PARTNERSHIP
WITHOUT BORDERS

CODE VDIC (HUSKROUA/1702/8.1/0035)

Output 3.1.
Common Disaster Prevention Volunteer Strategy
2021

Content

COMMON DISASTER PREVENTION VOLUNTEER STRATEGY

In the area of the CODE VDIC project, a program located in the North-Eastern Carpathians, the issue of security has become more important due to several changes in the environment, society, land-use and climate. Increased threats and challenges can only be addressed by communities with the involvement of volunteers. A more complex hazardous event with increasing damages, in terms of casualties and losses, can only be addressed in the future by developing new capacities and integrated strategic approaches. This trend makes it essential to involve voluntary intervention organizations in the emergency management. Cross-border hazards and risks, identified and analyzed in the program area, revealed an effective and flexible response can only be built on an integrated voluntary intervention strategy among the participating entities in the Project. Effective strategy for prevention, intervention and identification of the vulnerable areas should prioritize the activities in disaster risk management. The development of the strategy is based on the hazard identification, exposure and vulnerability assessment and risk analysis for the Project Partner's areas of responsibilities and includes the risk maps of the potential scenarios. Also, the self-assessment of the intervention capabilities, responsibilities in case of disasters, past experiences and lessons learned from previous activities were considered in the design of the Common Disaster Prevention Volunteer Strategy.

In the last decades we have faced an increasing number and severity of disasters, both natural and man-made, with cross-border effects. In this context local, national, regional, and international cooperation and coordination are more important than ever before. An effective cooperation and coordination of all the response capacities are fundamental for a successful Emergency management at all levels.

By working together, a proactive plan can be formulated for future disaster management activities among the risk areas, regions, countries. Moreover, sharing of experiences, good practices, and exchange of opinions among experts and practitioners from different countries have the potential to result in a model, that may be used for disaster prevention, response, and mitigation by all stakeholders at national and regional level.

Volunteer organizations, professional response capacities, local administration should seek to develop working relationships based on trust and the recognition of different characteristics, responsibilities, capacities, goals and needs. Regular contact among the different groups before, during, and after the disasters would greatly enhance this potential. Volunteer organizations should take advantage of opportunities to work together, to provide *relevant training for the emergency response personnel, to enhance disaster mitigation/relief efforts and the timelines, quality and accuracy of prevention, preparedness, and management.*

Objectives

The Volunteer capacities are task and needs driven pro-defined technical capabilities and specialized personnel from the community's set-up on a voluntary basis. As these capacities are expected to act in disaster affected areas from different partner countries, the further activities need to create the premises to fulfil the minimum standards for working in difficult conditions. The minimum standards are referring to: Interoperability, Coordination, Self-sufficiency, Standard Operating Procedures, Communication, Better prepare capacities, for international deployments, Provide a learning and networking opportunity for al' participants. To ensure effective coordination on the ground, education, training, and exercises are interlinked and inextricable elements of preparing the voluntary response capacities to maximize assistance to the affected community.

The main objective is to make disaster response capacities more pro-planned, predictable, effective, and faster in interventions in the cross-border area.

- Strengthen emergency preparedness and response, by creating new volunteer capacity in a form of a cross-border network.
- Share common guidelines and tools to face prevention and management challenges of natural and man-made disasters.
- To develop easily transferable capacity building methodologies and to set-up a transnational network to achieve the basis for the trans-border protocol of civil disaster management volunteer organizations to prevent, manage and monitor calamities.
- To create good practices and common procedures to be shared by all potential actors involved in the prevention of risks and management of disasters at macro regional level and provide possibilities to cooperate also in case of unforeseen events that require common cross-border regional preparedness and interventions.

The Specific objectives are:

- To develop the - Carpathian Region Disaster Response and Mitigation Network
- To strengthen cross- border capacities
- To raise awareness of the inhabitants towards the importance of preparedness and personal responsibility.

Strategic activities include:

1. Explore possible national, regional, and international cooperation mechanisms for sharing information, exchanging experience and knowledge in order to replicate best practices required for the effective. preparedness, prevention, and response activities in case of disasters and for identification of the vulnerable areas.

2. The volunteer capacities from partner countries and links should be further developed and strengthened by reinforcing correlation between preparedness and response, by seeking support for the work done in communities to reduce risk and prepare for disasters and in generating learning from that work.

3. Strong partnerships, cooperation, and coordination with the national and international key stakeholders within the humanitarian community (UN agencies, other NGOs, academic, corporate sectors etc.) should be strengthened to improve the support to communities.

4. Wide range of contacts among the stakeholders is needed including state agencies and institutions and local authorities for an effective cooperation and coordination.

5. A great importance will be given to lessons learnt and experience sharing. The use of different sources of information, best practices, guidelines, newsletters, and other resource materials should be compiled, analyzed, synthesized and shared among the partners stakeholders. Sharing of experiences, exchanging opinions and learning lessons from each other help to minimize losses and damages.

6. Public information, education and disaster awareness are extremely important. Therefore, it is highly recommended to raise disaster awareness and education on the behavior and impact of disasters among the population in the risk area. Emphasis should be given to disaster risk mitigation. More importantly, disaster resistance resilience communities are to be developed.

7. Each Partner will further enhance the visibility of the organization in the community and their importance in case of emergency and will continue to work with other communities and ensure support for other voluntary organizations development.

8. Adequate funds and resources should be arranged to enhance national and international capacity in emergency preparedness and disaster and response. Fundraising campaigns and other possibilities to increase the founds are necessary to be identified.

9. Capacity building of the organizations and voluntary teams is necessary thorough trainings, exercises, workshops, and exposure visits.

10. Hazard mapping of vulnerable areas is of major importance. Also, high risk areas should be identified and integrate with population distribution infrastructure and building stock databases by preparing new maps of such areas.

11. Long term and strong partnership with local administration, institutions and professional emergency response capacities (civil protection, firefighters, etc.) must be ensured in order to develop realistic cooperation strategies for involvement of the voluntary organizations in the disaster response actions.

12. To ease the cooperation and collaboration between all the partners' organizations a standardization of preparedness, standard operation procedures and other documents, is highly recommended.

13. Awareness of population and establishment of early warning systems for natural and human induced multi-hazards is highly desirable.

14. It is to be realized that preparedness, response, rehabilitation, and development are all part of a same process. Therefore, the holistic vision of this process must be reflected in the disaster risk management policy framework that should encompass existing policies.

15. While developing and implementing a development plan/project, its sustainability and proximity to disaster should be taken into account.

16. All the disaster management activities should meet the noble interest and good of the affected population by measuring the respect of agreed policies and standards such as Sphere and Code of Conduct.

17. Trainings, exercises and simulations should be carried out to sharpen the skills of the disaster responders.

18. Public participation and preparedness should be enhanced. There must be respect for, and inclusion, and incorporation of, local and indigenous knowledge.

19. An international perspective must be taken on essential knowledge and skills for education and training in emergency response.

As disaster response is a multi-sectoral and complex activity, it needs cooperation and coordination among stakeholders. This means a sharing of experiences, exchanging opinions and learning lessons help to minimize losses and damages.

Disaster risk analysis should be undertaken for all new development plan, program, and activities. Disaster risk reduction should be included in strategy papers and development plans.

It is of interest to note that donors, governments, and aid agencies prefer to invest in response rather than cost-effective disaster prevention and preparedness. Building relationships requires time and a wide range of contacts.

Cooperation and coordination mechanisms in disaster management should be established at all levels of response.

Risk mapping

Risk mapping is the process of establishing the spatial and temporal extent of risk (Probability & consequences), Risk mapping requires combining maps of hazards, exposure, and vulnerability, the results of risk mapping are usually presented in the form of maps that show the magnitude and nature of the risk.

In this project, the risk map is the documentation that points to the potentially affected areas in various scenarios, based on the GIS system, using previous multi-risk and multi-hazard analyses, it was a basic element for the elaboration and development of an effective strategy for prevention, intervention, and for the identification of vulnerable areas.

The developed network will use the risk maps to prioritize the preparedness, prevention and response activities.

All partners have provided inputs on their former activities concerning the area of disaster response and prevention, describing their most relevant volunteer intervention experiences of the past few years

Country reports, country hazard and risk maps were used to identify all possible natural and man-made hazards in the project area. A multi-hazard and multi-risk analysis was conducted for each countries project area.

We mention the fact that the maps presented are of general interest, for information purposes; for investment promotion activities, design, etc. in-depth studies are needed at the local level. We also draw attention to the fact that these maps were prepared only for certain areas / sectors, areas with significant potential risk of floods and forest fires located in the area of competence of the partner structures. The non-inclusion of areas in these maps does not mean that the area cannot be exposed to the risk of these disasters.

By drawing up risk maps, we wanted them to respond to the information and awareness needs of the population in the area (without taking over the responsibilities of the authorities) and to provide the intervention structures within the project with a necessary database in cross-border cooperation.

When developing the risk maps, we took into account the two main risks in the assessed areas, floods and forest fires. The maps include the areas of responsibility of the structures involved in the project. The main elements that formed the basis of the elaboration of the risk maps were the hazard maps on which the main vulnerable territorial and environmental elements within the locality (area of responsibility) were highlighted. Also, in order to identify / complete the data necessary for the elaboration of the Risk Maps, a questionnaire was prepared and sent to the partners, which included specific questions regarding the necessary data.

Questionnaire

- What is the organization interest area: names of the localities;
- If during the previous period there were disasters in the interest area: where and what type of disaster (we refer only to floods, forest fires / vegetation);
- What are the main areas, within the locality, at risk: areas inhabited within or near the areas at risk: areas inhabited within or near the areas at risk.
- What are the main vulnerable territorial and environmental elements within the locality (area of interest): the partner will attach a map with the elements that can be identified. We recommend you to use Google Earth, where all vulnerable elements from the list below should be positioned on the map using PIN marks, named with the type of vulnerable element and saved in KMZ file. For details regarding the maps, please contact us.
    - educational units: schools, high schools, universities, kindergartens, etc;
    - economic and production activities: industrial plants, factories, food warehouses;
    - transport units: airports, railway stations, bus stations, etc;
    - critical centers: electrical transformers, hazardous material deposits
    - water treatments plants;
    - accommodation units: hotels, motels;
    - care units: hospitals, orphanages, asylums, sanatoriums, etc.;
    - houses of worship and culture units: churches, culture houses, tourist attractions, etc.;
    - crowds: theaters, cinemas, supermarkets, stadiums;
    - hydro technical structures: dams, dykes, tailings ponds;

- zootehnical units;
- protected natural areas.

- Total number of the population within the locality and if possible, broken down by neighborhoods, areas likely to be affected;
- Vulnerability indicators (qualitative responses where appropriate - very good, good, suitable, poor, very poor):
  - The degree/level of awareness of the population regarding the existing risks;
  - Arrangement of buildings within a dangerous area;
  - Construction materials used to build the infrastructure;
  - Living standard, occupancy rate, average income;
  - The health level of the population;
  - The degree of preparedness of the population in case of emergencies;
  - The existence of special groups of people at risk;
  - Property insurance;
  - The existence of warning systems;
  - The existence of utility networks.

A map with identifiable elements will be attached to the questionnaire by the partner.

Flood risk assessment methodology

In order to assess the flood risk in this project, the Swiss methodology has been chosen. This methodology is based on the assessments developed on the global scale by Loat and Petrascheck, 1997, in the Office Fédéral des Eaux et de la Geology (Stănescu and Drobot, 2002). The qualitative approach of flood risk assessment takes into account, on the one hand, the level of danger of the flood and, on the other hand, the level of potential damage. This methodology has been simplified in some context and adapted to the available data provided by the project partners.

Flood danger level. In order to assess the flood danger level, according to the Swiss methodology, the first step requires the estimation of flood intensity.

Intensity, which can be rated as low (score 1), average (score 2) or high (score 3), is a function of water depth. The values of water depth is established according to the level of damages induced by a flood event on a person staying inside (or outside) a building, thus not being influenced by exceedance probability of the event (Table 1).

Table 1. Flood intensity (*adapted following Rudolf, 2006*)

Intensity	Depth of flow (m)
Low	Smaller than 0.5 - inhabitants are not endangered ; limited damages of buildings are possible
Medium	Between 0.5-1.5 - persons outside of buildings are endangered ; no seriously destructions, damages of buildings are possible
High	Greather than 1.5 - persons inside and outside of buildings are endangered ; seriously destructions of buildings are possible

The flood danger is further calculated by combining the intensity of the flood with the return period of the event (Figure 1).

Flood intensity	High	2	3	3
	Medium	1	2	3
	Low	1	1	2
		Low	Medium	High
		Return period		

Flood danger levels

Low	Medium	High

Figure 1. Matrix for flood's danger levels

(*adapted following Loat and Petrascheck, 1997*)

The return period is divided in four main classes, as follows:

- high, for a flood with a return period bellow 10 years (score 3);

- medium, with the return period between 10 and 100 years (score 2);

- low, with the return period between 100 and 500 years (score 1);

Vulnerability estimate. Difficulties encountered in designing of a clear methodology to estimate the level of damages led the experts from CADANAV (CAdastre des DAngers NAturels du canton de Vaud - Suisse) to work out a qualitative-based assessment method, i.e., a simplified assessment of the vulnerability, that allows the combination of the results with those obtained through the flood danger assessment. The following steps are included in this method (*EPFL, 2002, Stănescu and Drobot*, *2002*):

- analysis of exposed goods and assets, which includes mapping and framing of the exposed objectives in 3 categories (A-C), with the importance increasing from A class (for example: steppe, unexploited forest, mountain tracks etc), to C class (for example : buildings of special importance for emergency situations);

- designed of a potential damage level for the above defined categories of exposed objectives (Table 2);

Table. 2. Level of potential damages (*adapted following Ronte, 2003)*

Potential damages levels	Exposed objective classes
Low	A
Medium	B
High	C

Flood risk assessment. The qualitative approach of flood risk assessment involves the combination of the level of danger of the flood and the level of potential damages. The combination of these parameters leads to the establishment of 3 levels of risk (Figure 2).

Flood danger levels	High	2	3	3
	Medium	1	2	3
	Low	1	1	2
		Low	Medium	High
		Level of potential damages		

Low risk | Medium risk | High risk

Figure 2. Qualitative risk assessment matrix (*adapted following Widmer, B, 2002*)

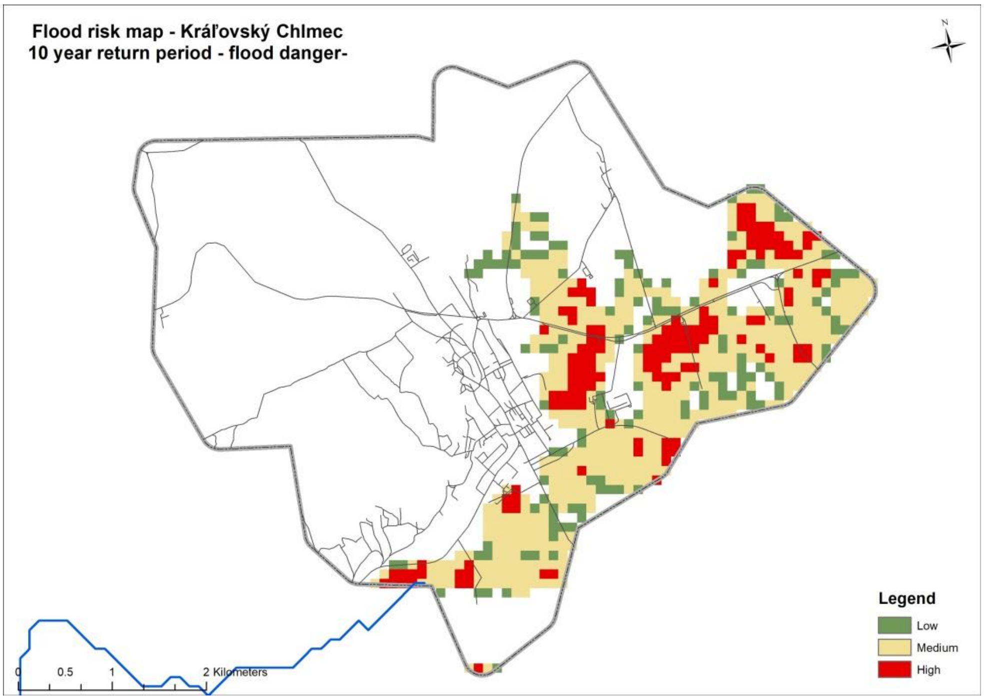

Figure 3. Example of flood danger – 10 year return period (Slovakia - Král’ovský Chlmec)

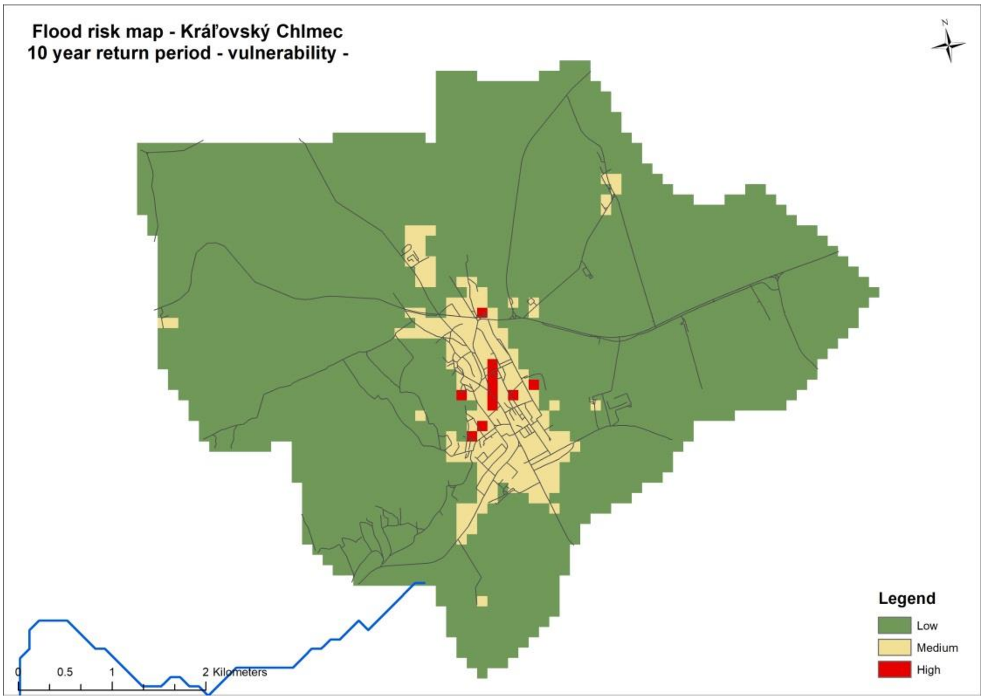

Figure 4. Example of flood vulnerability – 10 year return period (Slovakia – Král’ovský Chlmec)

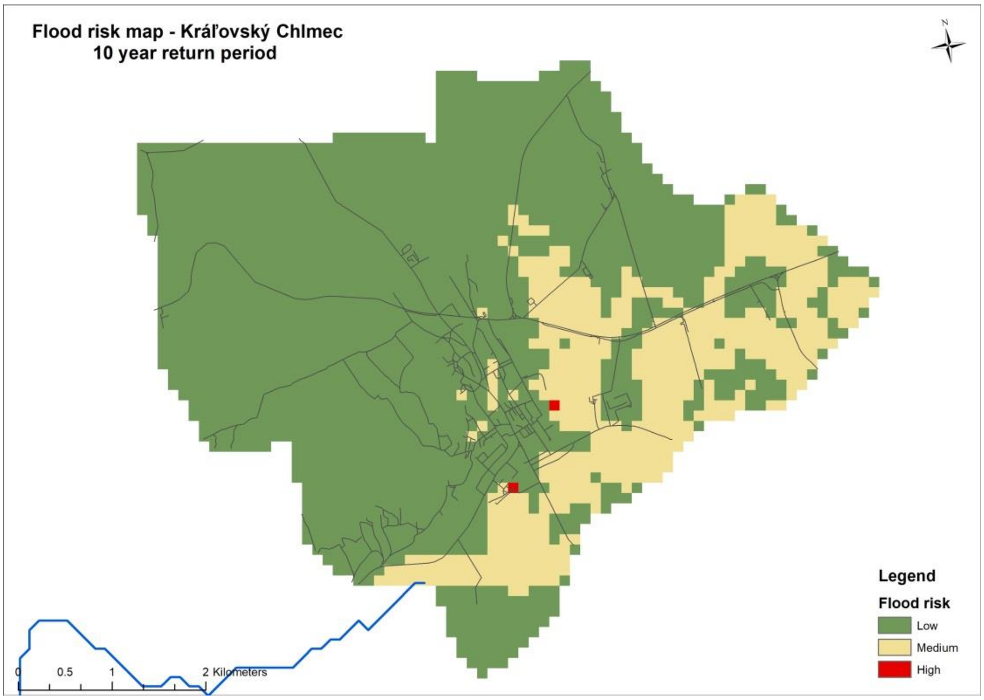

Figure 5. Exemple of flood risk map – 10 year return period (Slovakia - Král'ovský Chlmec)

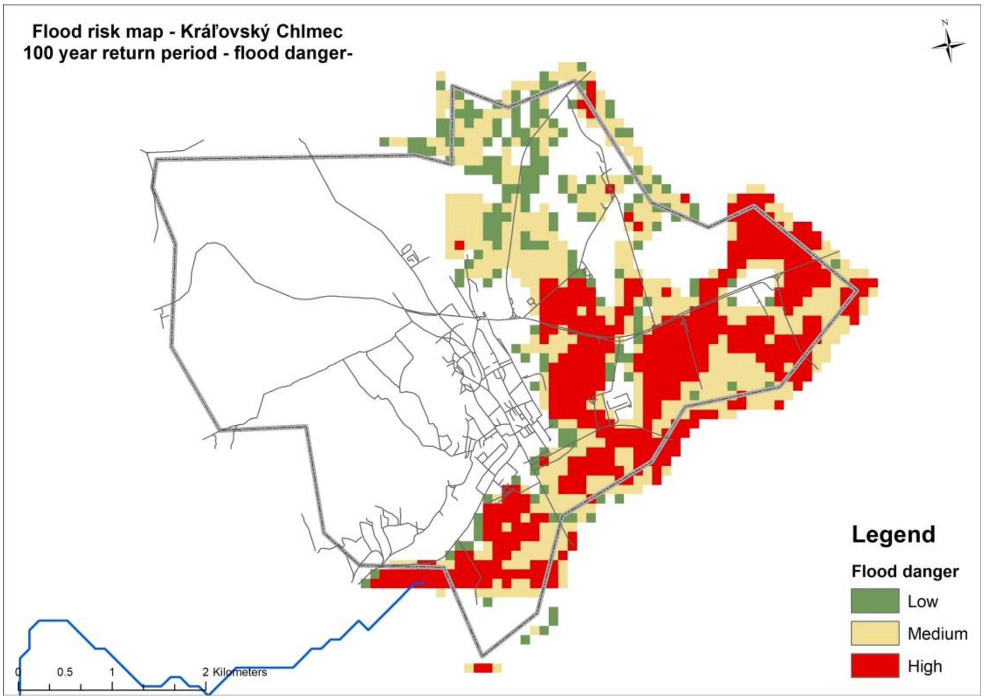

Figure 6. Example of flood danger - 100 year return period (Slovakia - Král'ovský Chlmec)

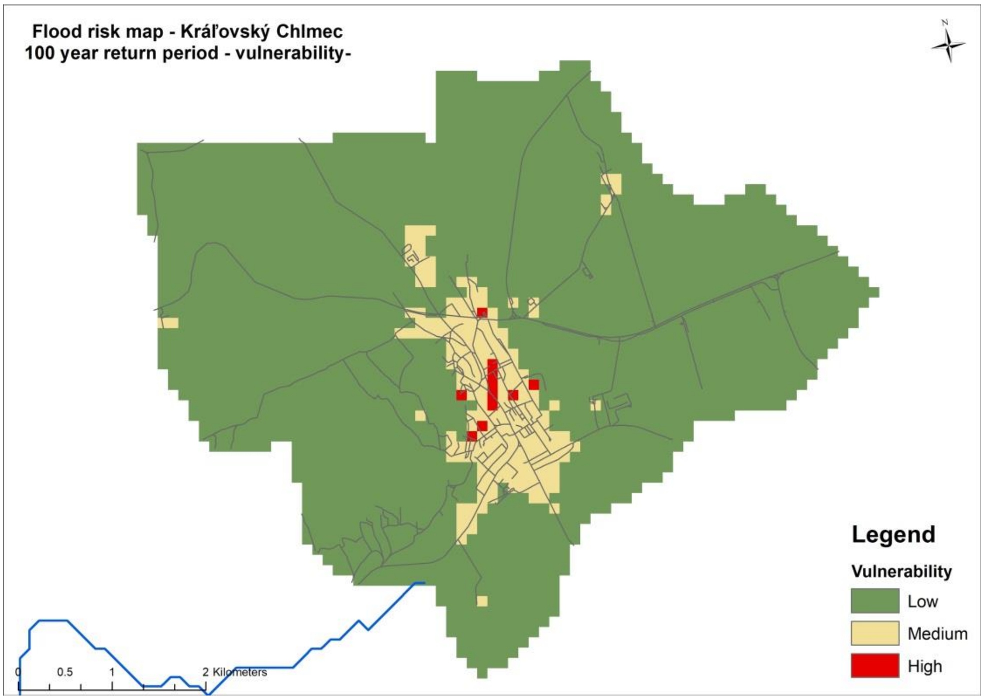

Figure 7. Example of flood vulnerability - 100 year return period (Slovakia - Král'ovský Chlmec)

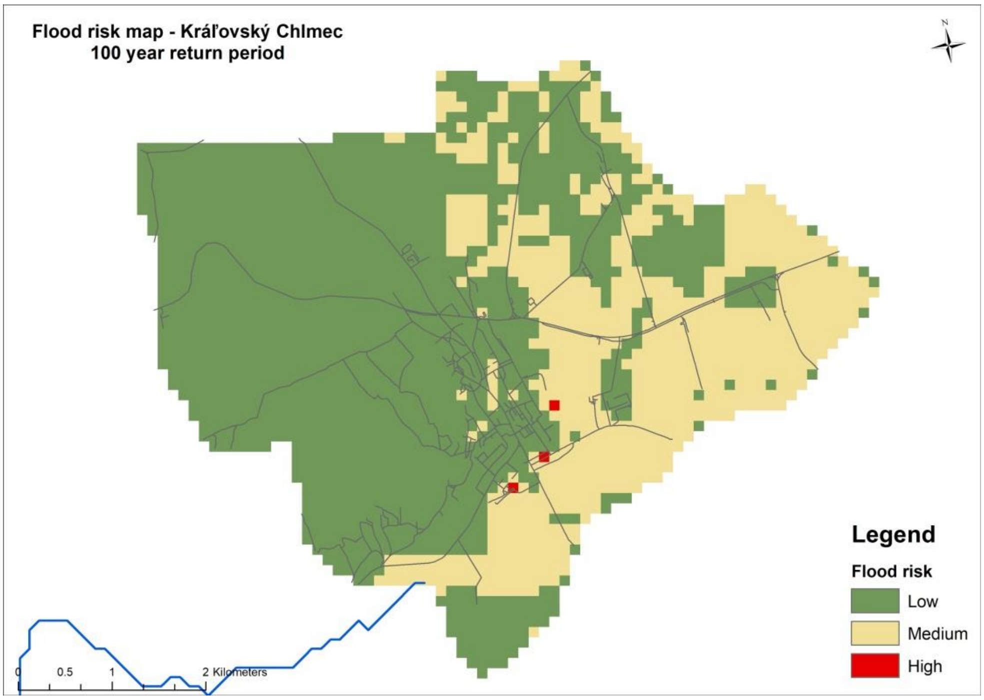

Figure 8. Exemple of flood risk map - 100 year return period (Slovakia - Král'ovský Chlmec)

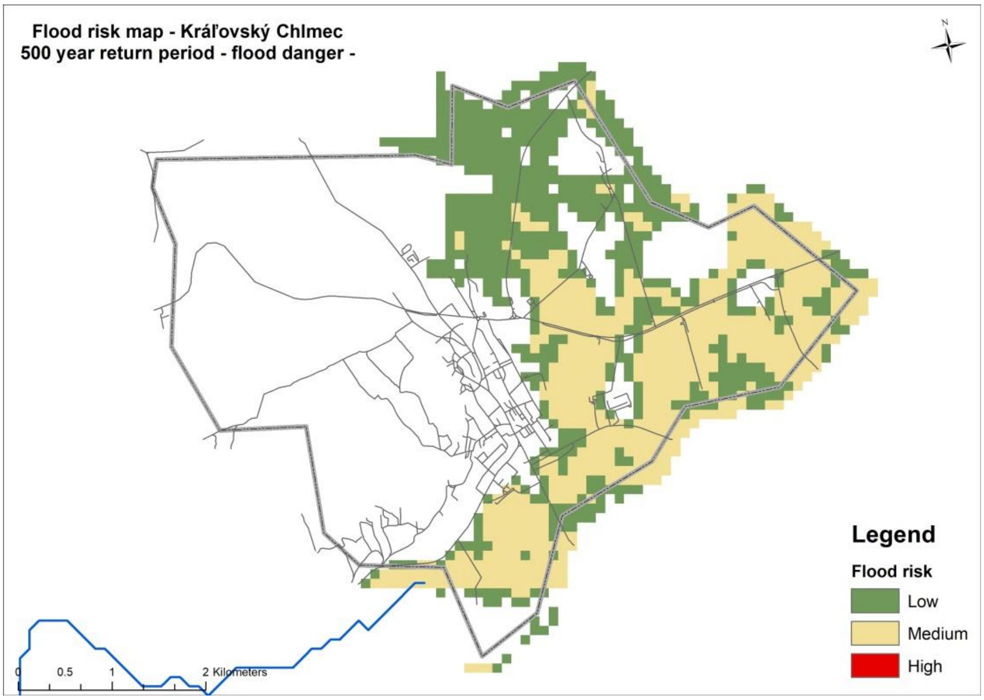

Figure 9. Example of flood danger - 500 year return period (Slovakia - Král'ovský Chlmec)

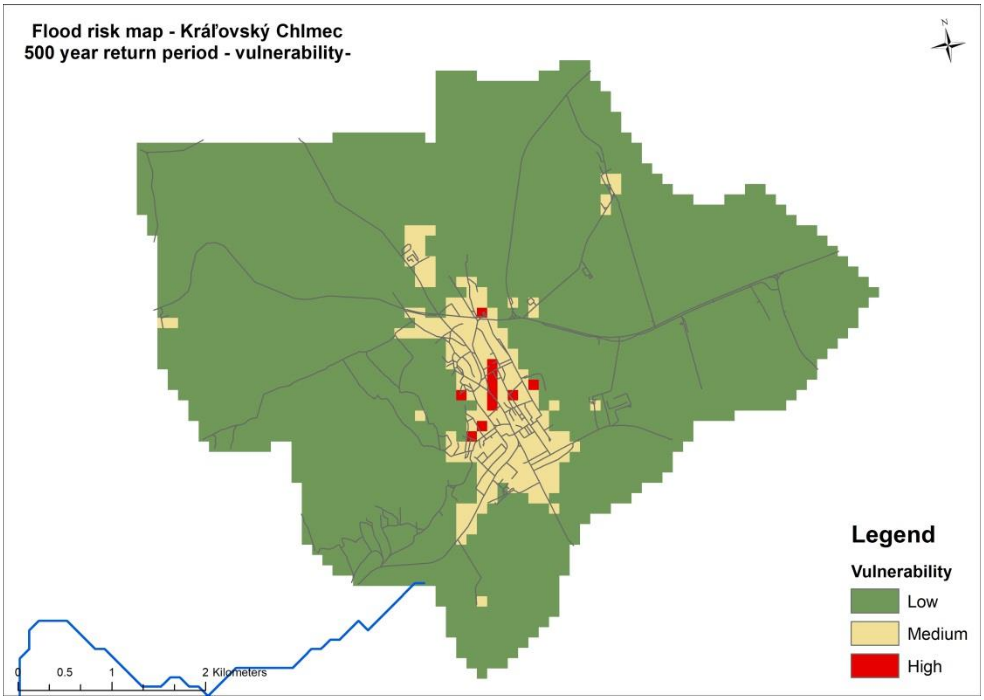

Figure 10. Example of flood vulnerability - 500 year return period (Slovakia - Král'ovský Chlmec)

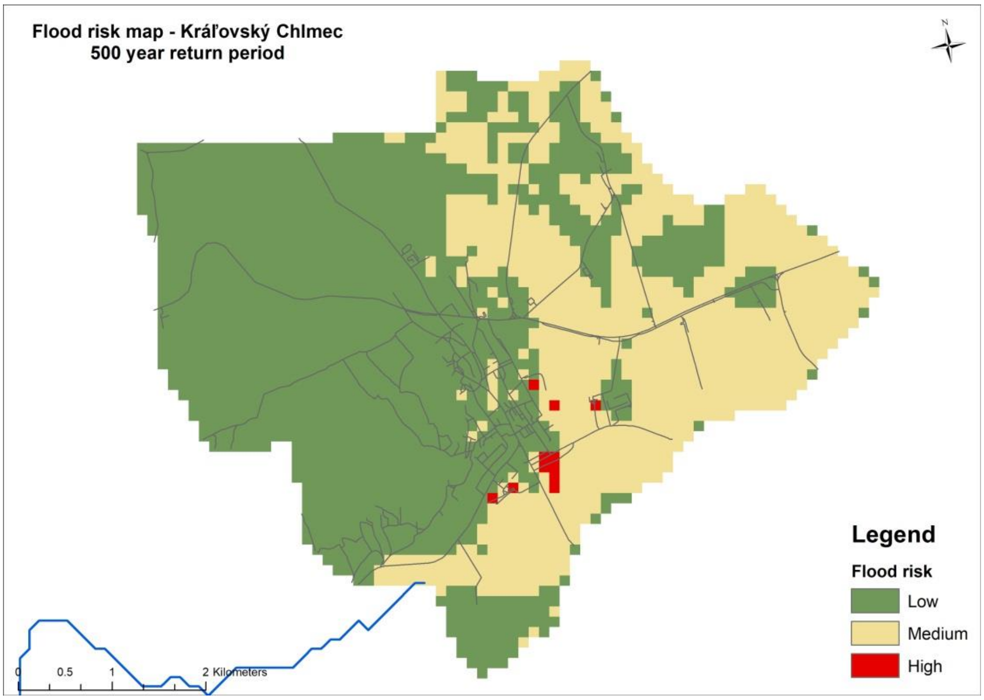

Figure 11. Exemple of flood risk map – 500 year return period

(Slovakia - Král'ovský Chlmec)

Forest fire assessment methodology

For the assessment of forest fire risk, we used a quantitative approach based on forest structure and type.

At EU level there is a comprehensive dataset related to land use, CORINE land cover; unfortunately, this data set does not cover third countries outside of EU, meaning that it does nor cover the Ukrainian territory. So, in order to be able to use the same methodology for all partner countries we used a different data set: Global Land Cover obtained from Copernicus Land Monitoring Service (CLMS). CLMS systematically produces global maps of land cover & cover changes and related surface area statistics.

The available global annual maps include (CLMS, https://lcviewer.vito.be/about):

- a discrete classification with 23 classes, following UN-FAO's Land Cover Classification System (LCCS) and related surface area statistics (km²) per level 0 and 1 administrative area as defined in UN-FAO Global Administrative Unit Layer;
- versatile cover fractions (%) for the 10 base classes, that can be combined to build custom classes for specific needs such as REDD+ forest monitoring.
- an indicator to distinguish forest types for pixels where the cover fraction exceeds 1%;
- an indicator of the input Data Density.

Table. 3 Classification of land use types Global Land Cover

LC100 code	UN LCCS level	Land Cover Class	Definition according UN	Color code (RGB)
0	-	No PROBAV data available		51, 51, 51
-	A12A3A20B2	Forest	Lands dominated by woody plants with a percent cover >15% and height exceeding 5 meters. Exception: a woody plant with a clear physiognomic aspect of trees	
111	A12A3A10B2D2E1	Closed forest, evergreen needle leaf	tree canopy >70%, almost all needle leaf trees remain green all year. Canopy is	0, 130, 0
112	A12A3A10B2D1E1	Closed forest,	tree canopy >70%,	0, 153, 0

		evergreen, broad leaf	almost all broadleaf trees remain green year round	
113	A12A3A10B2D2E2	Closed forest, deciduous needle leaf	tree canopy >70%, consists of seasonal needle leaf tree communities with an annual cycle of leaf-on and	0, 179, 0
114	A12A3A10B2D1E2	Closed forest, deciduous broad leaf	tree canopy >70%, consists of seasonal broadleaf tree communities with an annual	0, 204, 0
121	A12A3A11B2D2E1	Open forest, evergreen needle leaf	top layer- trees 15-70% and second layer- mixed of	112, 153, 0
122	A12A3A11B2D1E1	Open forest, evergreen broad leaf	top layer- trees 15-70% and second layer- mixed of shrubs and grassland, almost all broadleaf trees remain	131, 179, 0
123	A12A3A11B2D2E2	Open forest, deciduous needle leaf	top layer- trees 15-70% and second layer- mixed of shrubs and grassland, consists of seasonal needle leaf tree	150, 204, 0
124	A12A3A11B2D1E2	Open forest, deciduous broad leaf	top layer- trees 15-70% and second layer- mixed of shrubs and grassland, consists of seasonal broadleaf tree communities	169, 230, 0
20	AA12A4A20B3(B9)	Shrubs	These are woody perennial plants with persistent and woody stems and without any defined main	255, 187, 34
30	A12A2(A6)A20B4	Herbaceous vegetation	Plants without persistent stem or shoots above ground and lacking definite firm structure.	255, 255, 76
				240, 150,

40	A11A3	Cultivated and managed vegetation/agriculture (cropland)	Lands covered with temporary crops followed by harvest and a bare soil period (e.g., single and multiple cropping systems).	
50	B15A1	Urban / built up	Land covered by buildings and other man-made	255, 0, 0
60	B16A1(A2)	Bare / sparse vegetation	Lands with exposed soil, sand, or rocks and never has more than 10%	220, 220,
			during any time of the year	
70	B28A2(A3)	Snow and Ice	Lands under snow or ice cover throughout the year.	255, 255, 255
80	B28A1B1	Permanent water bodies	lakes, reservoirs, and rivers. Can be either fresh or salt-	25, 25, 255
81	B28A1B2	Temporary water		60, 160, 255
90	A24A2A20	Herbaceous wetland	Lands with a permanent mixture of water and herbaceous or woody vegetation. The vegetation	0, 150, 160
200	B28A1B1[1]	Open sea	Oceans, seas. Can be either fresh or salt-water bodies.	0, 0, 128
255	-	Not classified		0, 0, 0

Forest fire danger level. In order to assess the forest fire danger level, according to the methodology, the first step requires the estimation of fire hazard.

Forest fire danger is related to the type of forest (needle leaf species, broad leaved species, deciduous etc). Intensity (hazard) , which can be rated as low (score 1), average (score 2) or high (score 3), is a function of the dominant species. In general needle leaf species tend to be more prone to forest fire, while forests composed of bload leaved species are more fire resistant. This is also related to the specific habitat conditions as needle leaf species are better adapted for dry environments. The values of forest fire hazard are presented in Table 4. AS all study areas are part of the temperate climate zone not all the forest types indicated in Table 1 are included.

Table 4. Forest fire danger scores

Intensity	Type of forest
Low	Shrubs
Medium	Open forest, evergreen needle leaf; Closed forest, deciduous broad leaf; Open forest, deciduous broad leaf
High	Closed forest, deciduous needle leaf; Open forest, evergreen needle leaf

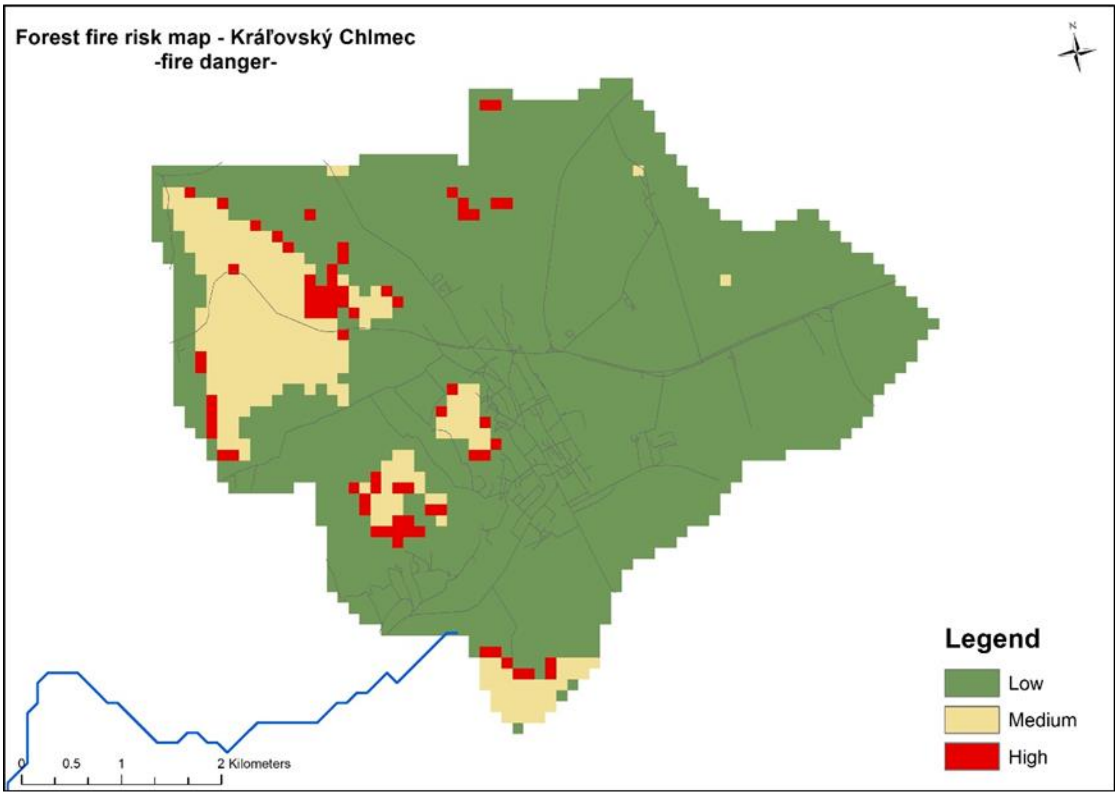

Figure 12. Forest fire danger level (Slovakia - Král'ovský Chlmec)

Vulnerability estimate.

Due to the data limitations, considerably availability of data, the methodology is mainly quantitative. We collected data from our partners and also used the landuse as a proxy for vulnerability analysis. As a result, the vunerability assesment includes:

- analysis of exposed goods and assets, which includes mapping and framing of the exposed objectives in 3 categories (A-C, similar to the flood risk methodology), with the importance increasing from A class (for example: arable land, other types of agricultural land, degraded land etc), to C class (for example : buildings of special importance for emergency situations);

- designed of a potential damage level for the above defined categories of exposed objectives (Table 5);

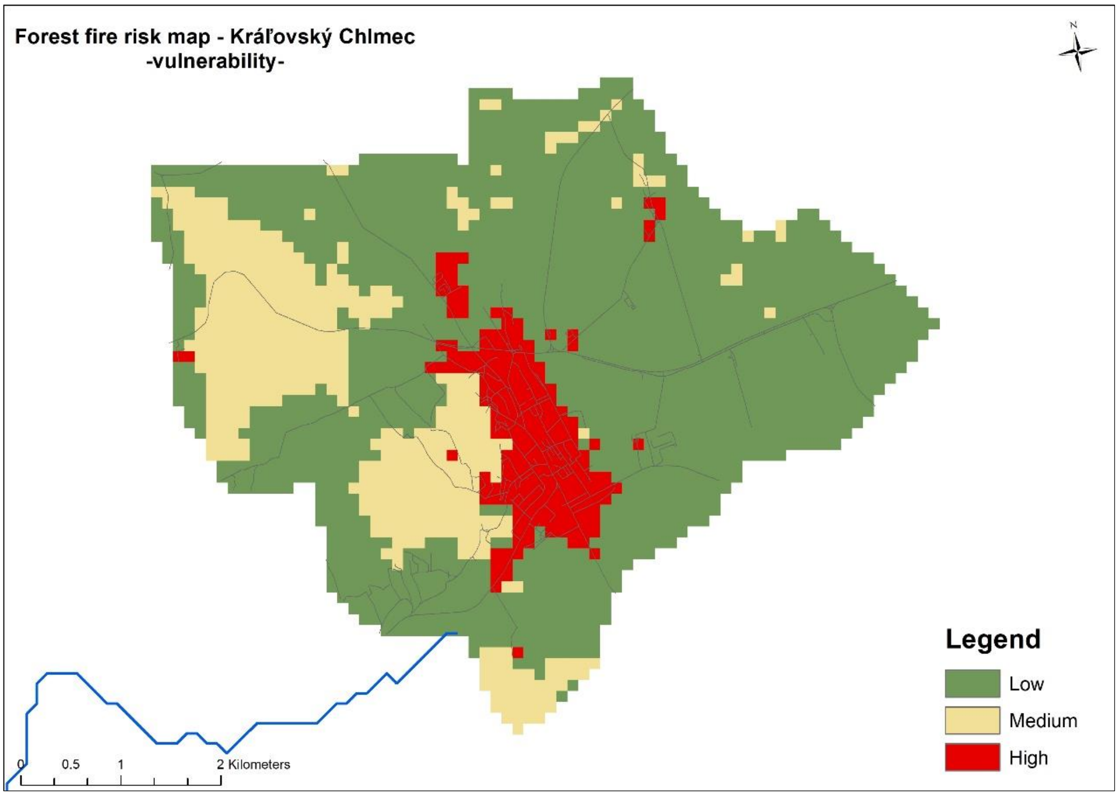

Figure 13. Forest fire vulnerability (Slovakia - Král'ovský Chlmec)

Table. 5. Level of potential damages

Potential damages levels	Exposed objective classes	Score
Low	A	1
Medium	B	2
High	C	3

Forest fire risk assessment. The qualitative approach of fire risk assessment involves the combination of the level of danger of the forest fire and the level of potential damages. The combination of these parameters leads to the establishment of 3 levels of risk (Figure 14).

Forest Fire danger	High	2	3	3
	Medium	1	2	3
	Low	1	1	2
		Low	Medium	High
		Level of potential damages		

Low risk	Medium risk	High risk

Figure 14. Qualitative risk assessment matrix (*adapted following Widmer, B, 2002*)

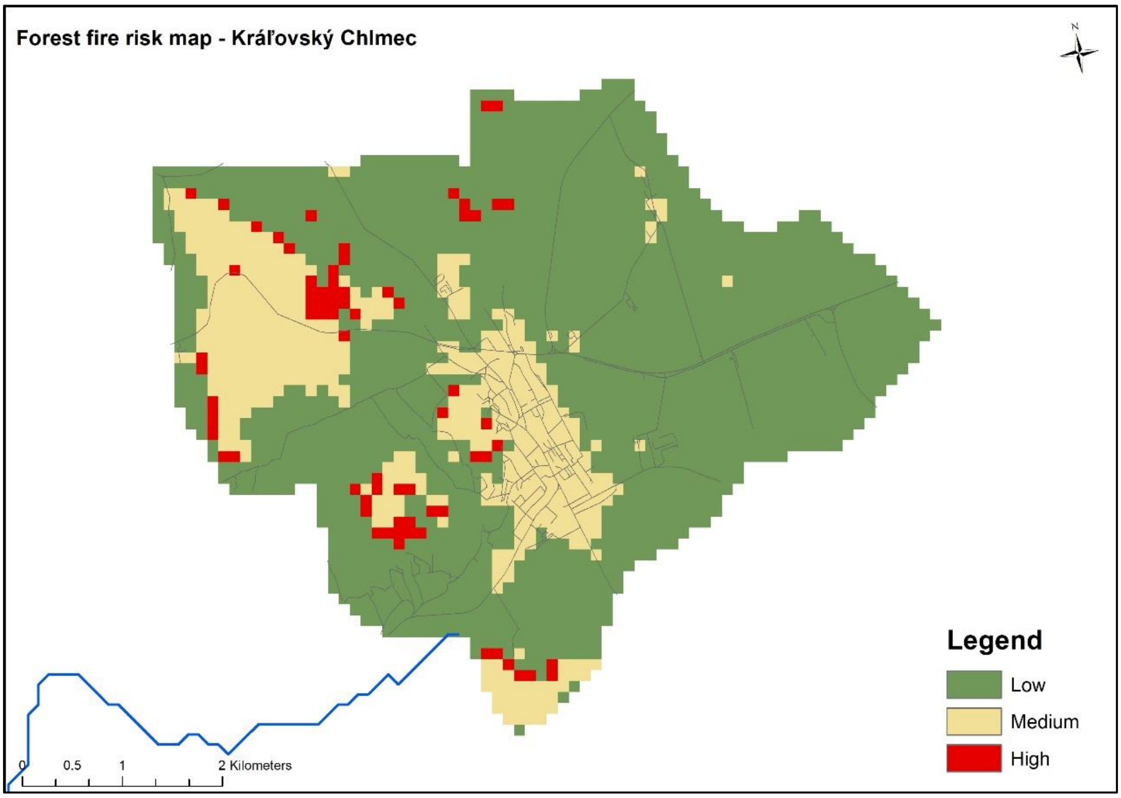

Figure 15. Forest fire risk map (Slovakia - Král’ovský Chlmec)

Maps

Floods risk maps - Hungary

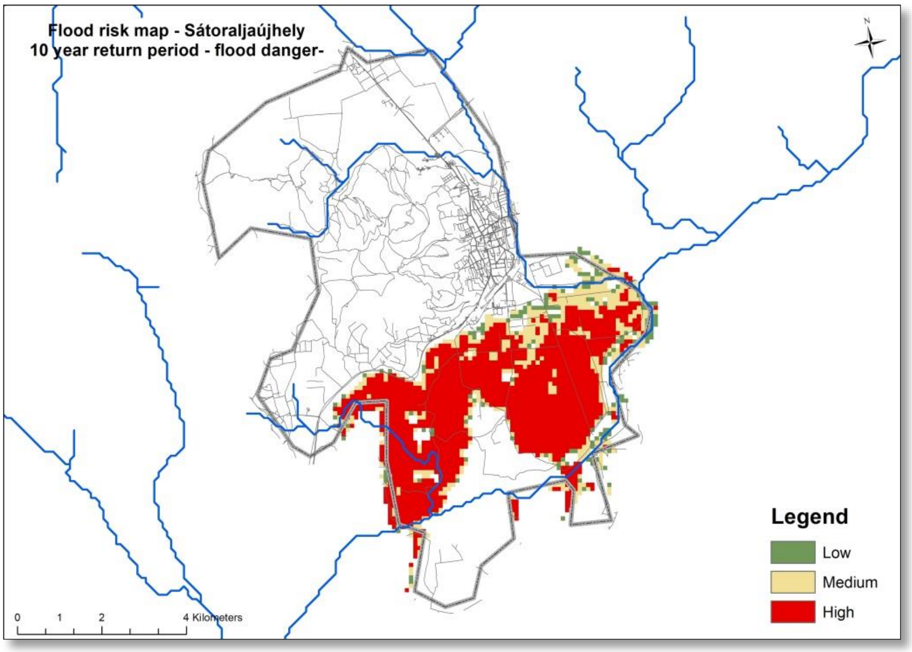

Figure 16. Flood danger – 10 year return period (Hungary - Sátoraljaújhely)

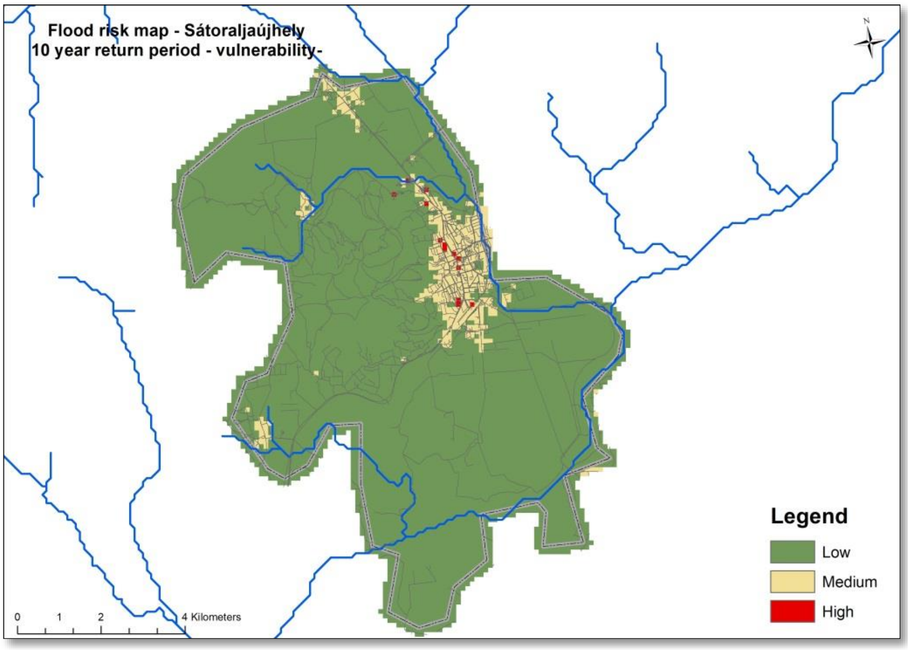

Figure 17. Flood vulnerability - 10 year return period (Hungary - Sátoraljaújhely)

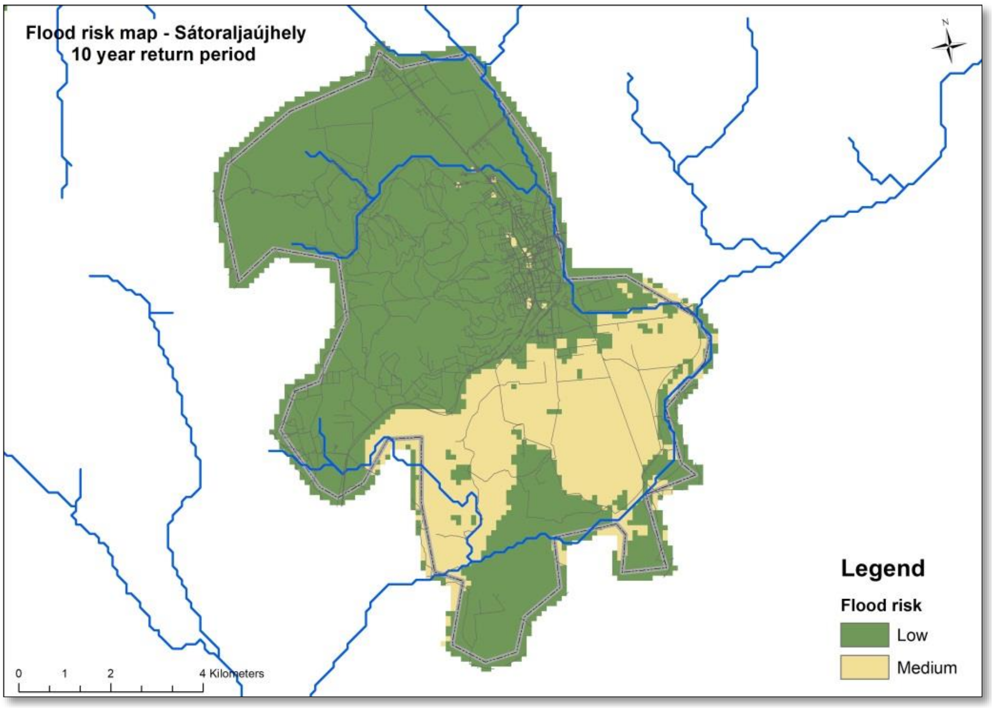

Figure 18. Flood risk map – 10 year return period (Hungary - Sátoraljaújhely)

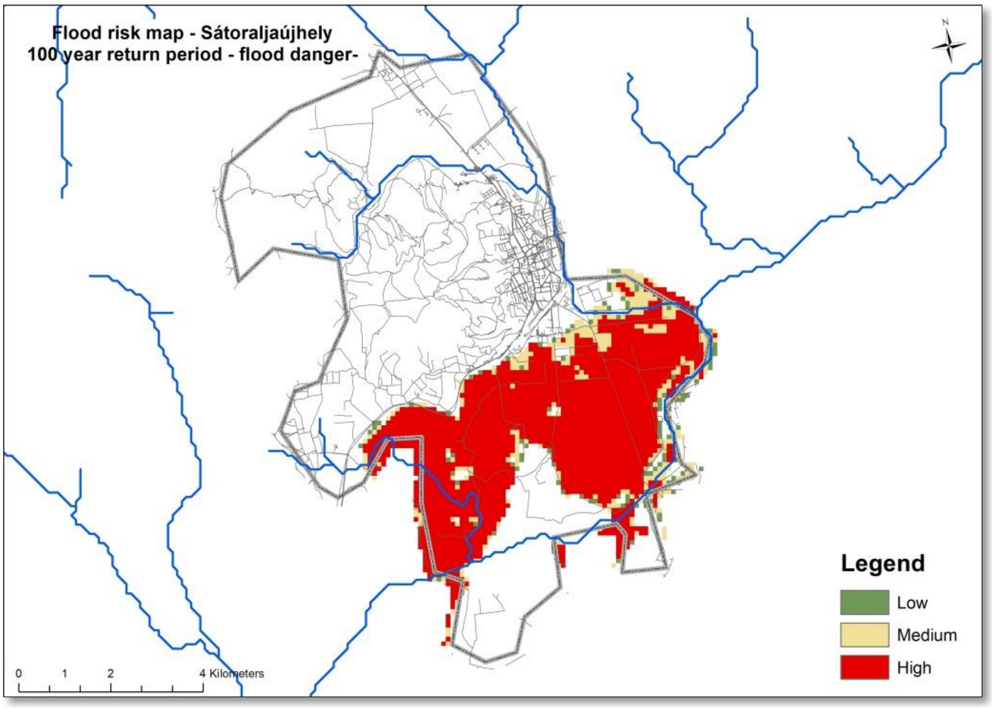

Figure 19. Flood danger – 100 year return period (Hungary - Sátoraljaújhely)

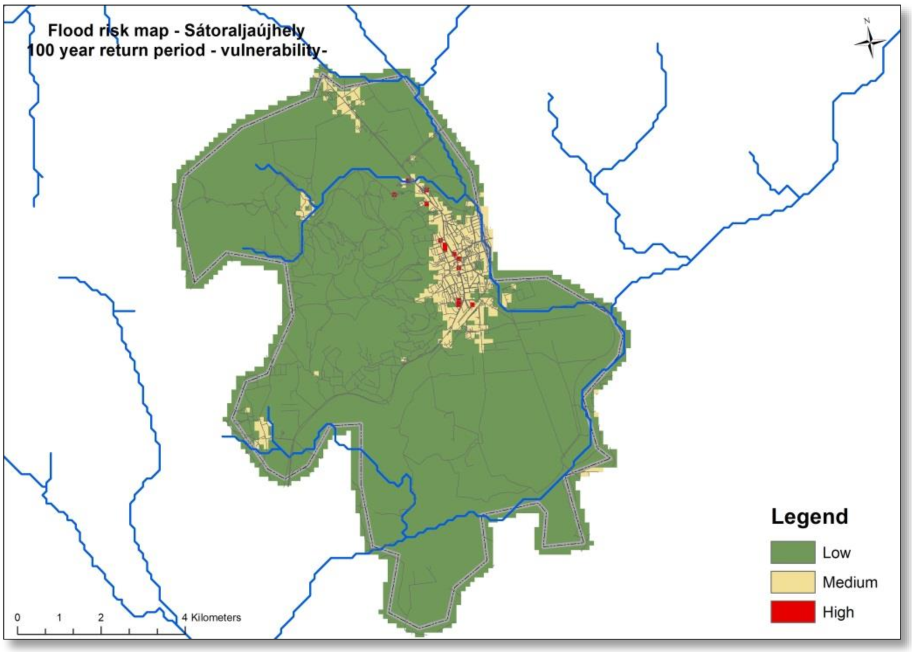

Figure 20. Flood vulnerability - 100 year return period (Hungary - Sátoraljaújhely)

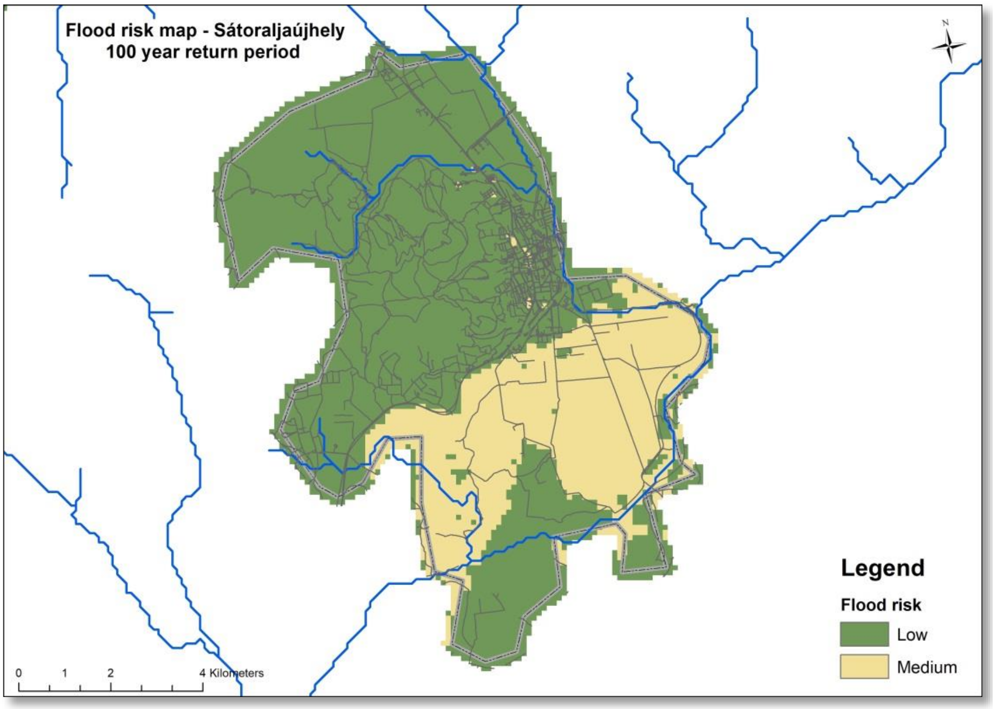

Figure 21. Flood risk map – 100 year return period (Hungary - Sátoraljaújhely)

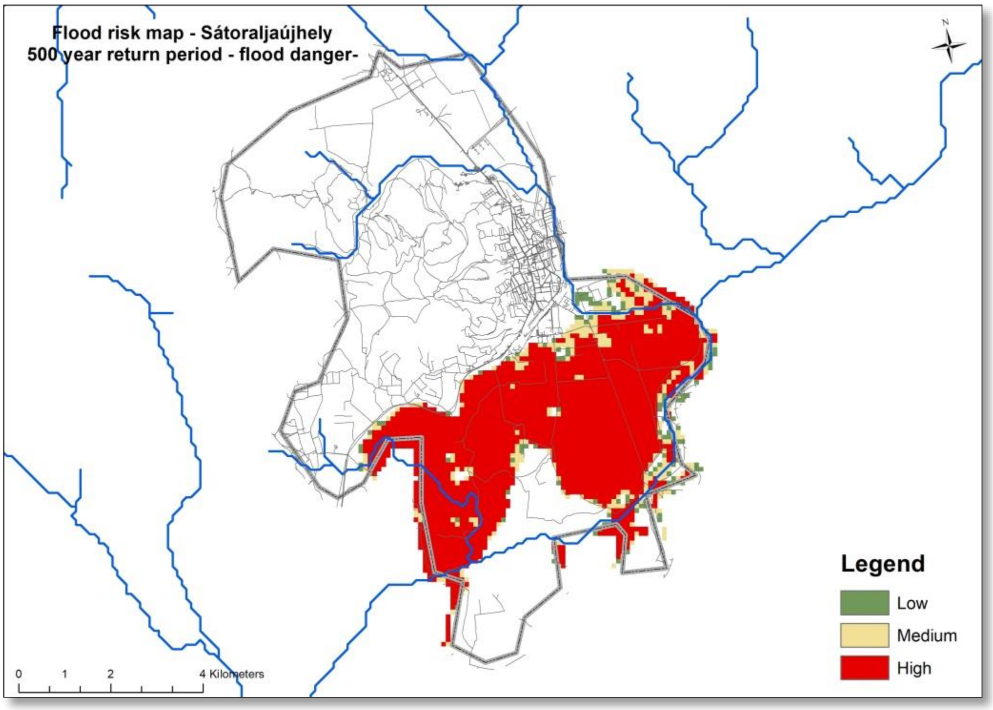

Figure 22. Flood danger – 500 year return period (Hungary - Sátoraljaújhely)

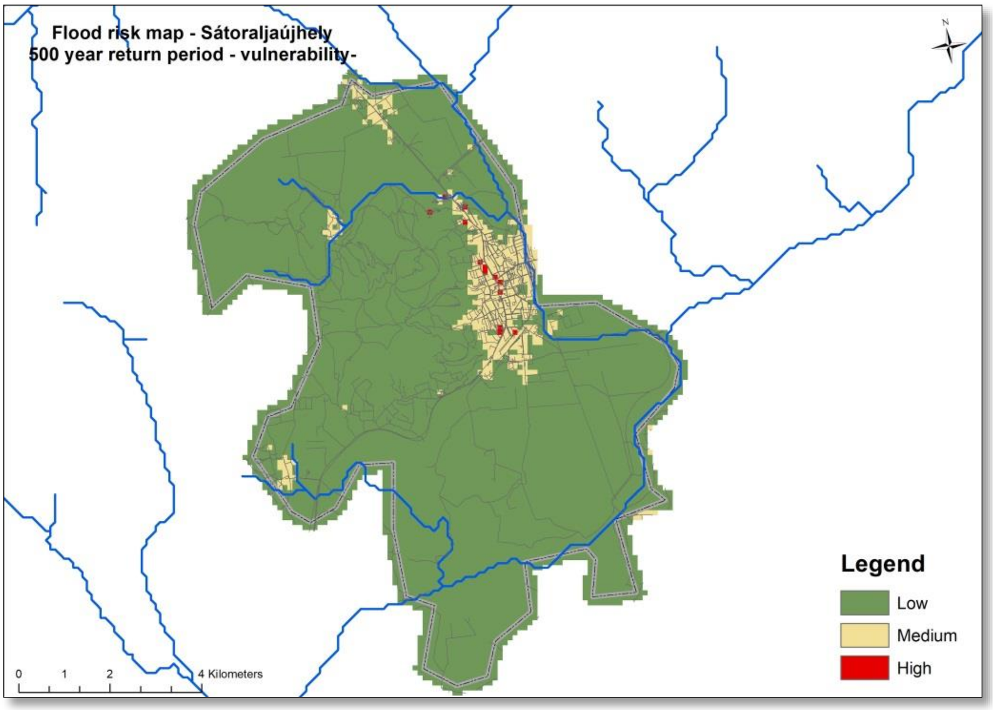

Figure 23. Flood vulnerability - 500 year return period (Hungary - Sátoraljaújhely)

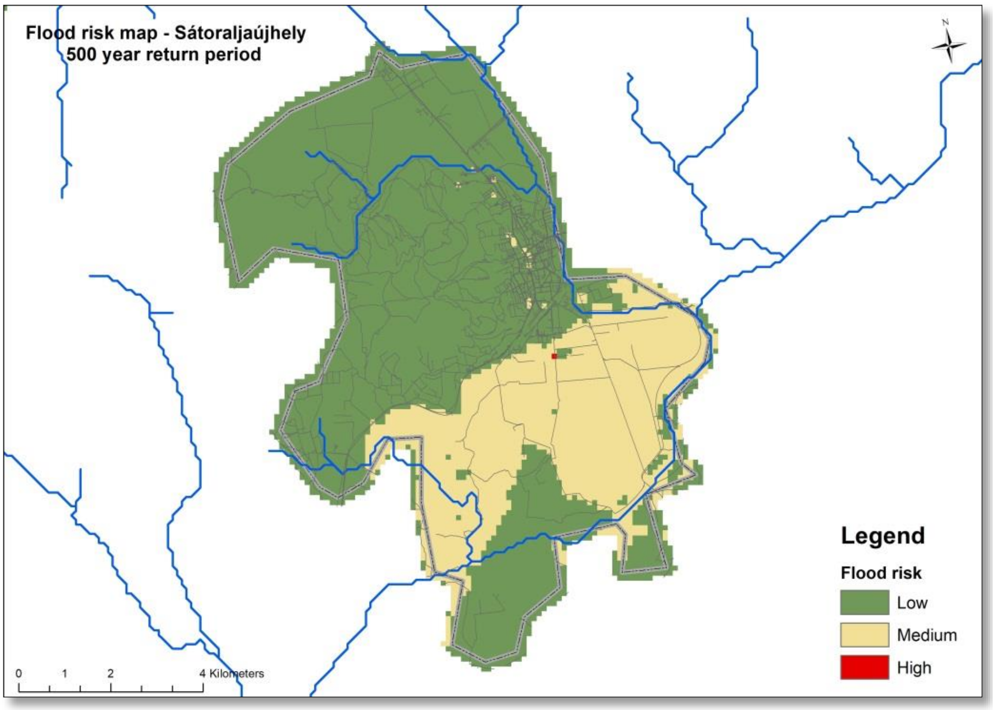

Figure 24. Flood risk map - 500 year return period (Hungary - Sátoraljaújhely)

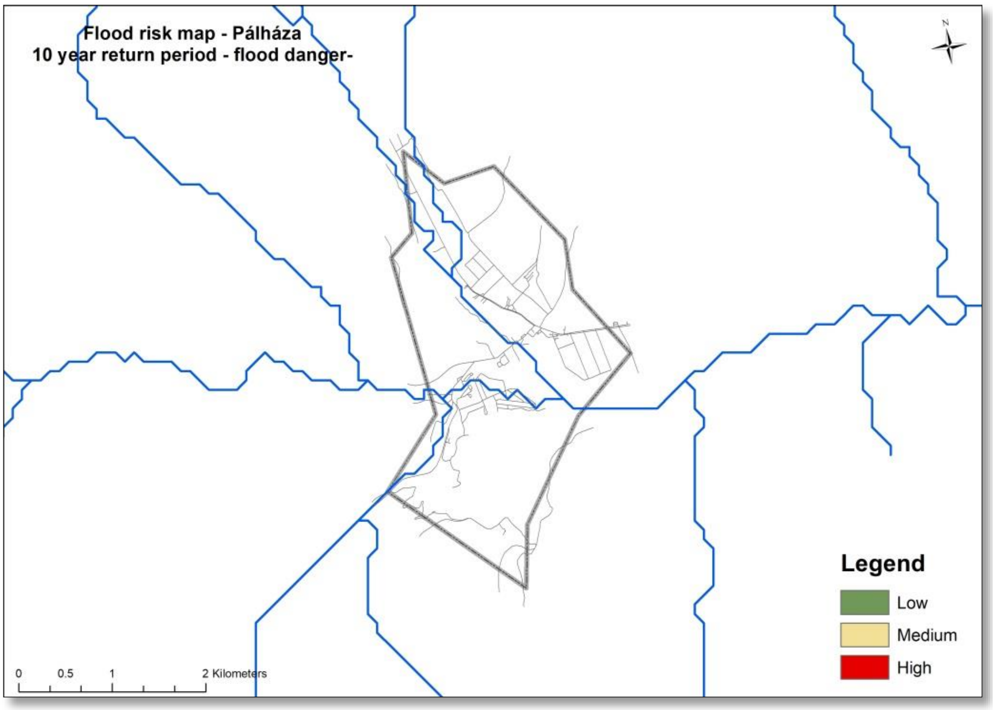

Figure 25. Flood danger – 10 year return period (Hungary - Pálháza)

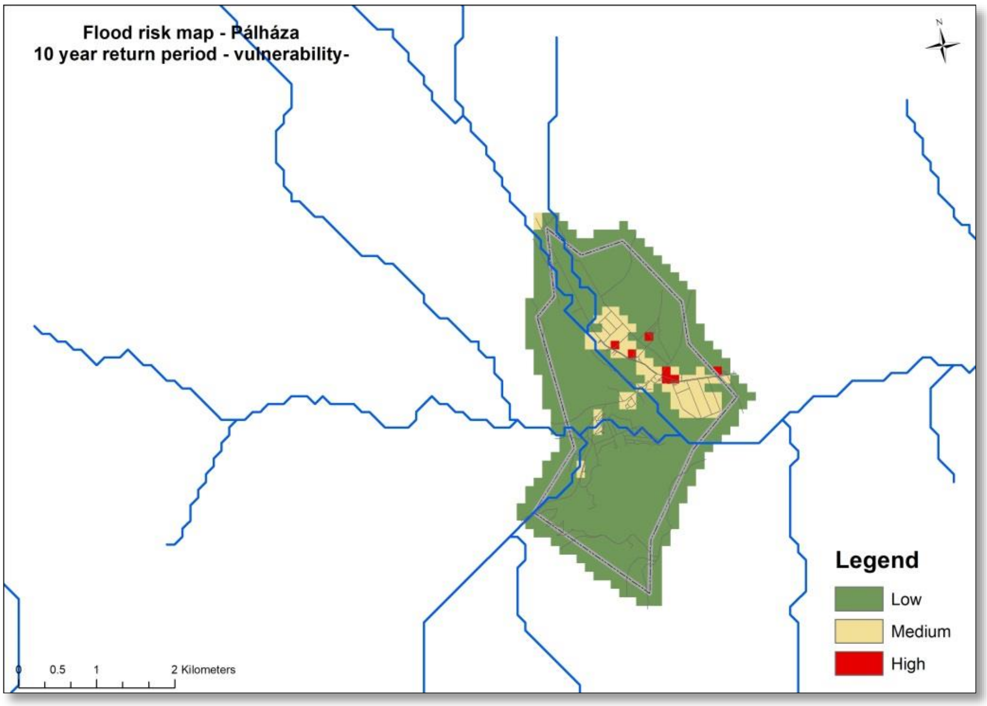

Figure 26. Flood vulnerability - 10 year return period (Hungary - Pálháza)

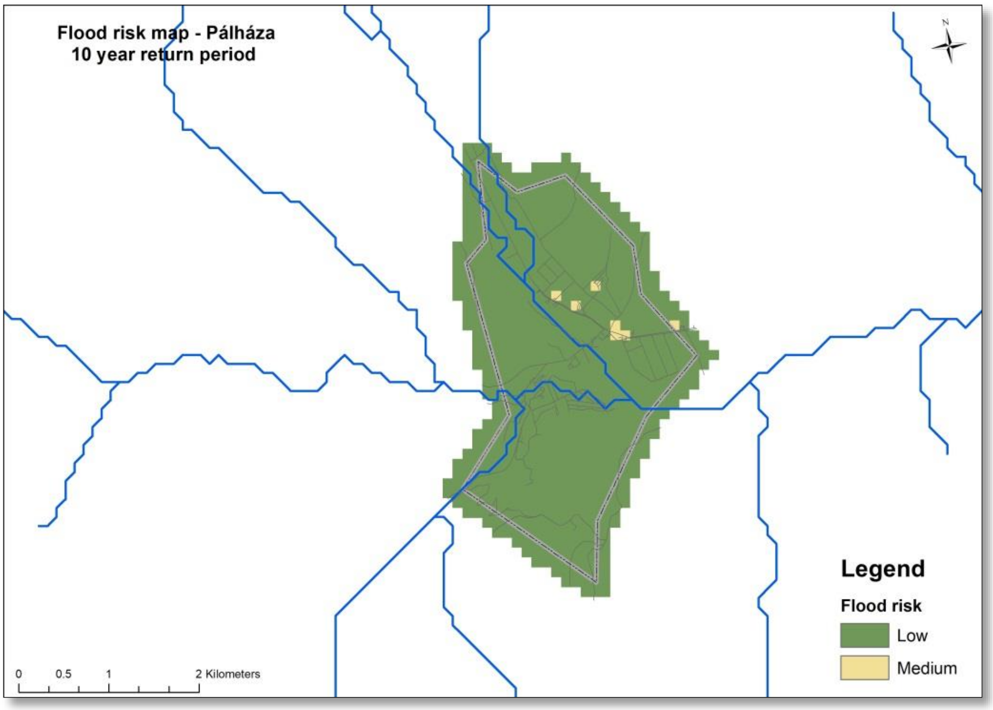

Figure 27. Flood risk map - 10 year return period (Hungary - Pálháza)

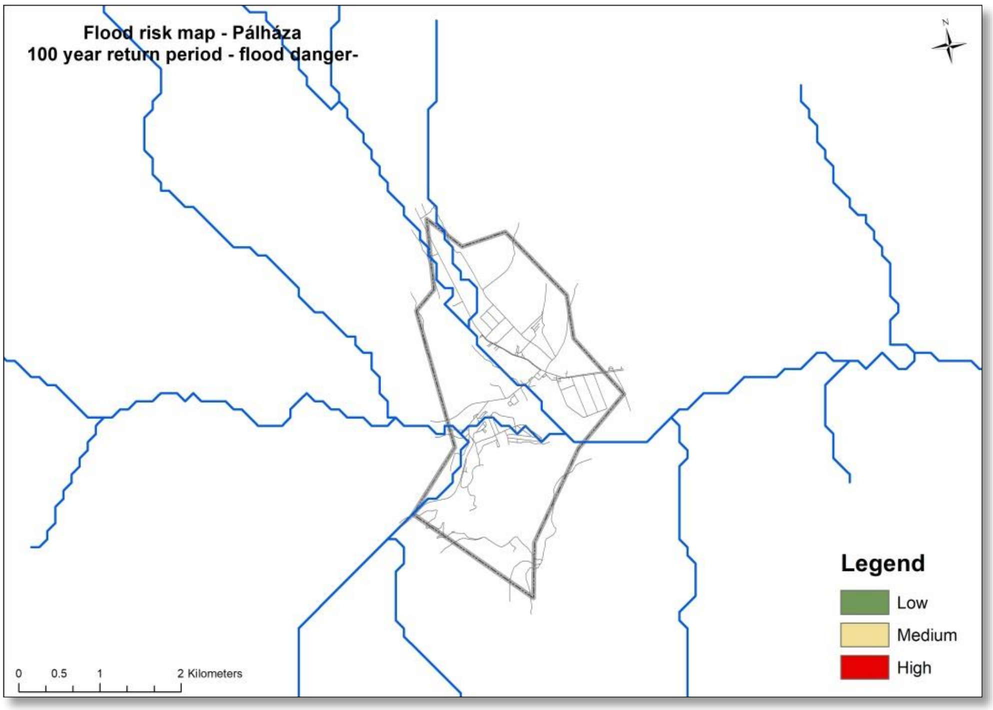

Figure 28. Flood danger – 100 year return (Hungary - Pálháza)

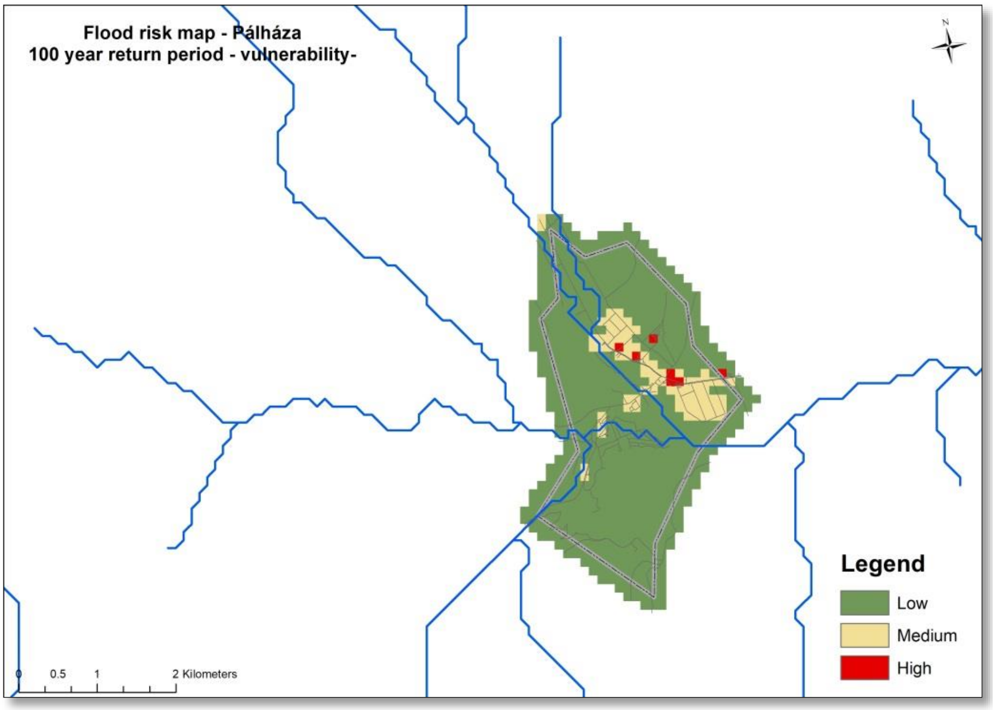

Figure 29. Flood vulnerability - 100 year return period (Hungary - Pálháza)

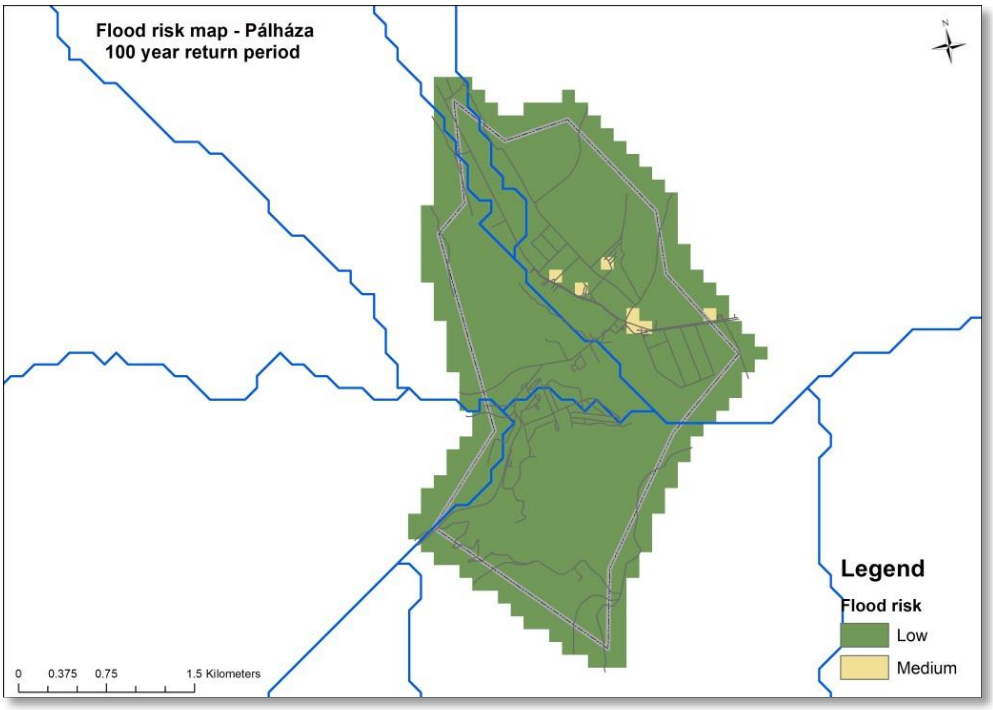

Figure 30. Flood risk map - 100 year return period (Hungary - Pálháza)

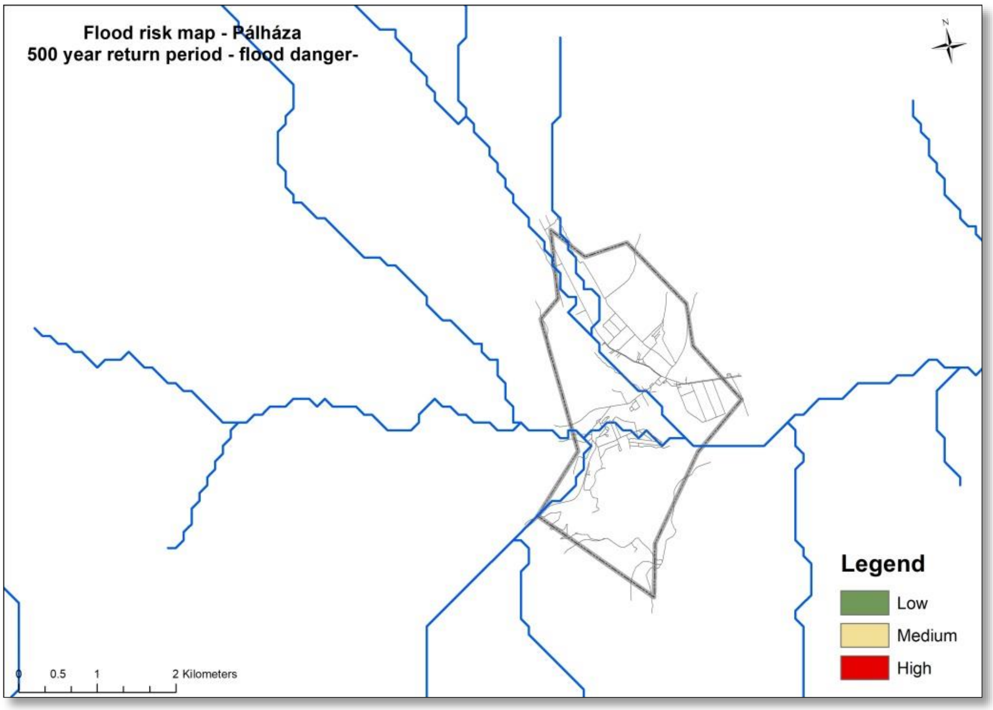

Figure 31. Flood danger - 500 year return period (Hungary - Pálháza)

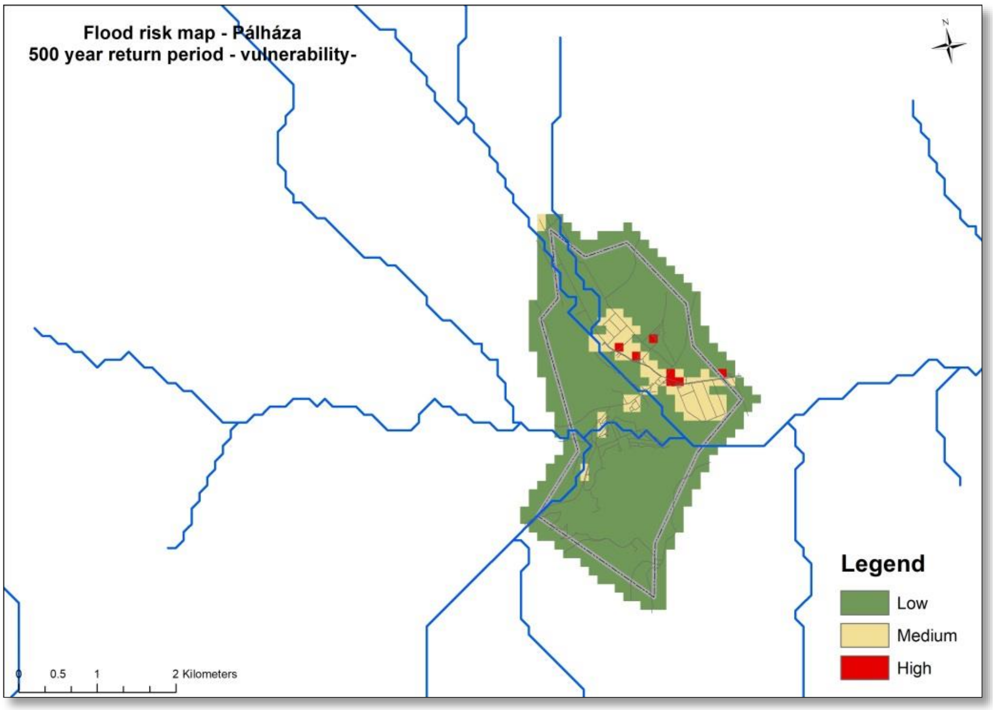

Figure 32. Flood vulnerability - 500 year return period (Hungary - Pálháza)

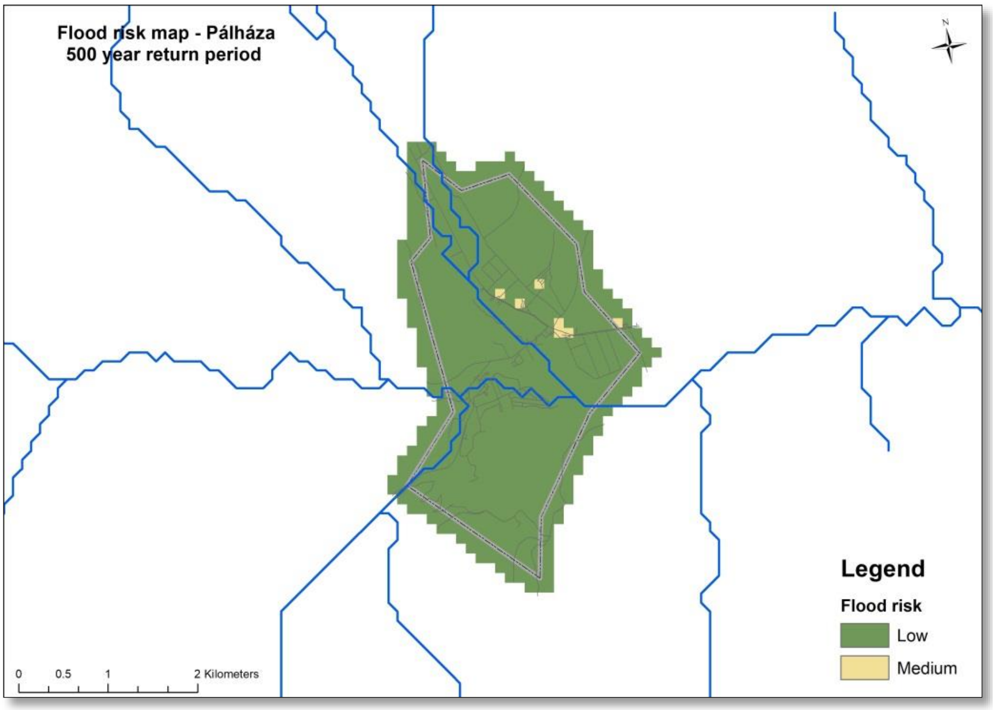

Figure 33. Flood risk map - 500 year return period (Hungary - Pálháza)

Floods risk maps - Romania

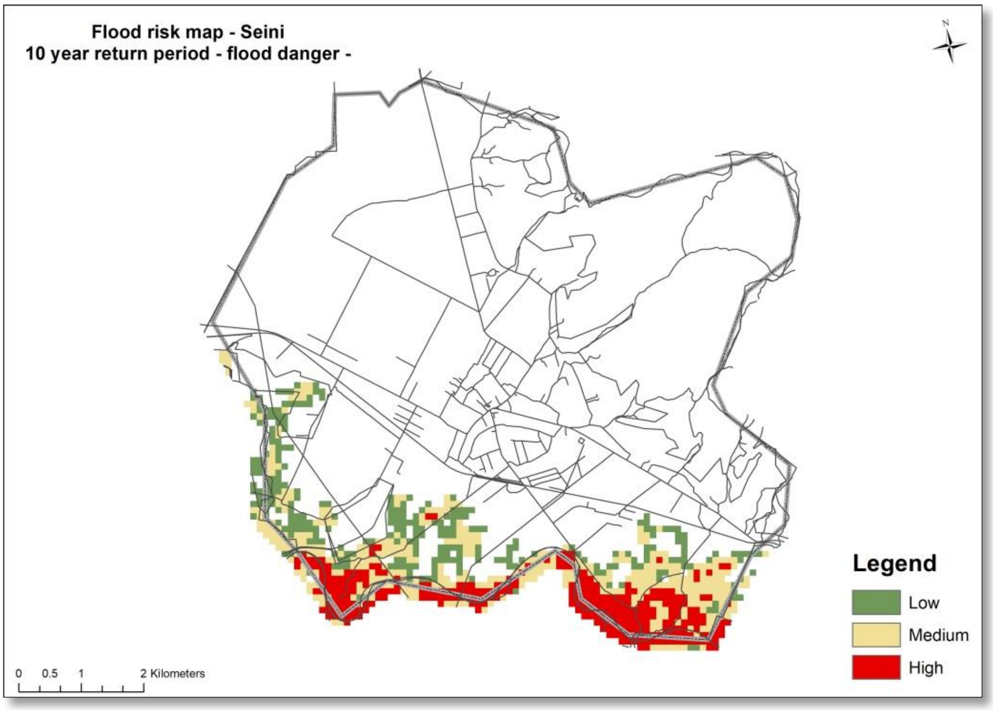

Figure 34. Flood danger - 10 year return period (Romania - Seini)

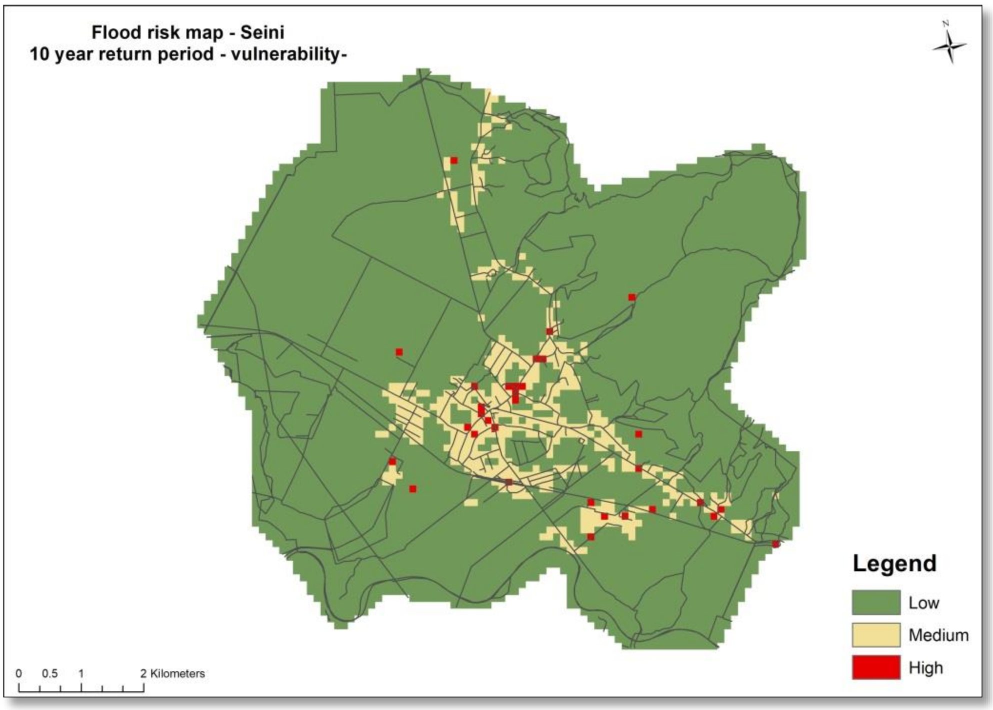

Figure 35. Flood vulnerability - 10 year return period (Romania - Seini)

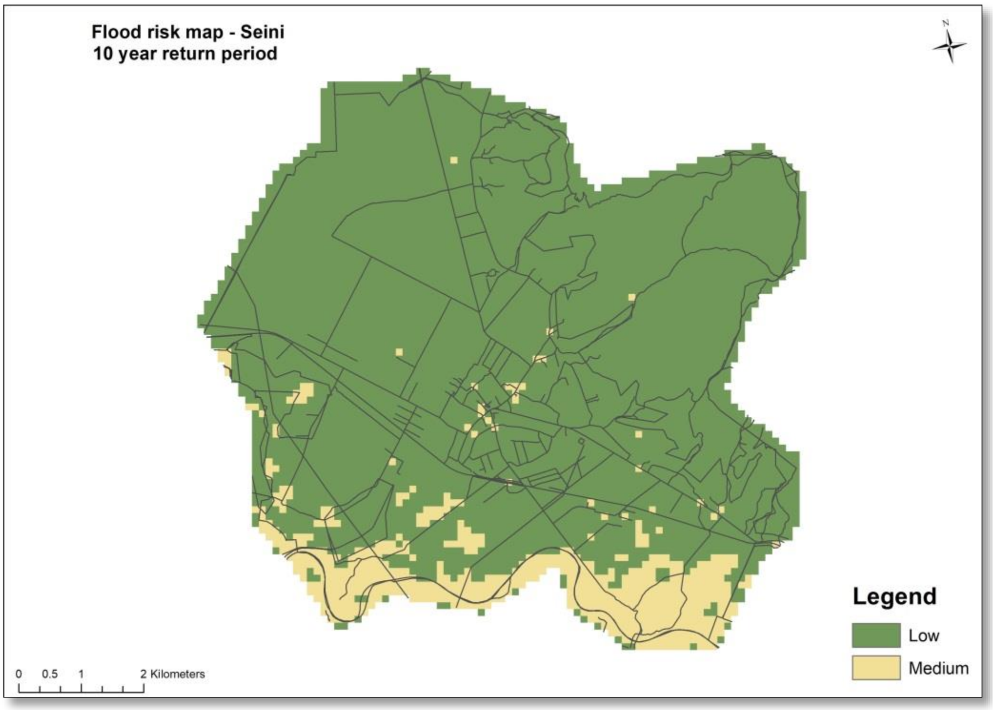

Figure 36. Flood risk map - 10 year return period (Romania - Seini)

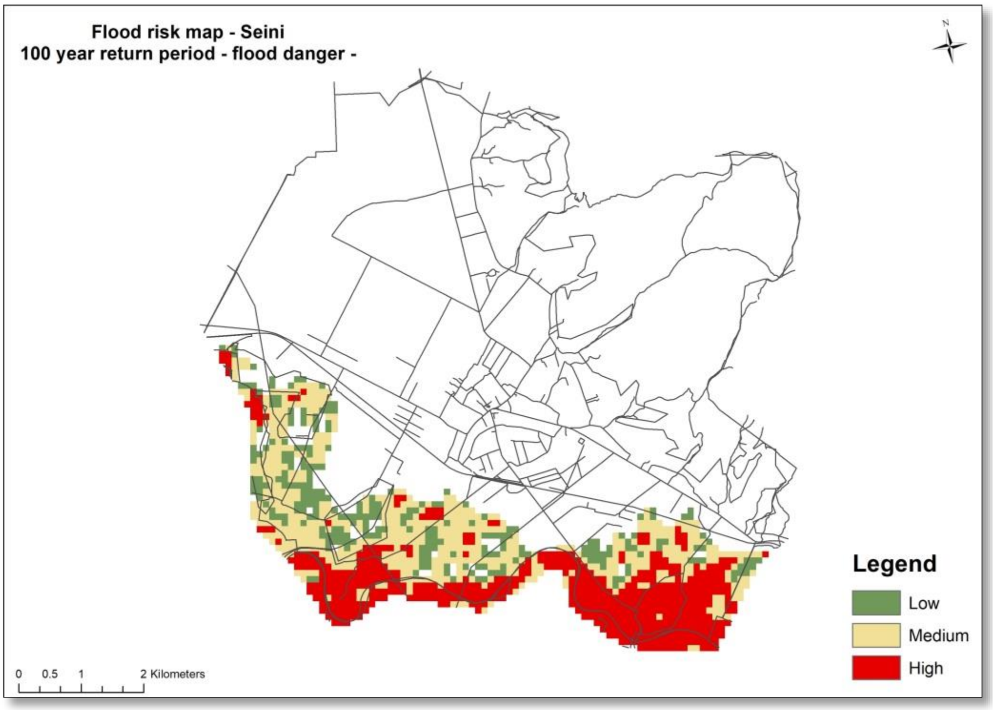

Figure 37. Flood danger - 100 year return period (Romania - Seini)

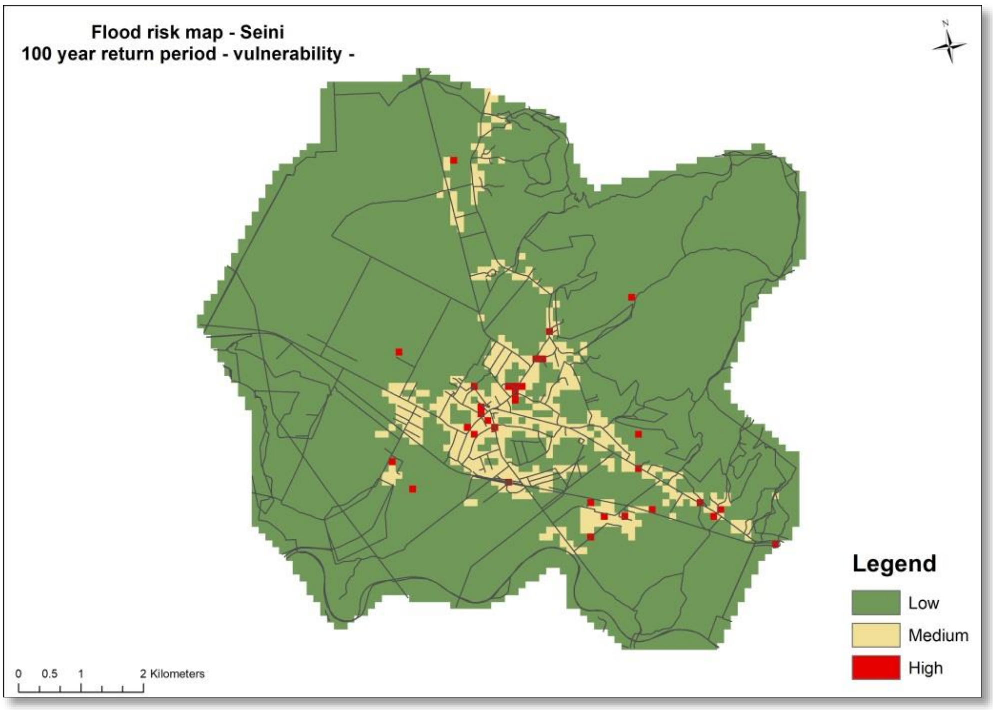

Figure 38. Flood vulnerability - 100 year return period (Romania - Seini)

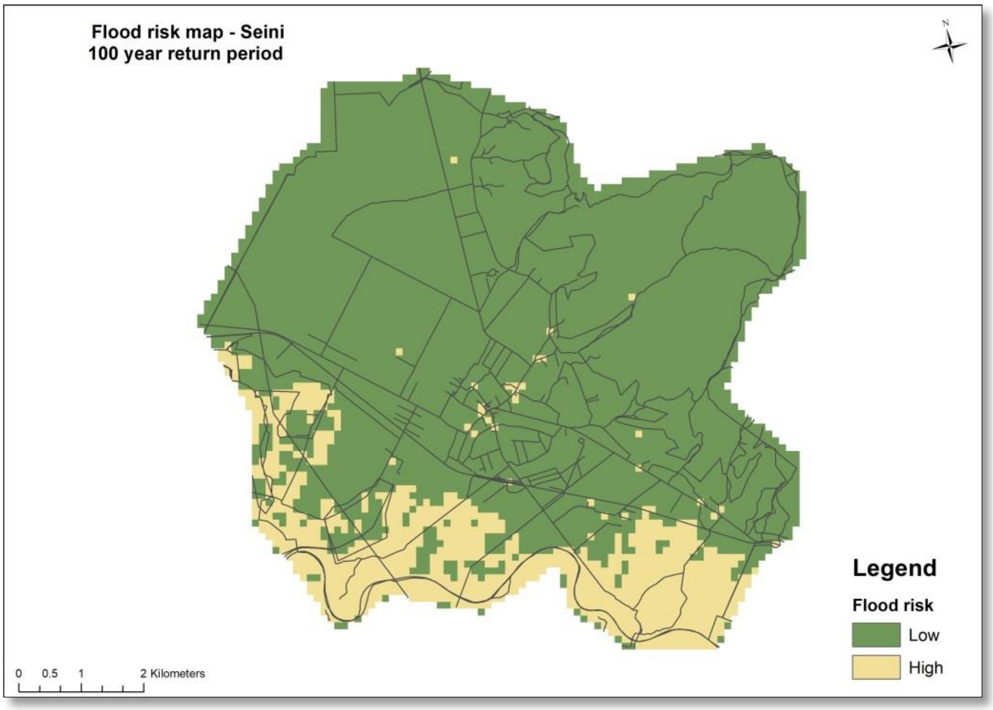

Figure 39. Flood risk map - 100 year return period (Romania - Seini)

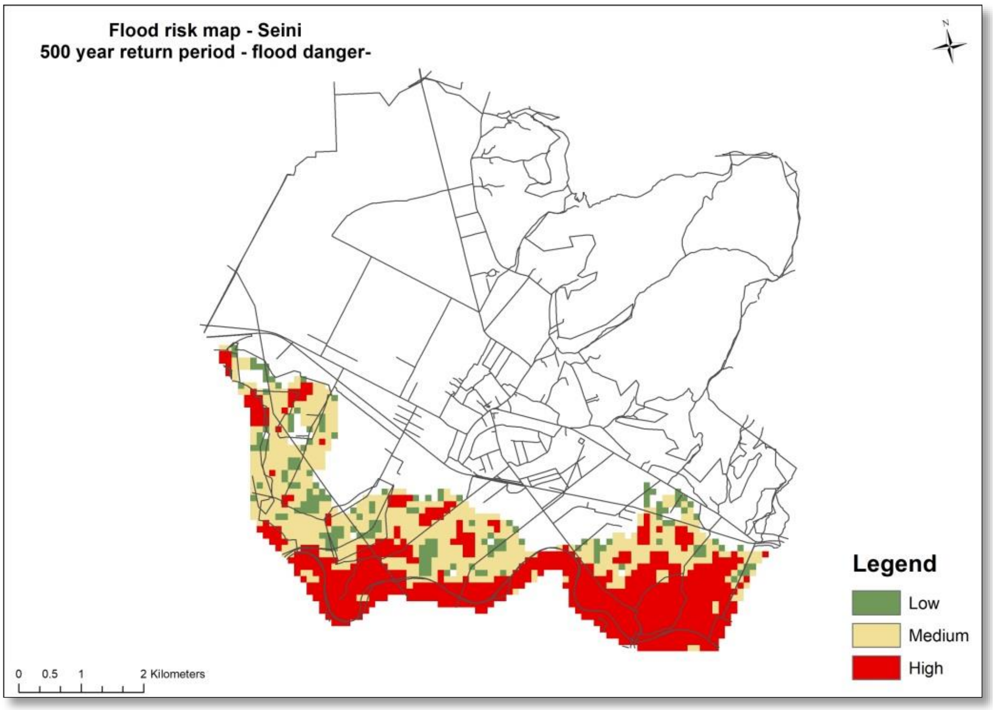

Figure 40. Flood danger - 500 year return period (Romania - Seini)

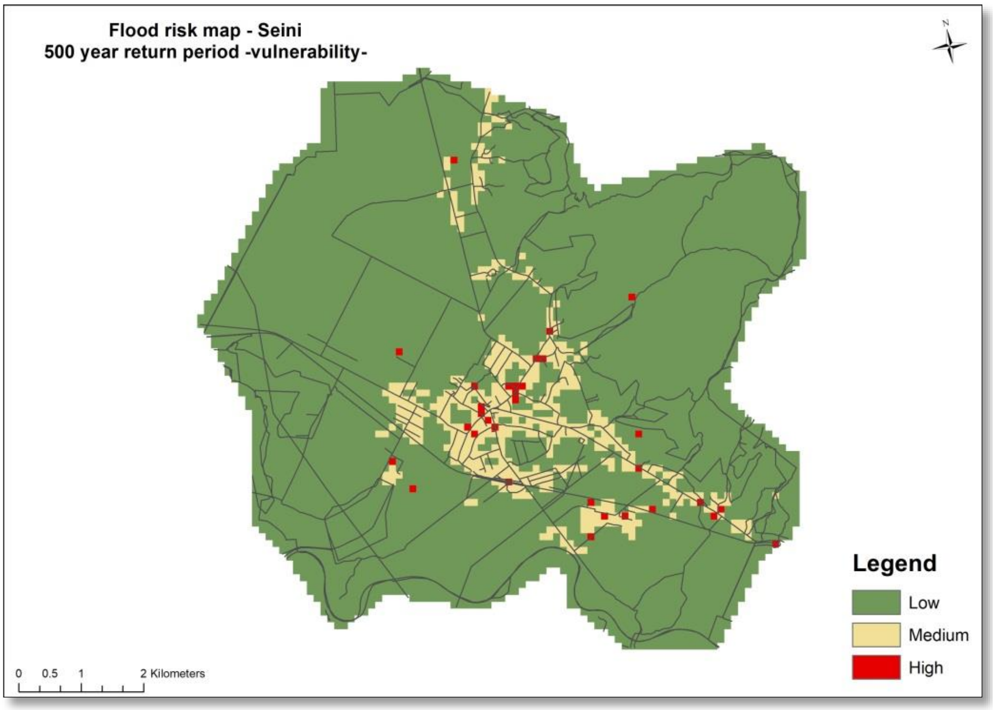

Figure 41. Flood vulnerability - 500 year return period (Romania - Seini)

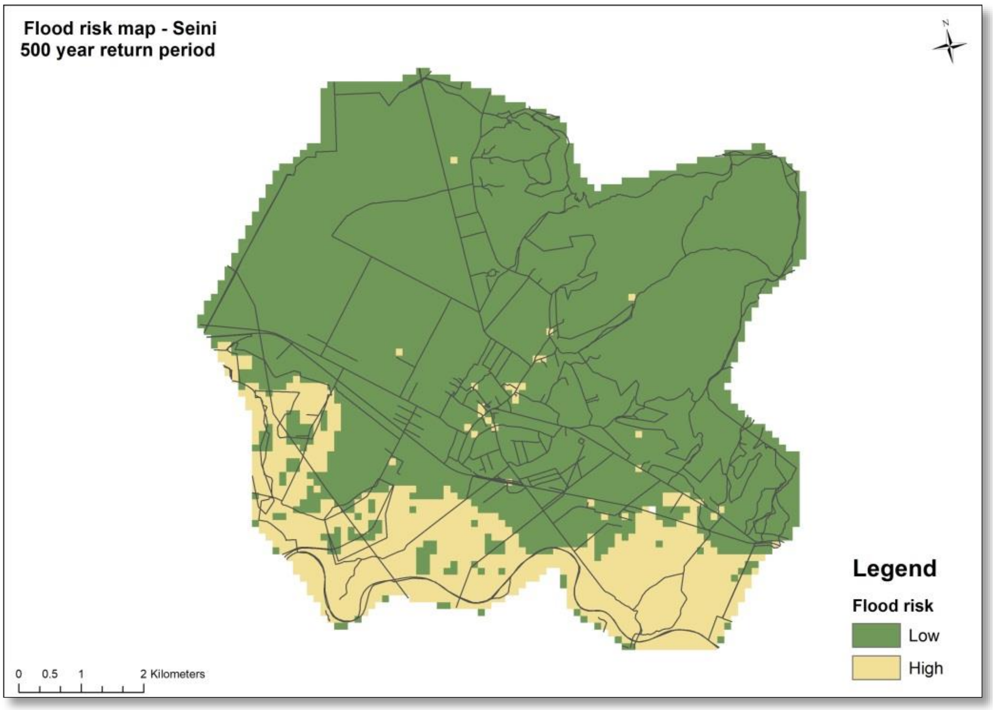

Figure 42. Flood risk map - 500 year return period (Romania - Seini)

Floods risk maps - Slovakia

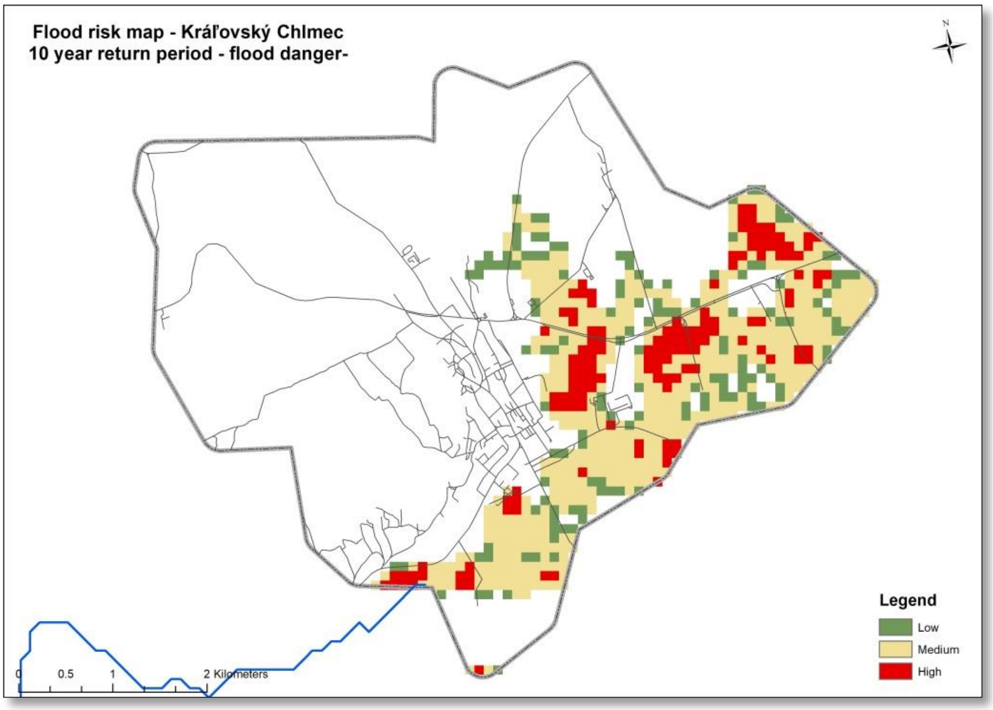

Figure 43. Flood danger - 10 year return period (Slovakia – Kráľovský Chlmec)

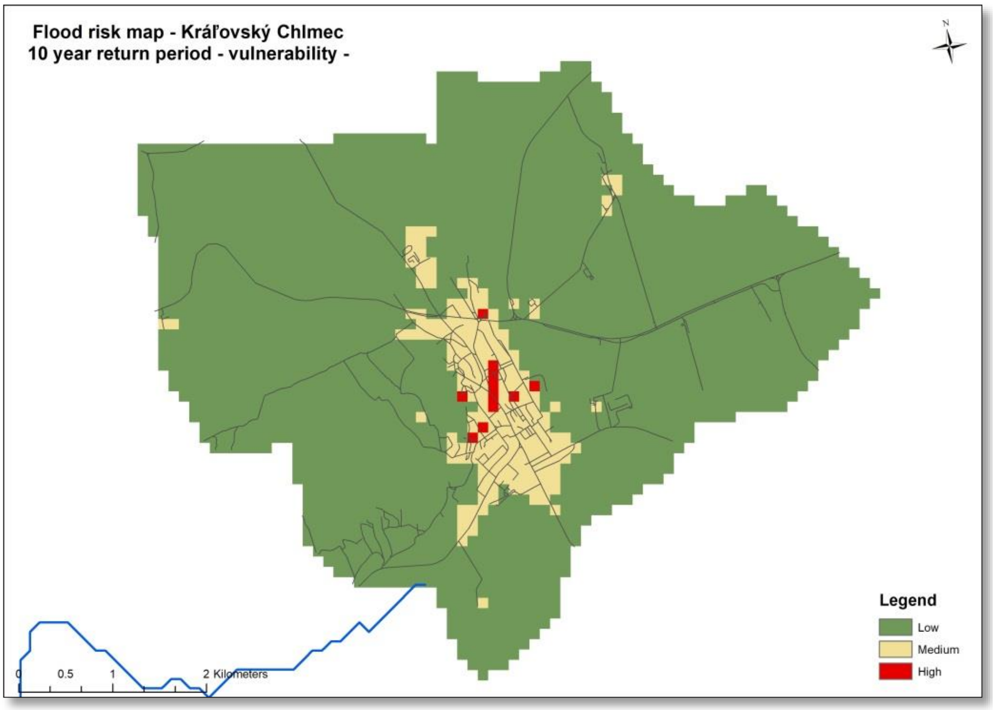

Figure 44. Flood vulnerability - 10 year return period (Slovakia – Král’ovský Chlmec)

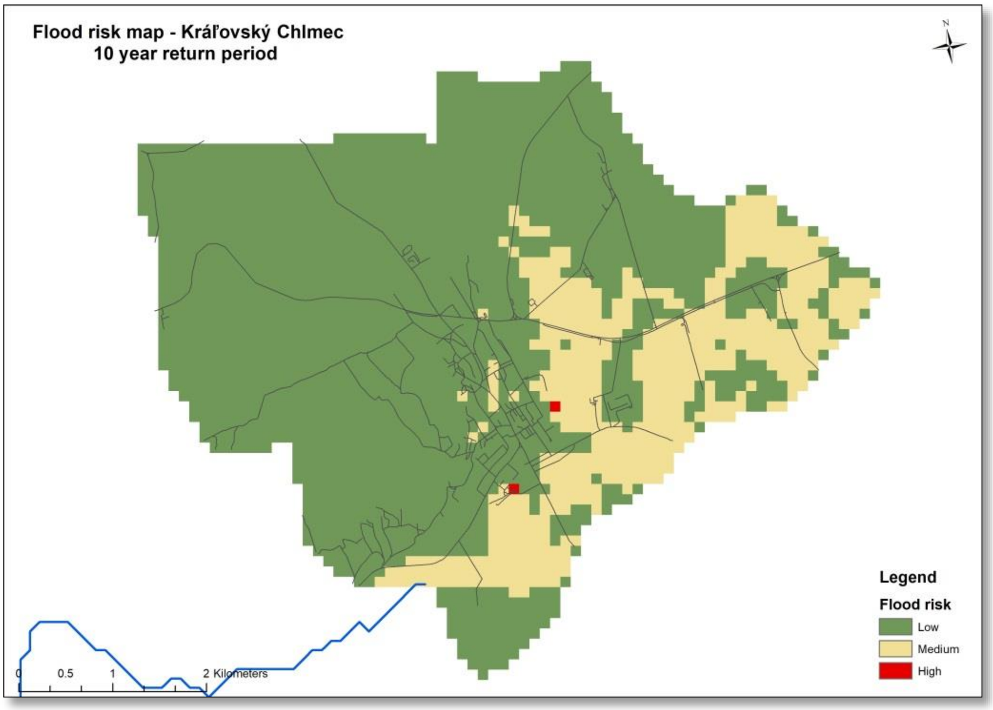

Figure 45. Flood risk map - 10 year return period (Slovakia – Král’ovský Chlmec)

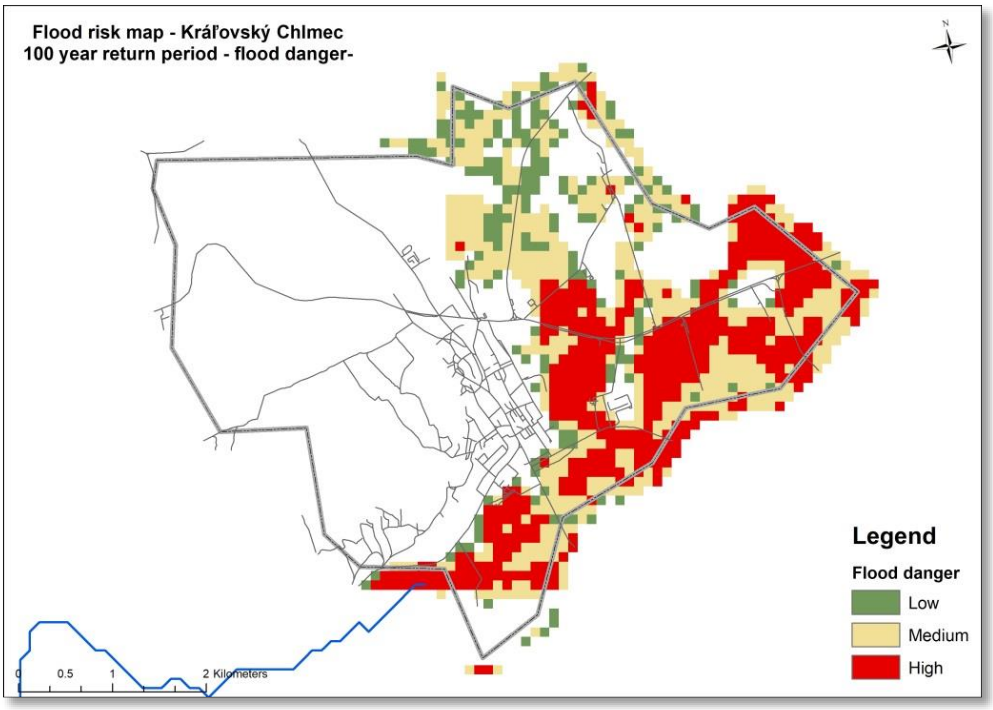

Figure 46. Flood danger - 100 year return period (Slovakia – Král'ovský Chlmec)

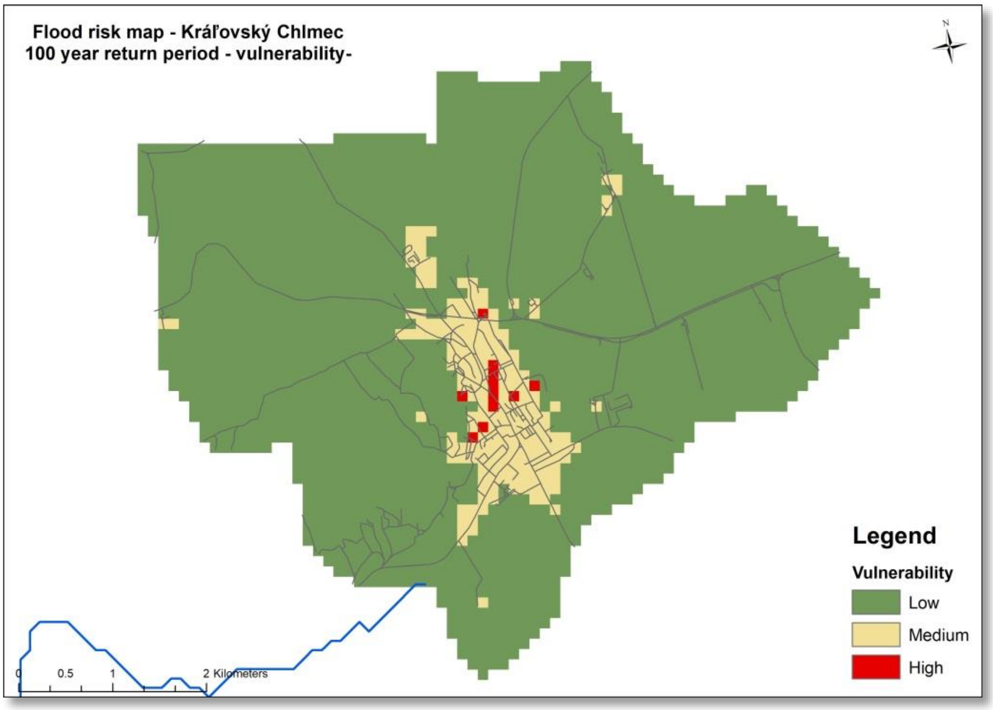

Figure 47. Flood vulnerability - 100 year return period (Slovakia - Král'ovský Chlmec)

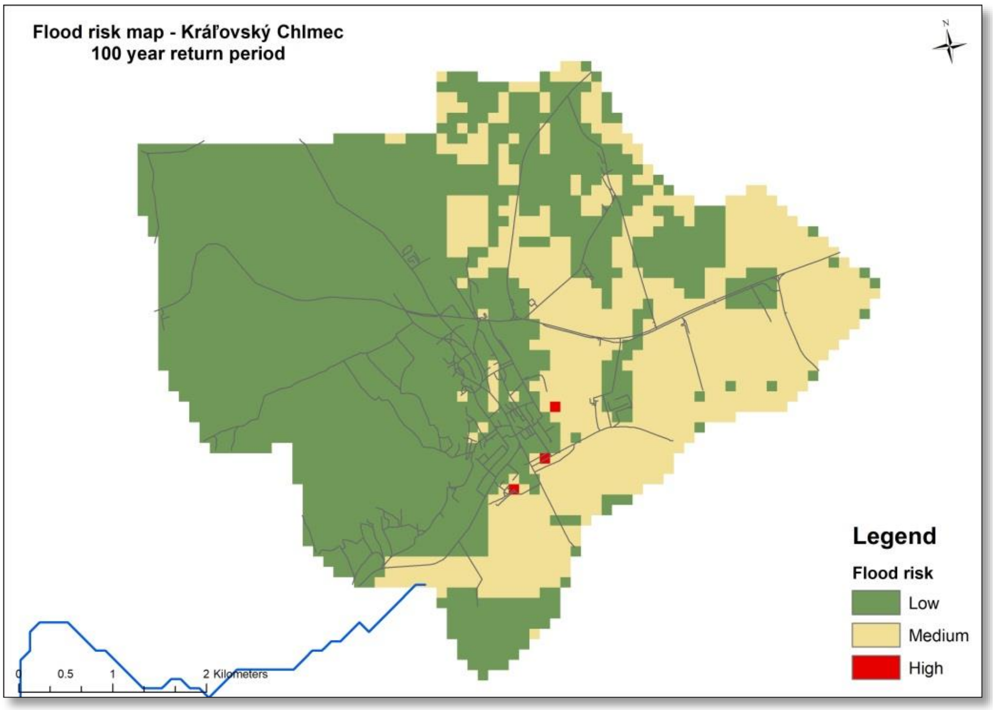

Figure 48. Flood risk map - 100 year return period (Slovakia - Král'ovský Chlmec)

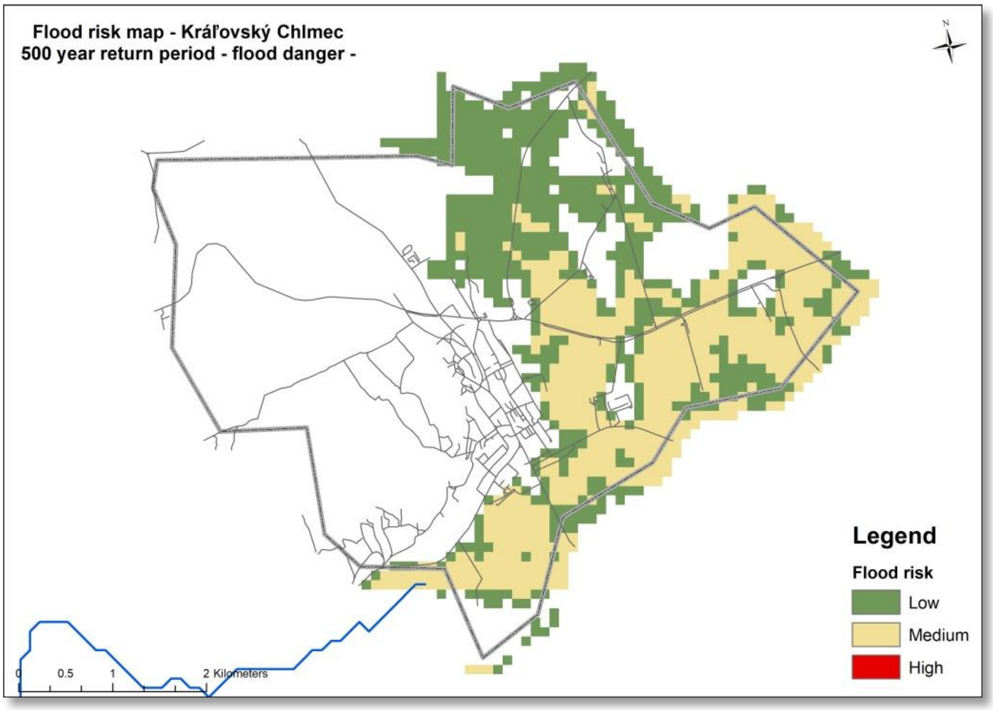

Figure 49. Flood danger - 500 year return period (Slovakia - Král'ovský Chlmec)

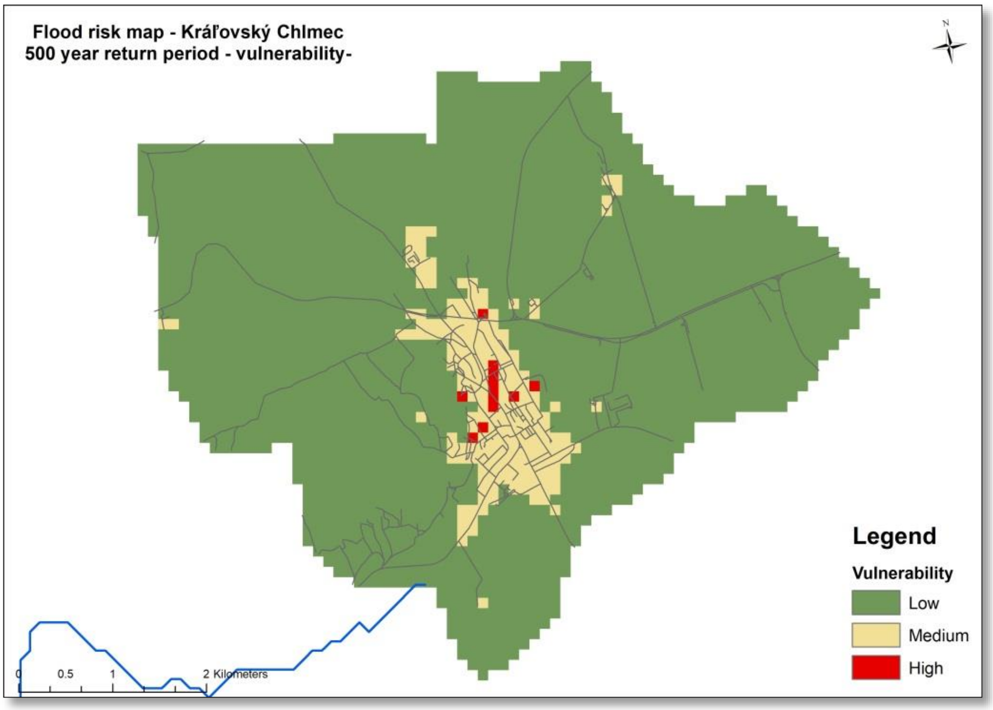

Figure 50. Flood vulnerability - 500 year return period (Slovakia - Král'ovský Chlmec)

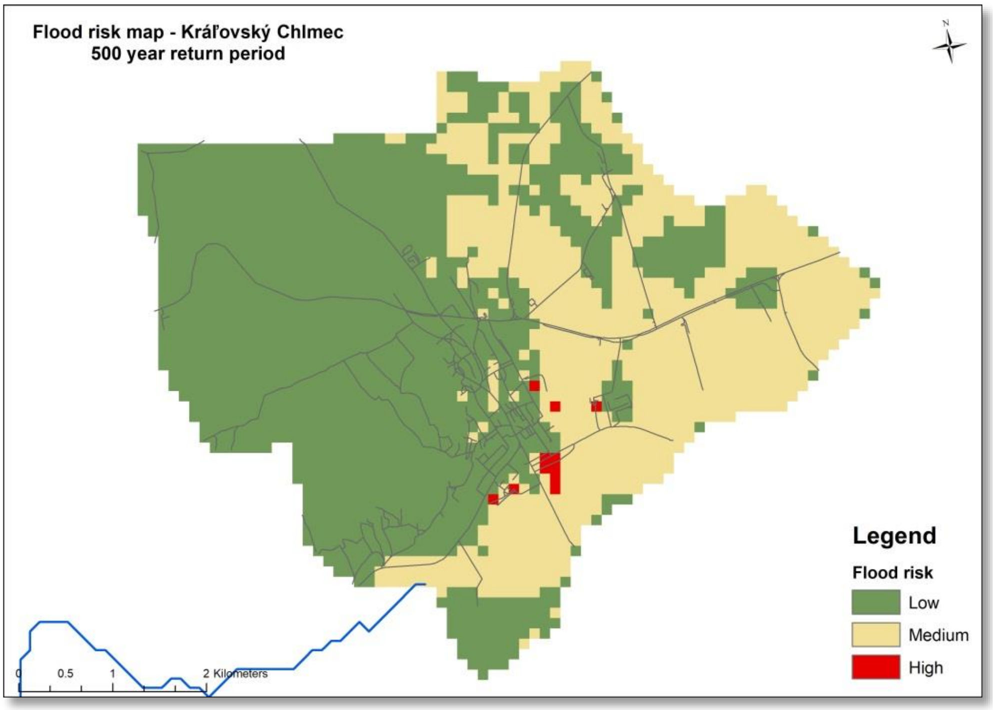

Figure 51. Flood risk map - 500 year return period (Slovakia - Král'ovský Chlmec)

Floods risk maps - Ukraine

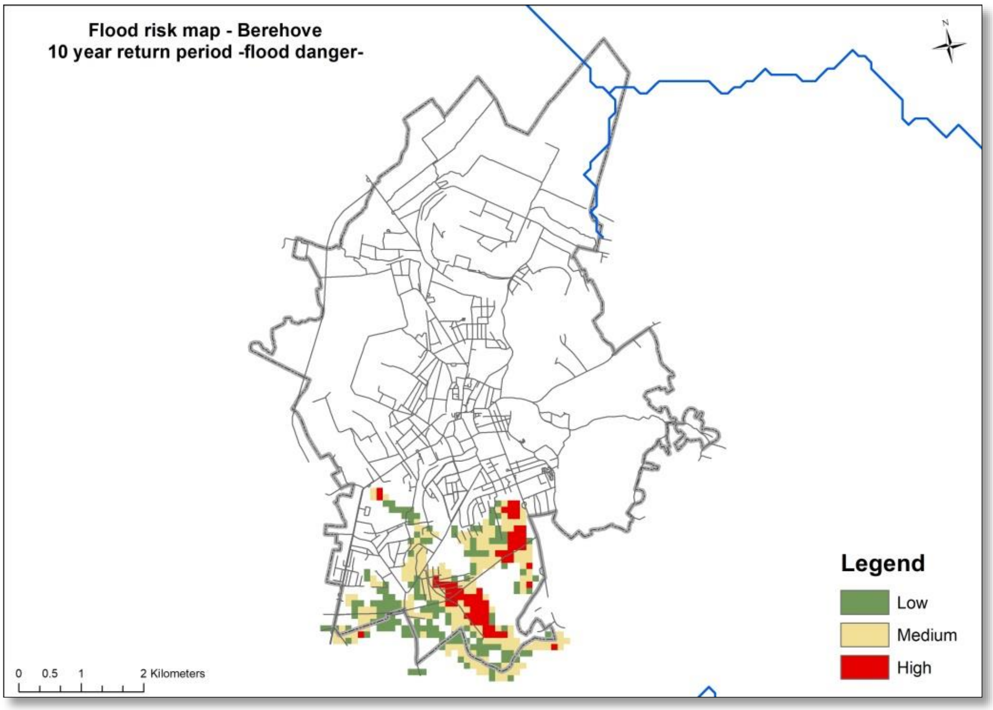

Figure 52. Flood danger - 10 year return period (Ukraine - Berehove)

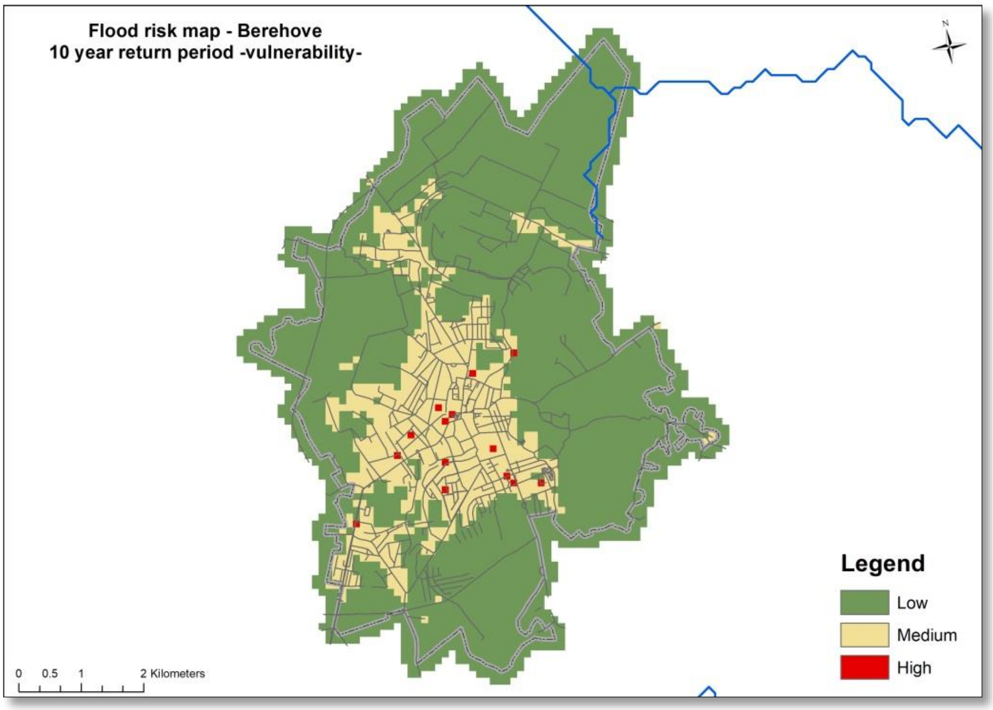

Figure 53. Flood vulnerability - 10 year return period (Ukraine - Berehove)

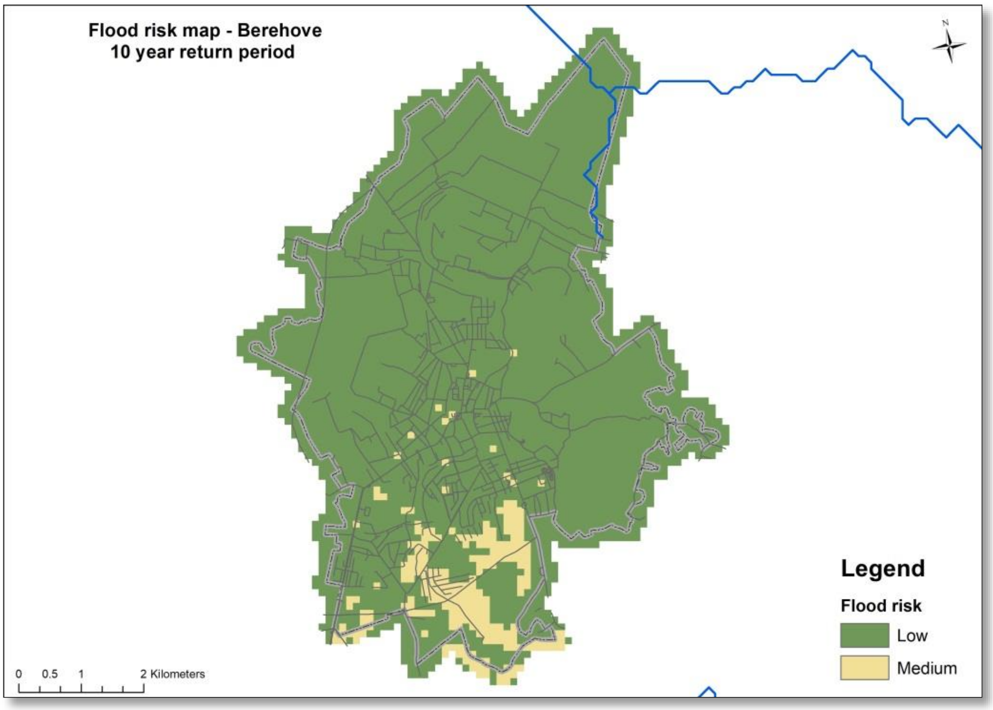

Figure 54. Flood risk map - 10 year return period (Ukraine - Berehove)

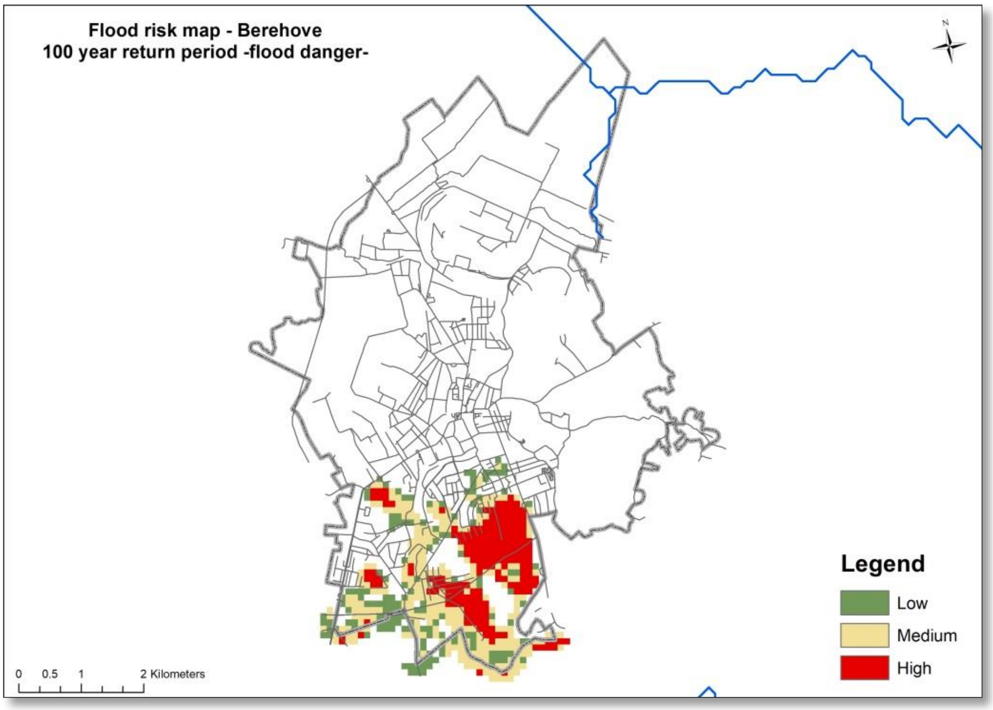

Figure 55. Flood danger - 100 year return period (Ukraine - Berehove)

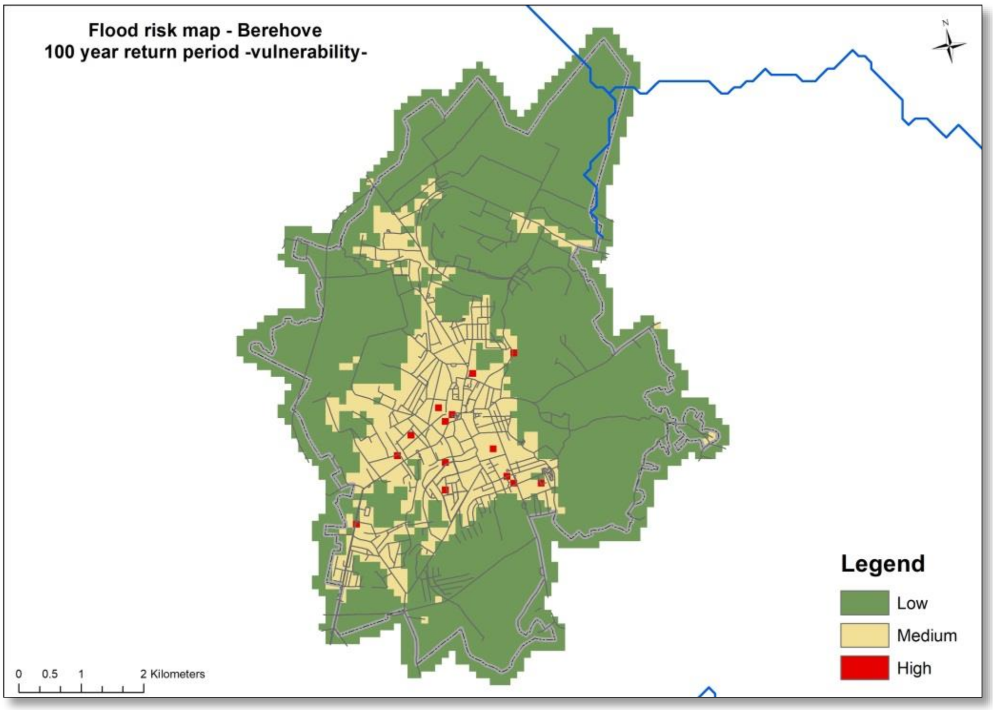

Figure 56. Flood vulnerability - 100 year return period (Ukraine - Berehove)

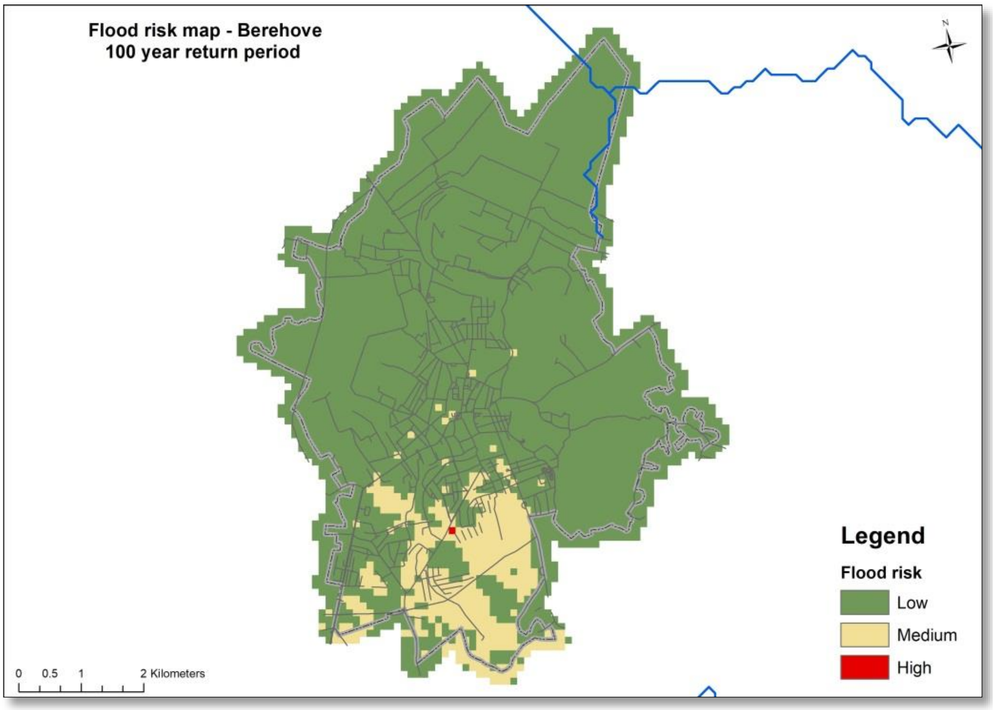

Figure 57. Flood risk map - 100 year return period (Ukraine - Berehove)

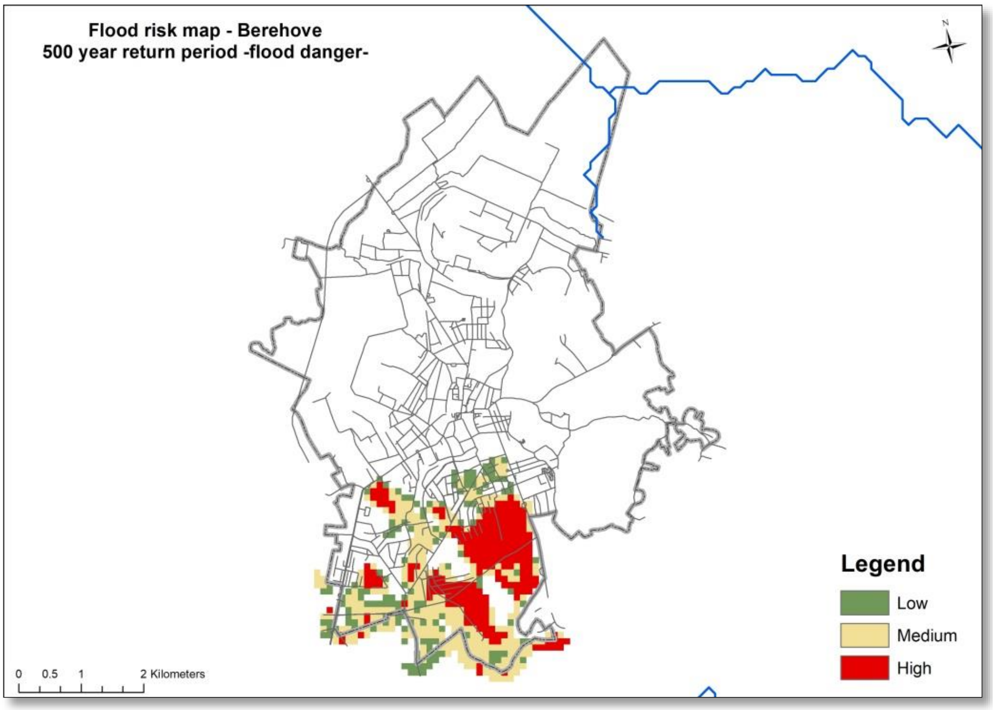

Figure 58. Flood danger - 500 year return period (Ukraine - Berehove)

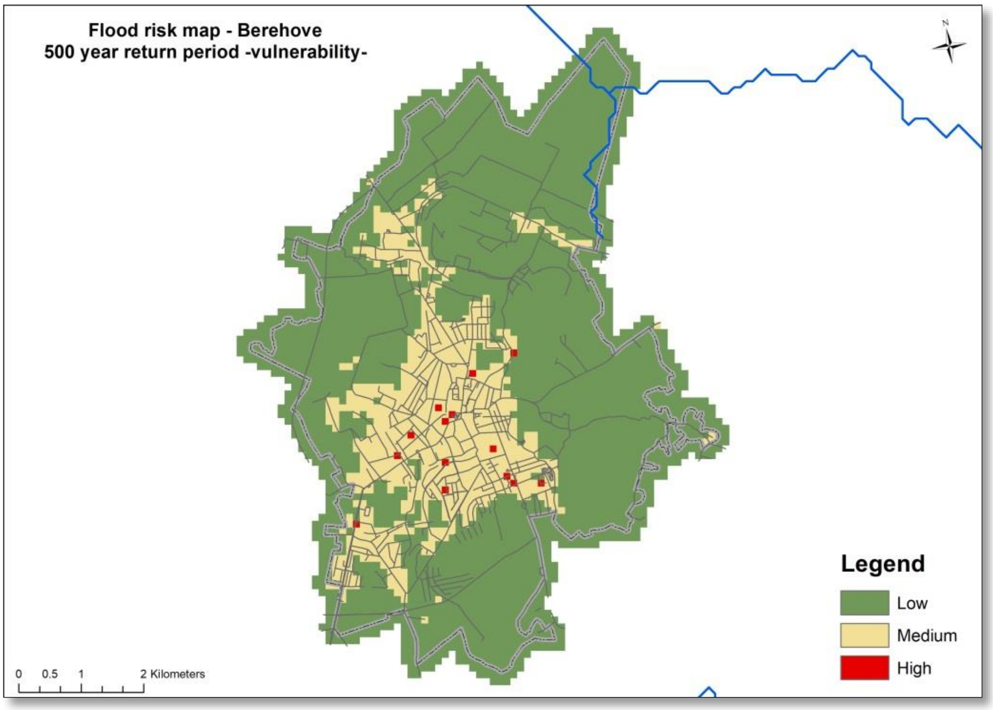

Figure 59. Flood vulnerability - 500 year return period (Ukraine - Berehove)

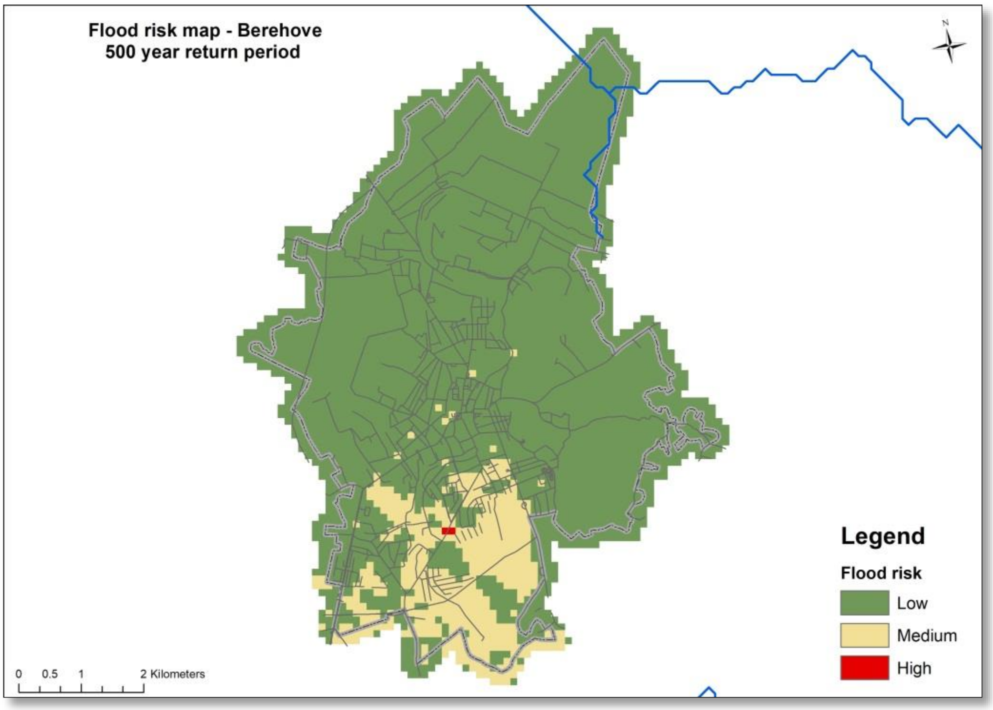

Figure 60. Flood risk map - 500 year return period (Ukraine - Berehove)

Forest fires risk maps

Forest fires risk maps - Hungary

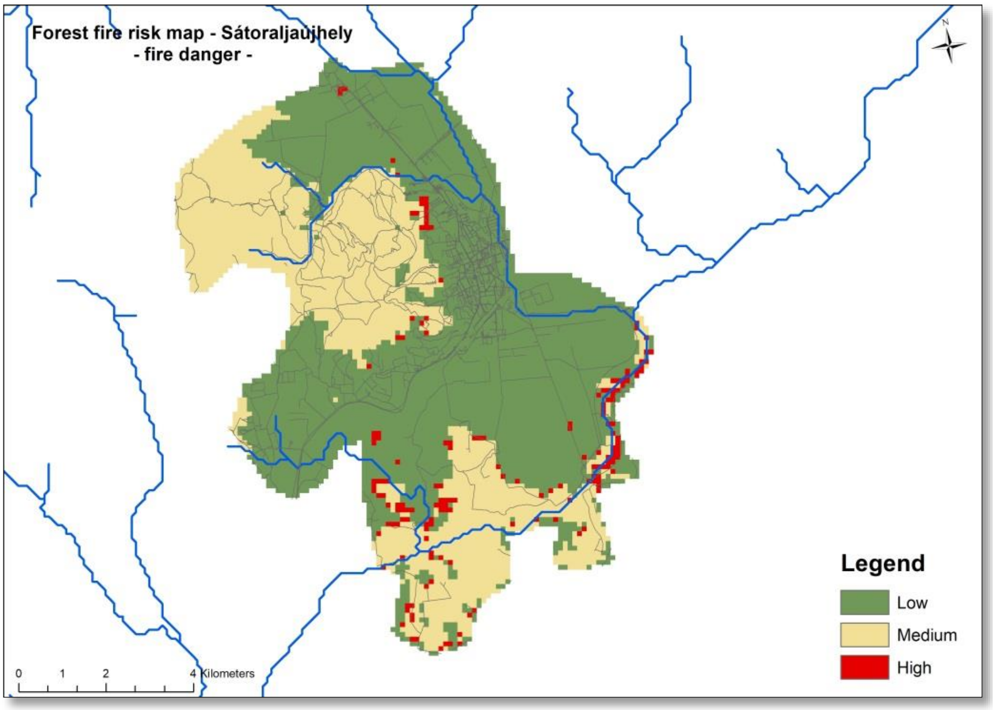

Figure 61. Forest fire danger level (Hungary - Sátoraljaujhely)

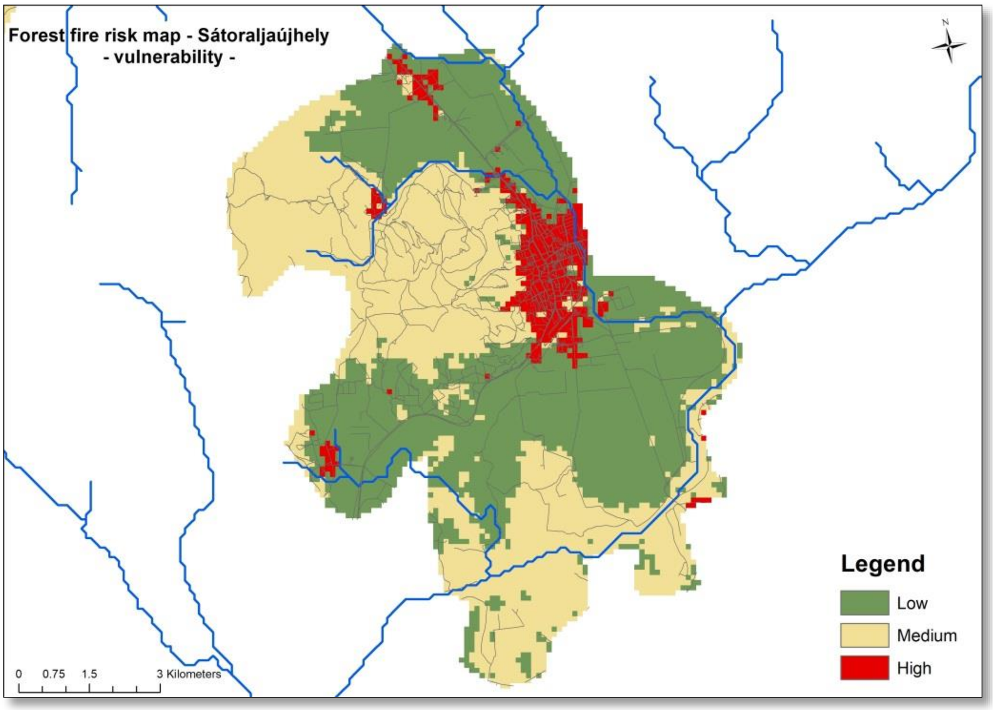

Figure 62. Forest fire vulnerability (Hungary - Sátoraljaujhely)

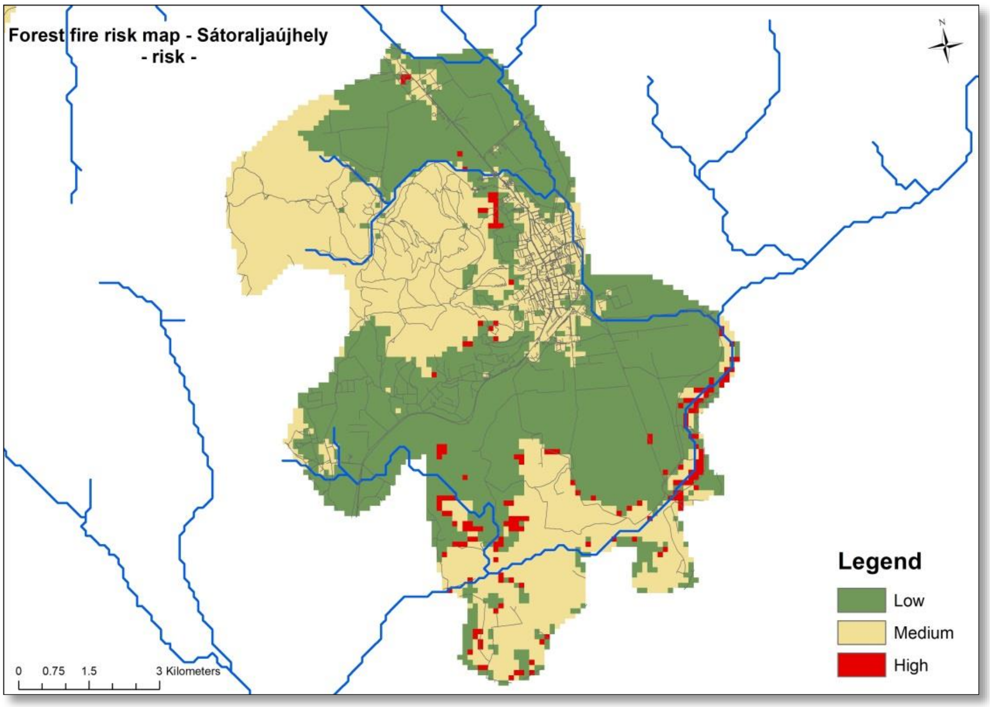

Figure 63. Forest fire risk map (Hungary - Sátoraljaujhely)

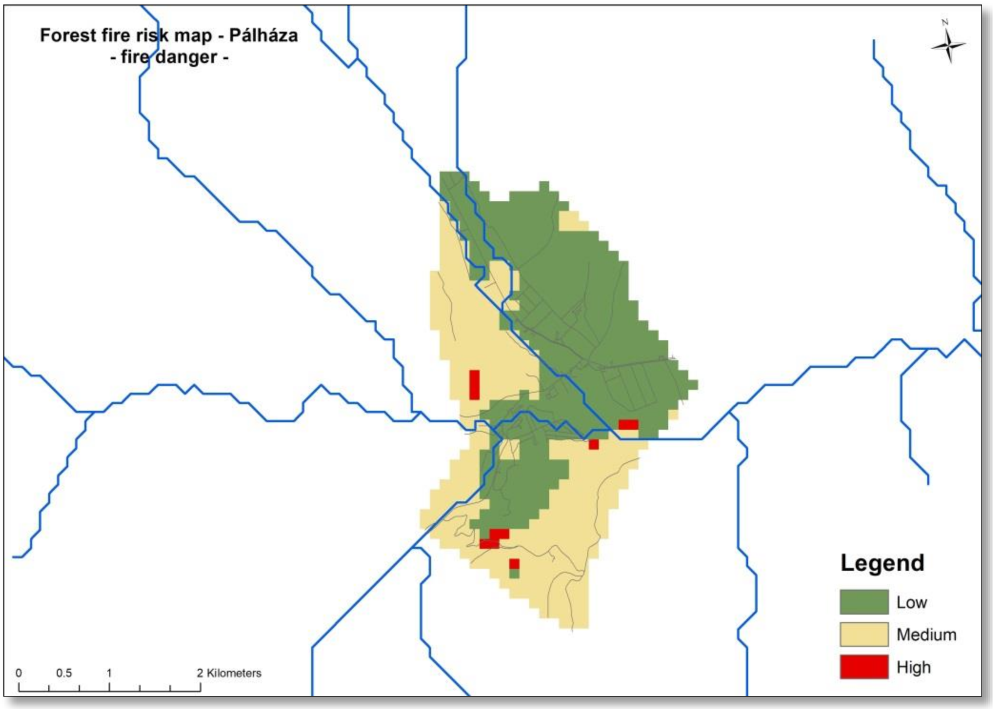

Figure 64. Forest fire danger level (Pálháza)

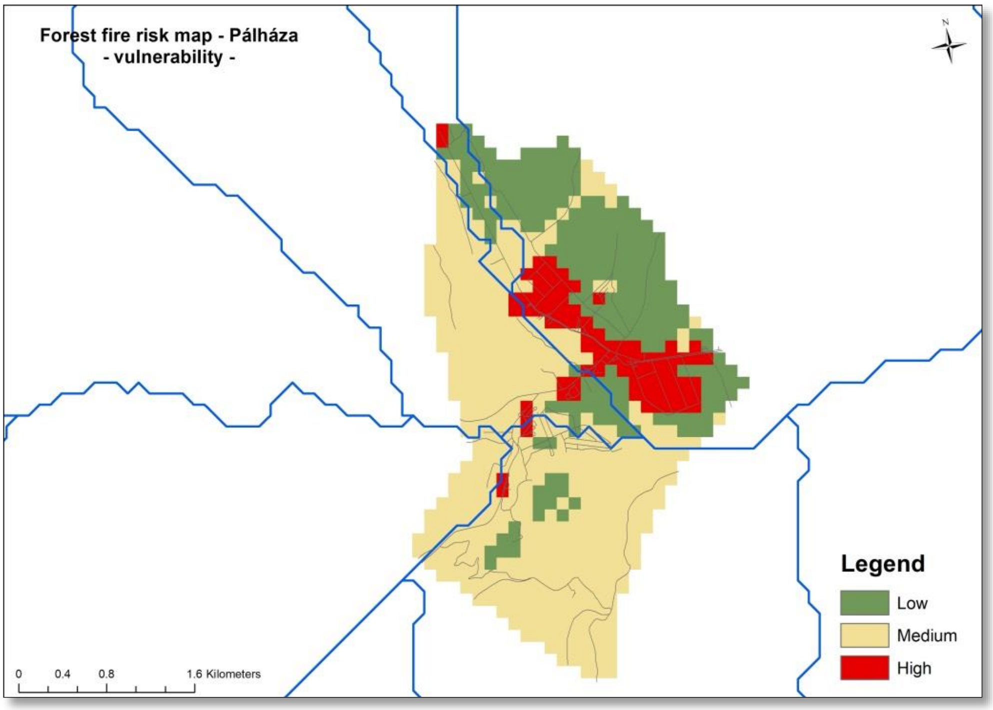

Figure 65. Forest fire vulnerability (Hungary - Pálháza)

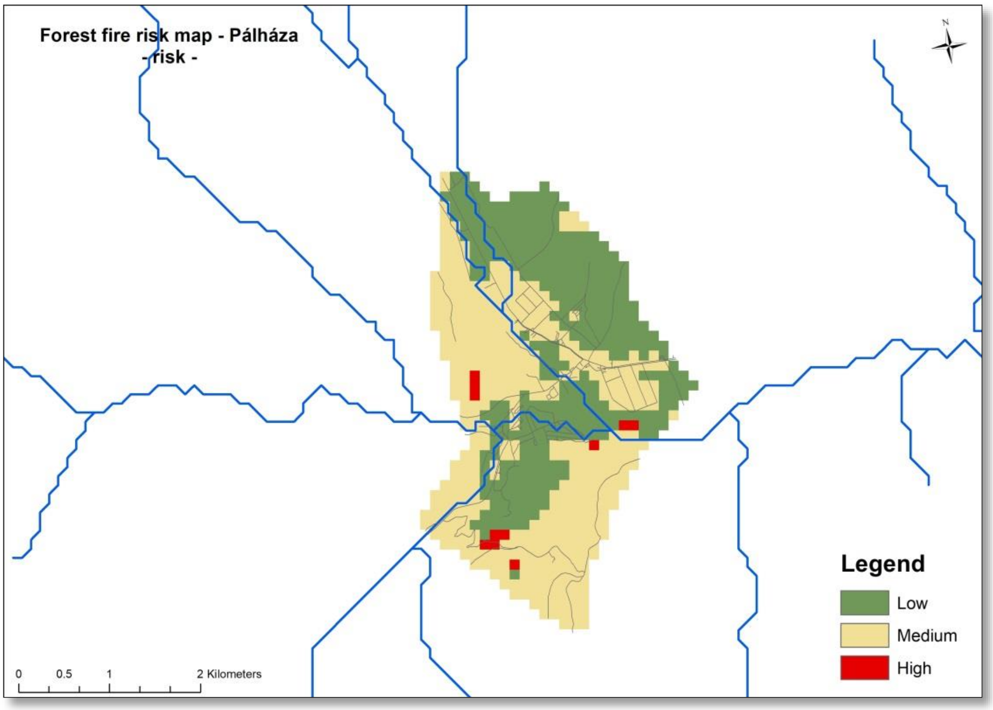

Figure 66. Forest fire risk map (Hungary - Pálháza)

Forest fires risk maps - Romania

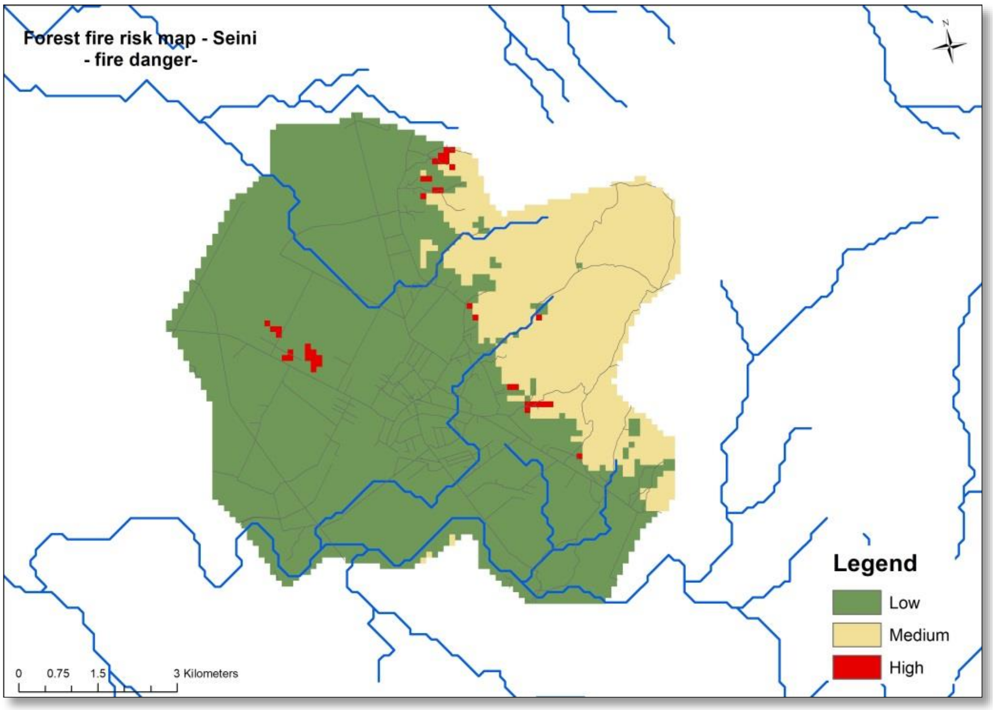

Figure 67. Forest fire danger level (Romania - Seini)

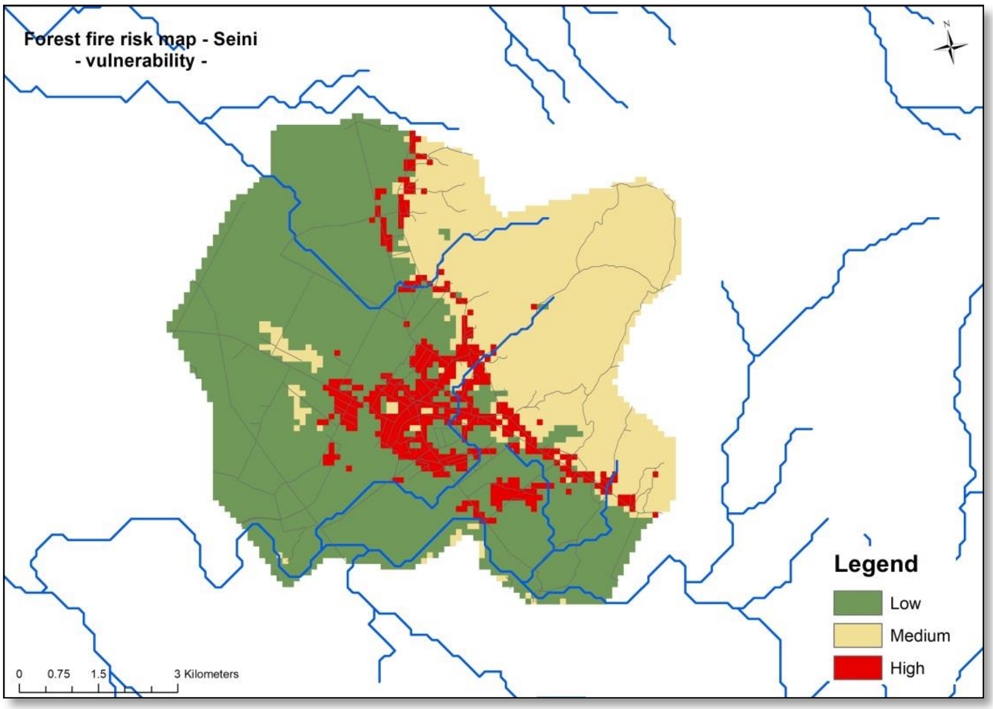

Figure 68. Forest fire vulnerability (Romania - Seini)

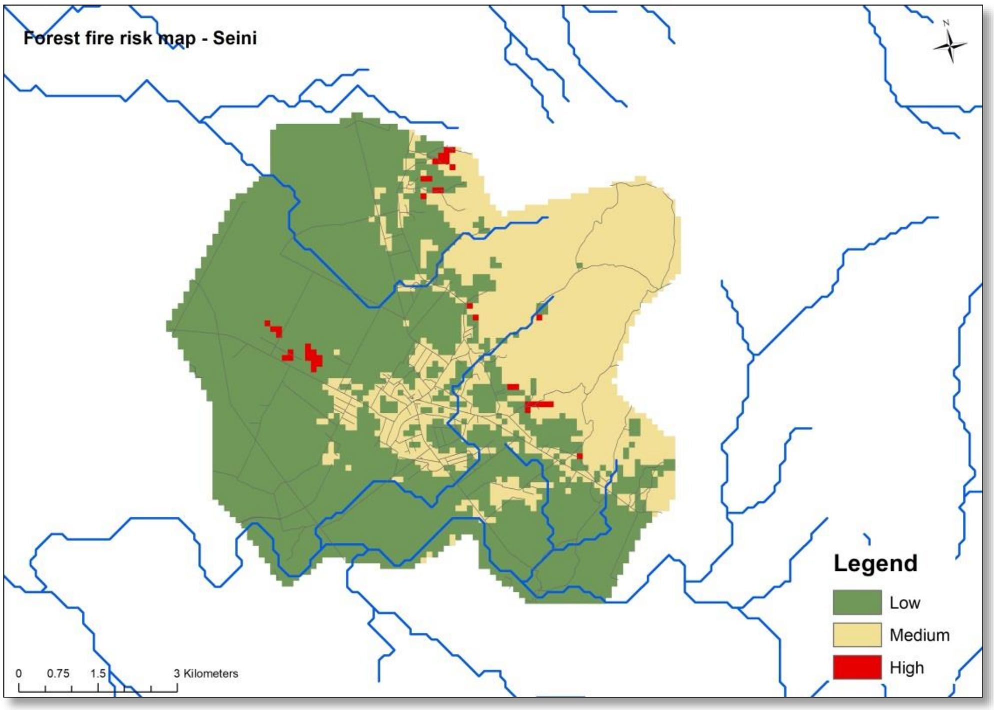

Figure 69. Forest fire risk map (Romania - Seini)

Forest fires risk maps - Slovakia

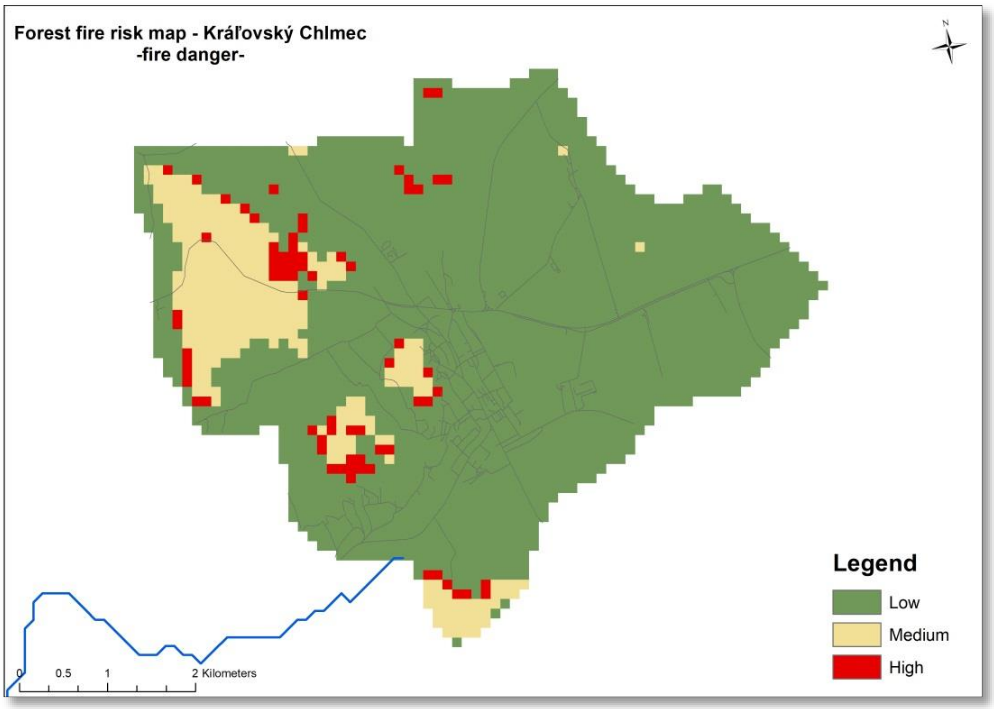

Figure 70. Forest fire danger level (Slovakia - Král'ovský Chlmec)

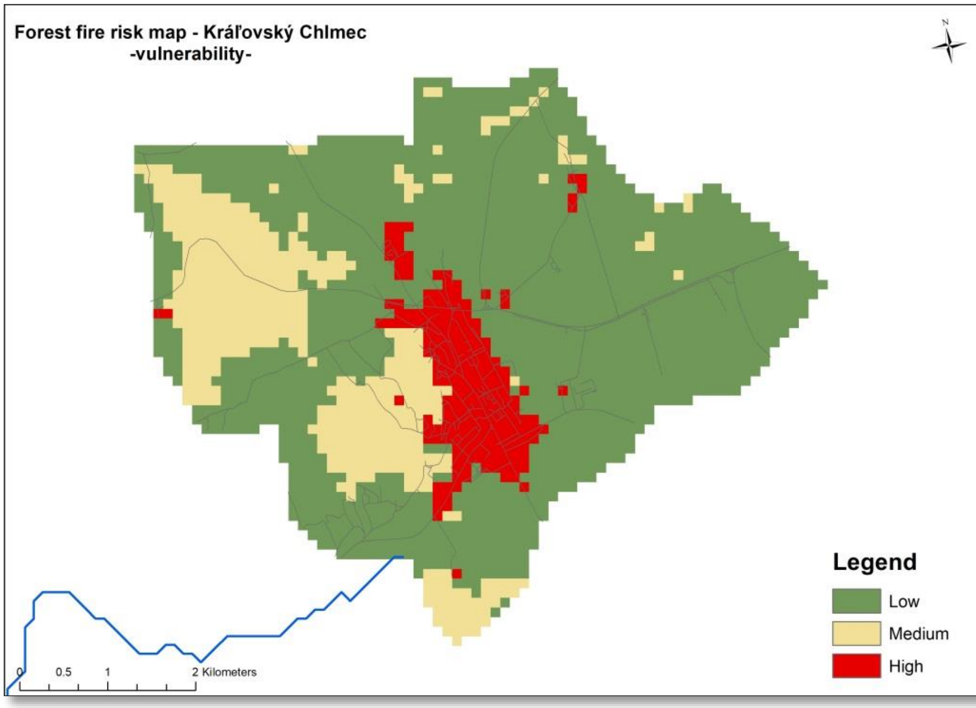

Figure 71. Forest fire vulnerability (Slovakia - Král'ovský Chlmec)

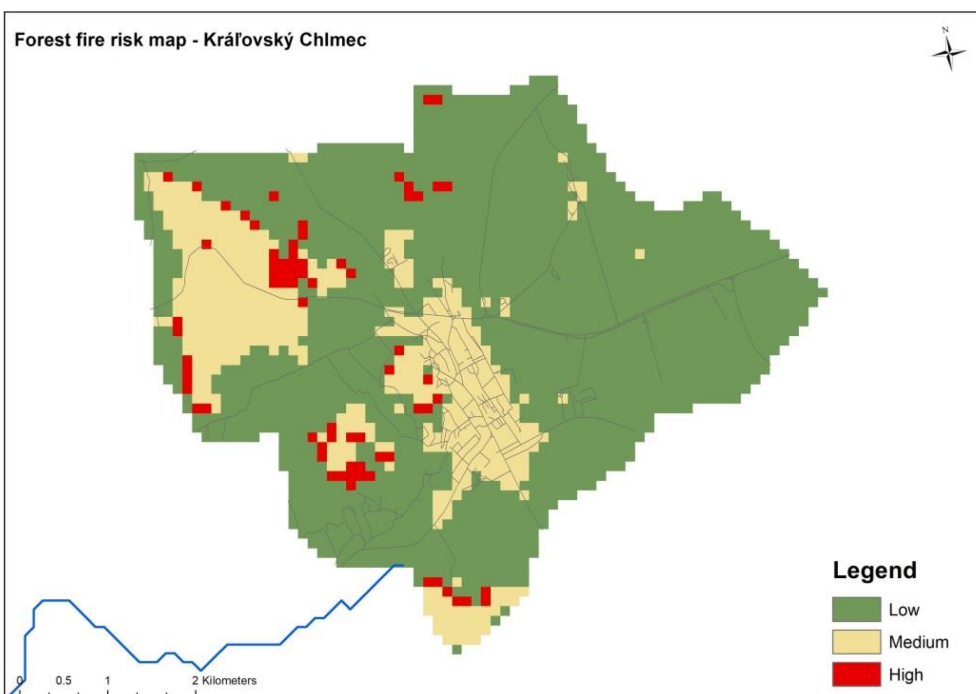

Figure 72. Forest fire risk map (Slovakia - Král'ovský Chlmec)

Forest fires risk maps - Ukraine

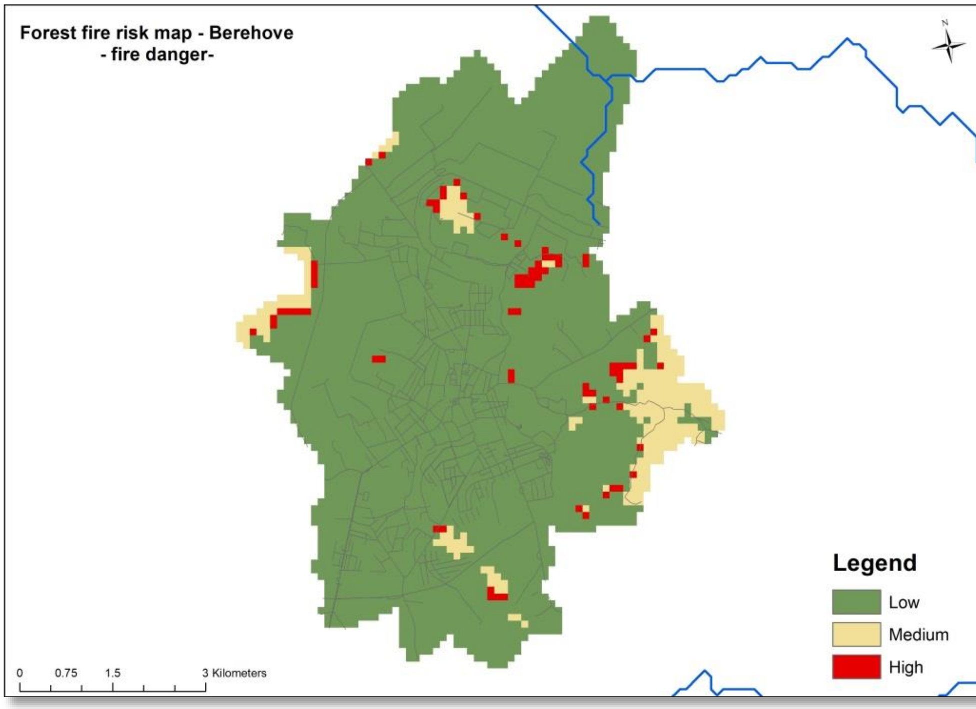

Figure 73. Forest fire danger level (Ukraine - Berehove)

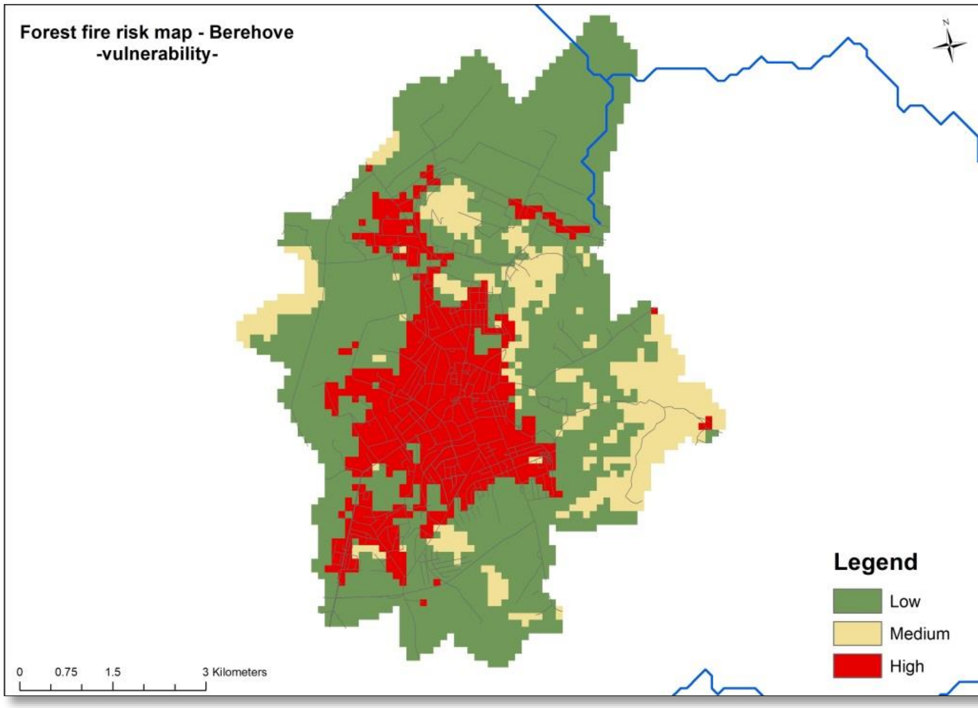

Figure 74. Forest fire vulnerability (Ukraine - Berehove)

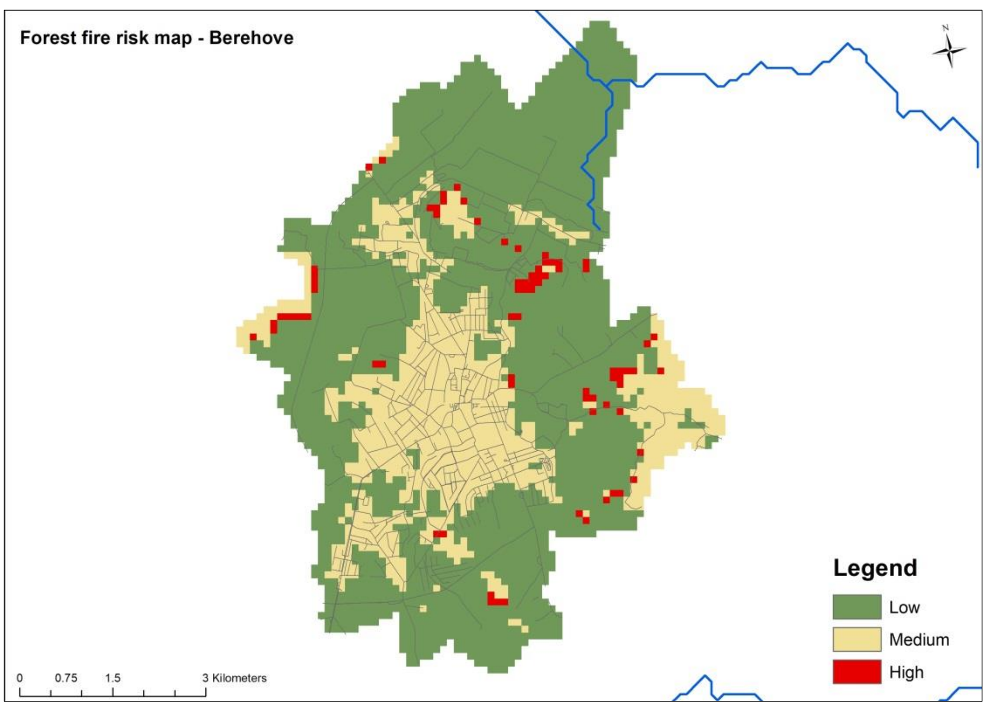

Figure 75. Forest fire risk map (Ukraine - Berehove)

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