

## Modeling of a Potential Pedestrian Path Using the Lowest Cost Method on the Example of the Balkan Mountain Waterfalls



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With the increased interest in cultural and historical heritage, the development of tourism, especially within local communities, has gained more and more importance through the development of walking tours. Walking tours can range from sightseeing in urban centers to natural attractions within a landscape. Organizing hiking tours in nature is similar to trekking and backpacking and can be organized within special, professional and commercial societies that deal with this type of trekking. The beginnings of this type of tourism date back to the 18th century.

Very little is known about the waterfalls of Balkan Mountain, they have not been studied much and the only information about them is available on the Internet and specialized sites dealing with this topic. For now, the most important information about them is represented by the treks posted on these pages by mountaineer teams who know these areas best.

Potential directions for the development of this mountain can be within the expansion of the network of hiking trails. The paper presents only some of the mapped walking trails, which are located on the part of Balkan Mountain that belongs to city Pirot. On the city Knjaževac side, there are trails around the newly built hotel complex and future ski trails. The Pirot part of Balkan Mountain is richer in waterfalls that are more recent, most of them have not yet been fully explored. Some waterfalls are located on inaccessible terrain, some dry up in the dry season, making them inaccessible and invisible. By locating, mapping and marking them on the ground, they become accessible to every walker. Some of the information is available to tourists - walkers, using the Internet, but with the economic investment of local communities in the infrastructure and greater popularization, Balkan Mountain would, over a certain period of time, from the current stage of recognition, become characteristic for hiking routes.

The application of modern technology is very important in the routing of paths. In the paper, a potential path that would connect the waterfalls of two river basins: Jelovac and Dojkinci rivers was analyzed using GIS technique. Angles of inclination and height were taken as the main parameters, and by including other factors (soil composition, hot and cold exposures, prohibitions, etc.), specific purpose paths can be calculated that would further popularize this mountain.

All the discovered waterfalls of Balkan Mountain are presented by cartography. An analysis of the existing footpaths on which the waterfalls are located revealed that some of them are not included, especially those located in the Jelovac river basin.

Also, the same waterfalls, by footpaths, are not connected with the waterfalls of the river of the neighboring basin, the Dojkinci river. The aim of this work is to propose the best approach to the route of the waterfalls of Balkan Mountain, for which no treks have been made, using the method of least costs with the help of GIS and DEM, which would connect the waterfalls of the neighboring watersheds. The length of the resulting path is 5.04 km, the difference in height from 1,356 to 1,769 m, connecting the waterfall Eagle Stone (watershed of the Dojkinci River) and the waterfalls of the Jelovac River.

**Key words:** footpath, waterfall, Balkan Mountain, analysis, Serbia, modeling, GIS