Report of the progress in updating

Final Version of April/2022

Deliverable Number 3.1.2.

Project Acronym	STREAM
Project ID Number	10249186
Project Title	Strategic Development of Flood Management
Priority Axis	2 – Safety and Resilience
Specific objective	2.2 - Increase the safety of the Programme area from natural and man-made disaster
Work Package Number	3
Work Package Title	Creating Flood Knowledge Documents
Activity Number	3.1.
Activity Title	Flood cadastre
Partner in Charge	University of Zadar
Partners involved	LP, PP1, PP2, PP3, PP5, PP6, PP7, PP8, PP9, PP10, PP11, PP12, PP13, PP14, PP15
Status	Final
Distribution	Public

Summary

Introduction

In the pursuit of developing a comprehensive pluvial flood risk management strategy, the creation of a flood cadastre emerges as a pivotal step. This entails establishing a database that meticulously documents the locations of historical flood incidents, encompassing the collection of all pertinent data necessary for accurate description and analysis of these events. By doing so, the resulting flood cadastre for six designated pilot areas will mark the inaugural detailed and official database of pluvial floods within the territory of the Republic of Croatia. The compilation of this database of historical flood locations involves the meticulous gathering of all relevant data, enabling a comprehensive understanding and analysis of flood occurrences across the six pilot sites. This endeavor plays a fundamental role in enhancing our knowledge and capacity to effectively respond to and manage pluvial flood risks.

1. Update of the flood cadastre for the areas of Biograd na Moru, Gospić, Metković, Poreč, Split and Zadar

One of the key steps in creating a pluvial flood risk management strategy is creating a flood cadastre. The preparation of the flood cadastre for the cities of Biograd na Moru, Gospić, Metković, Poreč, Split and Zadar can be divided into three phases in a methodological sense: (1) preparation of the database of historical floods, (2) standardization and harmonization of data, (3) preparation of cartographic representation. Each of the mentioned steps can be divided into sub-steps which, depending on the phase in which they take place, are divided into preparation, implementation and post-processing. Creation of the historical flood location database included the collection of all data that enable the description and analysis of flood events that occurred in the specified area. It is important to emphasize that there is no detailed official database of pluvial floods in Croatia. Hrvatske vode is the only institution that maintains an official flood database (Figure 2). However, records of river floods are significantly more detailed than records of pluvial floods. Also, for fluvial floods at the national level, there is a legal framework, i.e. regulations that define the way to create risk maps, collect data and generate prediction models. However, when it comes to pluvial floods, the legal framework is not defined, that is, the aforementioned regulations are not implemented. Accordingly, the created flood cadastre for six pilot areas will be the first detailed official database of pluvial floods in the territory of the Republic of Croatia. Creation of the historical flood location database included the collection of all data that enable the description and analysis of flood events that occurred at six pilot locations (Figures 3, 4, 5, 6, 7, 8). Data were collected from various sources. First, data was collected from the relevant institutions:

- Public fire brigades
- Civil protection
- City administrations
- Office for Spatial Planning
- Hrvatskih voda (Croatian waters)

The data was collected through organized meetings with the representatives of the mentioned institutions, where they gave us all the documents (analog and digital) at their disposal (Figure 1). Public fire brigades have provided us with databases on fire interventions related to floods. Other institutions do not maintain their own database on pluvial floods, but have drawn locations that are often blue on an analog orthophoto map. A survey was also conducted among the employees of the mentioned institutions. All collected data were subsequently processed, i.e. digitization, standardization and harmonization were carried out. Locations are associated with descriptive data (attributes). The created database has been updated with the data collected:

- Field research

- By vectorization from the Croatian basic map (HOK)
- By conducting survey research among the local population
- By talking to the local population
- By searching Internet sources (social networks, websites, portals, etc.)
- By searching for newspaper articles

Field research included going to frequently flooded locations accompanied by firefighters and collecting coordinates using GPS. Vectorization from HOK on a scale of 1:5000 included mapping of all water surfaces drawn on the map. Puddles, mud and surfaces were mapped to the greatest extent, along with smaller surface streams that occasionally flood. Also, a survey was conducted among the local population in the cities of Poreč, Metković, Biograd and Gospić, and in each of them 0.5% of the population was included. According to the type, the research sample was conceived as stratified, and according to the selection, as random. In addition to all the above methods of data collection, the locations of historical floods were identified with the help of newspaper articles and internet sources. Numerous photos and videos of flooded areas were collected.

Figure 1. Meetings with Public fire brigades, civil protection, city administrations, offices fro spatial planning.

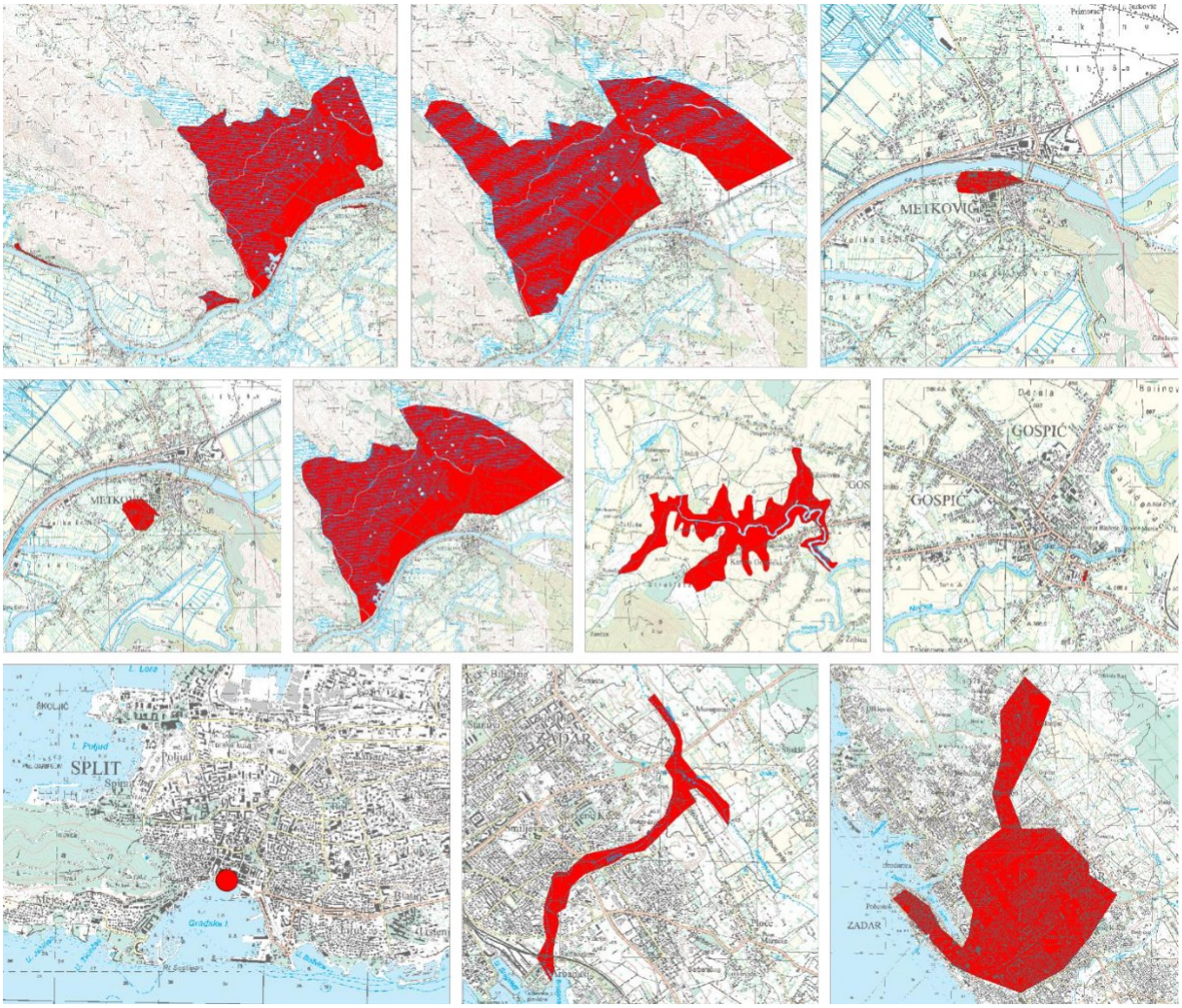

Figure 2. Register of flood events of Hrvatske vode - examples from the pilot area (Source: Hrvatske vode)

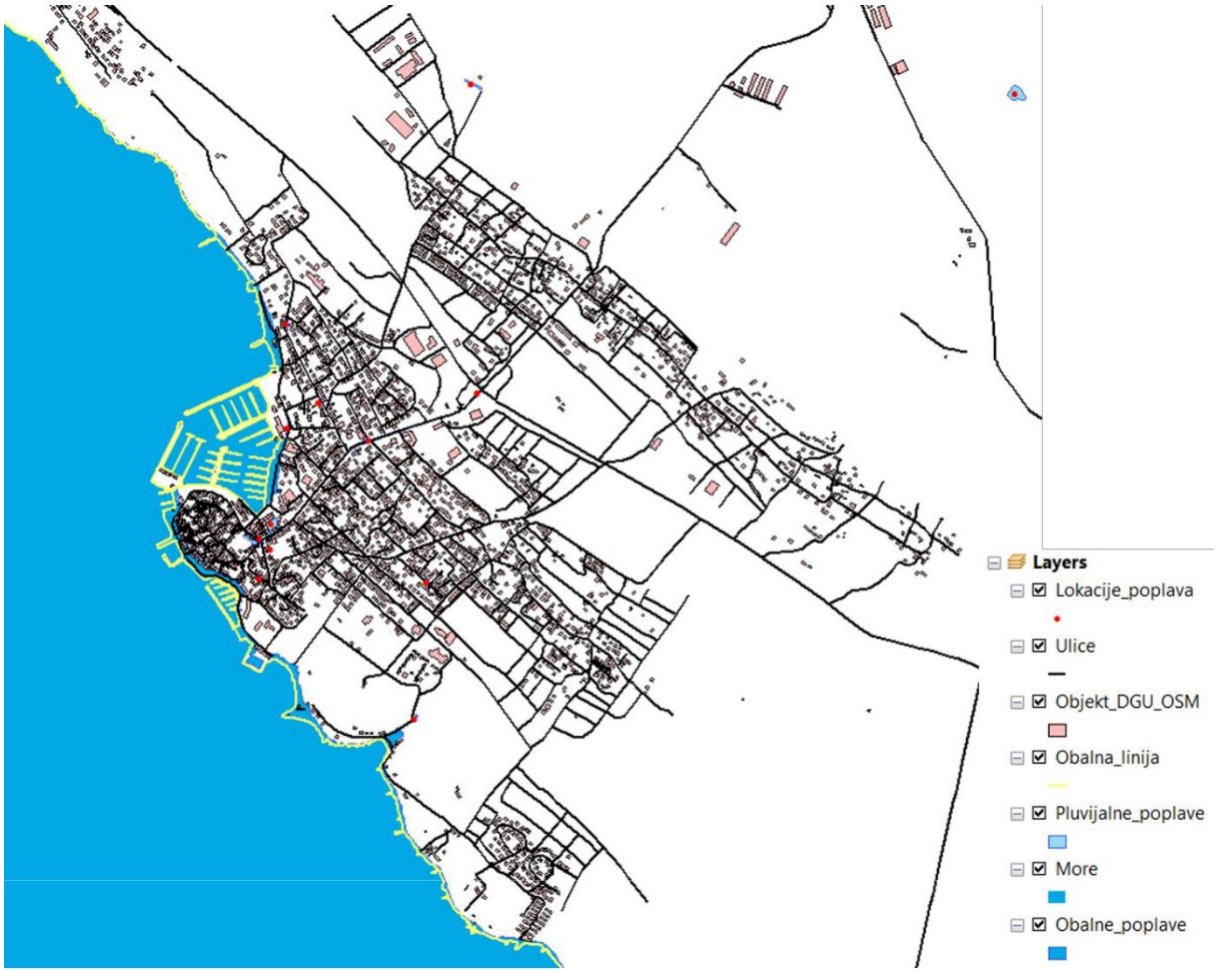

Figure 3. Collected and generated layers for updating the flood cadastre in the pilot area of Biograd na Moru

Figure 4. Collected and generated layers for updating the flood cadastre in the Gospić pilot area

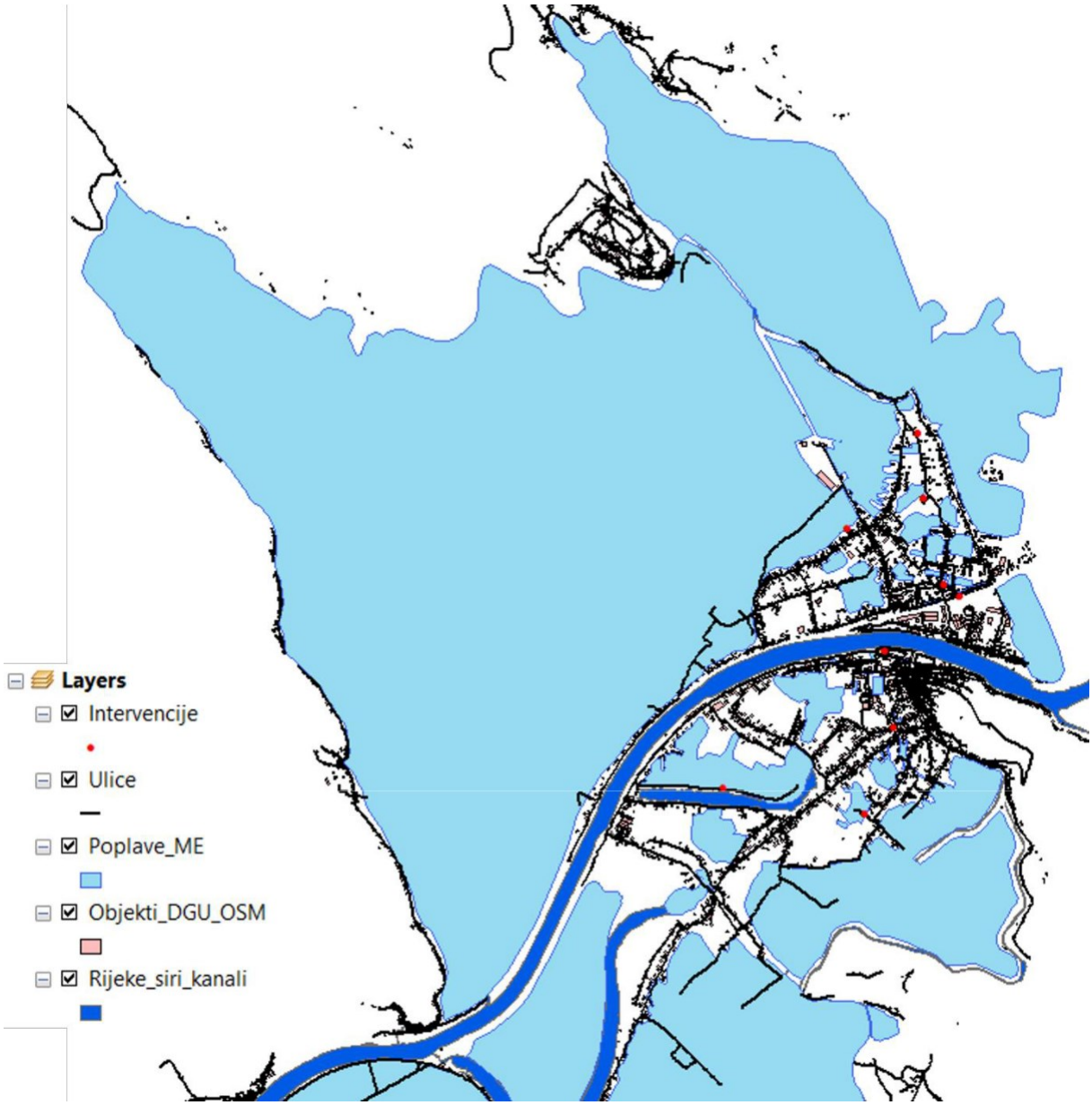

Figure 5. Collected and generated layers for updating the flood cadastre in the Metković pilot area

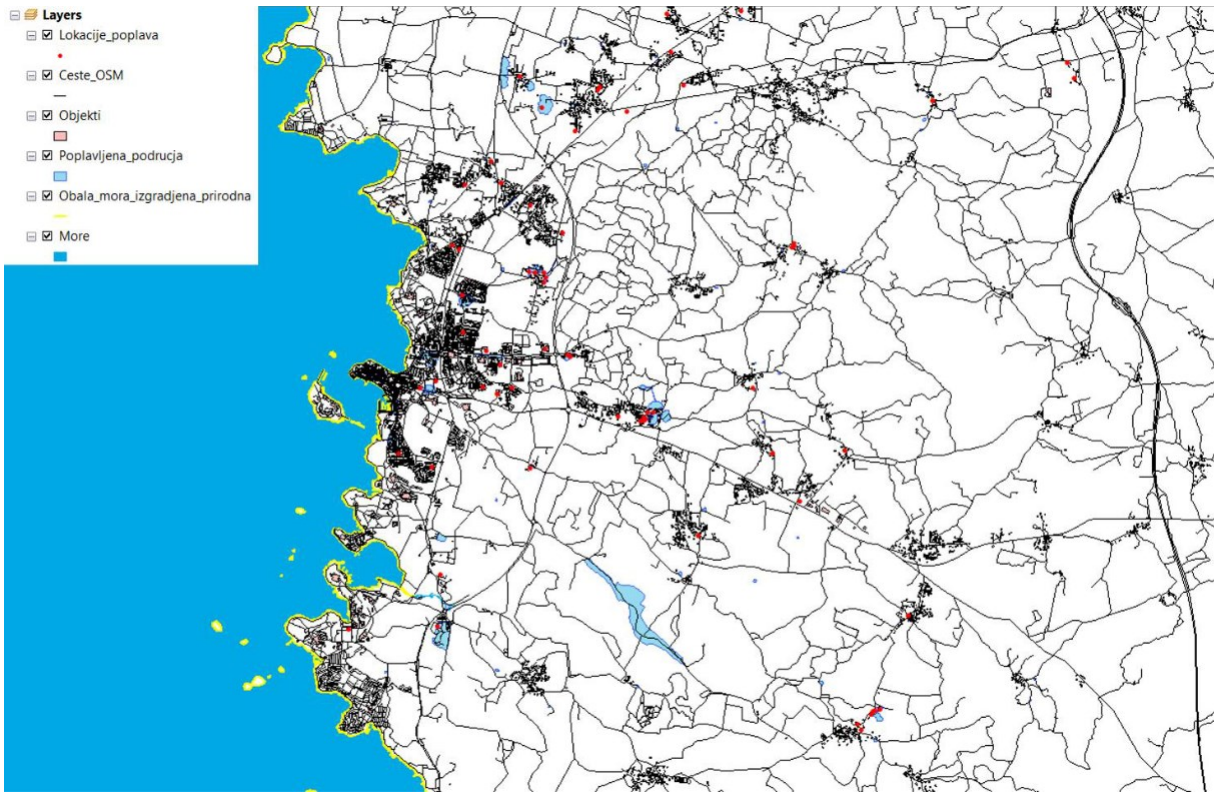

Figure 6. Collected and generated layers for updating the flood cadastre in the pilot area of Poreč

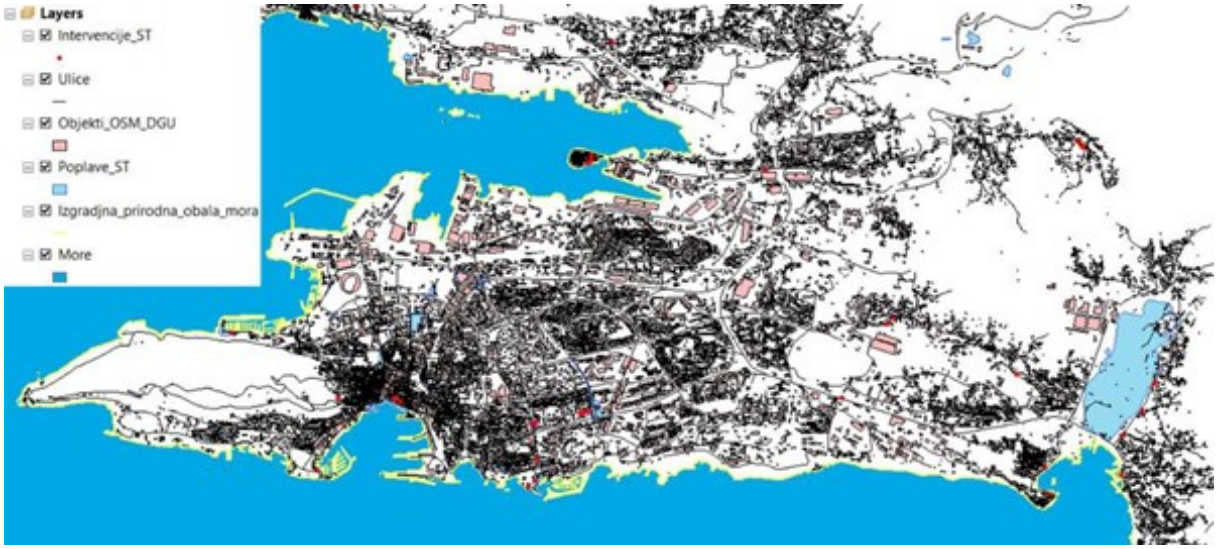

Figure 7. Collected and generated layers for updating the flood cadastre in the pilot area of Split

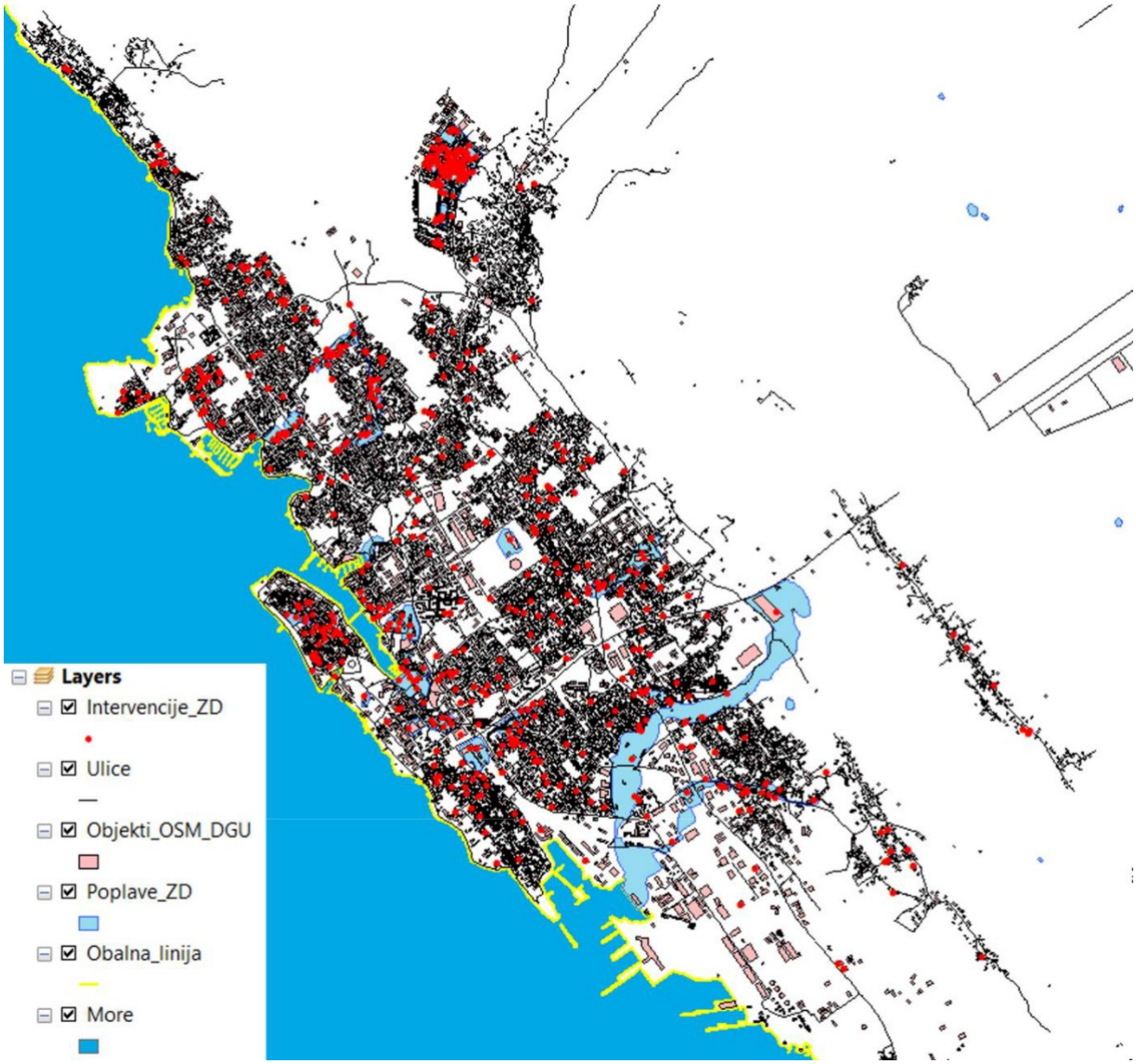

Figure 8. Collected and generated layers for updating the flood cadastre in the Zadar pilot area

Conclusion

The creation of a flood cadastre represents a pivotal milestone in the development of a comprehensive pluvial flood risk management strategy. By meticulously documenting the locations of historical flood incidents and collecting all pertinent data, the resulting flood cadastre for the six pilot areas in the Republic of Croatia becomes the first detailed and official database of its kind. The compilation of this database involves the meticulous gathering of relevant data, enabling a comprehensive understanding and analysis of flood occurrences across the designated pilot sites. This endeavor significantly contributes to our knowledge base, equipping stakeholders with vital information to make informed decisions and implement appropriate measures to mitigate pluvial flood risks.