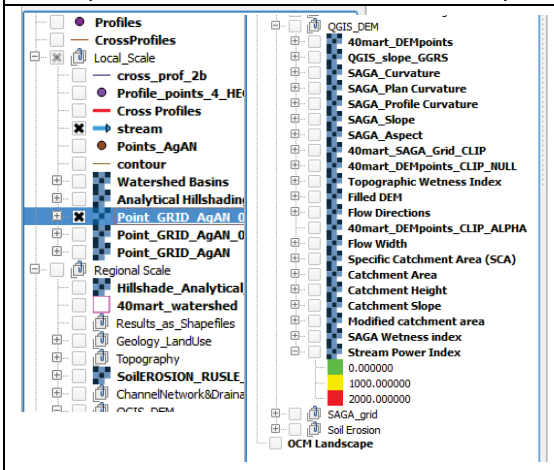
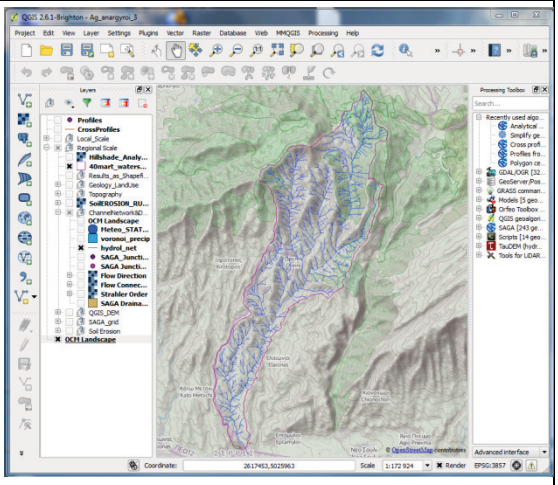
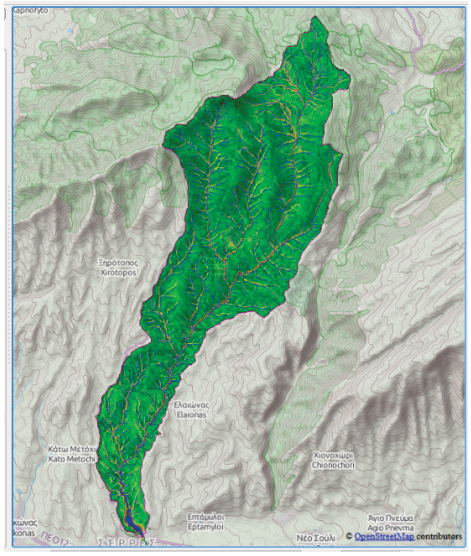
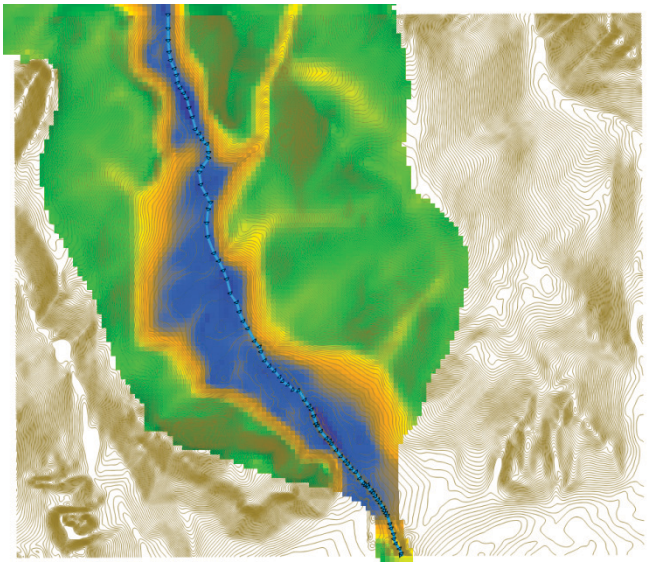
Flood Hazard assessment - From Regional to Local scale

A step-by-step tutorial

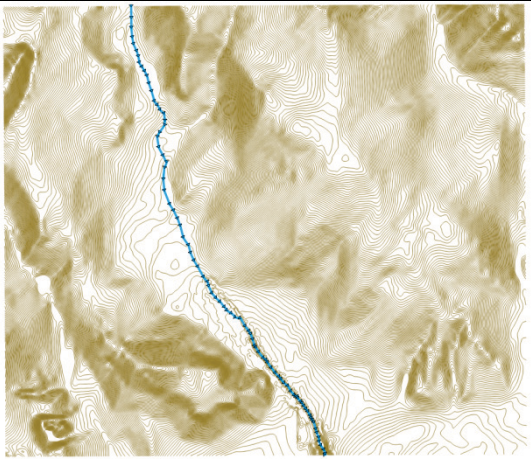
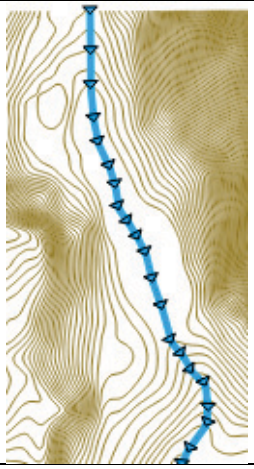
A.

Prepare all your data and do all the basic work (DEM & derivatives, stream net etc)	The area of REGIONAL implementation
	

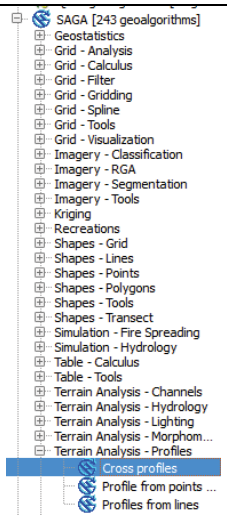
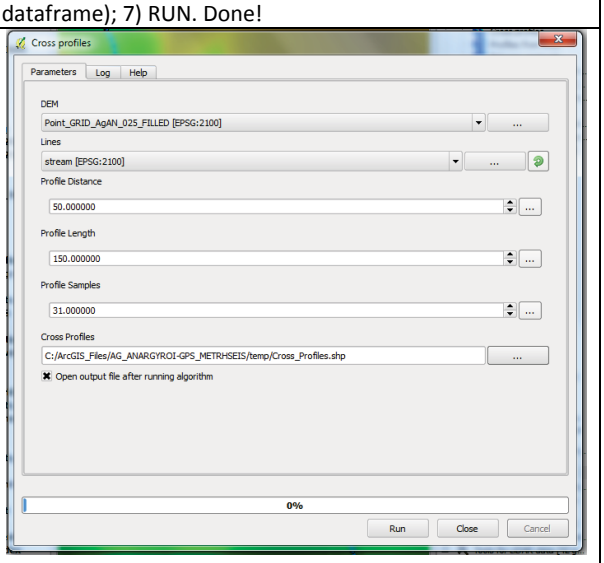
B.

Assess SAGA Wetness Index	From REGIONAL to LOCAL scale (zoom in)
	

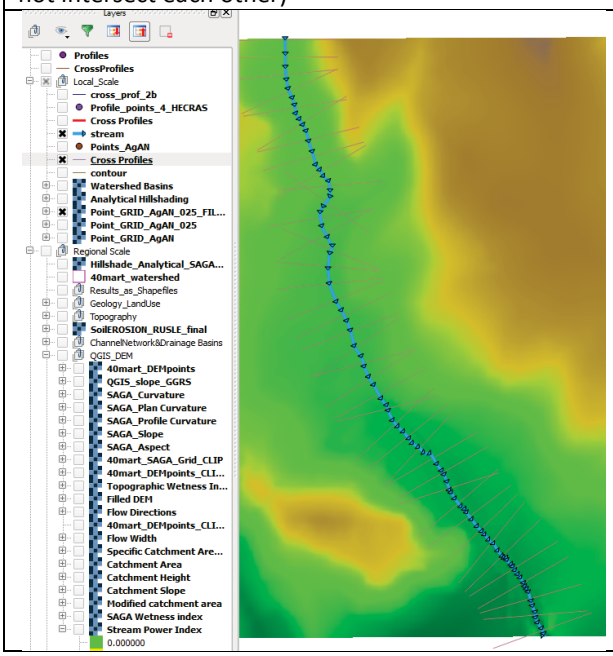
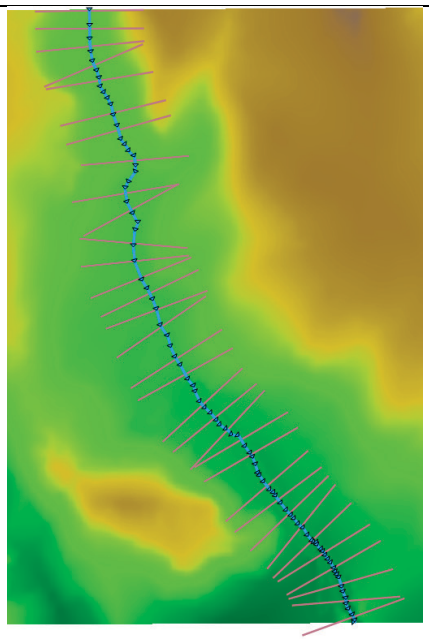
C.

Draw the STREAM line from upstream towards downstream (see the arrows on the blue/stream line)		
	Zoom IN	

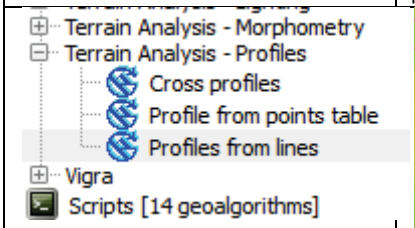
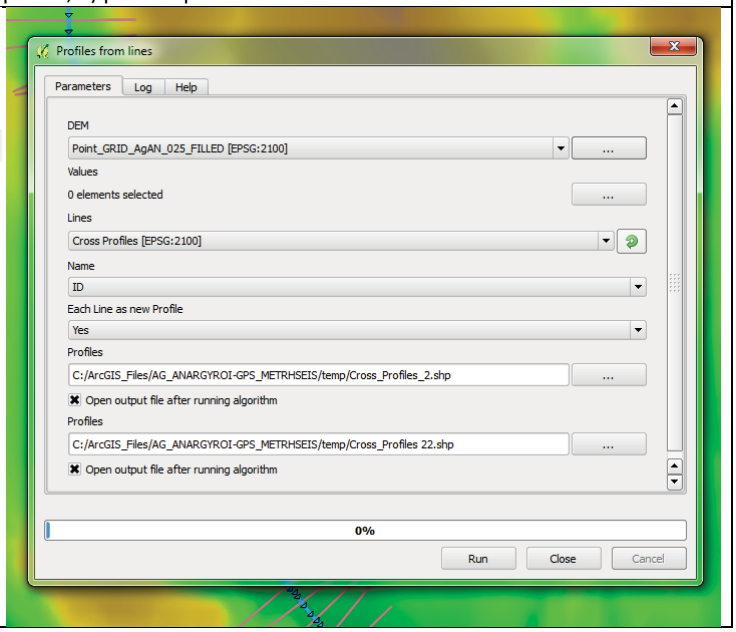
D.

Find the TERRAIN ANALYSIS –PROFILES > PROFILES FROM LINES option and RUN	This pops up! Input (top to bottom): 1) the DEM; 2) the stream (line); 3) the distance between profiles; 4) the length of each profile; 5) the number of point samples (elevation points calculated) in each profile (here it is 31 samples for 150m profiles which gives one elevation point per 5 meters); 6) the path/NAME for saving the file (clicking on the "open output file….", will load the file on the dataframe); 7) RUN. Done!
	

E.

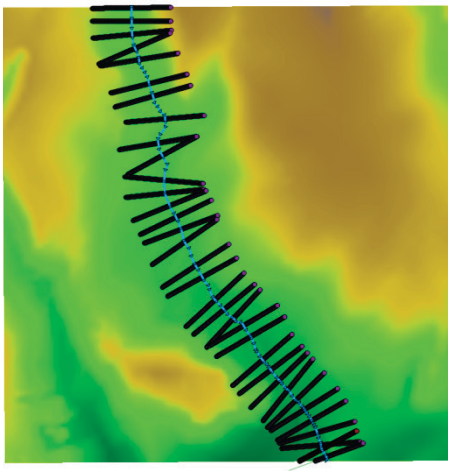
Cross Sections (profiles) have been created! YOU CAN SKIP the NEXT step (Clean them up so that they do not intersect each other)	YOU CAN SKIP this step (Cleaned! SAVE the file with a different name (ie. “Cross_profiles_”))
	

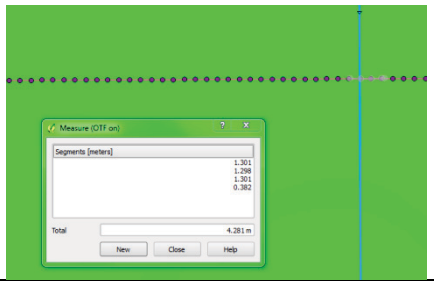
F.

Find the TERRAIN ANALYSIS – PROFILES > PROFILES FROM LINES option and RUN	Input: 1) DEM; 2) the “Cross_profiles_” file created; 3) select “ID” as the key for the identification of each profile; 4) YES! Each line as a NEW profile; 5) provide paths and name for the new files to be saved.
	

G.

..and here is the final Cross Section file MADE OF POINTS! (per 1.3m)	The attribute table shows: Line_ID (the initial ID we set as identifier. It corresponds to the respective Cross Section); ID (the series number of the point within the cross section specified with LINE_ID number); DIST (the distance from the starting point of the specific Cross Section);); DIST_SURF (the distance on ground surface); X, Y (coordinates of the point) and Z (the respective altitude).





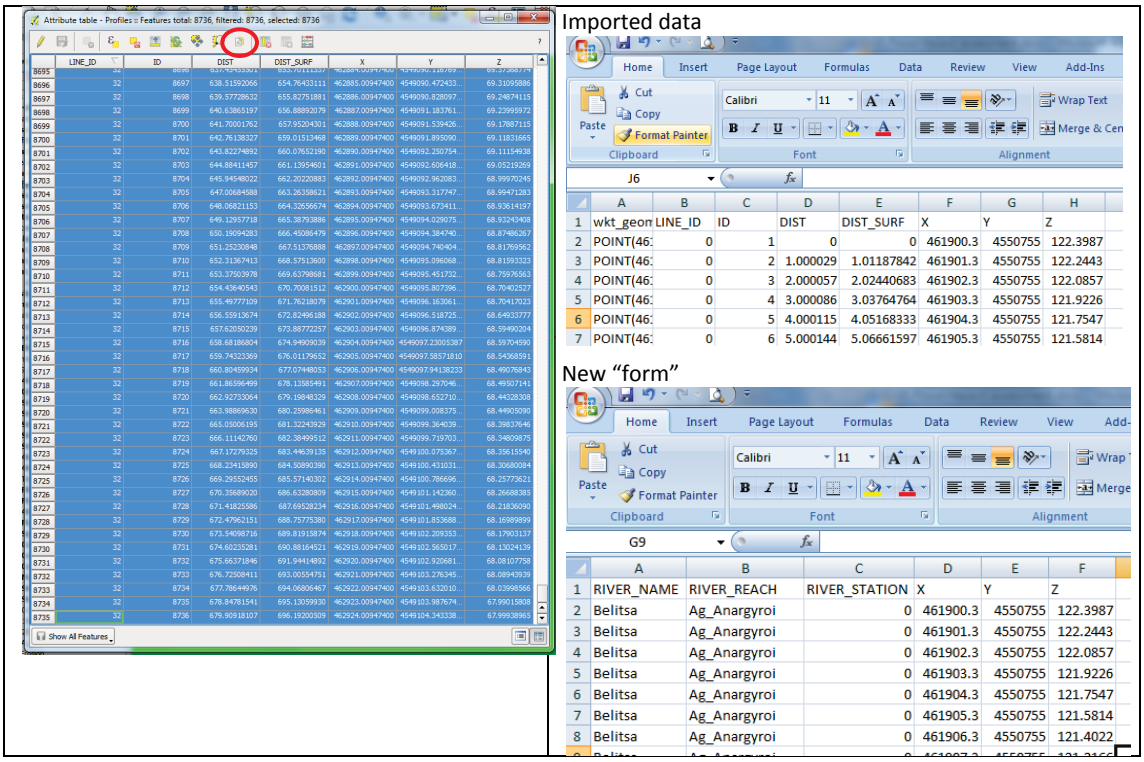
Attribute table - Profiles :: Features total: 8736, filtered: 8736, selected: 1

	LINE_ID	ID	DIST	DIST_SURF	X	Y	Z
278	0	279	278.00798393	290.76721010	462178.34797244	4550757.54955673	139.56878662
279	0	280	279.00801265	291.91331314	462179.34797244	4550757.55713560	140.12869263
280	0	281	280.00804137	293.07955483	462180.34797244	4550757.56471446	140.72874451
281	0	282	281.00807009	294.25116894	462181.34797244	4550757.57229332	141.33917236
282	0	283	282.00809881	295.43425744	462182.34797244	4550757.57987219	141.97134399
283	0	284	283.00812752	296.62723041	462183.34797244	4550757.58745105	142.62182617
284	0	285	284.00815624	297.82860841	462184.34797244	4550757.59502991	143.28759766
285	0	286	285.00818496	299.03716227	462185.34797244	4550757.60260877	143.96623230
286	0	287	286.00821368	300.25178067	462186.34797244	4550757.61018764	144.65560913
287	0	288	287.00824240	301.47151374	462187.34797244	4550757.61776650	145.35395813
288	0	289	288.00827112	302.69543737	462188.34797244	4550757.62534536	146.05960083
289	0	290	289.00829984	303.92269544	462189.34797244	4550757.63292423	146.77101135
290	0	291	290.00832856	305.15240844	462190.34797244	4550757.64050309	147.48664856
291	0	292	291.00835728	306.38371294	462191.34797244	4550757.64808195	148.20501709
292	0	293	292.00838600	307.61569438	462192.34797244	4550757.65566081	148.92454529
293	0	294	293.00841472	308.84737289	462193.34797244	4550757.66323968	149.64355469
294	0	295	294.00844344	310.07765446	462194.34797244	4550757.67081854	150.36016846
295	0	296	295.00847215	311.30532839	462195.34797244	4550757.67839740	151.07229614
296	0	297	296.00850087	312.52893540	462196.34797244	4550757.68597627	151.77738953
297	0	298	297.00852959	313.74949900	462197.34797244	4550757.69355513	152.47718811
298	0	299	298.00855831	314.95994105	462198.34797244	4550757.70113399	153.15917969
299	0	300	299.00858703	316.16009434	462199.34797244	4550757.70871285	153.82273865
300	1	301	0.00000000	0.00000000	461900.67311579	4550706.712883...	113.59159088
301	1	302	1.00000039	1.02913298	461901.67311579	4550706.712001...	113.34845734
302	1	303	2.00000078	2.05787788	461902.67311579	4550706.711120...	113.10697174
303	1	304	3.00000116	3.08632979	461903.67311579	4550706.710239...	112.86673737
304	1	305	4.00000155	4.11459132	461904.67311579	4550706.709358...	112.62731934
305	1	306	5.00000194	5.14276410	461905.67311579	4550706.708476...	112.38828278
306	1	307	6.00000233	6.16931049	461906.67311579	4550706.707595...	112.15634155
307	1	308	7.00000272	7.19770006	461907.67311579	4550706.706714...	111.91637421
308	1	309	8.00000311	8.22625900	461908.67311579	4550706.705833...	111.67568207
309	1	310	9.00000349	9.25503793	461909.67311579	4550706.704952...	111.43405151
310	1	311	10.00000388	10.28406826	461910.67311579	4550706.704070...	111.19135284
311	1	312	11.00000427	11.31336911	461911.67311579	4550706.703189...	110.94750977
312	1	313	12.00000466	12.34294348	461912.67311579	4550706.702308...	110.70251465
313	1	314	13.00000505	13.37277618	461913.67311579	4550706.701427...	110.45643616
314	1	315	14.00000544	14.40283718	461914.67311579	4550706.700545...	110.20940399
315	1	316	15.00000582	15.43308326	461915.67311579	4550706.699664...	109.96160126
316	1	317	16.00000621	16.46345975	461916.67311579	4550706.698783...	109.71325684
317	1	318	17.00000660	17.49389696	461917.67311579	4550706.697902...	109.46466064
318	1	319	18.00000699	18.52432497	461918.67311579	4550706.697021...	109.21610260

Show All Features

H.

In the Attribute table, Select ALL ROWS (by clicking on the left of the first and the last one-multiselect holding the SHIFT key pressed) and COPY them on the clipboard by pressing the 10th button from the left.	Paste them into EXCEL. We need two NEW columns called RIVER_NAME and RIVER_REACH respectively. Insert TWO columns on the left: Column A will be named as RIVER_NAME and Column B as RIVER_REACH 1. ADD the name of the river (column A) in ALL lines; 2. ADD the RIVER_REACH name; 3. RENAME column "Line_ID" as "RIVER_STATION" (column "Line_ID" of the "Profile_points.shp" shapefile). 4. DELETE the rest of the columns. Now the file has six columns: River_name (A), River_Reach (B), River_Station (C), X (D), Y (E) and Z (F) 5. Save the file in excel format so that you can re-use it. 6. SAVE the file in .CSV format. Please note than in some cases, EXCEL uses the semi-colon (;) character instead of the comma (,). Ready for the HEC-RAS!

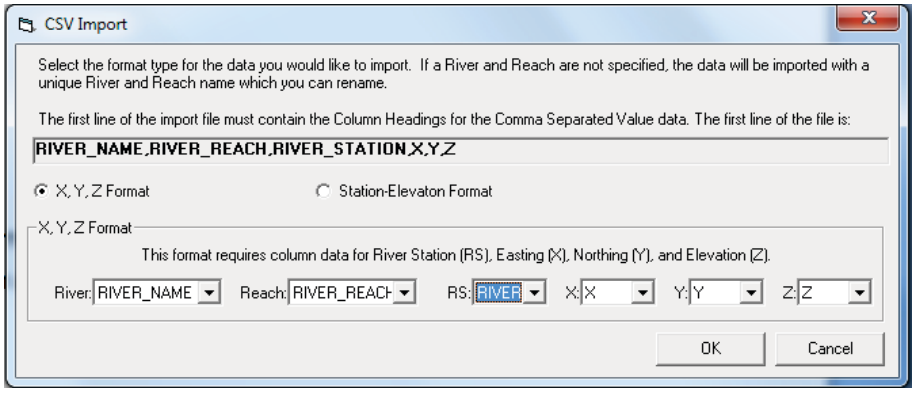


Please note than in some cases, EXCEL uses the semi-colon (;) character instead of the comma (,). In such a case, open the CSV file with Notepad, press ctrl-H (replace function) and REPLACE ";" with "," (do not use the quotes). SAVE the CSV file and it is ready for importing into HEC-RAS.

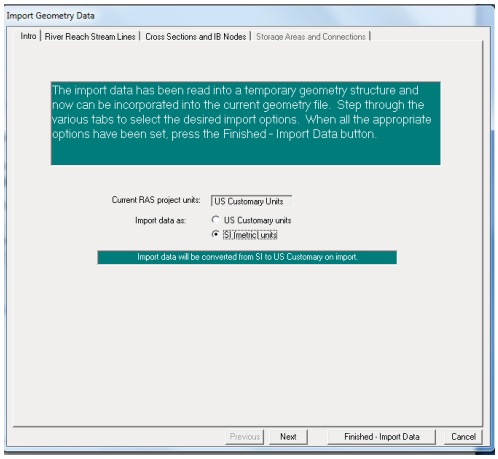
I. **Import** the .csv data file to **HEC-RAS**

Open HEC-RAS

1. New Project (set project path and name and save)
2. New Geometry Data (set project path and name and save)
3. Import Geometry Data / CSV (select the CSV file and open it)
4. Select the respective Columns for River, River reach etc



5. Press OK, and set the correct Unit System in the next window (below)



6. …NEXT…NEXT or FINISHED/Import Data

7. Got it! Create in QGIS Cross Sections and import them into HEC-RAS in less than 5’