

## YRE Eco Article (16-19): **VOLUJICA IS TRAVELLING INTO THE WORLD - still**

"Volujica is travelling into the world." With these words was one of the first articles about the devastation of the hill Volujica headlined in the newspaper "Barske novine" (Bar Newspaper) in November 2000. Thus began a story the roots of which reach as far back as the year 1910, when the stone from Volujica was used for the construction of the "Old Port", the future Port of Bar.

Volujica Hill is located next to the urban area of the city of Bar, above the Port, and separates the Bigovica Bay from the spacious bay of Bar, for which it serves as a natural breakwater. In the past it had a very important role in the development of the city, from prehistoric times, when the first human settlements were recorded, to the twentieth century, when the first radiotelegraphic station in the Balkans was built on the hill of Volujica.

The geological structure of the hill consists of carbonate sediments, such as limestone, dolomite and materials which derive from flysch and alluvial sediments that form an integral part of the field of Bar.<sup>1</sup>

Stone from the hill of Volujica started being used during the time of King Nikola, and only until the year 1988 as much as 3,260,293 m<sup>3</sup> of limestone ridge was excavated for the construction of piers, breakwaters and infrastructure facilities in the Port of Bar, and thereby one of the most beautiful caves in Montenegro - Pristanska Pećina (cave) was destroyed. Volujički dolomite started its overseas travels in 1978 when the export business to Africa (Gabon, Libreville) began<sup>2</sup>. In the second half of the nineties the journeys of Bar stone continued: the main destination was - Italy. In year 2000 the Port of Bar started rehabilitation of slopes of the hill of Volujica - the old working site, but that was of a short breath, because instead of that the Port of Bar starts the rehabilitation of the breakwater, again with Volujički stone. Then two more quarries were opened from where all the stone material was extracted: stone blocks from one to five tons, as well as quarried stone, which were necessary for the works on the breakwater<sup>3</sup>. The export peak occurs in the period 2004 - 2007, when the Bar maritime company "Nimont" exported 700,000 tons of stone per year. To date, the amount of exported limestone reached four million tons<sup>4</sup>. Stone export continues.



*Volujica in years 1933 and 2011: the degree of devastation is clearly seen*

Gradually, Volujica is disappearing, and in places where the stone is quarried large ugly scars are occurring in the form of bare karst, which first strikes the eye when entering Bar with the highway from the direction of Sutomore. But the problem is not only that of aesthetics. As contemporary ecology interprets, everything in nature is linked in cause-effect relationships, and the destruction of one ecosystem necessarily entails a series of impacts on other ecosystems.

<sup>1</sup> Assessment study of the environmental impact of construction of a regional sanitary landfill on the site Možura for the municipalities of Bar and Ulcinj (Beograd, April 2010)

<sup>2</sup> News paper "Luka Bar", November 2000

<sup>3</sup> Ibid. October 2000

<sup>4</sup> Portal Bar Info, 2012



*View of Volujica from the direction of Sutomore*

The Volujički cliff with its hinterland has several times been the subject of bare land afforestation in organised activities in the period from the forties to the eighties of the twentieth century, and until the quarry was opened this locality was the habitat of black pine and cypress, and on the rims of Volujica there was Aleppo pine. Macchia is replaced with evergreen trees of conifers in the foothill, and among the plant species there is a significant number of vulnerable macromycetes<sup>5</sup>. The faunal value was represented in the jackal - golden jackal, which the rocky hills suit best, but because of habitat loss, both it, like rabbits, partridges and Mediterranean sunbleak, completely disappeared from the area where the quarry operations began.

Regardless of the abundance of these species, their habitats should not be destroyed – and in the case of Volujica, for several reasons. The first is the basic one, environmental, which treats each individual of some type as the last, trying to protect the natural environment and existing species for future generations. The second is the impact that the destruction of Volujica may have on human beings and other species that do not have direct contact with the aforementioned habitat. This impact is reflected through eventual change in the microclimate of the bay of Bar, and thus the living conditions within this zone.

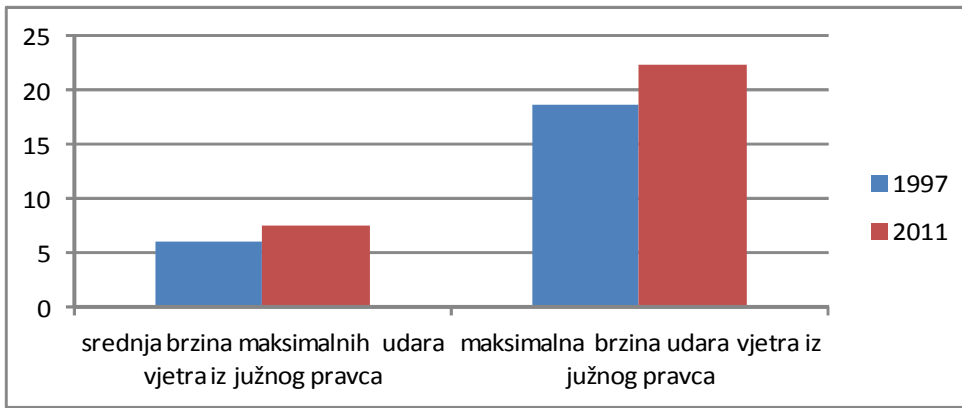
The data of the Hydrological and Meteorological Institute of Montenegro from the year 1997, the period prior to intensive exploitation of Volujički stone, say that the average speed of maximum wind gusts (the most dangerous for Bar) from the south direction were then 6 m/s, and that the maximum blow from the south direction had a speed of 18.7 m/s. The frequency of occurrence of maximum wind gusts from the south direction was 2%. Comparative data from the year 2011 show that the average speed of maximum wind gusts increased to 7.5 m/s, the maximum blow from the southern direction now has a speed of 22 m/s, and the frequency of occurrence of maximum wind gusts from the south direction is 4% (figures 1 and 2)<sup>6</sup>.

There is no evidence of a connection of these meteorological parameters with the exploitation of the Volujica hill, but the first analysis carried out by the Hydrological and Meteorological Service of Montenegro (HMZCG) in early 2012 speak in favour of this thesis.

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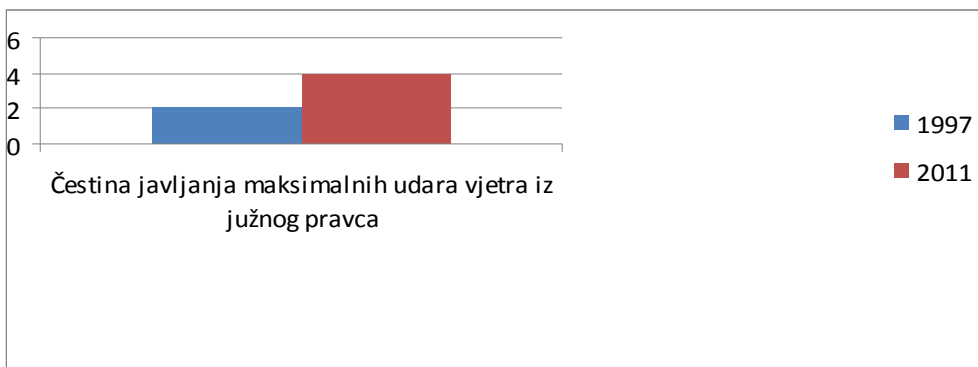
<sup>5</sup> Tršić Jadranka, Thesis: Macromycetes vulnerability of the coastal areas of the Adriatic coast (2010)

<sup>6</sup> Hydrological and Meteorological Service of Montenegro - HMZCG



(Figure 1: expressed in m/s)

Average speed of maximum wind gusts from the south direction    Maximum wind gusts from the south direction



(Figure 2: expressed in %)

Frequency of occurrence of maximum wind gusts from the south direction

Exploitation of stone from the Volujica hill has been one of the most profitable, if not the most profitable, business in the Municipality of Bar for many years, and it is not realistic that in the near future the Volujički quarry will stop working. When that, however, happens, the question remains - how to carry out rehabilitation of the ruined area. In our country no specific money has been set aside in the past for revitalisation of abandoned quarries or parts of them, but that area was left over to natural re-cultivation, and that process is extremely slow.

Revitalisation of the quarries implies restoring "the original life of" the space, it is necessary to meet the environmental, aesthetic, economic and social criteria. Technical rehabilitation is to ensure and provide the terrain, if there are slopes, landslides, etc. Biological remediation is reforestation, improvement of devastated areas, and is often limited for several reasons, mostly due to the aridity of the terrain.

There are very successful examples of revitalisation of abandoned quarries. In Croatia they are biologically revitalised with black pine, black ash and sycamore, hazel and ivy, until restoring a balance in the ecosystem. The football stadium in Braga, Portugal, built in 2003 within the Monte Castro quarry; the Resort "Pierres et Vacances" in Monaco was created after the old quarry was "filled with" modern architecture, and the quarry in Vinkuran in Istria, from which stone was excavated for the construction of the Arena in Pula, was turned into a museum of stone, a sculptor workshop, sculpture park, and part of it in areas for sports and recreational activities.

We do not know what will happen to Volujica. Will it really sail into the world? Only fear is left to the inhabitants of Bar and the ruthless human hand, which is, literally, breaking everything in sight.

(Note: the photos are taken from the photo archive site: Bar Info)

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