Journal of Young Scientist, Volume IV, 2016
ISSN 2344 - 1283; ISSN CD-ROM 2344 - 1291; ISSN Online 2344 - 1305; ISSN-L 2344 – 1283

MAP TRANSFORMATION SCALE 1:25000 FROM ANALOG TO DIGITAL VECTOR WITH ArcGIS 10.3

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Abstract

Vectorization can involve a series of procedures to achieve an acceptable raster-to-vector conversion. It can be as simple as executing one command to generate the vector features. Depending on the state of the input raster data you are working with, the vectorization process varies. This section is intended to provide an overview of the automatic vectorization experience. For vectorization we chose a trapeze in eight colors,scale 1:25.000.The software we work with isArcGis 10.3.

***Key words**: vectorization,vector,raster,ArcGIS,maps*

INTRODUCTION

ArcGIS is a geographic information system (GIS) for working with maps and geographic information. It is used for: creating and using maps; compiling geographic data; analyzing mapped information; sharing and discovering geographic information; using maps and geographic information in a range of applications; and managing geographic information in a database. The system provides an infrastructure for making maps and geographic information available throughout an organization, across a community, and openly on the Web.

MATERIALS AND METHODS

ArcGIS Extension:

1. ArcGIS Spatial Analyst

ArcGIS Spatial Analyst provides a broad range of powerful spatial modeling and analysis tools. You can create, query, map, and analyze cell-based raster data; perform integrated raster/vector analysis; derive new information from existing data; query information across multiple data layers; and fully integrate cell-based raster data with traditional vector data sources. Integrated with the geoprocessing framework, ArcGIS Spatial Analyst offers easy access to numerous functions in ModelBuilder™, a graphic modeling tool.

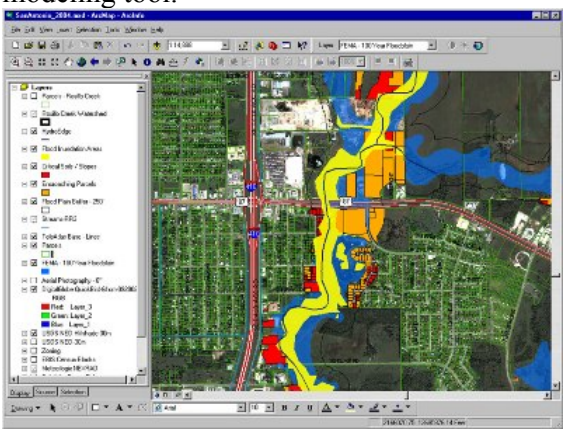

Figure 1. ArcGIS Spatial Analyst

2. ArcGIS 3D Analyst

ArcGIS 3D Analyst provides powerful and advanced visualization, analysis, and surface generation tools. Using ArcGIS 3D Analyst, you can seamlessly view extremely large sets of data in three dimensions from multiple viewpoints, query a surface, and create a realistic perspective image that drapes raster and vector data over a surface.

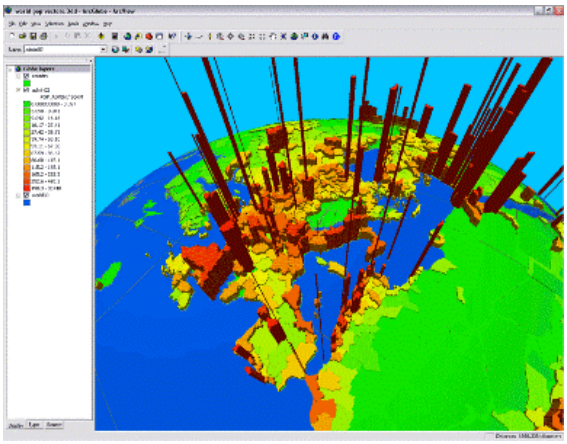

Figure 2. ArcGIS 3D Analyst

3. ArcGIS Geostatistical Analyst

ArcGIS Geostatistical Analyst provides a powerful suite of statistical models and tools for spatial data exploration and optimal surface generation. It allows you to create a statistically valid prediction surface, along with prediction uncertainties, from a limited number of data measurements. From determining whether an environmental safety threshold has been exceeded to locating mineral deposits, ArcGIS Geostatistical Analyst lets you model spatial data in a reliable and intelligent way. ArcGIS Geostatistical Analyst enables you to take advantage of these tools and techniques in an interactive graphical user interface (GUI) and as web services.

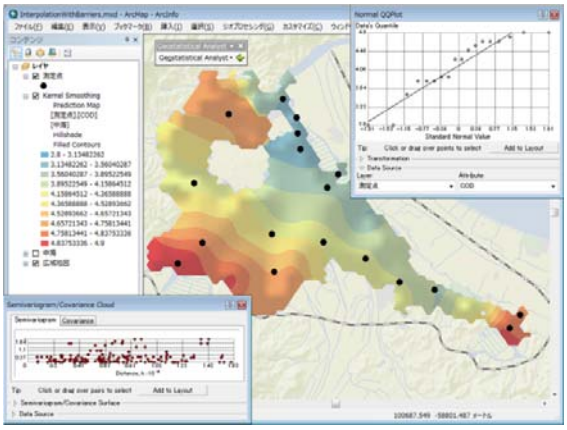

Figure 3. ArcGIS Geostatistical Analyst

4. ArcGIS Network Analyst

ArcGIS Network Analyst provides network-based spatial analysis, such as routing, fleet routing, travel directions, closest facility, service area, and location-allocation. Using a sophisticated network data model, users can easily build networks from their GIS data. ArcGIS Network Analyst enables users to dynamically model realistic network conditions, including one-way streets, turn restrictions, height restrictions, speed limits, and variable travel speeds based on traffic.

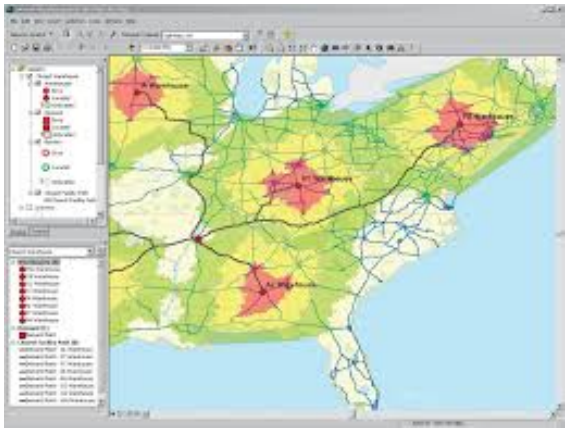

Figure 4. ArcGIS Network Analyst

5. ArcGIS Schematics

ArcGIS Schematics provides a powerful suite of tools to automate schematic representations of spatial or nonspatial data by taking advantage of core ArcGIS symbology and labeling. It allows you to schematically represent any kind of physical network including utilities (telecommunication, electric, gas) and transportation (railways, aviation, roads) and visualize virtually any logical network including social and economic networks. ArcGIS Schematics lets you rapidly visualize and check your data connectivity, quickly understand network architecture, and shorten the decision cycle by presenting focused views of the data.

6. ArcGIS Tracking Analyst

ArcGIS Tracking Analyst extends the time-aware capabilities of ArcGIS with advanced functions to let you view, analyze, and understand spatial patterns and trends in the context of time. By providing tools for time-dependent symbolization and time-based analysis, Tracking Analyst automates and enables the tracking and discovery of time-related trends and patterns. When combined with Tracking Server or GeoEvent Processor for Server, ArcGIS Tracking Analyst can be used to create a real-time GIS tracking system.

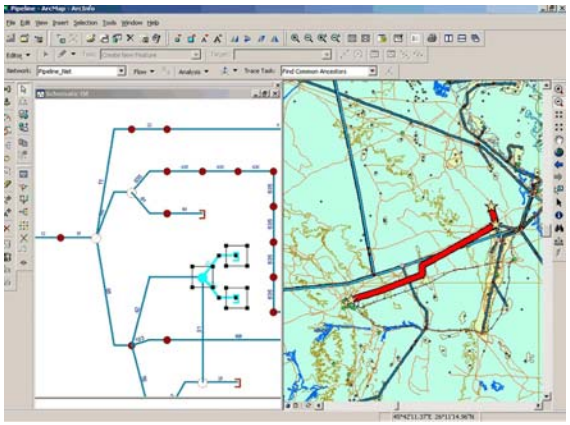

Figure 5. ArcGIS Schematics

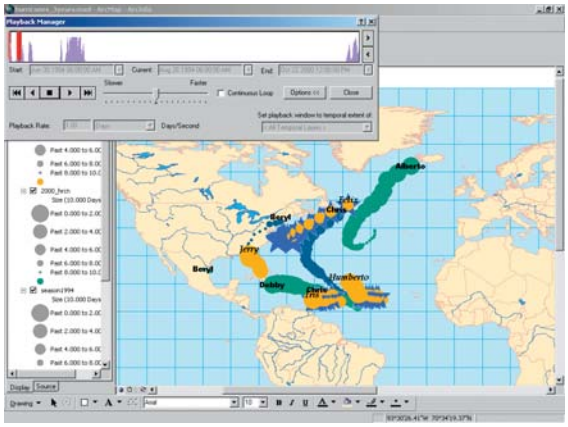

Figure 6. ArcGIS Tracking Analyst

7. ArcGIS Publisher

ArcGIS Publisher gives you the freedom to easily share and distribute your GIS maps, globes, and data with anyone. ArcGIS Publisher converts ArcGIS map and globe documents to Published Map Files (PMFs). PMFs are viewable through ArcGIS for Desktop products including ArcReader™, a free downloadable application from Esri. PMFs contain instructions about the location and symbology of data layers (rendering rules, scale dependencies, etc.) so you can quickly, easily, and securely share dynamic electronic maps locally, over networks, or via the Internet. ArcGIS Publisher also enables you to easily package PMFs together with their data, if desired. Developers can use the ArcGIS Publisher extension's ArcReaderControl to create and distribute royalty-free, customized ArcReader application 2D or 3D maps.

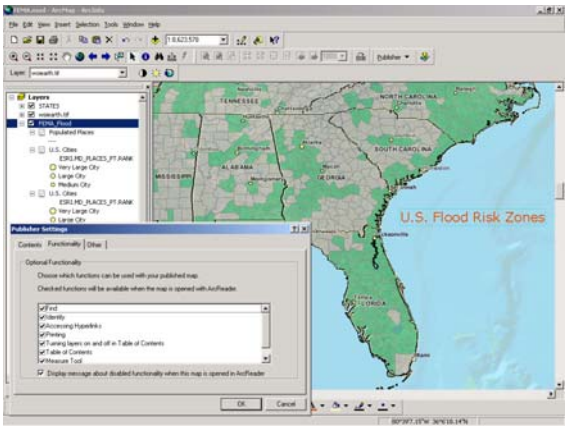

Figure 7. ArcGIS Publisher

8. ArcGIS Data Interoperability

ArcGIS Data Interoperability eliminates barriers to data sharing by providing state-of-the-art direct data access; data translation tools; and the ability to build complex spatial extraction, transformation, and loading (ETL) processes. Jointly developed by Esri and Safe Software— an Esri corporate alliance—this extension is built on Safe Software's industry-standard FME technology. ArcGIS Data Interoperability allows you to use any standard GIS data, regardless of format, within the ArcGIS for Desktop environment for mapping, visualization, and analysis. The Workbench application, included with the extension, enables you to build complex spatial ETL tools for data validation, migration, and distribution.

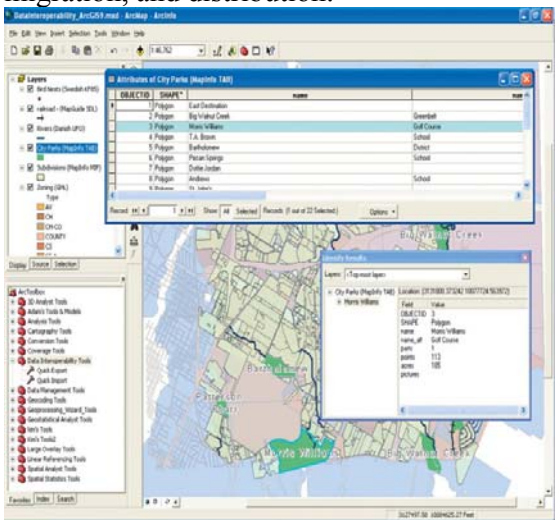

Figure 8. ArcGIS Data Interoperability

RESULTS AND DISCUSSIONS

For vectorization we chose a trapeze in eight colors scale 1: 25.000. We work with ArcGIS software is version 10.3 Desktop.

Create a theme in ArcGIS 10.3

- To create a theme launch project in ArcGIS with extension **.mxd** and then click with your mouse on catalog.
- Click with the mouse to create a new theme **Home - 9201\New\Shapefile**
- Add a theme name in the window **name** and then choose the appropriate type (**Feature Type)** of entity theme we want to represent in vector format.

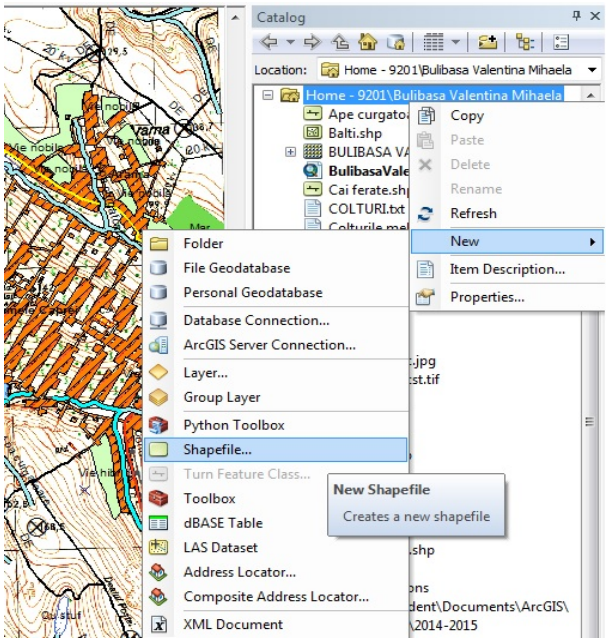

Figure 9. Creating a new shapefile

- Click the Edit button to select the projection system(**Projected Coordinate Systems/National Grids/Europe/Stereo 1970)** and then we press **Ok**.

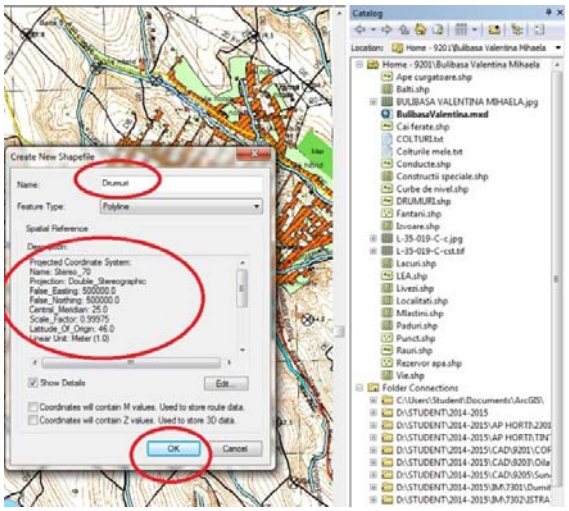

Figure 10. We choose coordinate system -Stereo 1970

- The new theme apper in the Table of contents/Layers.
- The new created theme is saved with the name we want and the extension .dbf , .prj , .shp , .shx

Editing a theme in ArcGIS 10.3

- Check the existence of the **Editor toolbar**on the menu toolbar. If this dosen't exist we click **Customize/Toolbars** and then we thick the **Editor toolbar**.
- Before starting the actual editing we must complete columns of table attributes. We click on the **Table Of Contents/Layers** on the shapefile.Right click on the Atribute table opens a submenu proper attributes table, there are already three default fields:**Fid, Shape, ID.**

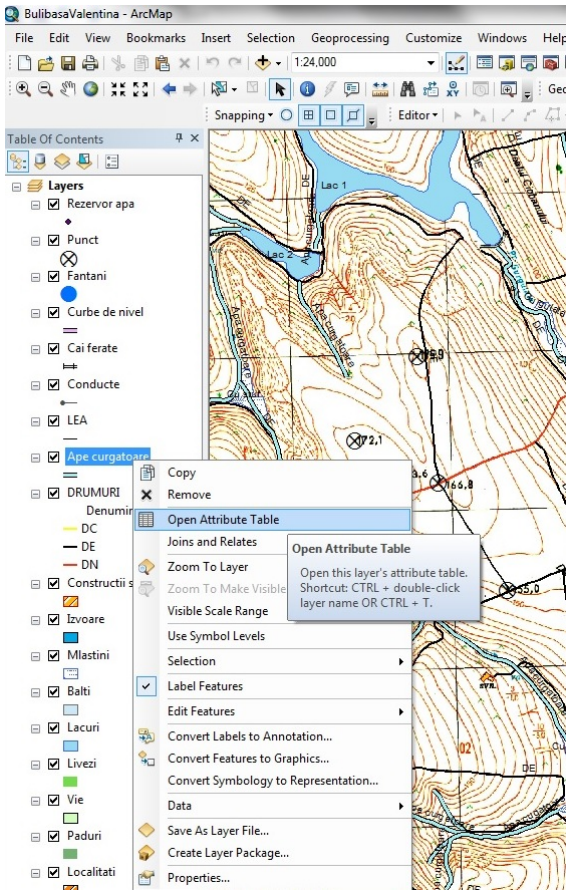

Figure 11. Open the attribute table of the theme

- If we want to add new fields click on the table options and then we click **<u>Table/Table Option/Add Field</u>.**

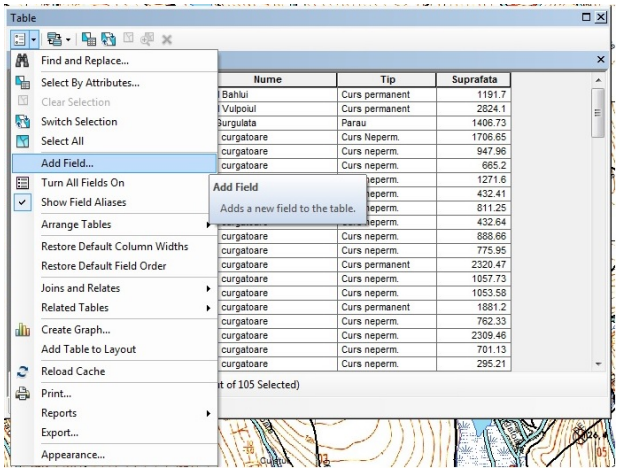

Figure 12. Add the necessary columns theme

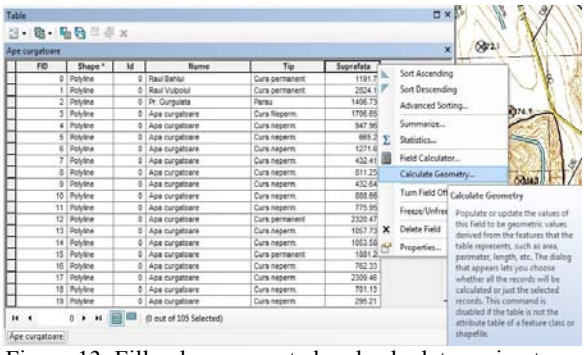

Figure 13. Fill columns created and calculate perimeter / area

- To start the actual editing we position ourselves with the mouse on the desired theme and we click on the **Start editing.**
- After vectorization open the attribute tableand fill in the fields created.
- After we finished vectorized we close the editing session: **Stop editing** and **Save edits.**

CONCLUSIONS

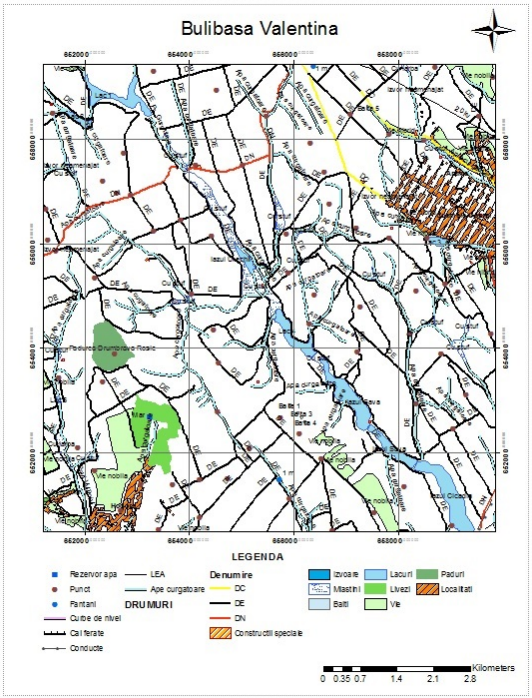

Figure 14. Vectorised map with Arcgis 10.3

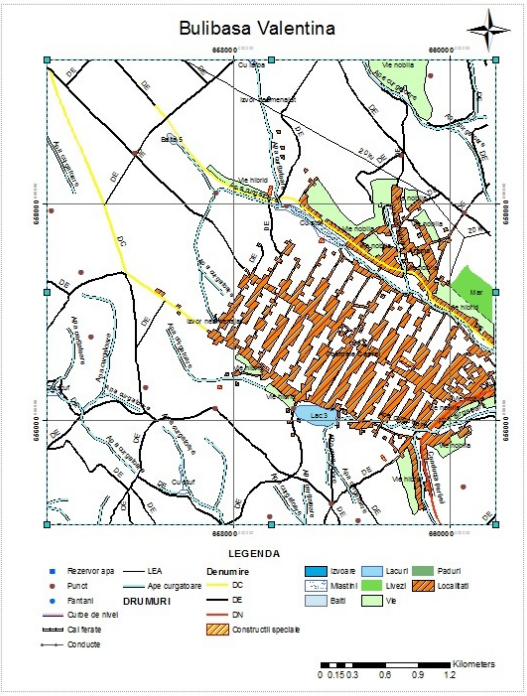

Figure 15. Detail vectorised map with Arcgis 10.3

ACKNOWLEDGEMENTS

The products were made in the research activities conducted within the project PN II - PT-PCCA-2013-2016 "Increasing competitiveness in wine products, applying the technology of bioconversion"

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