#### Water Rennovation in Ukraine

Project no. 22320101



Visegrad Fund
•

## Data Processing in GIS

Andrzej Strużyński

Kraków 22-28 IV 2024

The project is co-financed by the Governments of the Czechia, Hungary, Poland and Slovakia through Visegrad Grants from International Visegrad Fund. The mission of the fund is to advance ideas for sustainable regional cooperation in Central Europe.

## **Data Processing in GIS**

Visegrad Fund
•

Plan:

- 1. new project
- 2. project data (DTM, river, ortofotomap)
- 3. data analysis
- 4. drawing new objects
- 5. data export

modeling of flow

- 6. data import
- 7. generating flood zones

## Data Processing in GIS – new project

# Visegrad Fund



## set the right coordinate system in Poland EPSG:2180



#### in Ukraine

| Predefined Coordinate Reference Systems | Hide deprecated CRSs |
|---|----------------------|
| Coordinate Reference System             | Authority ID         |
| Projected                               |                      |
| <ul> <li>Transverse Mercator</li> </ul> |                      |
| UCS-2000 / Ukraine TM zone 10           | EPSG:6384            |
| UCS-2000 / Ukraine TM zone 11           | EPSG:6385            |
| UCS-2000 / Ukraine TM zone 12           | EPSG:6386            |
| UCS-2000 / Ukraine TM zone 13           | EPSG:6387            |
| UCS-2000 / Ukraine TM zone 7            | EPSG:6381            |
| UCS-2000 / Ukraine TM zone 8            | EPSG:6382            |
| UCS-2000 / Ukraine TM zone 9            | EPSG:6383            |

#### create new project

Save project in good location !!!



# Visegrad Fund •

#### add rasters

and set their CRS to the proper one (for this project epsg:2180)



#### Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help 🕼 Data Source Manager Ctrl+I 🔎 A 🕞 📲 🖥 🕐 🈂 🔜 - 📑 - 🤜 - 🔍 - 🔍 🖼 🌞 \Sigma 📰 - 🚃 - 🤛 🍭 Create Lave 2 🛞 Ctrl+Shift+V 🤫 🦷 🦏 🦷 📿 之 🔎 Embed Lavers and Groups Add Raster Laver. Ctrl+Shift+R Add from Layer Definition File Add Mesh Laver. ු 🐨 📍 🗞 Q Data Source Manager | Vector ↑ \_ □ X tt Georeferencer 5. Add Delimited Text Layer - cross-sect Source Type F initial-flood 🖄 Copy Style Add PostGIS Lavers. 7 Browser WSE OK Add SpatiaLite Layer. wse-border R Add MS SQL Server Laye Copy Layer V Vector • File Directory Database O Protocol: HTTP(S), cloud, etc. OGC API - countour lin Add/Edit Virtual Laver. Stradomka Add WMS/WMTS Laver. Stradomka \_ Open Attribute Table E6 Raster Add XYZ Layer. Stradomka Filter Attribute Table Encoding Automatic Ŧ rzeki o Add WCS Layer. / Toggle Editing zlew el C Add WFS / OGC API - Featur Mesh Save Layer Edits Source Add ArcGIS REST Server La 1 dime F dtm\_Stra III. Add Vector Tile Laver. Save As... 67195 78 Point Cloud Sk Add Point Cloud Laver Vector Dataset(s) Save As Layer Definition File. 67195 78 Add GPX Layer 7195\_78 Remove Layer/Group Ctrl+D Delimited 78 G7195 78 🕞 Duplicate Layer(s) 67195 70 ↑ □ × Open OGR Supported Vector Dataset(s) Set Scale Visibility of Layer(s) 67195 78 67195 78 Set CRS of Laver(s) Ctrl+Shift+C V 67195 78 2023-24b-letni Set Project CRS from Laver AS WD 5T VF-project GIS zrodla\_mphp as dane studenci Desktop Layer Properties. Filter... Ctrl+E Name Size Modified Type 🚥 Labeling Documents 🔳 rzeki o.dbf 33.8 MB Document 29 May 2021 ™ Show in Overview on Show All in Overview rzeki o.prj 383 bytes Text 27 Sep 2010 Downloads Se Hide All from Overview 📄 rzeki o.shp ESRI Shapefile Music 📄 rzeki o.shp.xml 13.5 kB Markup 27 Oct 2003 rzeki o.shx 457.3 kB ESRI Shapefile Index 29 May 2021 Pictures zlew el.dbf 7.8 MB Document 3 Sep 2020 zlew el.pri 383 bytes Text 27 Sep 2010 Videos zlew el.shp ESRI Shapefile zlew el.shp.xml 10.8 kB Markup 27 Oct 2003 🜵 AS W... zlew el.shx 239.2 kB ESRI Shapefile Index 3 Sep 2020 + Other Locations Processing Toolbox Laver Order Lavers All files Ŧ Cancel Open ArcGIS

👯 Help

#### insert vector layers

Visegrad Fund

#### 6/37

X Close

Add



load the ortofotomap

1. the data https://www.geoportal.gov.pl/uslugi/usluga-przegladania-wms

https://mapy.geoportal.gov.pl/wss/service/PZGIK/ORTO/WMTS/StandardResolution

2. the addition?service=WMTS&request=getcapabilities

|   | Create a New WMS/WMTS Connection  |                   |
|---|---|-------------------|
| 📮 🎕 🗸 🖉 🖏 🌃 🚺 💓 🥖 File Edit Select View Image   | Connection Details  |                   |
| Carl Content of C | Name orto_1 URL 5IK/ORTO/WMTS/StandardResolution?service=WMTS&request=getCapabilities |                   |
| V_ Vector orto_1  | Authentication  |                   |
| Connect         New         Edit         Remove           Q   | Configurations Basic  | R Browser         |
| Mesh ID Name Title Abstract   | No Authentication V Computation   | Vector            |
| Pelimited<br>Text   | Configurations store encrypted credentials in the QGIS authentication database.       | Raster            |
| GPS   | HTTP Headers  | Point Cl          |
| A SpatiaLite  | Referer   | + Text            |
| PostgreSQL Image Encoding   | Advanced  WMS0MMTS Options  | GPS               |
| MS SQL<br>Server  | WMS DPLMode   | SpatiaLi          |
| Virtual Options Tile size   | WMS bPI-mode all  WMTS server-side tile pixel ratio Undefined (not scaled)            | Postgres          |
| WMS/<br>WMTS Request step size  | Ignore GetMap/GetTile/GetLegenoGraphic URI reported in capabilities                   | Server            |
| Api Maximum number of GetFeatureInfo results  | Ignore reported layer extents   | Layer             |
| WCS     Use contextual WMS Leoend   | Ignore axis orientation (WMS 1.3/WMTS)  | WFS / C           |
| xyz   | Smooth pixmap transform   | API -<br>Features |
| Vector Tile   |   | 🕀 wcs             |
| Load as separate layers<br>Scene Select layer(s)  |   | XYZ               |
| REST CHelp  |   | Scene             |
| Stationed   |   | ArcGIS<br>REST    |
| reassaing Taglhay Layor Order Lawy  | Help QCancel  |                   |

#### Visegrad Fund Data Source Manager — WMS/WMTS ↑ - □ × Layers Layer Order Tilesets Layer Format Title Style Tileset CRS PSG:3857 EPSG:3857 EPSG:3857 EPSG:3857 PSG:4326 PSG Styl domyślny dla ortofotomapy EPSG:2180 EPSG:218 EPSG:2180 Interpretation Default Layer name ORTOFOTOMAPA Load as separate layers Tileset selected 🔀 Help ✓<u>A</u>dd X Close

#### Data Processing in GIS – project data Visegrad Fund ØX / 🕼 🔍 🌄 🖏 - 💷 🖬 🗔 - cross-sections initial-flood zone WSE OK wse-border - countour line Stradomka cs-800m Stradomka points-150m - Stradomka reach ✓ — rzeki o zlew el V V ORTOFOTOMAPA dtms. 🚺 dtm Stradomka ▶ 🗸 💽 67195 782729 M-34-77-B-c-3-4 ▶ 🗸 F 67195 782728 M-34-77-B-c-3-3 F 67195 782727 M-34-77-B-c-3-2 ▶ 🗸 F 67195 782726 M-34-77-B-c-3-1 ▶ 🗸 F 67195 782688 M-34-77-A-d-4-4 ▶ ▼ ¥ 67195 782687 M-34-77-A-d-4-3 ▶ 🗸 繴 67195 782686 M-34-77-A-d-4-2 ▶ 🗸 🔰 67195 782685 M-34-77-A-d-4-1

Processing Toolbox Layer Order Layers

C Type to locate (Ctrl+K)

vor

#### merge rasters



| Layers   |   | 0 ×                | 1 1 2                                       |             |         |                   |            |                          |     |
|--|---|--------------------|---|-------------|---------|-------------------|------------|--------------------------|-----|
| 🤞 🏨 🔍 🌄 Sara 🛙   | 🎚 î 🗔   |                    |   |             |         |                   |            |                          |     |
| ▼ ▼ ₩ <u>Merged</u>  |   | C ?                |   |             |         |                   |            |                          |     |
| 366.579987   | _   | -                  |   |             |         |                   |            |                          |     |
|  | Q   |                    |   | Save Raster | Layer a | S                 |            |                          | • X |
|  | Output mode   | Raw data           | Rendered imag                               | e           |         |                   |            |                          |     |
| 0  | Format  |                    | ▼ Create                                    | VRT         |         |                   |            |                          |     |
| cross-section  | File name //run/media/as/AS_WD_5T/dane/studenci/2023-24b-letni/VF-project/GIS/dtm_Stradomka.tif |                    |   |             |         |                   |            |                          |     |
| Imitial-flood_     WSE_OK  | Layer name  |                    |   |             |         |                   |            |                          |     |
| wse-border   | CRS   | Project CRS: EF    | Project CRS: EPSG:2180 - ETRF2000-PL / CS92 |             |         |                   |            |                          |     |
| <ul> <li>countour_line</li> <li>Stradomka c</li> </ul>   | - Extent  | (current: laver)   |   |             |         |                   |            |                          |     |
| Stradomka_p  | ↓ Extent  | current. layer)    |   |             |         |                   |            |                          |     |
| ✓ — Stradomka_rt   | _   |                    | North                                       | 223900.5000 |         |                   |            |                          |     |
| zlew_el  | West 58   | 7543.5000          |   |             |         | East 5            | 94358.5000 |                          |     |
| Image: Image |   |                    | South                                       | 219155.5000 |         |                   |            |                          |     |
| dtm_Strac  | Calculate from Layer * Layout Map * Bookmark *  |                    |   |             |         |                   |            |                          |     |
| V ¥ 67195_782  |   |                    | Current La                                  | yer Extent  | M       | ap Canvas Exter   | t          |                          |     |
| ✓ ¥ 67195_782  | ▼ Resolu  | tion (current: lav | er)   |             |         |                   |            |                          |     |
| → ✓ ₩ 67195_782  | Horizo  | untal 1            |   | Vortice     | al 1    |                   |            | Lavor Posolution         |     |
| ► 67195_782  | C-hur   |                    |   | Deve        | au 1    |                   |            | Layer Resolution         |     |
| ► 07195_782  | Colum   | INS [0015          |   | Rows        |         | >                 |            |                          |     |
|  | 🔻 🗸 Crea  | ate Options        |   |             |         |                   |            |                          |     |
|  | Profile H   | ligh Compression   |   |             |         |                   |            | •                        |     |
|  |   |                    | Nomo  |             |         |                   | Value      |                          |     |
|  | 1 COMP  | RESS               | Nume  |             |         | DEFLATE           | Value      |                          |     |
|  | 2 PRED  | CTOR               |   |             |         | 2                 |            |                          |     |
|  | 3 ZI EVE  | -                  |   |             |         | 9                 |            |                          |     |
|  |   |                    |   |             |         |                   |            |                          |     |
|  |   |                    | Usla  |             |         |                   |            |                          |     |
|  |   | Validate           | нер   |             |         |                   |            |                          |     |
|  | 💌 🗌 Pyra  | amids              |   |             |         |                   |            |                          | -   |
|  | Help  |                    |   |             | V       | Add saved file to | map 🧃      | <u>⊘C</u> ancel <b>₽</b> | ĮΚ  |
| Processing Toolbox   |   |                    |   |             |         |                   |            |                          |     |

export merged raster to file

- set path and name
- set projection
- set compression
- set no data values

| put mode   Raw data  Rendered image  mat GeoTIFF Create V  rname /run/media/as/AS_WD_5T/dane/studenci/2023-24b-letni/VF-project/GIS/dtm_Stradomka.tif  r name Project CRS: EPSG-2180 - ETRF2000-PL / CS92  Project CRS: EPSG-2180 - ETRF200-PL / CS92  |              |  |            | Save           | e Raster Layer | as |  |   | Ŷ         |  |  |  |
|--|--------------|--|------------|----------------|----------------|----|--|---|-----------|--|--|--|
| mat GeoTIFF Create V   name /run/media/as/A5_WD_5T/dane/studenci/2023-24b-letni/VF-project/GIS/dtm_Stradomka.tif @   er name Project CRS: EPSG-2180 - ETRF2000-PL / CS92 *   S Project CRS: EPSG-2180 - ETRF2000-PL / CS92 *   Overview format External (GeoTiff_ovr) *   Resolutions * *   Overview format External (GeoTiff_ovr) *   Resolutions * *   Overview format External (GeoTiff_ovr) *   Resolutions * *   Create Options *   Profile Default *   Pofile Default *   Value *   Value *   * Value   * Name   Value *   * Name   Value *   * Name   * Name   * *  | put mode 💿 F | Raw data   | a 🔿 Rende  | ered image     |                |    |  |   |           |  |  |  |
| Inum       Inum/media/as/AS_WD_5T/dane/studenci/2023-24b-terni/VF-project/GIS/dtm_Stradomka.tif       Image: Control of the strategy of the s  | mat Ge       | oTIFF  |            |                |                |    |  | • | Create VR |  |  |  |
| er name         S       Project CRS: EPSG:2180 - ETRF2000-PL / CS92         C       prostrusts         Resolutions       Overview format         External (GeoTiff .ovr) <ul> <li>Resampling method</li> <li>Average</li> <li>2</li> <li>4</li> <li>8</li> <li>16</li> <li>32</li> <li>64</li> </ul> Custom levels            Create Options <ul> <li>Profile Default</li> <li> <ul> <li>Name</li> <li>Value</li> <li>Mane</li> <li>Value</li> <li> <li>Image: Second Sec</li></li></ul></li></ul>   | name /run    | /run/media/as/AS_WD_5T/dane/studenci/2023-24b-letni/VF-project/GIS/dtm_Stradomka.tif |            |                |                |    |  |   |           |  |  |  |
| S       Project CRS: EPSG:2180 - ETRF2000-PL / CS92         I       Fyramuss         Resolutions          Overview format       External (GeoTiff.ovr)         Resolutions          Overview format       External (GeoTiff.ovr)         Resolutions          Cverview format       External (GeoTiff.ovr)         Resolutions          Levels       2         Custom levels          Create Options          Profile       Default         Value          Value      <  | er name      |  |            |                |                |    |  |   |           |  |  |  |
| Resolutions  | S Pro        | ject CR  | S: EPSG:21 | 80 - ETRF2000- | PL / CS92      |    |  |   | •         |  |  |  |
| Resolutions         Overview format       External (GeoTiff_ovr)       •         Resampling method       Average       •         Levels       2       4       8       16       32       64         Custom levels   | r yrannu     | э  |            |                |                |    |  |   |           |  |  |  |
| Overview format       External (GeoTiff.ovr)       •         Resampling method       Average       •         Levels       2       4       8       16       32       64         Custom levels   |              |  |            |                |                |    |  |   |           |  |  |  |
| Resampling method       Average       •         Levels       2       4       8       16       32       64         Custom levels  |              |  | External ( |                |                |    |  |   |           |  |  |  |
| Levels       2       4       8       16       32       64         Custom levels  |              |  |            |                |                |    |  |   |           |  |  |  |
| Custom levels Create Options Profile Default  Name Value Value  Value Value Value Value  Voldate Help  ✓ No data values  From To 10 0  |              |  |            | 4              |                |    |  |   |           |  |  |  |
| Create Options Profile Default  Name Value |              |  |            |                |                |    |  |   |           |  |  |  |
| Profile Default   Name Value  Name Value  Value  Value  Value  Value  Value  Value  Valuate Help  Valuate Value  Value Value  Value Va |              |  |            |                |                |    |  |   |           |  |  |  |
| Name Value Name Value Va |              |  |            |                |                |    |  |   |           |  |  |  |
| Image:                  |              |  |            |                |                |    |  |   |           |  |  |  |
| Image: Second                  |              |  |            |                |                |    |  |   |           |  |  |  |
| Validate Help            Image: Organization of the second s                           |              |  |            |                |                |    |  |   |           |  |  |  |
| Walidate Help     Validate Help     Vodata values     From To     10 0     @ = 20  |              |  |            |                |                |    |  |   |           |  |  |  |
| From         To           10         0   |              |  |            |                |                |    |  |   |           |  |  |  |
|  | V No data    | values   |            |                |                |    |  |   |           |  |  |  |
|  |              | F  | rom        |                |                | То |  |   |           |  |  |  |
|  | 10           |  |            | 0              |                |    |  |   |           |  |  |  |
|  |              |  |            |                |                |    |  |   |           |  |  |  |
|  |              |  |            |                |                |    |  |   |           |  |  |  |
|  | -            |  |            |                |                |    |  |   |           |  |  |  |

• Visegrad Fund

# Visegrad Fund

#### set good legend

| Layers Ø 🕅   |  |                                 |                                      |               |                                 |            | 1       |                                       |          |
|--|--|---------------------------------|--------------------------------------|---------------|---------------------------------|------------|---------|---------------------------------------|----------|
|  |  |                                 |                                      |               |                                 |            |         |                                       |          |
| cross-sections     initial-flood_zone  |  |                                 |                                      |               | No V                            |            |         |                                       |          |
| ▶ □ ₩ WSE_OK   |  | Q                               |                                      | Layo          | er Properties - dtm_Stradomka — | Symbology  |         | ↑   X                                 | , //     |
| wse-border   |  | Q                               | <ul> <li>Band Rendering</li> </ul>   |               |                                 |            |         | ·                                     | A.       |
| <ul> <li>Stradomka_cs-800m</li> </ul>  | and the second   | <ul> <li>Information</li> </ul> | Render type Singleband pseudocolor * |               |                                 |            |         |                                       | a        |
| Stradomka_points-150m  |  |                                 | Band                                 | Band 1 (Grav) |                                 |            |         |                                       |          |
| ✓ — rzeki_o  |  | Source                          | Min                                  | 224 1700027   |                                 | Max        | 270     |                                       |          |
| zlew_el  |  |                                 | Min / May Value Sattings             | 224.1799927   |                                 | IVIAX      | 270     |                                       |          |
|  |  | Transparency                    | Min / max value Settings             |               | Linner                          |            |         |                                       | 1 1 Free |
| ✓ Mathematical Mathematica<br>Mathematical Mathematical |  |                                 | Interpolation                        |               | Linear                          |            |         |                                       | 16 10 18 |
| Band 1 (Gray)  |  | 📐 Histogram                     | Color ramp                           |               |                                 |            |         | •                                     |          |
|  |  | of Rendering                    | Label unit suffix                    |               |                                 |            |         |                                       |          |
|  |  | A                               | Label precision                      |               | 4                               |            |         |                                       |          |
| 224.179993   |  | S remporal                      | Value Color Label                    |               |                                 |            |         | <b></b>                               |          |
| ▶ 🗌 F 67195_782729_M-34-77-B-c-3-4   |  | 🖄 Pyramids                      | 224.1799927 224.1800                 |               |                                 |            |         |                                       | e e      |
| <ul> <li>              §             67195_782728_M-34-77-B-c-3-3      </li> <li>             67195_782727_M-34-77-B-c-3-2         </li> </ul>   | A CONTRACTOR OF  | Elevation                       |                                      |               |                                 |            |         |                                       | Awet     |
| ▶ <b>67195_782726_M-34-77-B-c-3-1</b>  |  |                                 | 235.6349945 235.6350                 |               |                                 |            |         |                                       | Tan      |
| <ul> <li>67195_782688_M-34-77-A-d-4-4</li> <li>67195_782687_M-34-77-A-d-4-3</li> </ul>   |  | 🍠 Metadata                      | 247.0899964 247.0900                 |               |                                 |            |         |                                       |          |
| ► ■ ■ 67195_782686_M-34-77-A-d-4-2   |  | Egend                           |                                      |               |                                 |            |         |                                       | ALC: N   |
| ▶ 67195_782685_M-34-77-A-d-4-1   |  | Display                         | 258.5449982                          |               |                                 |            |         |                                       |          |
|  |  | -                               | 270                                  |               |                                 |            |         | · · · · · · · · · · · · · · · · · · · |          |
|  | 1000   | Attribute Tables                | Mode Continuous -                    |               |                                 |            |         | Classes 5                             |          |
|  |  | 📲 QGIS Server                   | Classify 🖶 📼 🛷 늘 🔜                   |               |                                 |            |         | Legend Settings                       |          |
|  | and the second s | -                               | Clip out of range values             |               |                                 |            |         |                                       |          |
|  | and the second   |                                 |                                      |               |                                 |            |         |                                       |          |
|  | 1.00   |                                 | Layer Kendering                      |               |                                 |            |         |                                       |          |
|  |  |                                 | Blending mode Normal                 |               |                                 | •          |         | 👆 Reset                               | 1996     |
|  |  |                                 | Brightness                           | 0             | 0                               | Contrast   | 0       | 0 \$                                  | K. 39-   |
|  |  |                                 | Gamma                                |               | 1.00                            | Saturation | 0       | 0 \$                                  | 1.1      |
|  |  |                                 |                                      |               |                                 | r r        |         |                                       |          |
|  |  |                                 | Style -                              |               |                                 |            | ✓ Apply | / <u>©C</u> ancel <u>@C</u> K         |          |
|  |  |                                 | A second and the second second       |               |                                 |            |         |                                       |          |
| Processing Toolbox Laver Order Lavers  |  |                                 | 3                                    |               |                                 |            |         |                                       |          |



Visegrad Fund
•

zoom to loaded DTM's

measure the length of some kilometers and choose the river reach

#### Data Processing in GIS – drawing new objects

| 🍬 📽 Vî 🔏 🖏 🌃 🕼 🕖 /   | ) 📑 🦯 - Vii /k - 🛃  | 🛅 😪 🖹 🖢 🔶 📟 💁 🗠 ጫ ጫ 🧠 🥵 🦷 🦉 🦉  | n 🔁 🛃                          | • •                        |
|--|---|--|--------------------------------|----------------------------|
| ayers 🕅 🖉 🖉  | (2)   |  |                                |                            |
| <ul> <li>Additional and the second se</li></ul> | File name<br>File encoding<br>Geometry type<br>Additional dimensions<br>New Field<br>Name<br>Type<br>abc Text (string)<br>Length 80<br>Fields List<br>Name<br>Type<br>id<br>Integer | Inun/media/as/AS_WD_5T/dane/studenci/2023-24b-letni/VF-project/GIS/Stradomka_reach.shp         UTF-8         V* LineString         None       Z (+ M values)         Project CRS: EPSG:2180 - ETRF2000-PL / CS92         Precision         Image: Add to Fields List         Length       Precision         10 |                                | create new<br>vector layer |
|  | Jan Help  | Remove Fi  | eld<br>P <u>OK</u><br>Młynówka | 14 / 37                    |

• Visegrad Fund

Data Processing in GIS – drawing new objects

Visegrad Fund
•

#### **RIVER CHANNEL**

- 1. edit layer
- 2. toggle drawing
- 3. draw by left button finish by right button fill data in table (or left blank)
  4. save objects in layer
- 5 1. switch editing off

set layer properties



#### Data Processing in GIS – drawing new objects Visegrad Fund **OCHAINAGE PLUGIN** 💘 😭 Vi 🌈 🖏 🔛 Vi 🖉 🛯 🥢 / 🕞 🖯 - Vi /k - 🕺 👘 🔫 🗈 🖻 Layers PX 💉 🥼 🔍 🍸 🖧 🕶 🕼 ≽ cross-sections 🔰 initial-flood zone QChainage $\uparrow X$ WSE OK wse-border Basic Advanced Labeling countour line Select Layer to chainage Stradomka cs-800m Stradomka points-150m Stradomka reach 🗸 💳 Stradomka reach 800.0000000 meters Chainage every 🗕 rzeki o zlew el Only first and last point Force last point ORTOFOTOMAPA Output Layername chain Stradomka reach ✔ . 尚 dtms 🚺 dtm Stradomka F 67195 782729 M-34-77-B-c-3-4 67195 782728 M-34-77-B-c-3-3 F 67195 782727 M-34-77-B-c-3-2 💢 Help ⊘K 🙆 <u>C</u>ancel F 67195 782726 M-34-77-B-c-3-1 67195 782688 M-34-77-A-d-4-4

qchainage - measure distance along lines – points on river

- location of cross-sections, - coordinates of river nodes for channel data export 16 / 37

## Data Processing in GIS – drawing new objects

# • Visegrad Fund



important !!!

in this exercise:

- 150m points layer

is used to reflect the run of the river channel in Mike model

- 800m points layer

is used to import data (water surface elevation) from Mike to cross-section location



Visegrad Fund
•

points measured along lines

in 150m points layer add X and Y coordinate fields

export x coordinates to WGS x(transform(\$geometry, layer\_property(@layer\_name, 'crs'),'EPSG:4326')) to epsg:2180 x(transform(\$geometry, layer\_property(@layer\_name, 'crs'),'EPSG:2180'))

for y coordinates replace x with y



RIVER CHANNEL (150m point layer)

open layer attribute table

CTRL-A select all features

CTRL-C copy values to clipboard

CTRL-V paste values to notepad and then to spreadsheet (i.e. MS Excel)

in excel change data order to be ready for import to Mike 19/37

Visegrad Fund

| Data Processing in GIS –   | drawing new objects   | •  |
|--|---|--|
| avente contervulives aved as ve there as   |   | Visegrad Fund  |
| create contour lines and save them as  | a vector layer in the project localic   |  |
| Project-practical school<br>Project Edit View Laver Settings Plugins Vector Raster Database Web Mesh Processing Help   | AS-QGIS   |  |
| 🗅 ⊨ 🗏 💫 🛠 🕐 🕾 🛞 💬 🏪 Raster Calculator  | 🚯 🗰 🏷 🗐 - 🚃 - 💭 🎯 -   |  |
|  |   |  |
|  |   |  |
| Layers I I I I I I I I I I I I I I I I I I I   |   | f DHC  |
| Conversion Conversion  |   | Kess (   |
| ▶ Winitial-flood_zone ₩ Initial-flood_zone ₩ WSE OK  | Q Contour   | * ×  |
| wse-border   | Parameters Log  |  |
| <ul> <li>✓ — countour_line</li> <li>✓ ● Stradomka cs-800m</li> </ul>   | Input layer   |  |
| Stradomka_points-150m  | # dtm_Stradomka [EPSG:2180]   |  |
| v ■ Stradomka_reach<br>□ = rzeki_o   | Band number   |  |
|  | Band 1 (Gray)   |  |
| ▼ ØRIOFOTOMARA   | Interval between contour lines  |  |
| ✓ ★ dtm_Stradomka ★ 67195 782729 M.34.772 B.o.3.4  | 2.500000<br>Attribute same (if not not use allocation attribute is attracked) [antiana]]  |  |
| <ul> <li>✓ 67195_782728_M-34-77-B-c-3-3</li> </ul>   | Attribute name (if not set, no elevation attribute is attached) (optional)  |  |
| <ul> <li> <sup>™</sup> 67195_782727_M-34-77-B-c-3-2             <sup>™</sup> </li> <li> <sup>™</sup> 67195 782726 M-34-77-B-c-3-1         </li> </ul>  | Offset from zero relative to which to interpret intervals [optional]  |  |
| <ul> <li>► 0126_r0125_m0547150614</li> <li>► 0126_r0125_m2688_M-34-77-A-d-44</li> </ul>  | 0.000000  |  |
| <ul> <li> <sup>™</sup> 67195_782687_M-34-77-A-d-4-3      </li> <li> <sup>™</sup> 67195 782686_M-34-77-A-d-4-2         </li> </ul>  | ► Advanced Parameters   |  |
| ▶ 🗌 🕅 67195_782685_M-34-77-A-d-4-1   | Contours  |  |
|  | [Save to temporary file]  |  |
|  | ✓ Open output file after running algorithm  |  |
|  |   |  |
|  |   |  |
|  | GDAL/OGR console call   |  |
|  | gdal_contour -b 1 -a ELEV -i 2.5 -f "GPKG" /rur/media/as/AS_WD_5T/dane/studenci/2023-24b-letni/VF-project/GIS/dtm_Stradomka.tif /tm | up/  |
|  | processing_uJCKJe/288ac1d804b648be88113c6983e87e95/OUTPUT.gpkg  |  |
|  |   |  |
|  |   |  |
|  |   | and the second sec |
| The the first have a   |   |  |
| the state of the former  |   |  |
| Ma marken  |   | 4  |
| A A A A  | 0%  | Cancel   |
|  | Close Close   | Run U  |
| and the second sec |   | 20/37  |
| Processing Toolbox Layer Order Layers  |   |  |

Q. Type to locate (Ctrl+K)



Q. Type to locate (Ctrl+K) Toggles the editing state of the current layer Coordinate 220849, 590708 🔉 Scale 1:8838 Ŧ A Magnifier 100% C Rotation 0.0  create new vector layer - polylines

draw elements from left to right perpendicularly to countour lines

set numbers of every cross-section

save layer

close editing

save project 21/37

#### PROFILE TOOL PLUGIN (icon name: Terrain Profile)





- 1 select dtm
- 2 start plugin
- 3 add dtm layer
- 4 select cross-section layer
- 5 choose picked features
- 6 pick cross-section feature
- 7 copy table to clipboard

#### paste data to notepad

repeat points 4 - 7until all data is copied



Q. Type to locate (Ctrl+K) Select the polyline feature in



## **Flow Modeling**

## (classes by Maciej Wyrębek)

To import data from Mike View:

- assign water level elevation in spreadsheet with coordinates of cross-sections points location (in this excersise point vector layer of raster 800m)
- import txt or csv data from spreadsheet prepared in order
   X Y Z c-s\_number,
   where: c-s\_number is cross-section number,
   Z is a water elevation for modeled flood wave
- create buffer layer from points layer
- copy Z values from buffer layer to cross-sections layer (spatial join)

Visegrad Fund

G

| A  |   | Data St  | Jurcen               | nanager – Deninneu re  | AL  |                        |  | 10 <sup>1</sup> | - |
|--|---|--|----------------------|--|---|------------------------|--|-----------------|---|
| er 🛑                                       | File name /run/media/as/AS_   | WD_5T/dane/studer  | nci/202              | 23-24b-letni/VF-project/   | res_from_Mike   |                        |  |                 | × |
|  | Layer name res_from_Mike  |  |                      |  | Encoding  | UTF-8                  |  |                 |   |
|  | ▼ File Format   |  |                      |  |   |                        |  |                 |   |
|  |   |  |                      |  |   |                        |  |                 |   |
|  | O CSV (comma separated  | values) 🗸 Tab  |                      |  | Colon   |                        | Space  |                 |   |
|  | <ul> <li>Regular expression delir</li> </ul>  | niter Semic  | olon                 |  | Comma   |                        | Others   |                 |   |
| loud                                       | <ul> <li>Custom delimiters</li> </ul>   | Quote "  |                      |  |   |                        | Escape "   |                 |   |
| ed   |   |  |                      |  |   |                        |  |                 |   |
| _  | Record and Fields Optio   | ns   |                      |  |   |                        |  |                 |   |
| ckage                                      | <ul> <li>Geometry Definition</li> </ul>   |  |                      |  |   |                        |  |                 |   |
|  | Point coordinates   | X field  | x                    |  | •   | Z field                | Z  |                 |   |
|  | -   | Y field  | Y                    |  |   | M field                |  |                 |   |
| lite                                       | <ul> <li>Well known text (WKT)</li> </ul>   |  |                      |  |   |                        | · · · · · · · · · · · · · · · · · · ·  |                 |   |
|  |   |  |                      | IC   |   |                        |  |                 |   |
| SOL  | <ul> <li>No geometry (attribute o</li> </ul>  | only table)  |                      | IS coordinates   | -0100 ETDE0000  |                        | 202  |                 |   |
| SQL  | O No geometry (attribute o  | only table) Geomet   | DM<br>try CR         | IS coordinates<br>S Project CRS: EPSG  | 6:2180 - ETRF2000   | -PL / CS               | 92   |                 | Ŧ |
| ⊧SQL<br>L                                  | No geometry (attribute o  | only table) Geomet   | DM<br>try CR         | IS coordinates<br>S Project CRS: EPSC  | 5:2180 - ETRF2000   | -PL / CS               | 92   |                 | * |
| eSQL<br>L                                  | <ul> <li>No geometry (attribute o</li> <li>Layer Settings</li> </ul>  | only table) Geomet   | DM<br>try CR         | IS coordinates<br>S Project CRS: EPSG  | 6:2180 - ETRF2000   | -PL / CS               | 92   |                 | ¥ |
| eSQL<br>L                                  | <ul> <li>No geometry (attribute o</li> <li>Layer Settings</li> <li>Sample Data</li> </ul>   | inly table) Geomet   | DM<br>try CR         | IS coordinates<br>S Project CRS: EPSC  | 5:2180 - ETRF2000   | -PL / CS               | 92   |                 | Ŧ |
| eSQL<br>IL<br>Layer<br>VMTS                | <ul> <li>No geometry (attribute o</li> <li>▶ Layer Settings</li> <li>Sample Data</li> <li>X</li> </ul>  | inly table) Geomet   | DM<br>try CR         | IS coordinates<br>S Project CRS: EPSC<br>cr_no   | cngmeters   | -PL / CS               | 92<br>Z  |                 | • |
| eSQL<br>L<br>Layer<br>VMTS                 | <ul> <li>No geometry (attribute of</li> <li>▶ Layer Settings</li> <li>Sample Data</li> <li>X</li> <li>1.2 Decimal (double) ▼</li> </ul>   | nly table) Geomet  | DM<br>try CR<br>e) ▼ | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)                                     | cngmeters<br>123 Integer (32 b)   | -PL / CS<br>s          | Z<br>1.2 Decimal (double)  |                 | * |
| eSQL<br>L<br>Layer<br>VMTS<br>OGC          | <ul> <li>No geometry (attribute of</li> <li>▶ Layer Settings</li> <li>Sample Data</li> <li>X</li> <li>1.2 Decimal (double) ▼</li> <li>1 588863.943267473</li> </ul>   | rnly table) Geomet<br>Y<br>1.2 Decimal (double<br>220859.804649921   | DM<br>try CR<br>e) ▼ | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)                                     | cngmeter:<br>123 Integer (32 b)<br>0  | -PL / CS<br>s<br>it) ▼ | 292<br>Z<br>1.2 Decimal (double) ¥<br>253.3  |                 | • |
| eSQL<br>IL<br>Layer<br>VMTS<br>OGC         | <ul> <li>No geometry (attribute of b Layer Settings</li> <li>Sample Data</li> <li>X</li> <li>1.2 Decimal (double) ▼</li> <li>1 588863.943267473</li> <li>2 589270.098326586</li> </ul>  | Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871   | DM<br>try CR<br>e) ▼ | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)<br>1<br>2                           | cngmeters<br>123 Integer (32 b<br>0<br>800  | -PL / CS<br>s<br>it) ▼ | 2<br>1.2 Decimal (double)<br>253.3<br>250.87   |                 | • |
| eSQL<br>DL<br>Layer<br>VMTS<br>OGC<br>IS   | <ul> <li>No geometry (attribute of black bl</li></ul> | rnly table) Geomet<br>Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747   | DM<br>try CR<br>e) ▼ | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)<br>1<br>2<br>3                      | cngmeters<br>123 Integer (32 b<br>0<br>800<br>1600  | -PL / CS<br>s<br>it) ▼ | Z<br>1.2 Decimal (double)<br>253.3<br>250.87<br>247.49   |                 | • |
| eSQL<br>Layer<br>VMTS<br>OGC               | <ul> <li>No geometry (attribute of between the second second</li></ul> | rily table) Geomet<br>Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747<br>220407.267482586   | DM<br>try CR<br>e) ▼ | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)<br>1<br>2<br>3<br>4                 | <ul> <li>ETRF2000</li> <li>cngmeters</li> <li>123 Integer (32 b)</li> <li>0</li> <li>800</li> <li>1600</li> <li>2400</li> </ul>   | -PL / CS<br>s<br>it) ▼ | Z<br>1.2 Decimal (double) ¥<br>253.3<br>250.87<br>247.49<br>245.04                               |                 | * |
| eSQL<br>Layer<br>VMTS<br>OGC<br>:s         | <ul> <li>No geometry (attribute of between the second second</li></ul> | rily table) Geomet<br>Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747<br>220407.267482586<br>220537.299212542   | e) T                 | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br><sup>123</sup> Integer (32 bit)<br>1<br>2<br>3<br>4<br>5 | <ul> <li>cngmeters</li> <li>123 Integer (32 b)</li> <li>0</li> <li>800</li> <li>1600</li> <li>2400</li> <li>3200</li> </ul>   | -PL / CS<br>s<br>it) ▼ | Z<br>1.2 Decimal (double) *<br>253.3<br>250.87<br>247.49<br>245.04<br>241.35                     |                 | • |
| eSQL<br>Layer<br>VMTS<br>OGC<br>≉S         | <ul> <li>No geometry (attribute of begin terms)</li> <li>Layer Settings</li> <li>Sample Data</li> <li>X</li> <li>1.2 Decimal (double) ▼</li> <li>1 588863.943267473</li> <li>2 589270.098326586</li> <li>3 589868.103727522</li> <li>4 590585.358937664</li> <li>5 591260.606073744</li> <li>6 591770.022258632</li> </ul>  | Anly table) Geomet<br>Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747<br>220407.267482586<br>220537.299212542<br>220617.069867975   | e) -                 | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)<br>1<br>2<br>3<br>4<br>5<br>6       | Cngmeters<br>cngmeters<br>123 Integer (32 b<br>0<br>800<br>1600<br>2400<br>3200<br>4000   | PL / CS<br>s<br>it) ▼  | Z<br>1.2 Decimal (double) ¥<br>253.3<br>250.87<br>247.49<br>245.04<br>241.35<br>240.53           |                 | • |
| eSQL<br>Layer<br>VMTS<br>OGC<br>Is         | <ul> <li>No geometry (attribute of black bl</li></ul> | rinly table) Geomet<br>Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747<br>220407.267482586<br>220537.299212542<br>220617.069867975<br>221023.587519639  | e) 🔻                 | IS coordinates<br>S Project CRS: EPSC<br>cr_no<br>123 Integer (32 bit)<br>1<br>2<br>3<br>4<br>5<br>6<br>7  | <ul> <li>ETRF2000</li> <li>cngmeters</li> <li>123 Integer (32 b)</li> <li>0</li> <li>800</li> <li>1600</li> <li>2400</li> <li>3200</li> <li>4000</li> <li>4800</li> </ul> | PL / CS                | Z<br>1.2 Decimal (double)<br>253.3<br>250.87<br>247.49<br>245.04<br>241.35<br>240.53<br>238.05   |                 | • |
| eSQL<br>IL<br>VMTS<br>OGC<br>IS            | <ul> <li>No geometry (attribute of Layer Settings</li> <li>Sample Data</li> <li> <ul> <li>1.2 Decimal (double) ▼</li> <li>1 588863.943267473</li> <li>2 589270.098326586</li> <li>3 589868.103727522</li> <li>4 590585.358937664</li> <li>5 591260.606073744</li> <li>6 591770.022258632</li> <li>7 591989.823066657</li> </ul> </li> </ul>   | Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747<br>220407.267482586<br>220537.299212542<br>220617.069867975<br>221023.587519639   | e) -                 | IS coordinates<br>S Project CRS: EPSC  | cngmeters<br>123 Integer (32 b)<br>0<br>800<br>1600<br>2400<br>3200<br>4000<br>4800   | PL / CS<br>s<br>it) ▼  | 2<br>1.2 Decimal (double) ▼<br>253.3<br>250.87<br>247.49<br>245.04<br>241.35<br>240.53<br>238.05 |                 | • |
| eSQL<br>IL<br>VMTS<br>OGC<br>IS            | <ul> <li>No geometry (attribute of Layer Settings</li> <li>Sample Data</li> <li>              1.2 Decimal (double) ▼          </li> <li>             158863.943267473         </li> <li>             589270.098326586         </li> <li>             589868.103727522         </li> <li>             4590585.358937664         </li> <li>             591260.606073744         </li> <li>             591770.022258632         </li> <li>             7591989.823066657         </li> </ul>   | Y<br>Anily table) Geomet<br>Y<br>Anily Comparison<br>Y<br>Anily Comparison<br>Anily Comparison<br>Y<br>Anily Comparison<br>Y<br>Anily Comparison<br>Y<br>Anily Comparison<br>Y<br>Anily Comparison<br>Anily Com | e) -                 | IS coordinates<br>S Project CRS: EPSC  | cngmeters<br>123 Integer (32 b)<br>0<br>800<br>1600<br>2400<br>3200<br>4000<br>4800   | PL / CS<br>s<br>it) ▼  | 2<br>1.2 Decimal (double) ▼<br>253.3<br>250.87<br>247.49<br>245.04<br>241.35<br>240.53<br>238.05 |                 | • |
| eSQL<br>Layer<br>VMTS<br>OGC<br>Is<br>Tile | <ul> <li>No geometry (attribute of Layer Settings</li> <li>Sample Data</li> <li>              1.2 Decimal (double) ▼      </li> <li>             158863.943267473         </li> <li>             589270.098326586         </li> <li>             589868.103727522         </li> <li>             4 590585.358937664         </li> <li>             591260.606073744         </li> <li>             591770.02228632         </li> <li>             7 591989.823066657         </li> </ul>  | Y<br>1.2 Decimal (double<br>220859.804649921<br>220470.832885871<br>220335.143586747<br>220407.267482586<br>220537.299212542<br>220517.069867975<br>221023.587519639   | e) 🗾                 | IS coordinates<br>S Project CRS: EPSC<br>123 Integer (32 bit)<br>1<br>2<br>3<br>4<br>5<br>6<br>7           | 2180 - ETRF2000<br>cngmeters<br>123 Integer (32 b)<br>0<br>800<br>1600<br>2400<br>3200<br>4000<br>4800  | PL / CS<br>s<br>it) ▼  | 2<br>1.2 Decimal (double) ▼<br>253.3<br>250.87<br>247.49<br>245.04<br>241.35<br>240.53<br>238.05 |                 | • |



import data from file named res\_from\_Mike

delimiter is tab

geometry definition X is X, Y is Y Z is Z (water)

set proper CRS

#### imported layer is a point one



points location is different then cross-sections location

Visegrad Fund

the max difference can be found and measured with Measure





Q. Type to locate (Ctrl+K)

#### buffer layer is created with radius set to 3 meters

28/37

Coordinate 221405.888, 592312.541 🕷 Scale 1:29 💌 🚔 Magnifier 100% 💠 Rotation 0.0 ° 🗘 👽 Render 💮 EPSG:2180

Visegrad Fund



data collected in layer buffer is copied to layer cross-sections by location

29/37



| Į | 7 B   📆 | 🖥 🗠 🖻 🗎     | हि 📄 🔽 🧧    | 7 🔳 💠 🞾 | 1. 1. 🕅 🗄 | 1 🚍 I 🔍 🗐 |
|---|---------|-------------|-------------|---------|-----------|-----------|
|   | id      | Х           | Y           | cr_no   | cngmeters | Z         |
| 1 | 1       | 588863.9432 | 220859.8046 | 1       | 0         | 253.3     |
| 2 | 2       | 589270.0983 | 220470.8328 | 2       | 800       | 250.87    |
| 3 | 3       | 589868.1037 | 220335.1435 | 3       | 1600      | 247.49    |
| 4 | 4       | 590585.3589 | 220407.2674 | 4       | 2400      | 245.04    |
| 5 | 5       | 591260.6060 | 220537.2992 | 5       | 3200      | 241.35    |
| 6 | 6       | 591770.0222 | 220617.0698 | 6       | 4000      | 240.53    |
| 7 | 7       | 591989.8230 | 221023.5875 | 7       | 4800      | 238.05    |
| 8 | 8       | 592316.2383 | 221401.7018 | 8       | 5600      | 234.9     |

Show All Features

Visegrad Fund

data collected in layer buffer is copied to layer cross-sections by location

it's worth to export this as a vector layer

• Visegrad Fund

This data can be used to interpolate water surface elevation between cross-sections

the TIN interpolation is used on the base of Z values

the borders and CRS of the new raster are taken from the cross-sections vector layer

it's important to properly set the created raster resolution (here set to 0.5 m)

details can be found at the next slide ...

#### • Visegrad Fund

•

| 💘 🎕 Vî 🎤 🖏 🎇 🖉 🥢 🌶                    |  | 💐 💐 💐 🗶 🛃 📩 1,1                            |  |
|---------------------------------------|--|--|--|
| Processing Toolbox                    |  | <b>T A</b>                                 |  |
| 🎭 🍓 🕓 🖹 I 🤛 I 🗞                       | Parameters Log   | <sup>1</sup> TIN interpolation             |  |
| 🔍 interpol 🖉                          | Input layer(s)   | Generates a Triangulated Irregular         | Maria Maria and a second se  |
| <ul> <li>Recently used</li> </ul>     |  | Network (TIN) interpolation of a point     | A State of the second s |
| TIN interpolation                     | Vector layer V cross-sections-WSE *                          | vector layer.                              |  |
| ✓ Q Interpolation                     | Interpolation attribute 1.2 Z                                | With the TIN method you can create a       |  |
| Heatmap (Kernel Density Estimation)   | Ulas 7 secretinate for internelation                         | surface formed by triangles of nearest     |  |
| Line density                          |  | around selected sample points are created  |  |
| TIN interpolation                     |  | and their intersections are connected to a |  |
| <ul> <li>Q Vector geometry</li> </ul> | Vector layer Attribute Type                                  | compact as possible triangles. The         |  |
| 🔆 Interpolate point on line           | cross-sec Z Points 👻   | resulting surfaces are not smooth.         |  |
| Line substring                        |  | The algorithm creates both the raster      |  |
| "" Points along geometry              |  | layer of the interpolated values and the   |  |
| ▼ W GRASS<br>▼ Baster (r*)            |  | vector line layer with the triangulation   |  |
|                                       |  | boundaries.                                |  |
| 🔬 r.fillnulls                         |  |  |  |
| 🔬 r.resamp.bspline                    |  |  |  |
| w r.resamp.interp                     |  |  |  |
|                                       |  |  |  |
|                                       | Interpolation method   |  |  |
| <ul> <li>Vector (v.*)</li> </ul>      | Linear   |  |  |
| v.surf.bspline                        | Extent   |  |  |
| V.surf.idw                            | E996E4 9477 E02277 E792 210020 0797 221621 2190 [EDSC:2190]  |  |  |
| ₩ v.sufi.rst                          | 500034.0417,542517.5102,214920.0101,221051.5109 [LF-50.2100] |  |  |
| V.Sunistovuov                         | Output raster size   |  |  |
|                                       | Rows 3423 Columns 7446 \$                                    |  |  |
|                                       | Pixel size X 0.500000 ♀ Pixel size Y 0.500000 ♀              |  |  |
|                                       | Interpolated   |  |  |
|                                       | [Save to temporary file]                                     |  |  |
|                                       | ✓ Open output file after running algorithm                   |  |  |
|                                       | Triangulation [optional]                                     |  |  |
|                                       | [Skip output]  |  | [1] M. M. Martin, M. M. Martin, M. Martin, M. Martin, and A. Martin, Nucl. Phys. Rev. Lett. 10, 101 (1997).  |
|                                       | Open output file offer running algorithm                     |  |  |
|                                       |  |  |  |
|                                       |  |  |  |
|                                       |  |  |  |
|                                       |  |  |  |
|                                       | 0%   |  |  |
|                                       |  |  |  |
| Processing Teelbox Laver Order Lavers | G Advanced  Run as Batch Process                             | X Close Run                                |  |
| Flocessing Toolbox Layer Order Layers |  |  |  |

the borders of the raster flow outside the cross-sections range – it has to be corrected  $^{32}$  /  $^{37}$ 



new vector polygon layer is created to draw the proper borders of the WSE raster

• Visegrad Fund



| 🤽 🎕 Vi 🔏 🖷 🎇 🖉 🖉  | / 📴 / - 📯 🏷 - 🕅 🛅 😪 🖻 🖥 🐟 🧀 💷 🌒 🗐 🤐 🚳 🖓 🧠 💘 💘 💘 💘 🥮 🗶 之 🔧 🛁 🔍 Lip Raster by Mask Layer + X   |                  |
|---|--|------------------|
| ayers DX  | Paramatars   |                  |
|   |  |                  |
|   | Input layer  | Mincher Mulde St |
| • res_from_Mike   | Interpolated [EPSG:2180]   |                  |
| cross-sections  | Mask layer   |                  |
| WSF OK  | 🖓 wse-border [EPSG:2180]   |                  |
| wse-border  | Selected features only   |                  |
| 🗌 F Interpolated 💭  | Source CRS [optional]  |                  |
| <ul> <li>countour_line</li> <li>Stradomka_cs-800m</li> </ul>  | Project CRS: EPSG:2180 - ETRF2000-PL / CS92 🔹  |                  |
| Stradomka_points-150m   | Target CRS [optional]  |                  |
| ✓ — Stradomka_reach   | Project CR5: EPSG:2180 - ETRF2000-PL / CS92  |                  |
| rzeki_o   | Target extent (optional)   |                  |
|   | No set   |                  |
| ✓ 創 dtms  | Assign a specified podata value to output hands [ontional]   |                  |
| ↓ ↓ ↓ dtm_Stradomka ↓ ↓ ↓ 67195 782729 M-34-77-B-c-3-4  | Prosing a specified induita value to output banks (optionita)  |                  |
| ▶   |  |                  |
| ▶ <b>*</b> 67195_782727_M-34-77-B-c-3-2   | Create an output alpha band  |                  |
| <ul> <li> <i>i</i> 6/195_/82/26_M-34-77-B-c-3-1      </li> <li> <i>i</i> 6/195_782688 M-34-77-A-d-4-4         </li> </ul> | ✓ Match the extent of the clipped raster to the extent of the mask layer   |                  |
| G7195_782687_M-34-77-A-d-4-3  | Keep resolution of input raster  |                  |
| ▶ <b>*</b> 67195_782686_M-34-77-A-d-4-2   | Set output file resolution   |                  |
| • 6/195_782685_M-34-77-A-d-4-1  | X Resolution to output bands [optional]  |                  |
|   | Not set  |                  |
|   | Y Resolution to output bands [optional]  |                  |
|   | Not set  |                  |
|   | Advanced Parameters  |                  |
|   | Clipped (mask)   |                  |
|   | Save to temporary file]  |                  |
|   | Copen output file after running algorithm  |                  |
|   |  |                  |
|   |  |                  |
|   | GDAL/OGR console call  |                  |
|   | gdalwarp -overwrite -s_srs EPSG:2180 -t_srs EPSG:2180 -of GTiff -cutline /run/media/as/AS_WD_5T/dane/studenci/2023-24b-letni/VF-project/   |                  |
|   | GIS/wse-border.shp -cl wse-border -crop to _cutine /tmp/processing _uCKJe/081da237a2904304a5378ce15b86d106/OUTPUT.tif /tmp/<br>processing uLCKJe/df05b7ce0c94090290403042b559ce/OUTPUT.tif |                  |
|   |  |                  |
|   | 0% Cancel  |                  |
|   | Welan Advanced y Dun as Batch Process  |                  |
| Processing Toolbox Layer Order Layers   |  |                  |

the raster can be shrink by the "clip raster by mask layer" procedure

## Data Processing in GIS – generating flood zones

• Visegrad Fund

| Q                        |                                      |                | Raster Calcula | itor             |                   | Ŷ                  | ×        |          |              |                |
|--------------------------|--------------------------------------|----------------|----------------|------------------|-------------------|--------------------|----------|----------|--------------|----------------|
| Raster Bands             | ;                                    |                | Result Layer   |                  |                   |                    |          |          |              | March 1        |
| 67195_7826               | 685_M-34-77-A-d-                     | 4-1@1          | Create o       | n-the-fly raster | instead of writ   | ting layer to disk |          |          |              | 244            |
| 67195_7826               | 687_M-34-77-A-d-                     | 4-2@1          | Output laye    | r F-project/C    | GIS/initial-flood | _zone_2.tif 🚳 🗌    |          |          |              |                |
| 67195_7826               | 088_M-34-77-A-a-<br>726_M-34-77-B-c- | 4-4@1<br>3-1@1 | Output form    | at GeoTIFF       |                   |                    | -        |          |              |                |
| 67195_7827<br>67195_7827 | 727_M-34-77-B-c-<br>728_M-34-77-B-c- | 3-2@1<br>3-3@1 | Spatial Ex     | tent             |                   |                    |          |          |              |                |
| 67195_7827<br>WSE_OK@    | 729_M-34-77-B-c-<br>01               | 3-4@1          | Use Sele       | cted Layer Ex    | tent              |                    | -        |          |              |                |
| WSE_interp<br>dtm_Strado | oolated@1<br>mka@1                   |                | X min 58       | 8655.84990       | X max             | 592377.58050 \$    |          |          |              |                |
| initial-flood_           | zone@1                               |                | Y min 2        | 19852.59020      | 🗘 Y max           | 221629.82040 \$    | j        |          |              |                |
|                          |                                      |                | Resolution     |                  |                   |                    |          |          |              |                |
|                          |                                      |                | Columns        | 7444 ;           | Ro                | ows 3555 \$        |          |          |              |                |
|                          |                                      |                | Output CRS     | EPSG:21          | 80 - ETRF2000     | 0-PL / CS92 👻      |          |          |              |                |
|                          |                                      |                | ✓ Add rest     | ult to project   |                   |                    |          |          | $\sim$       | [              |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |
| - Onerstern              |                                      |                |                |                  |                   |                    |          |          | $\backslash$ | Sec. 1         |
| ♥ Operators              |                                      |                |                |                  | 1                 |                    |          |          | $\sqrt{2}$   |                |
| +                        |                                      | (              | min            |                  | cos               | acos               |          | \\\      |              |                |
| <u> </u>                 |                                      | )              | max            | AND              | sin               | asın               |          |          |              |                |
| <                        |                                      | =              | abs            | OR               | tan               | atan               |          |          |              |                |
| <=                       | >=                                   | !=             |                | sqrt             | log10             | In                 |          | <u>۱</u> | Same In      |                |
| Raster Calcul            | ator Expression                      |                |                |                  |                   |                    |          |          | ~~~\/        |                |
| "WSE_0K@1"               | " >= "dtm_Str                        | adomka@1       | п              |                  |                   |                    |          |          |              |                |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |
|                          |                                      |                |                |                  |                   |                    |          |          |              | And A CONTRACT |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |
| Expression val           | lid                                  |                |                |                  |                   |                    | 10 miles |          |              |                |
|                          |                                      |                |                |                  |                   |                    |          |          |              |                |

The raster of flood zones can be generated in raster calculator with the expression comparing the raster of water surface elevation to the raster of DTM model

. XHelp

## Data Processing in GIS – generating flood zones

• Visegrad Fund



The vector layer can be created with the Raster to vector procedure

#### Data Processing in GIS



THANK YOU