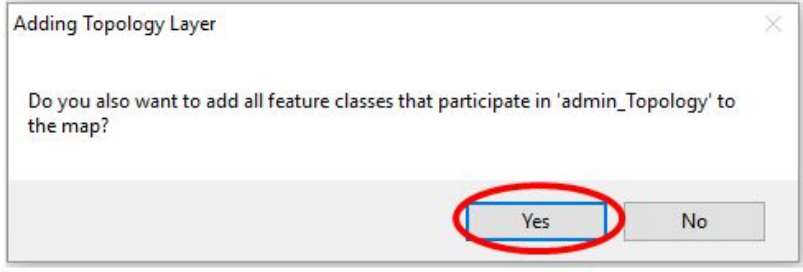
Result



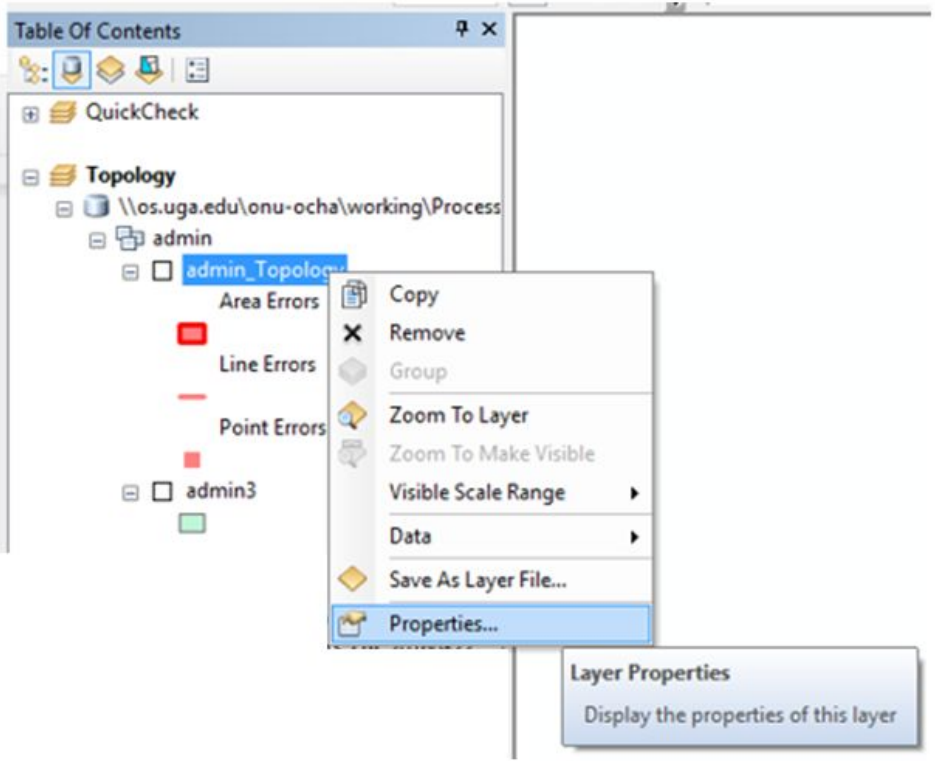
6. Open Desktop and add FC and topology to data frame

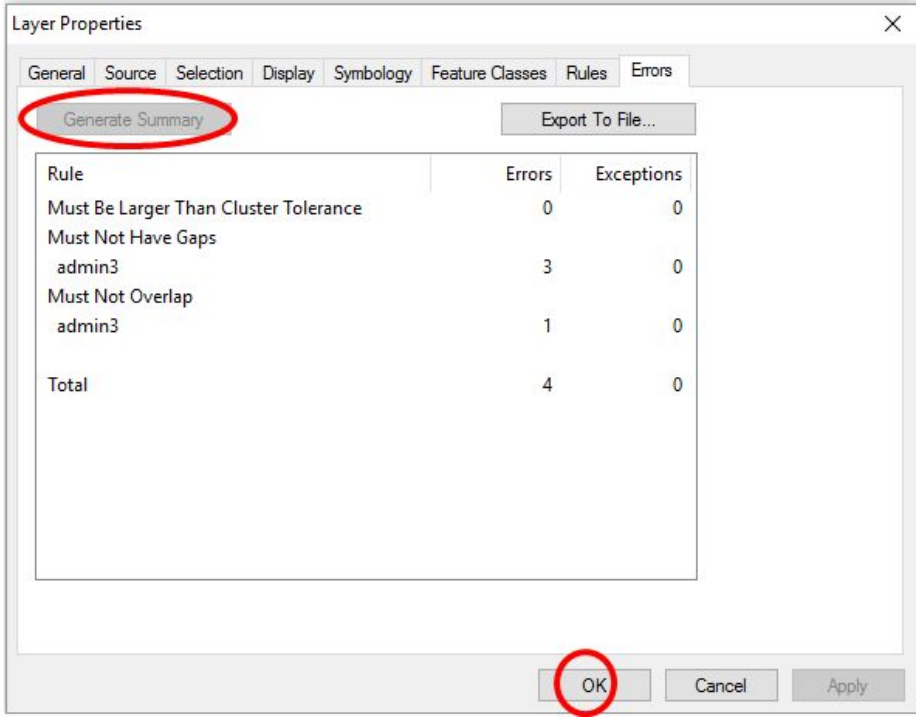
If you are asked to add other layers that participate in topology say yes





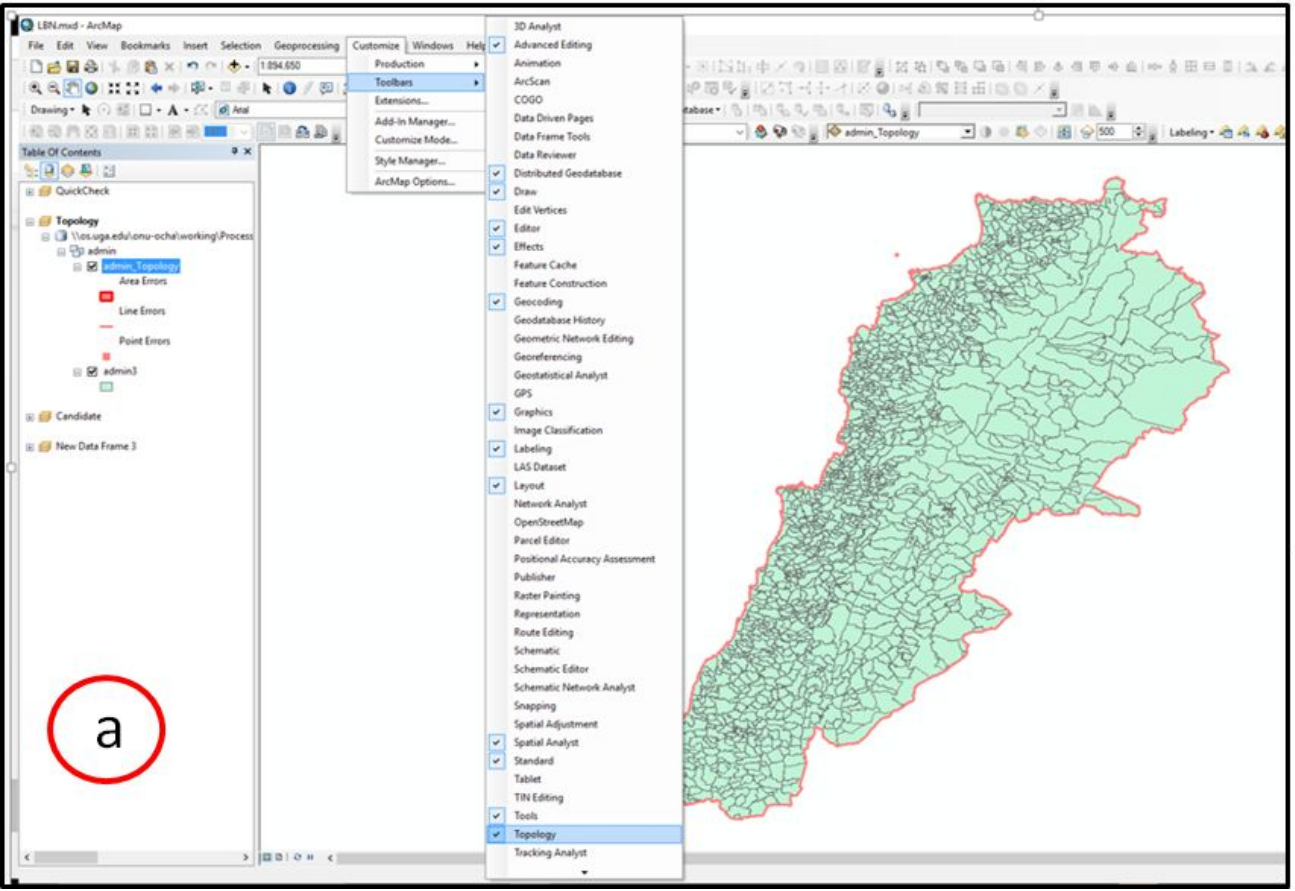
7. Summarize topology errors



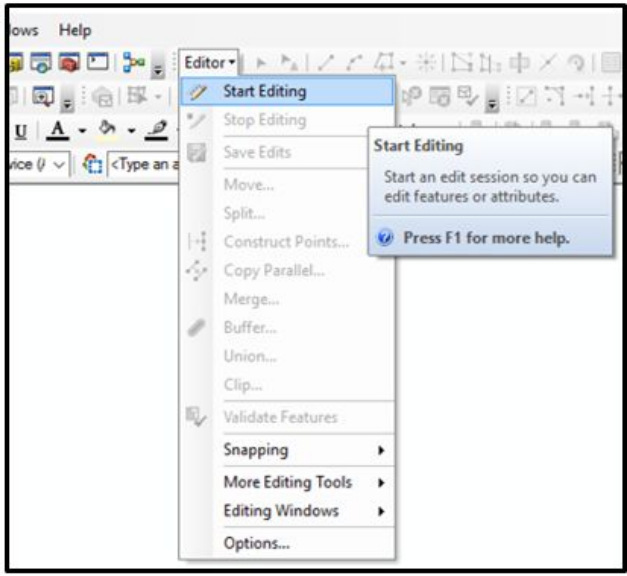


8. Inspect the errors

Enable the topology toolbar, start edit session to enable topology tools



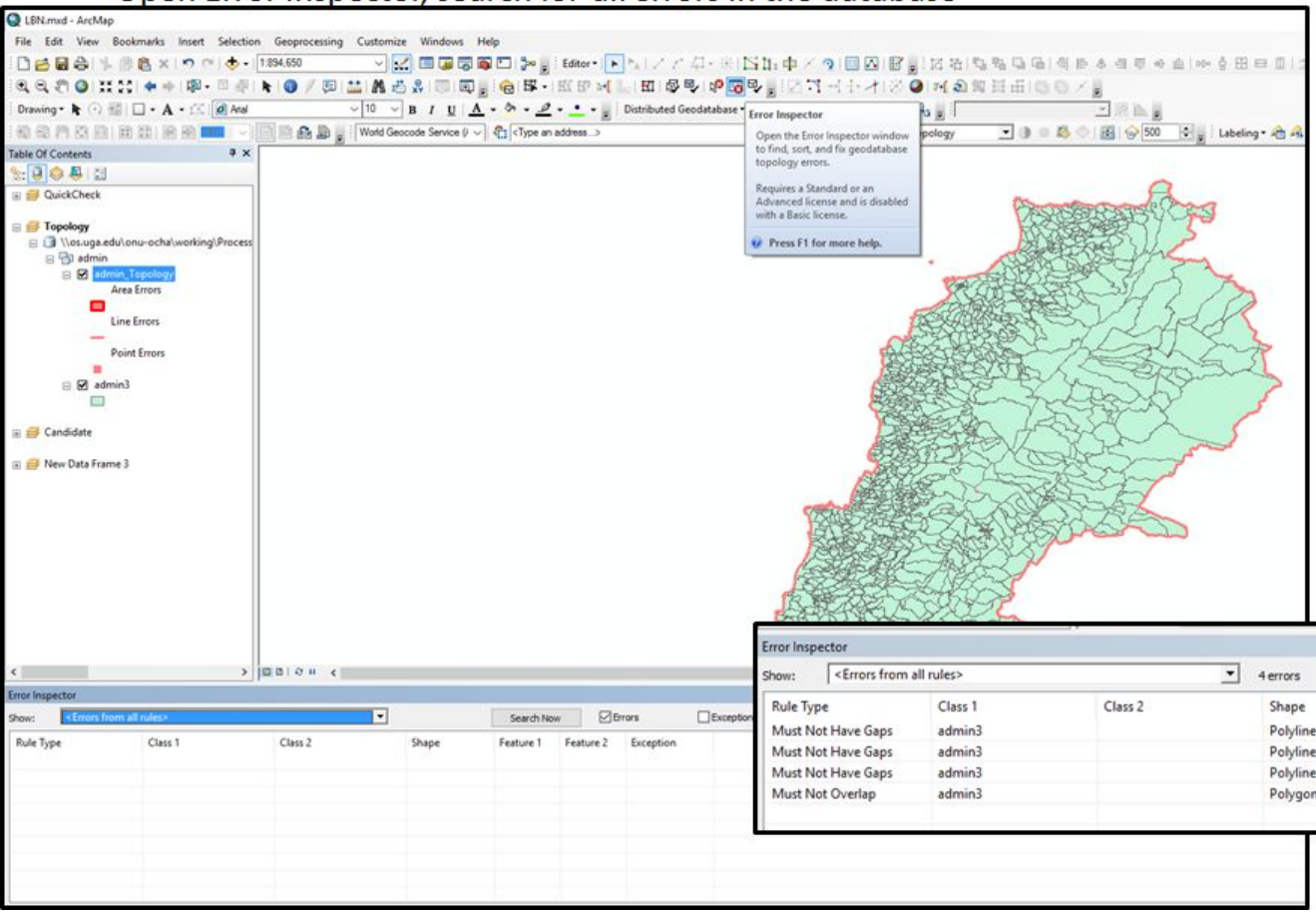
b

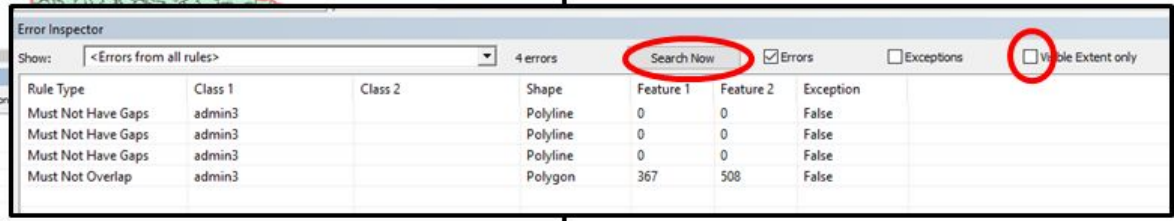


c

9. Inspect the errors

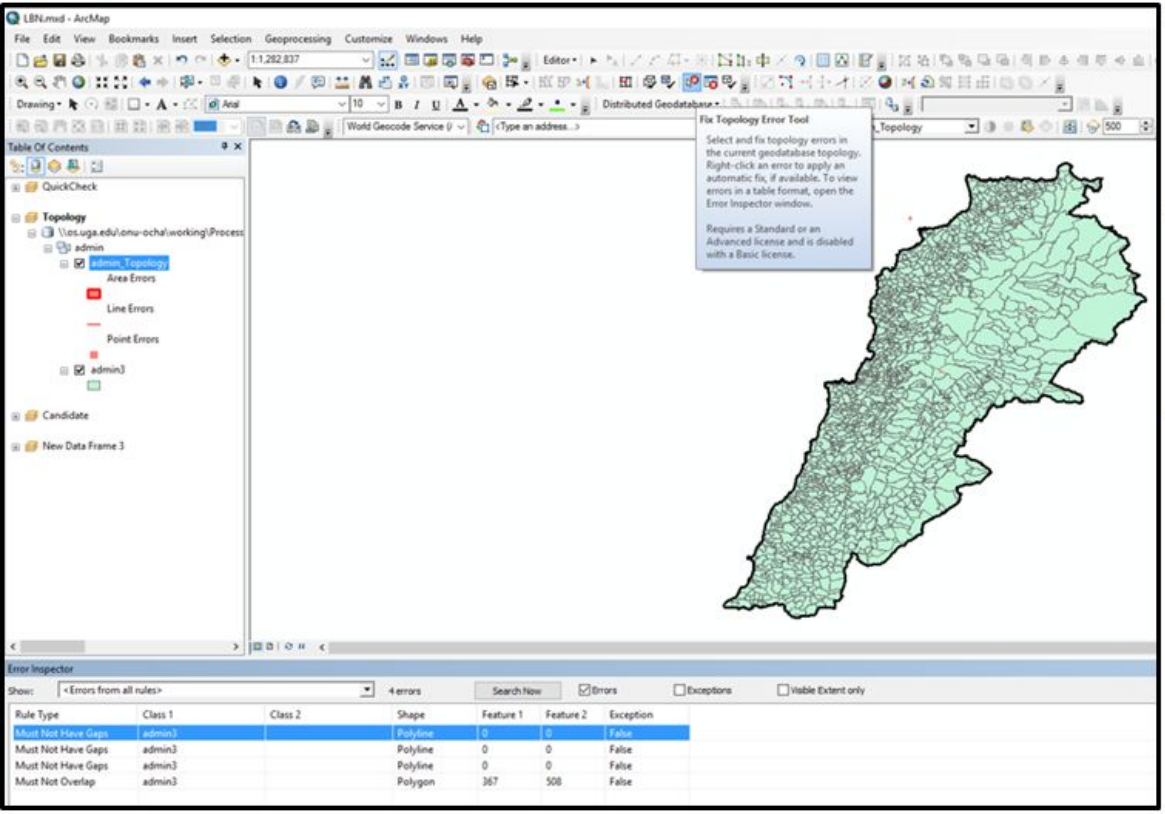
Open Error Inspector, search for all errors in the database



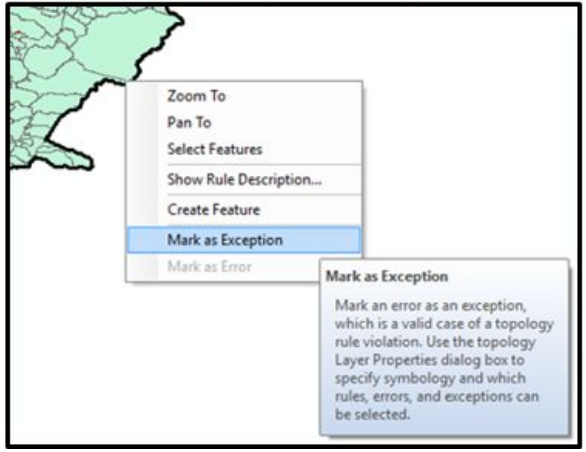


10. Mark national boundary as exception

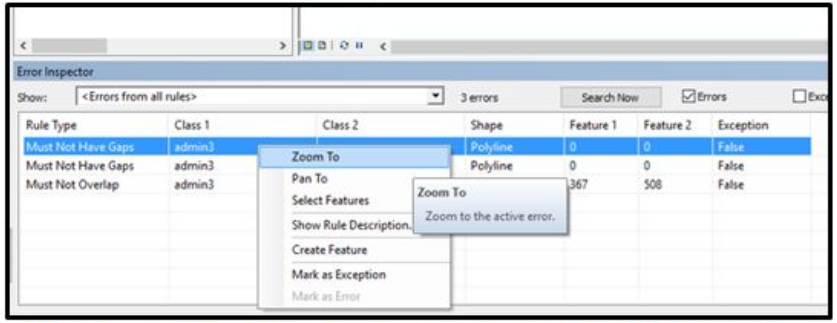
Using ‘Fix Topology Error Tool’ Select the error on the national boundary so that it turns black



- Every polygon layer will always have at least 1 gap error because the outermost boundary does not share a boundary with another polygon.
- ArcGIS will report this as a gap error - it is a false positive and not a true error
- There will also be gap errors around any existing offshore islands
- Right click to mark as exception

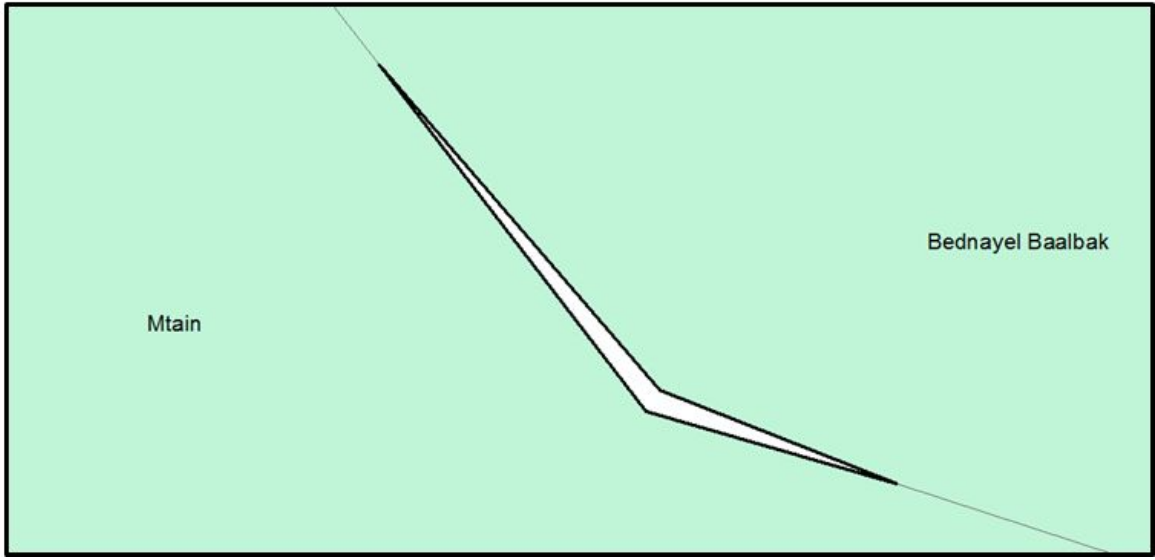


11. Fill gaps

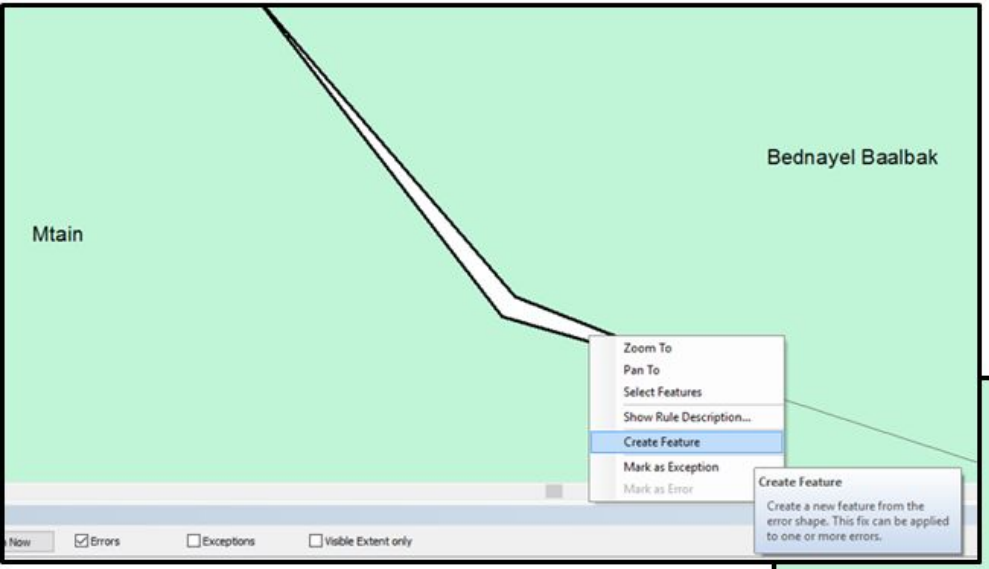


Step through and zoom to each error in the table

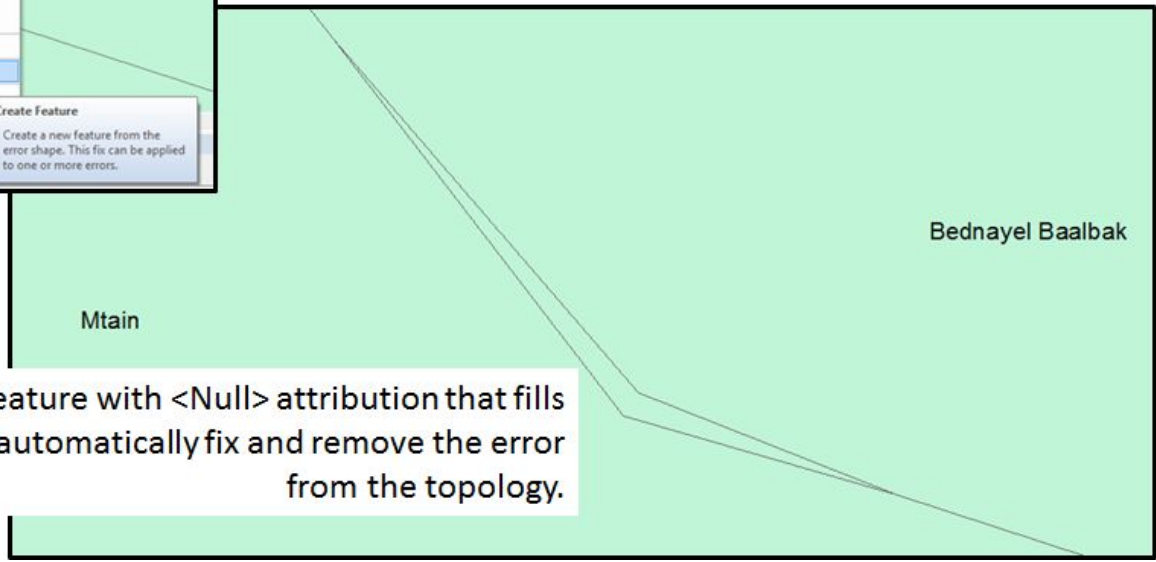
This is a gap error – there is a space between neighboring admin units (Mtain and Bednayel Baalbak)



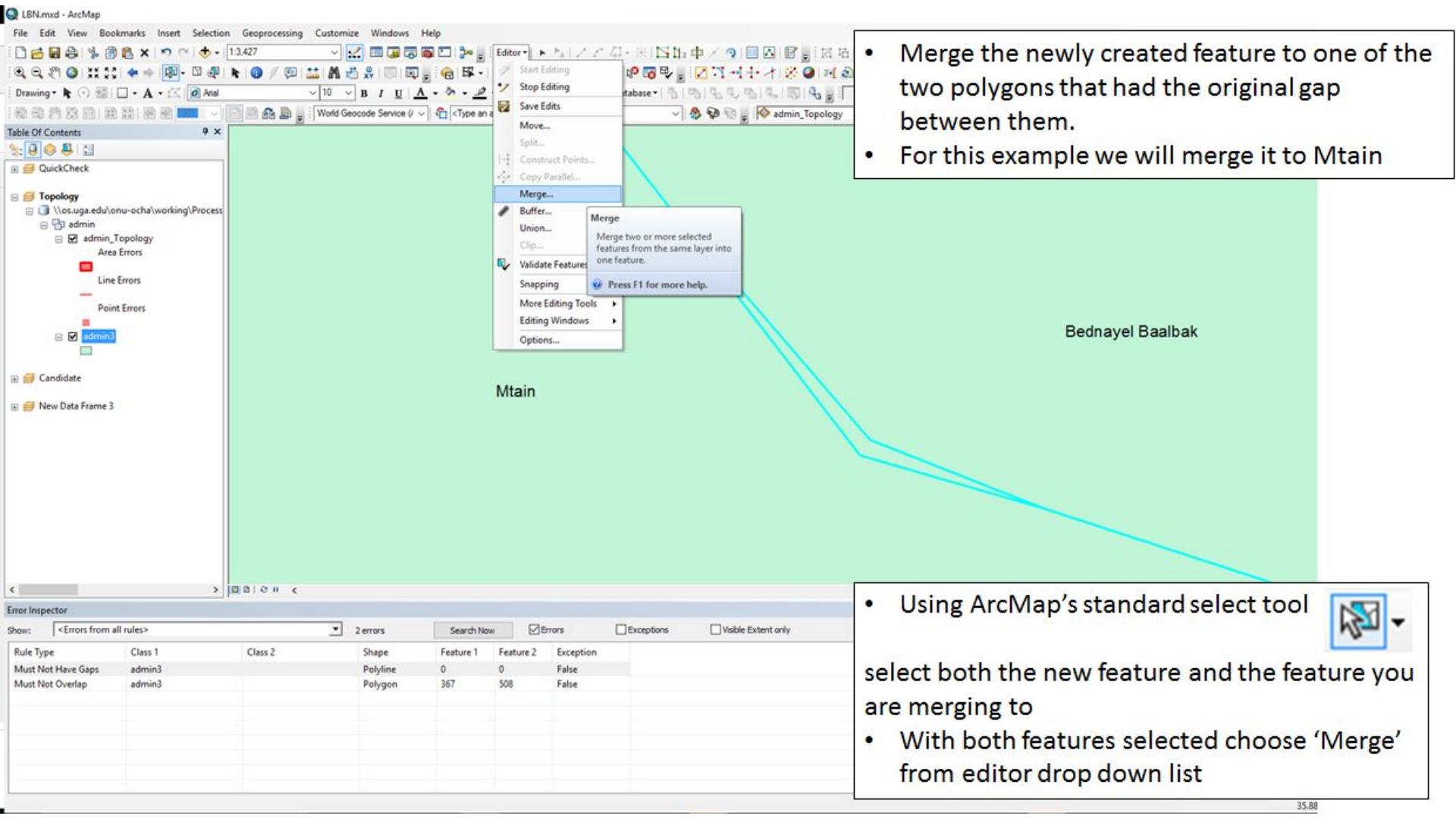
Fill gaps



-  Using the 'Fix Topology Error Tool',
- right click and create a feature in the space



- This creates a new feature with <Null> attribution that fills in the gap. This will automatically fix and remove the error from the topology.



- Merge the newly created feature to one of the two polygons that had the original gap between them.
- For this example we will merge it to Mtain

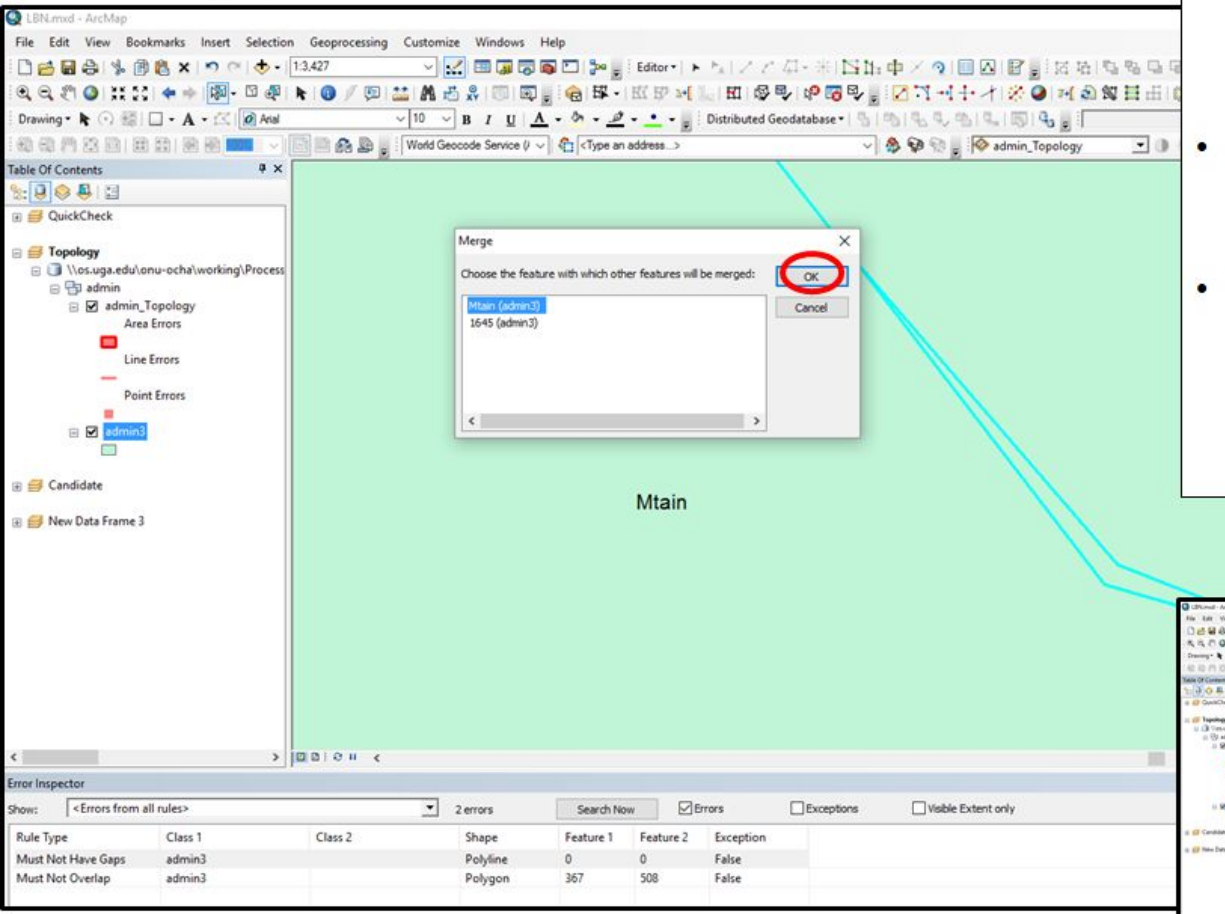
- Using ArcMap's standard select tool

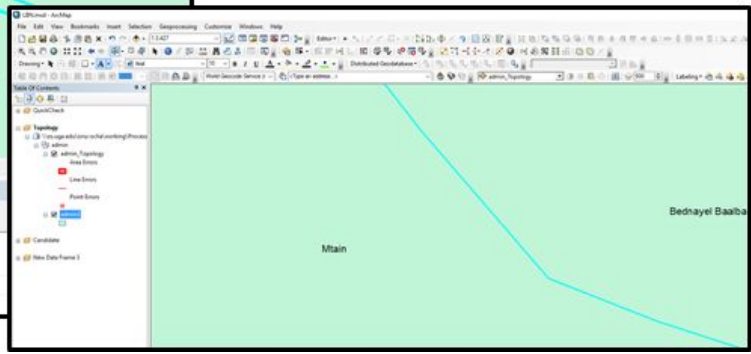
select both the new feature and the feature you are merging to

- With both features selected choose 'Merge' from editor drop down list

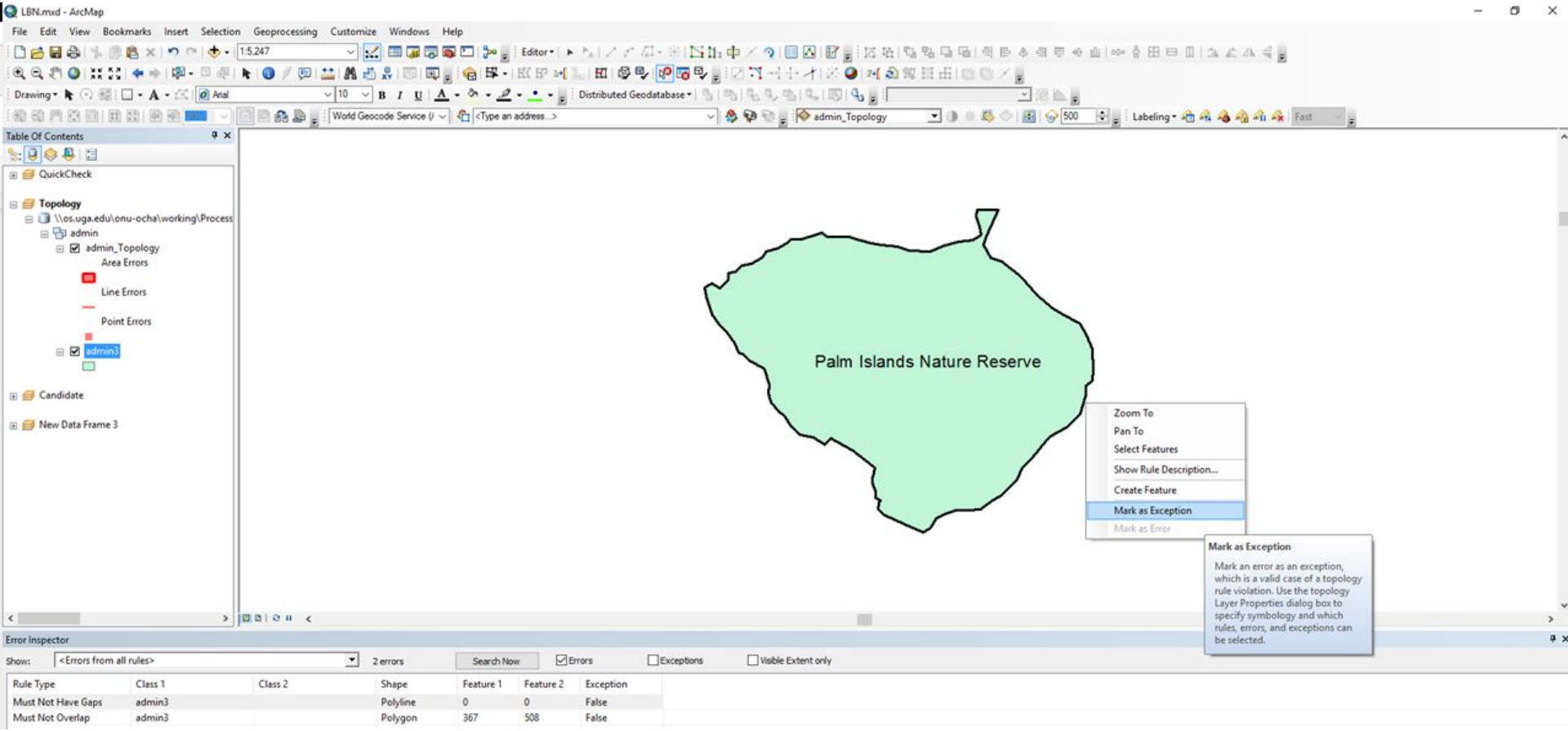
Fill gaps

- In the ‘Merge’ dialog box make sure to choose the original attributed feature and not the newly created feature and then click ‘OK’.
- The new feature will be merged to the original and the gap will have been successfully removed.
- When the merge is completed the feature that you merged to will automatically be selected, so it is a good idea to go ahead and clear your selection now before proceeding.



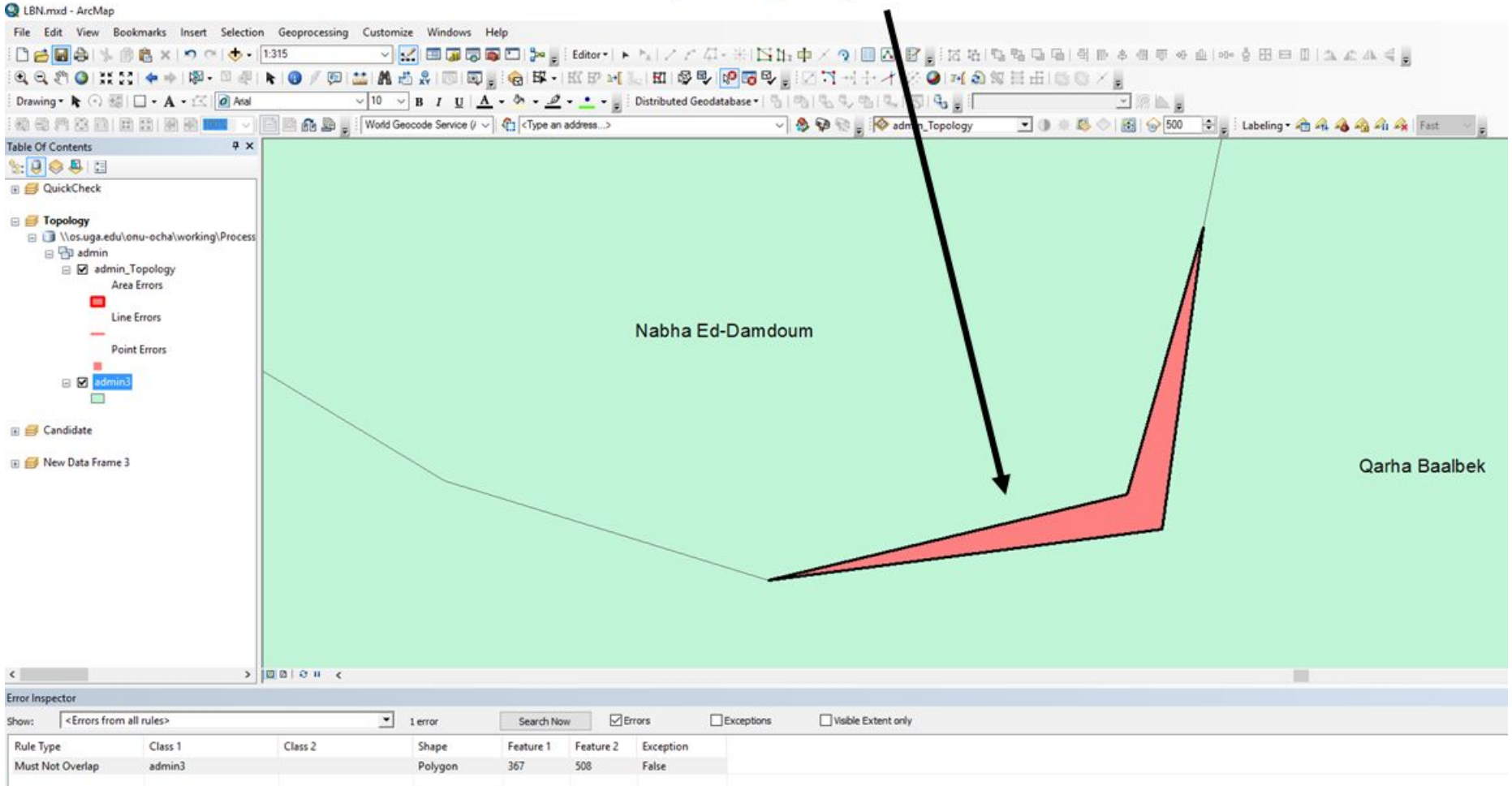


12. Step through error list



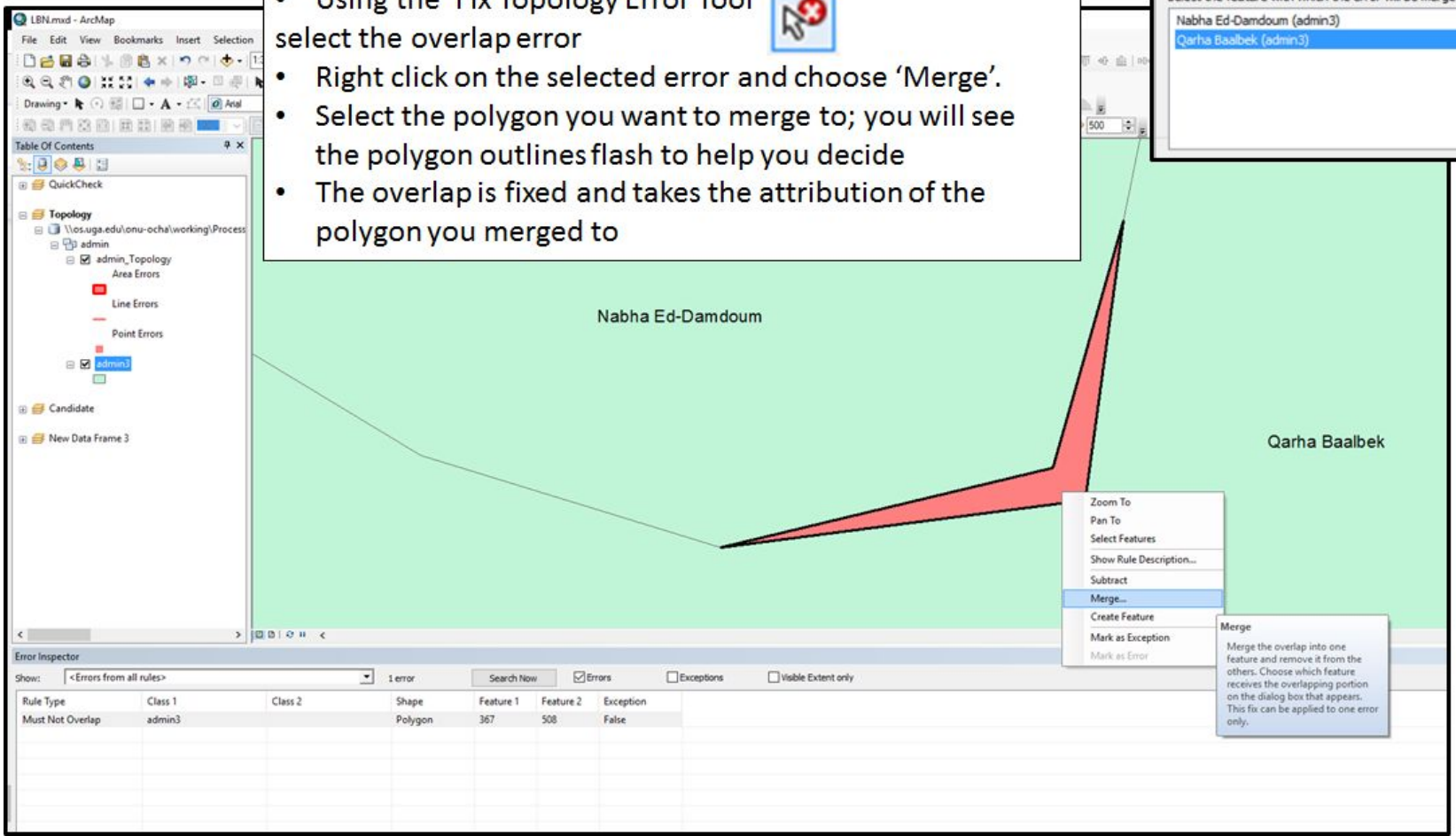
13. Fix overlaps

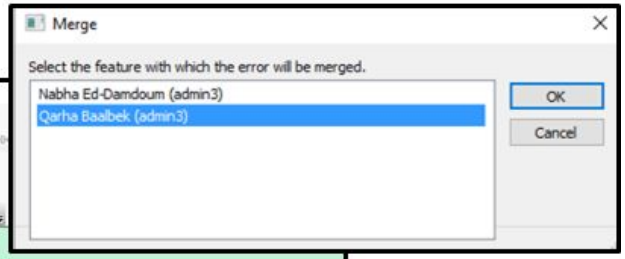
This is an overlap error – a portion of Nabha Ed-Damdoum overlays on top of Qarha Baalbek



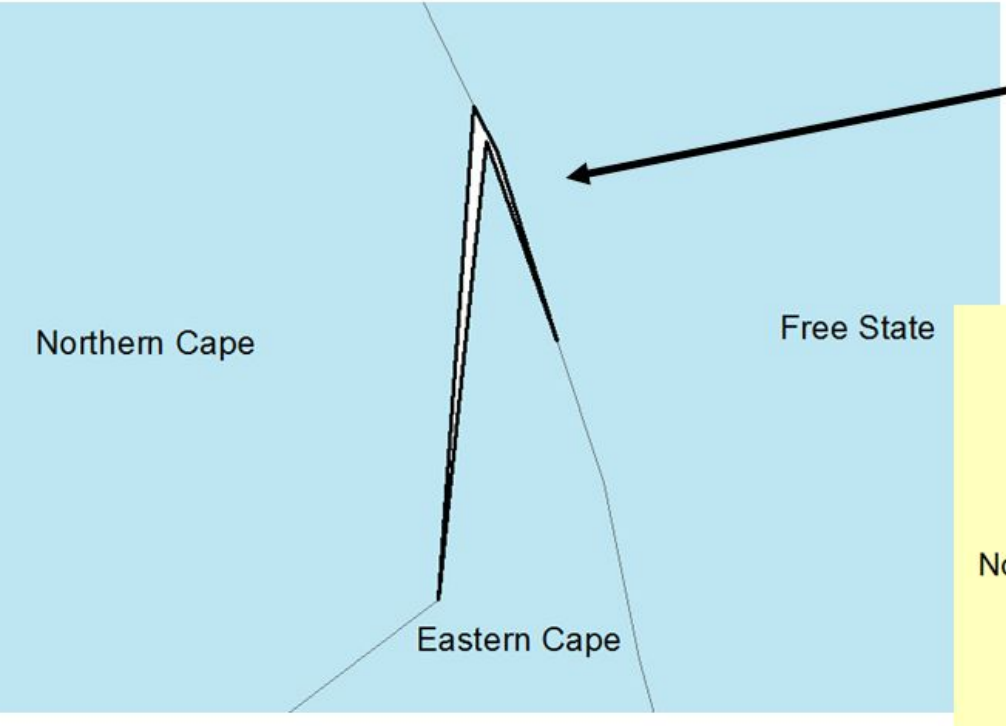
13. Fix overlaps

- Using the ‘Fix Topology Error Tool’ select the overlap error
- Right click on the selected error and choose ‘Merge’.
- Select the polygon you want to merge to; you will see the polygon outlines flash to help you decide
- The overlap is fixed and takes the attribution of the polygon you merged to



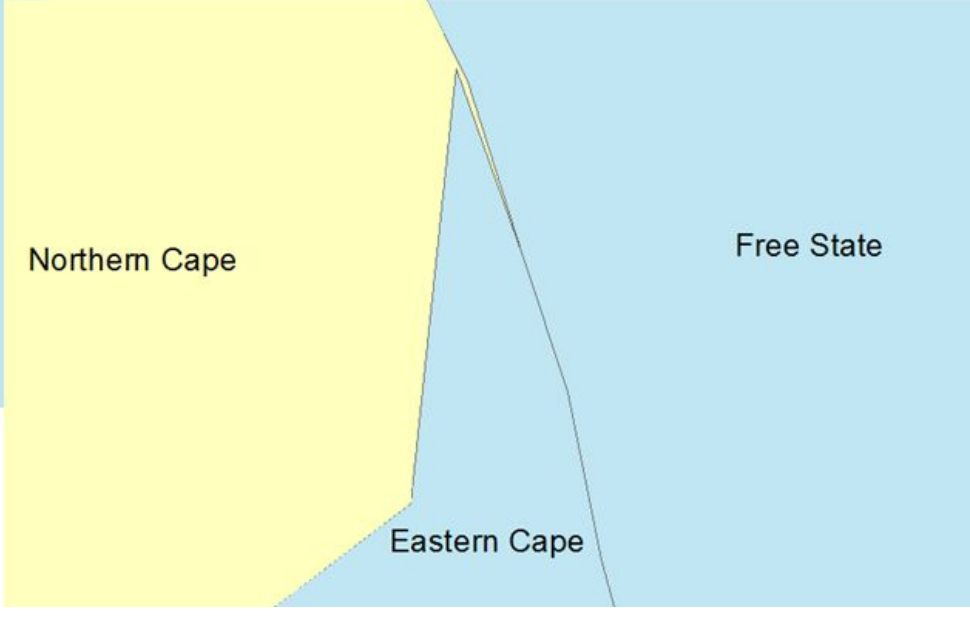


Caution - Examples from ZA



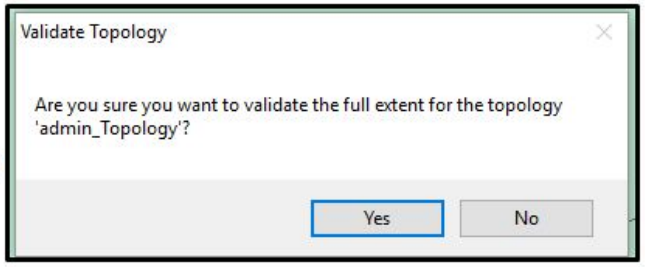
If you fill this gap, and merge to NC, the Northern Cape boundary is very strange

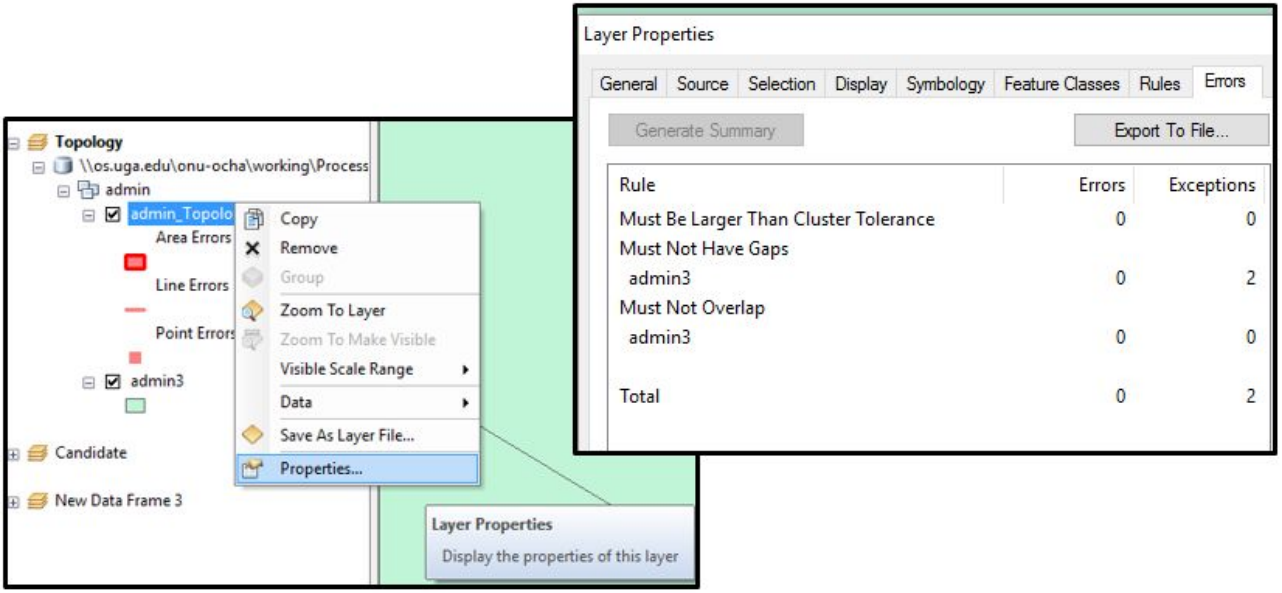
In this case merge to Eastern Cape



14. Generate Final Report

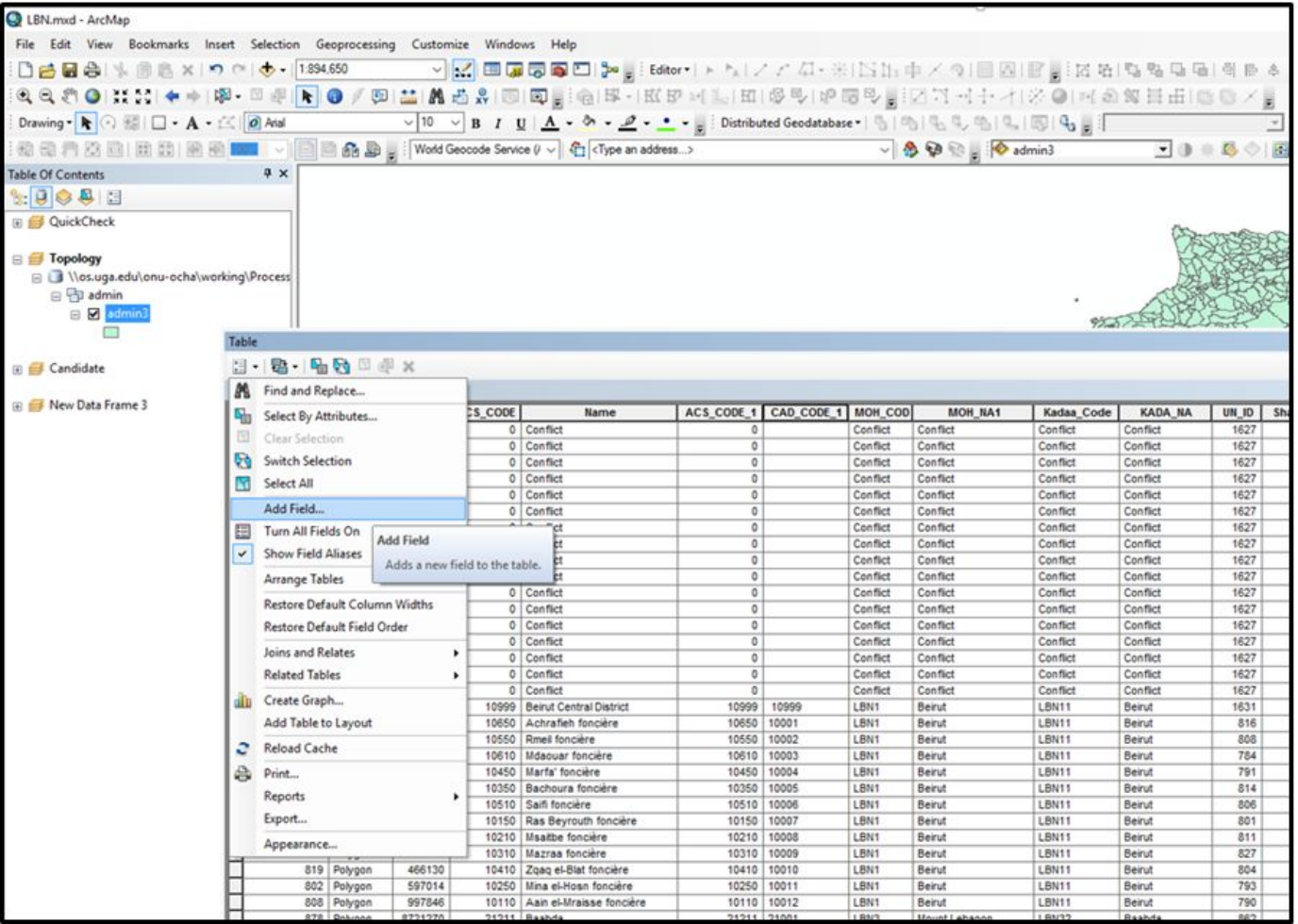
- After fixing all the topology errors and marking the necessary exceptions, revalidate the topology for the entire extent to make sure none of your editing created new errors, and you haven't missed any errors
- Use the 'Validate Entire Topology' button to do this 



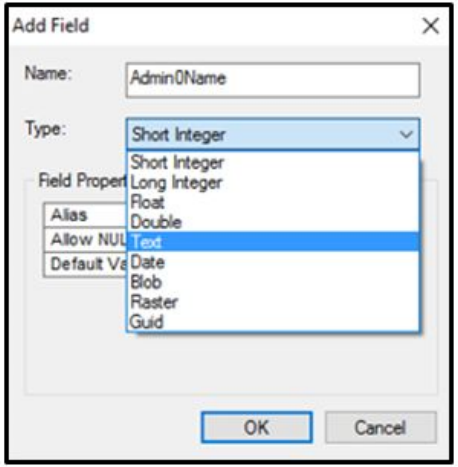


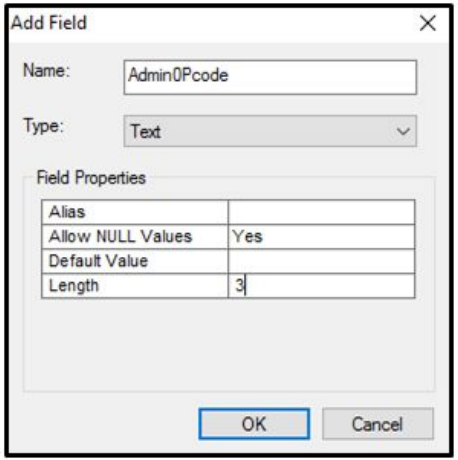
- After validating, generate a new error report (right click on the topology layer > properties > Errors tab > Generate Summary
- If all the topology has been successfully fixed the report should look something like this, with zero reported errors and all of the exceptions reported
- Save Edits; stop editing

15. Create higher admin layers

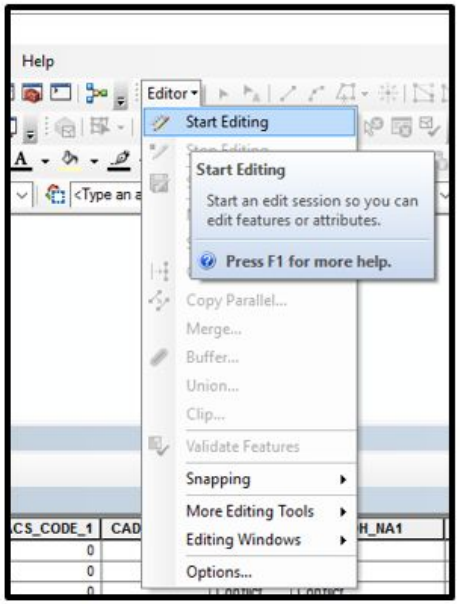


Add missing fields

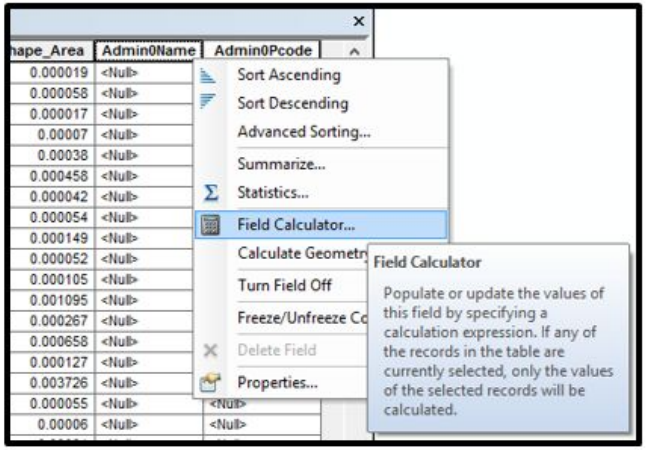




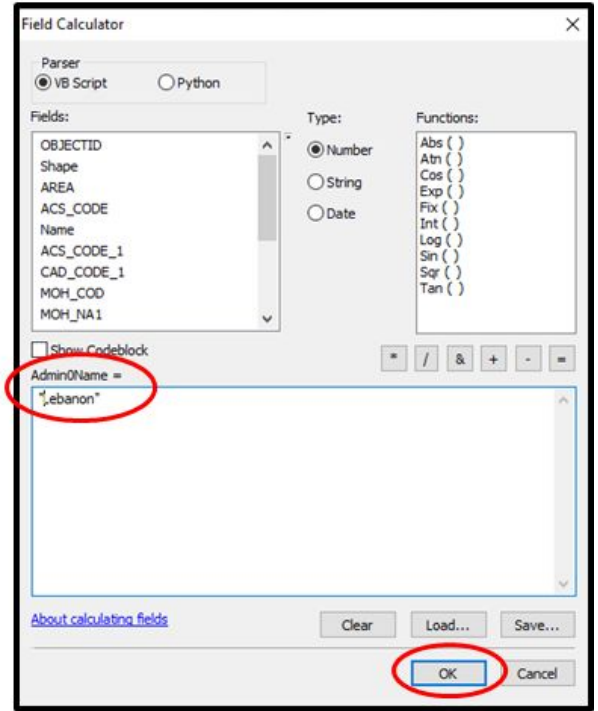
Start Edit Session



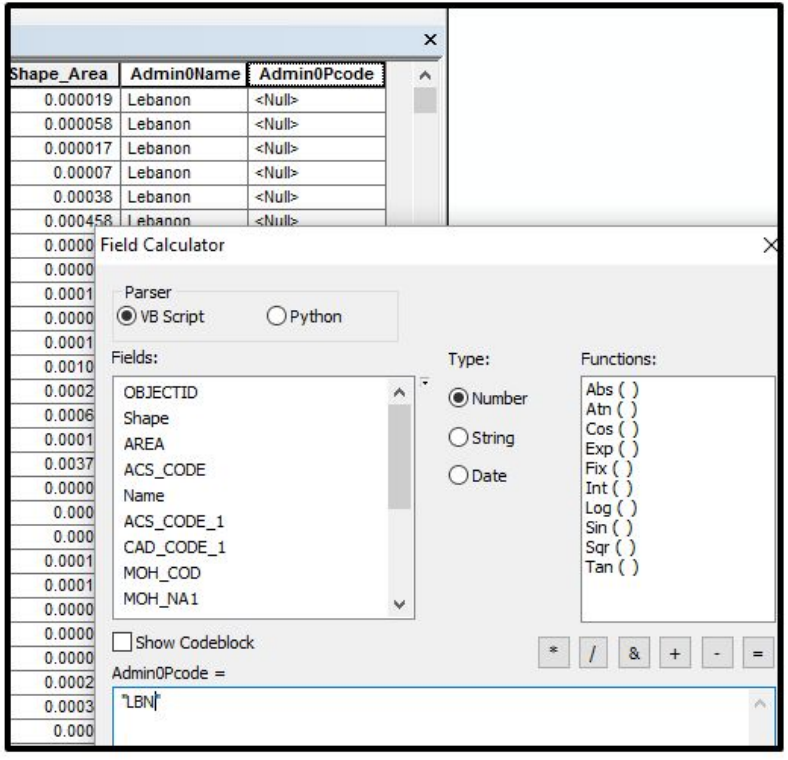
Choose field, open calculator



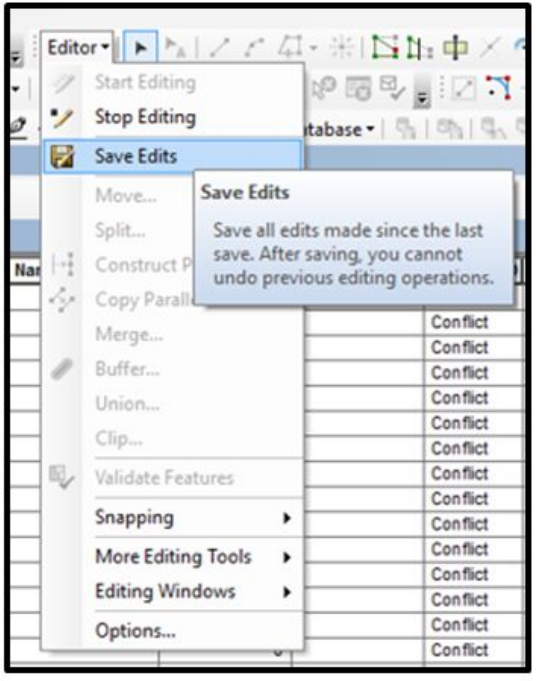
Populate value



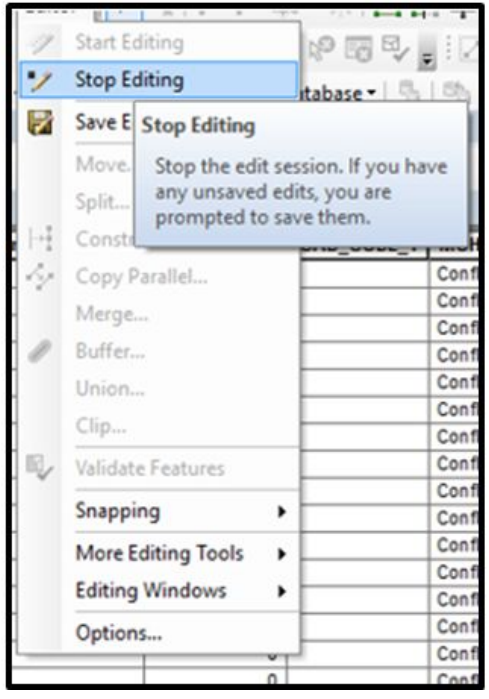
Populate Admin0 Pcodes



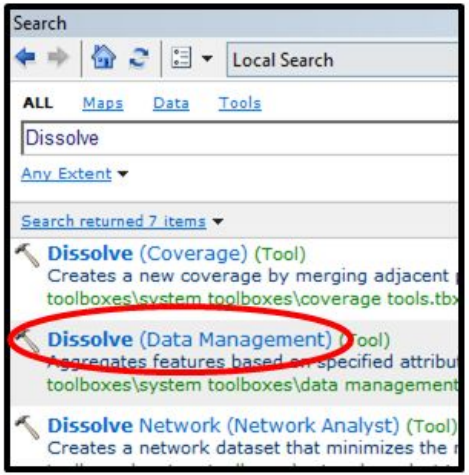
Save edits

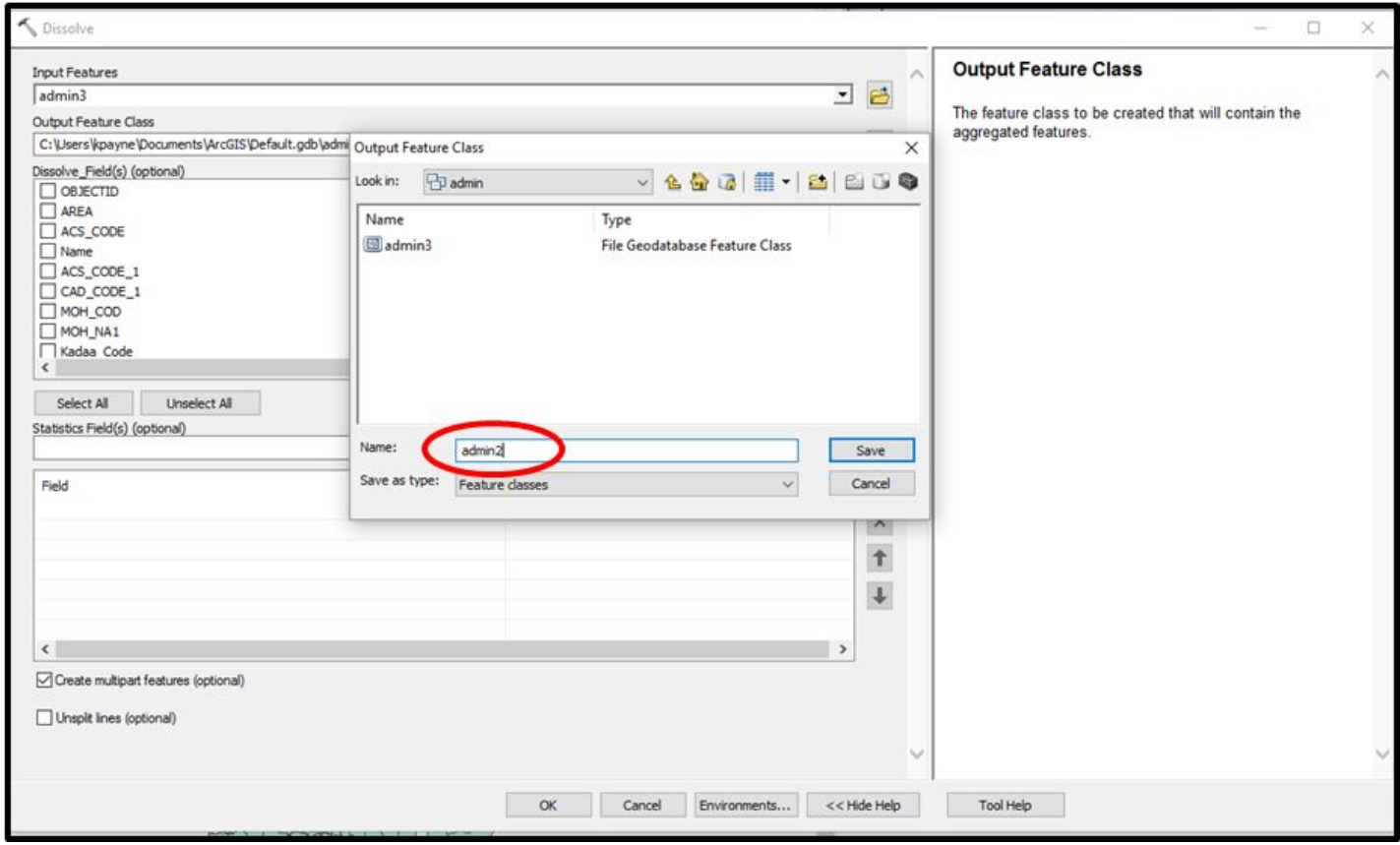


Stop Edit Session

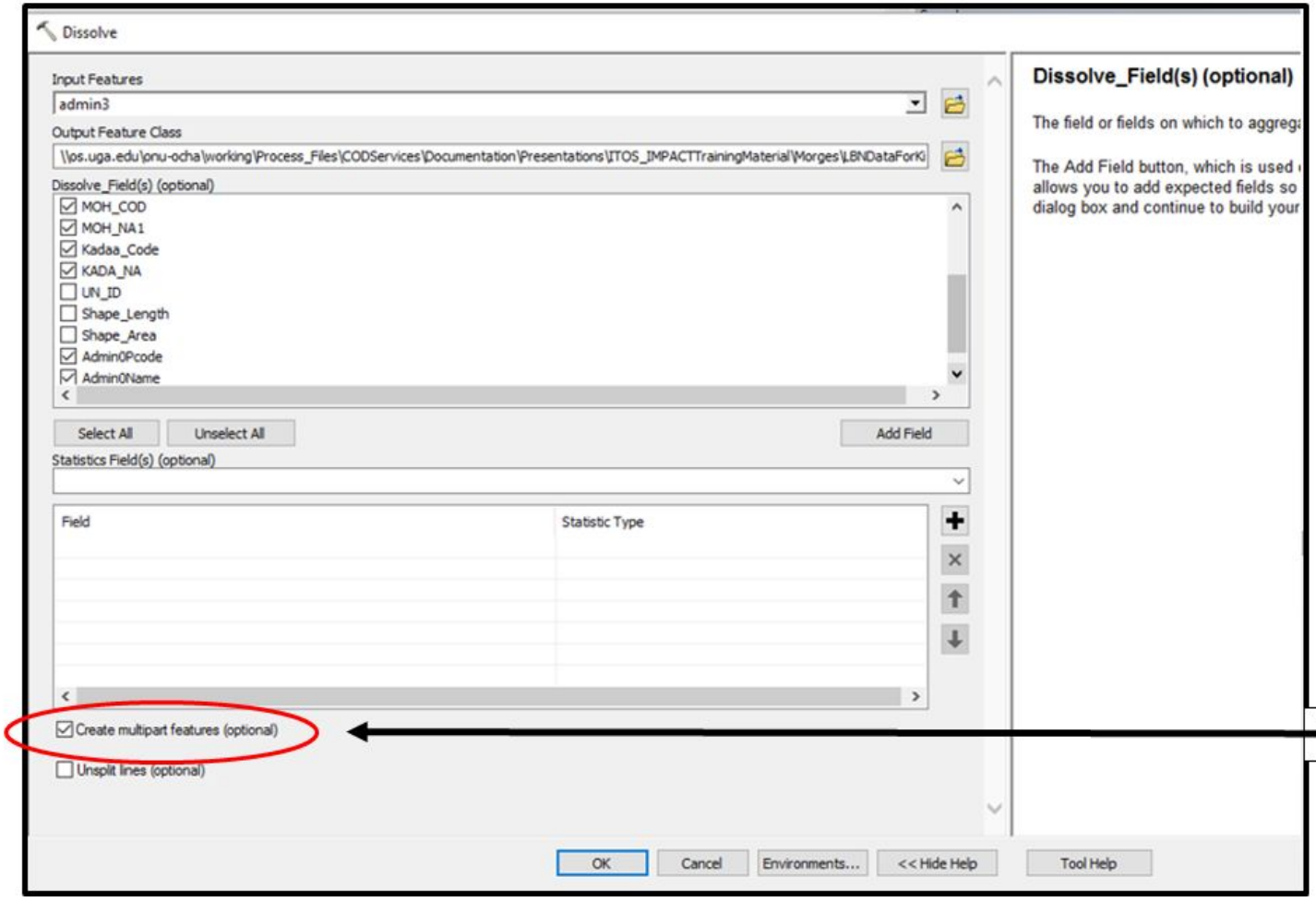


Find Dissolve tool (Data Management) – choose output dataset



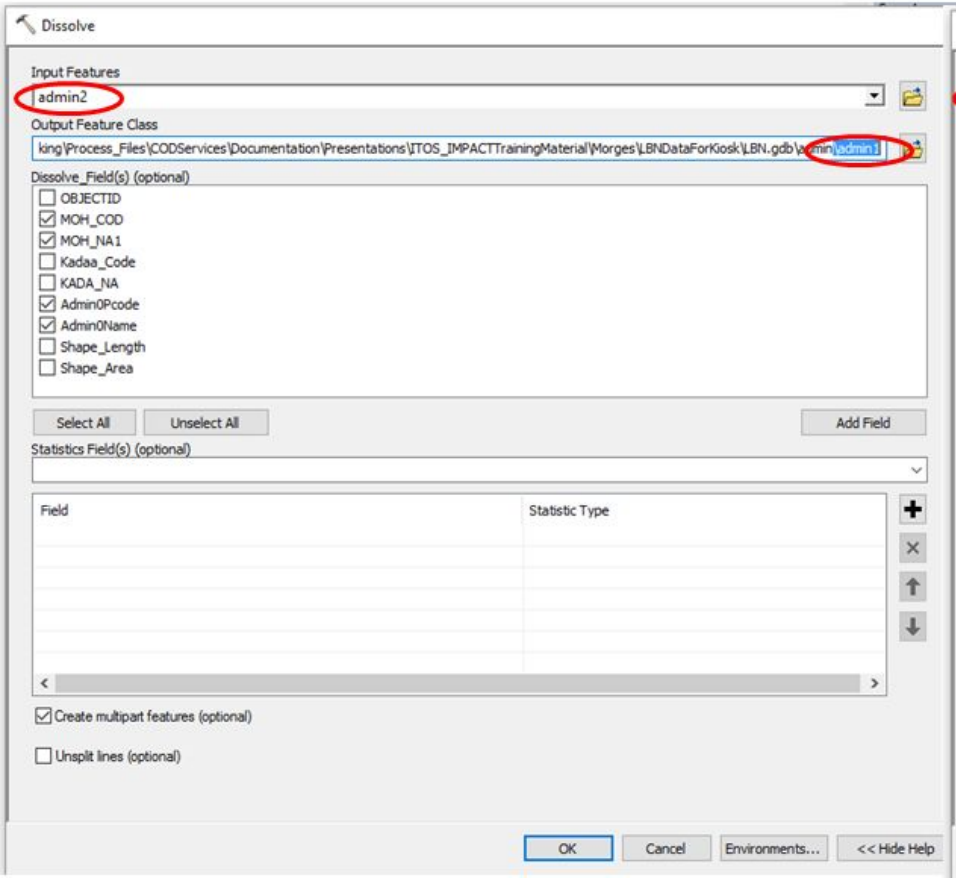


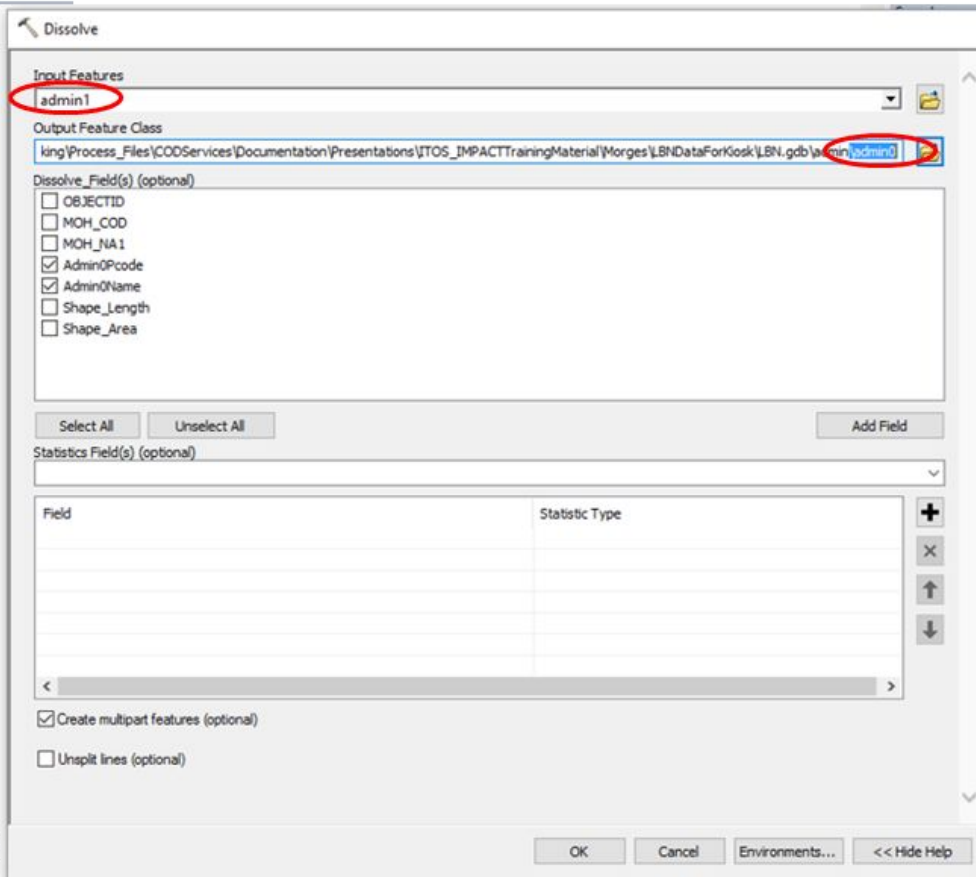
Dissolve on ALL Lower admin unit names and pcodes



Create multipart polygons

Repeat for all Admin layers





Original Admin1 units

Table

AdminLevel_1

Gov_New	MOH_code_n
Akkar	LBN7
Baalbek-El Hermel	LBN8
Beirut	LBN1
Bekaa	LBN2
El Nabatieh	LBN4
Mount Lebanon	LBN3
North	LBN5
North	LBN5
South	LBN6

0 (0 out of 9 Selected)

AdminLevel_1

New, dissolved units

Table

admin1

MOH_COD	MOH_NA1
LBN7	Akkar
LBN8	Baalbek-El Hermel
LBN1	Beirut
LBN2	Bekaa
Conflict	Conflict
LBN3	Mount Lebanon
LBN4	Nabatiye
LBN5	North
LBN6	South

1 (0 out of 9 Selected)

admin1

- Both contain 9 units
- New unit ‘Conflict’
- Old unit El Nabatieh (LBN4) is now called Nabatiye
- 2 North Units existed in old data, one for the island and one for the mainland

Original Admin2 units

Table

AdminLevel_2

Kadaa_Code	Name_AR	Name_EN
LBN51	عكار	Akkar
LBN31	عاليه	Aley
LBN32	بعبدا	Baabda
LBN21	بعلبك	Baalbek
LBN53	بشرى	Bcharre
LBN11	بيروت	Beirut
LBN41	بنت جبيل	Bent Jbeil
LBN33	الشوف	Chouf
LBN52	البترون	El Batroun
LBN22	الهرمل	El Hermel
LBN54	الكورة	El Koura
LBN36	المتن	El Meten
LBN55	المنية الضنية	El Minieh-Dennie
LBN44	النبطية	El Nabatieh
LBN42	حاصبيا	Hasbaya
LBN34	جبيل	Jbeil
LBN62	جزين	Jezzine
LBN35	كسروان	Kesrwane
LBN43	مرجعيون	Marjaayoun
LBN23	راشيا	Rachaya
LBN61	صيدا	Saida
LBN63	صور	Sour
LBN56	طرابلس	Tripoli
LBN56	طرابلس	Tripoli
LBN24	البقاع الغربي	West Bekaa
LBN25	زحلة	Zahle
LBN57	زغرتا	Zgharta

1 (0 out of 27 Selected)

AdminLevel_2

New, dissolved units

Table

admin2

Kadaa_Code	KADA_NA
LBN51	Akkar
LBN31	Aley
LBN32	Baabda
LBN21	Baalbek
LBN52	Batroun
LBN53	Bcharre
LBN11	Beirut
LBN41	Bint Jubail
LBN33	Chouf
Conflict	Conflict
LBN36	El Metn
LBN42	Hasbaiya
LBN22	Hermel
LBN62	Jezzine
LBN34	Jubail
LBN35	Kasrouane
LBN54	Koura
LBN43	Marjaayoun
LBN55	Minieh-Danieh
LBN44	Nabatiye
LBN23	Rachiaya
LBN61	Saida
LBN63	Sour
LBN56	Tripoli
LBN24	West Bekaa
LBN25	Zahle
LBN57	Zgharta

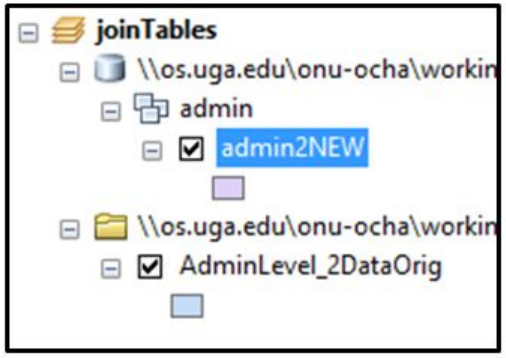
1 (0 out of 27 Selected)

admin2

- Both contain 27 units
- New unit ‘Conflict’
- 2 Tripoli Units existed in old data, one for the island and one multipart for the mainland
- Many small name changes El Ermel=Hermel; Jbeil=Jubail
- Pcodes are entirely consistent!! ☺

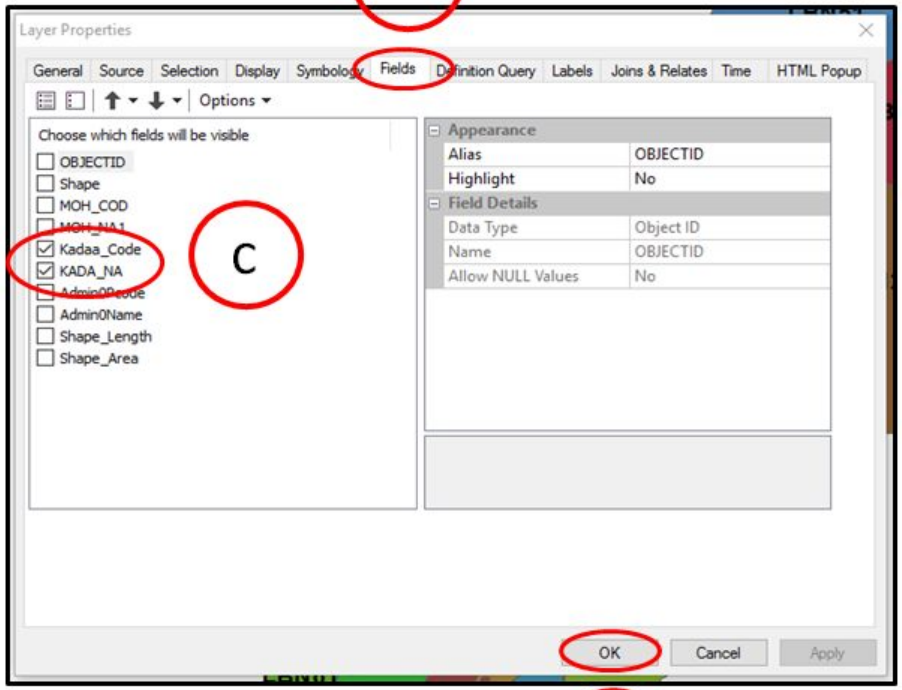
Original Admin2 units labelled in **BLACK**

New, dissolved units labelled in ***RED***



a

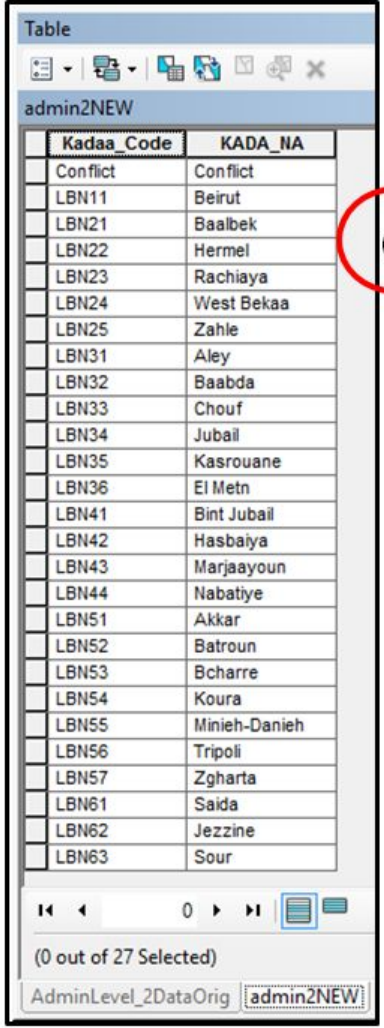
b



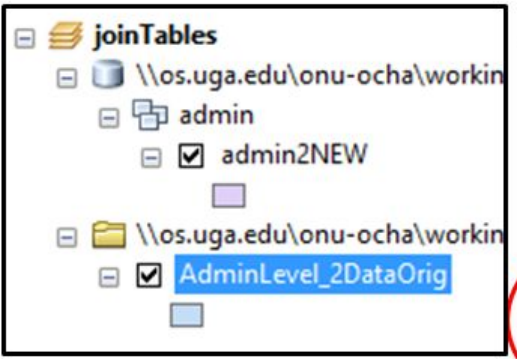
c

d

Perform Join to regain Arabic names in new admin2 layer – clean workspace

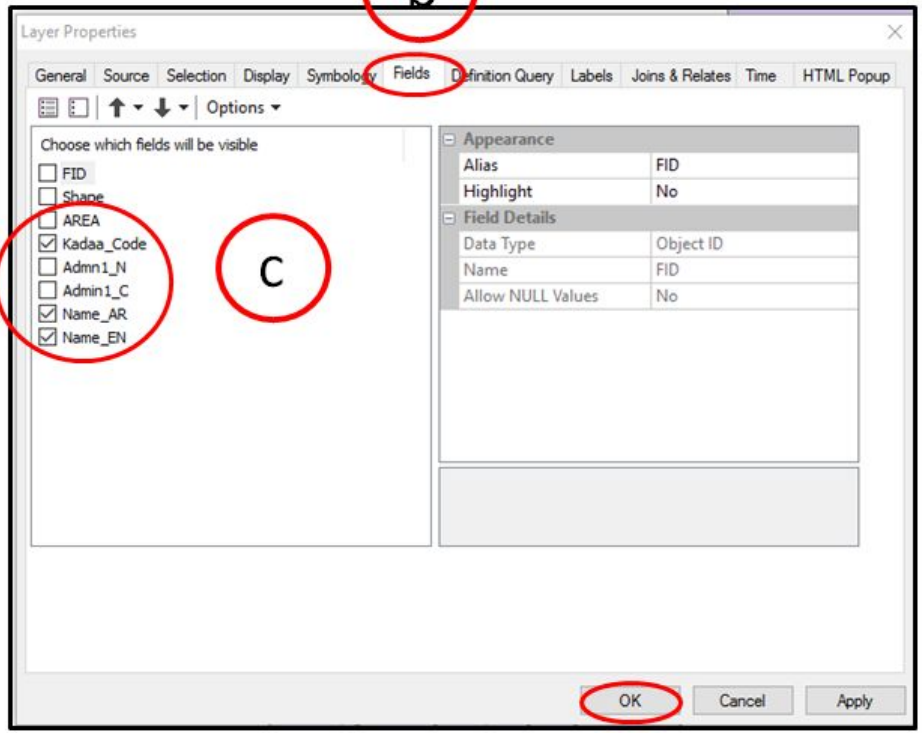


e



a

b



c

d

e

Table

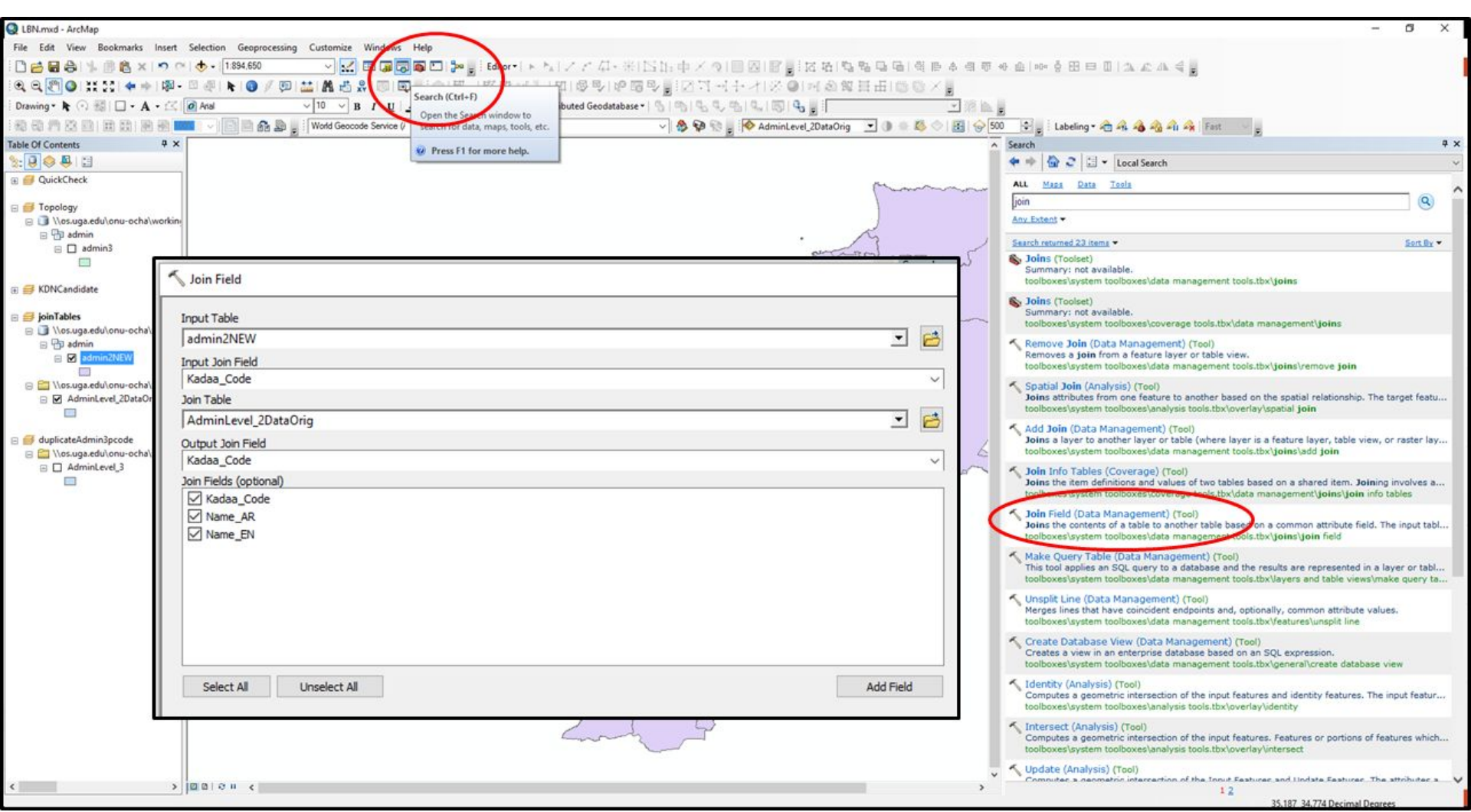
AdminLevel_2DataOrig

Kadaa_Code	Name_AR	Name_EN
LBN11	بيروت	Beirut
LBN21	بعلبك	Baalbek
LBN22	الهرمل	El Hermel
LBN23	راشيا	Rachaya
LBN24	البقاع الغربي	West Bekaa
LBN25	زحلة	Zahle
LBN31	عاليه	Aley
LBN32	بعبدا	Baabda
LBN33	الشوف	Chouf
LBN34	جبيل	Jbeil
LBN35	كسروان	Kesrwane
LBN36	المتن	El Meten
LBN41	بنت جبيل	Bent Jbeil
LBN42	حاصبيا	Hasbaya
LBN43	مرجعيون	Marjaayoun
LBN44	النبطية	El Nabatieh
LBN51	عكار	Akkar
LBN52	البترون	El Batroun
LBN53	بشري	Bcharre
LBN54	الكورة	El Koura
LBN55	المنية الضنية	El Minieh-Dennie
LBN56	طرابلس	Tripoli
LBN56	طرابلس	Tripoli
LBN57	زغرتا	Zgharta
LBN61	صيدا	Saida
LBN62	جزين	Jezzine
LBN63	صور	Sour

0

(0 out of 27 Selected)

AdminLevel_2DataOrig | admin2NEW


LBN.mxd - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
Search (Ctrl+F)
Open the Search window to search for data, maps, tools, etc.
Press F1 for more help.
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Joins (Toolset)
Summary: not available.
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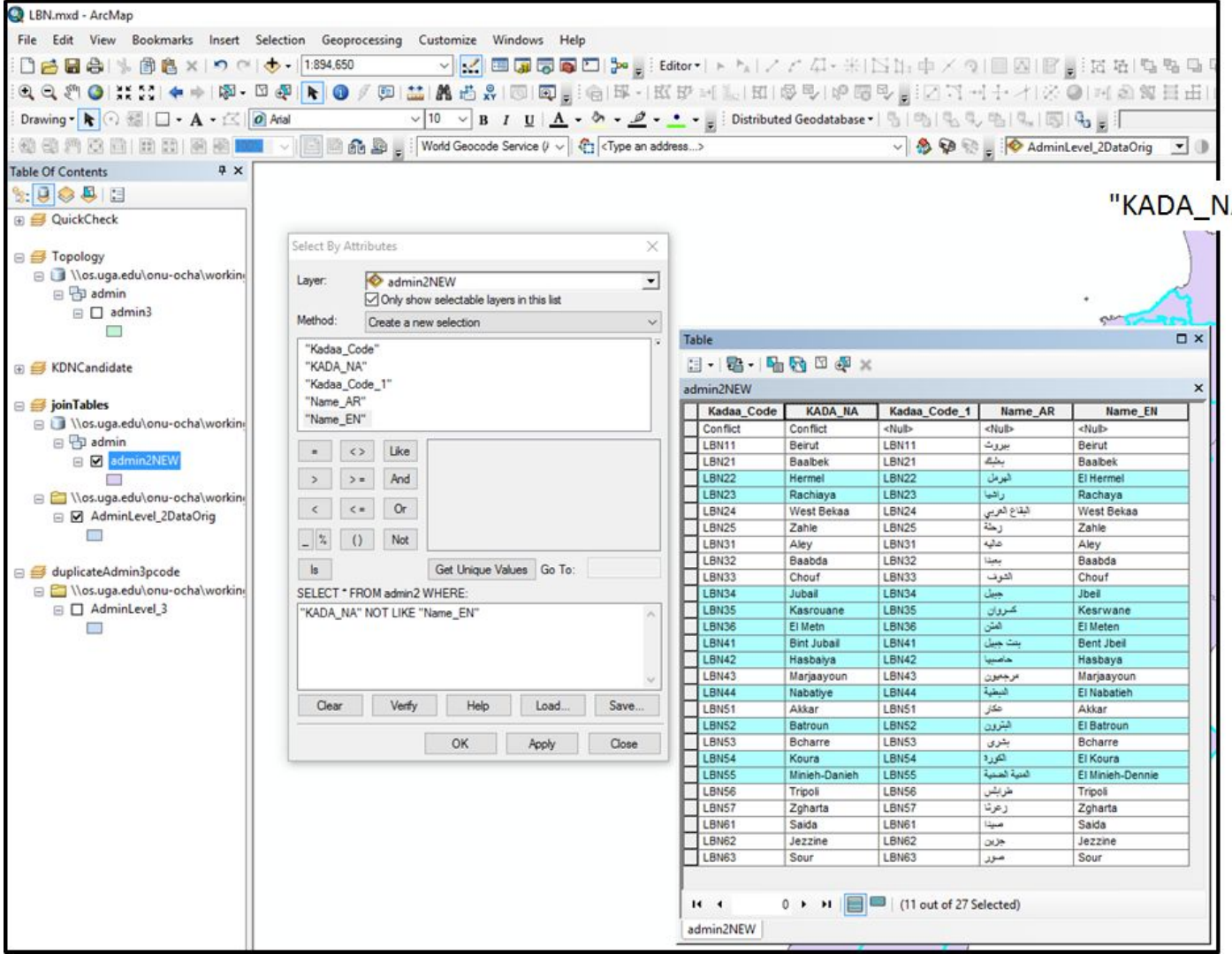
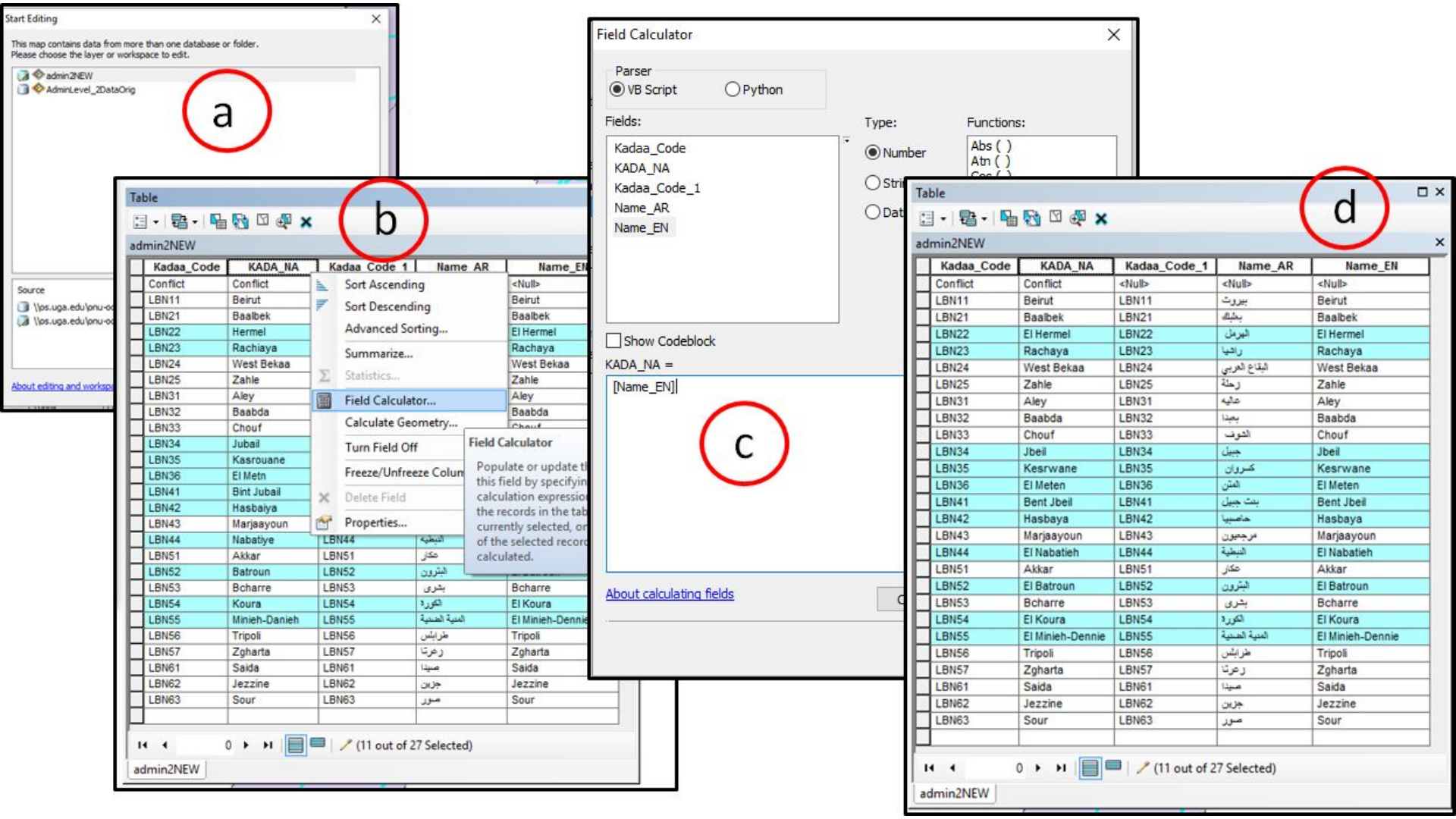
Remove Join (Data Management) (Tool)
Removes a join from a feature layer or table view.
toolboxes\system toolboxes\data management tools.tbx\joins\remove join
Spatial Join (Analysis) (Tool)
Joins attributes from one feature to another based on the spatial relationship. The target featu...
toolboxes\system toolboxes\analysis tools.tbx\overlay\spatial join
Add Join (Data Management) (Tool)
Joins a layer to another layer or table (where layer is a feature layer, table view, or raster lay...
toolboxes\system toolboxes\data management tools.tbx\joins\add join
Join Info Tables (Coverage) (Tool)
Joins the item definitions and values of two tables based on a shared item. Joining involves a...
Join Field (Data Management) (Tool)
Joins the contents of a table to another table based on a common attribute field. The input tabl...
toolboxes\system toolboxes\data management tools.tbx\joins\join field
Make Query Table (Data Management) (Tool)
This tool applies an SQL query to a database and the results are represented in a layer or tabl...
toolboxes\system toolboxes\data management tools.tbx\layers and table views\make query ta...
Unsplit Line (Data Management) (Tool)
Merges lines that have coincident endpoints and, optionally, common attribute values.
toolboxes\system toolboxes\data management tools.tbx\features\unsplit line
Create Database View (Data Management) (Tool)
Creates a view in an enterprise database based on an SQL expression.
toolboxes\system toolboxes\data management tools.tbx\general\create database view
Identity (Analysis) (Tool)
Computes a geometric intersection of the input features and identity features. The input featur...
toolboxes\system toolboxes\analysis tools.tbx\overlay\identity
Intersect (Analysis) (Tool)
Computes a geometric intersection of the input features. Features or portions of features which...
toolboxes\system toolboxes\analysis tools.tbx\overlay\intersect
Update (Analysis) (Tool)
1 2
35.187 34.774 Decimal Degrees



"KADA_NA" NOT LIKE "Name_EN"

Kadaa_Code	KADA_NA	Kadaa_Code_1	Name_AR	Name_EN
Conflict	Conflict	<Null>	<Null>	<Null>
LBN11	Beirut	LBN11	بيروت	Beirut
LBN21	Baalbek	LBN21	بعلبك	Baalbek
LBN22	Hermel	LBN22	الهرمل	El Hermel
LBN23	Rachiaya	LBN23	راشيا	Rachaya
LBN24	West Bekaa	LBN24	البقاع الغربي	West Bekaa
LBN25	Zahle	LBN25	زحلة	Zahle
LBN31	Aley	LBN31	عاليه	Aley
LBN32	Baabda	LBN32	بعبدا	Baabda
LBN33	Chouf	LBN33	الشوف	Chouf
LBN34	Jubail	LBN34	جبيل	Jbeil
LBN35	Kasrouane	LBN35	كسروان	Kesrwane
LBN36	El Metn	LBN36	المتن	El Meten
LBN41	Bint Jubail	LBN41	بنت جبيل	Bent Jbeil
LBN42	Hasbaiya	LBN42	حاصبيا	Hasbaya
LBN43	Marjaayoun	LBN43	مرجعيون	Marjaayoun
LBN44	Nabatiye	LBN44	النبطية	El Nabatieh
LBN51	Akkar	LBN51	عكار	Akkar
LBN52	Batroun	LBN52	البترون	El Batroun
LBN53	Bcharre	LBN53	بشري	Bcharre
LBN54	Koura	LBN54	الكورة	El Koura
LBN55	Minieh-Danieh	LBN55	المنية الضنية	El Minieh-Dennie
LBN56	Tripoli	LBN56	طرابلس	Tripoli
LBN57	Zgharta	LBN57	زغرتا	Zgharta
LBN61	Saida	LBN61	صيدا	Saida
LBN62	Jezzine	LBN62	جزين	Jezzine
LBN63	Sour	LBN63	صور	Sour


Start Editing
This map contains data from more than one database or folder.
Please choose the layer or workspace to edit.
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Kadaa_Code_1
Name_AR
Name_EN
Conflict
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LBN22 Hermel
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LBN24 West Bekaa
LBN25 Zahle
LBN31 Aley
LBN32 Baabda
LBN33 Chouf
LBN34 Jubail
LBN35 Kasrouane
LBN36 El Metn
LBN41 Bint Jubail
LBN42 Hasbaiya
LBN43 Marjaayoun
LBN44 Nabatiye
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LBN52 Batroun
LBN53 Bcharre
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VB Script
Python
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Kadaa_Code_1
Name_AR
Name_EN
Type:
Number
Functions:
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KADA_NA =
[Name_EN]
c
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LBN21 Baalbek بعلبك
LBN22 El Hermel الهرمل
LBN23 Rachaya راشيا
LBN24 West Bekaa البقاع الغربي
LBN25 Zahle زحلة
LBN31 Aley عاليه
LBN32 Baabda بعبدا
LBN33 Chouf الشوف
LBN34 Jbeil جبيل
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BEFORE EXPORTING:

- Clear selected set
- Removed unwanted fields (or make them invisible)
- Make desired fields visible again