

Capacity building for conservation of the subterranean biodiversity of the Skadar/Shkodra Lake basin (Montenegro and Albania)

Krepitev zmogljivosti za varstvo podzemne biotske raznovrstnosti v bazenu Skadarskega jezera (Črna gora in Albanija)

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Here we briefly describe the capacity building part of the project »Assessment of the endangered subterranean biodiversity of the Skadar/Shkodra Lake Basin (Montenegro and Albania)« conducted in 2016 with the support of the Critical Ecosystem Partnership Fund (CEPF, www.cepf.net), a global nature conservation fund which enables civil society to protect the world's biodiversity hotspots. The partnership included participants from the Tular Cave Laboratory as the leading partner, and four more organisations: the Biospeleological Society of Montenegro (Montenegro), University of

Shkodra »Luigj Gurakuqi« (Albania), the Scientific Research Centre of the Slovenian Academy of Sciences and Arts (Slovenia), and the Department of Life Sciences at the University of Trieste (Italy). The project continued the work started in 2013–2014 during Tular's prior CEPF project in Bosnia and Herzegovina and Montenegro (Aljančič et al. 2014, Gorički et al. 2017). The project in 2016 was both research and capacity building orientated, focusing on three main objectives: i) assessment of the endangered subterranean biodiversity; ii) public promotion and academic outreach, and iii) extending the Trans-Balkan conservation alliance and capacity building.

The project has enhanced the Slovenia–Montenegro–Albania–Italy trans-border cooperation on conservation of the endangered subterranean biodiversity and protection of groundwater, through organizing events and meetings, study visits and specialized trainings, connecting local communities as well as non-governmental and governmental organisations.

Particular attention was given to the increasing negative anthropogenic pressure on karst, in particular the pollution of groundwater, which receives virtually no concern in Montenegro, while the situation in Albania is only worse. Inappropriate management of karst and its ecosystem services, lack of practical response and low public awareness result in high pollution of groundwater and serious subterranean habitat destruction. The following main threats to the subterranean habitats of the study area were identified during this project:

- unregulated infrastructure (sewage systems only in larger towns, with ineffective wastewater treatment; public landfills and illegal dumps placed on vulnerable karst locations); one such case is the town of Cetinje, with an underground outlet into Skadar Lake through the cave system of the Obodska pećina;
- agriculture, through massive use of fertilizers, particularly viticulture in the catchment area of karst springs;
- no organized trash collection and recycling in rural areas, rubbish dumped in nature (nearly all caves around settlements serve as illegal dumping sites);
- unregulated construction of tourist facilities, mostly on the coast of the Adriatic Sea and Skadar Lake, with notable pressure on

important trans-border biodiversity areas of Montenegro and Albania, such as Buljarica, Ulcinj Salina, parts of Skadar Lake National Park, etc.;

- uncontrolled growing of built-up areas around Shkodra's karst region (Albania) coupled with exploitation of new quarries and intensive water pumping for drinking water necessities for the local community;
- several type localities of endemic subterranean species have already been destroyed (B. Sket, pers. comm. Apr. 2016).

The above mentioned threats were addressed in four key capacity building activities, which involved young researchers, scientists, conservationists, as well as local communities in the study area:

1. Training for vertical cave explorations: At the start of this project, there was only one trained caver still active in Albania (Enis Shehu, pers. comm. Oct. 2016), meaning that the subterranean bio- and geodiversity hidden behind vertical parts in caves would be almost impossible to access without assistance of foreign experts. To build safe cave exploration capacity, Albanian conservationists were invited to attend a 5-day course to learn basic caving knowledge and skills. The instructor-led training was focused on the safe use of single-rope technique, needed to visit vertical caves. The course was first led indoors on artificial climbing walls in Tirana (Fig. 1a), followed by two-day outdoor practice in four caves in the karst area on the northeast side of Shkodra Lake, Albania. The training was successfully accomplished by ten young Albanian researchers and conservationists, all attending fieldwork training and workshop.

2. Training on fieldwork in caves: Participants continued with practical training on survey and protection of karst was performed during caving practice trips mentioned above. There, sampling techniques to collect cave animals, as well as methods to collect water samples for eDNA analysis for the presence of proteus were also demonstrated during the fieldwork.

3. International workshop on biodiversity of the Southeast Dinaric Karst: In order to raise attention of the Albanian and Montenegrin nature conservation community on the research and conservation of the Southeast Dinaric karst, the workshop »Conservation of cave biodiversity in

Southeast Dinaric Karst« was organized on 29. 10. 2016 in Shkodër, Albania. The workshop gathered twenty participants from six countries presenting their experiences, methods and solutions, participating in the discussions on protection of the endangered karst biodiversity of Montenegro and Albania. Students from Albania and Montenegro were invited to present their recent work (conservation action within their NGOs or their research projects at universities) through scientific communications. For many of them, this was the first opportunity to present their work in English, to a specialized public (Fig. 1b; Tular 2016).



Figure 1. A: Single-rope technique training for safe cave exploration, conducted at the »Rock Tirana« climbing wall in Tirana, Albania (photo: Magdalena Năpăruș-Aljančić); B: Participants of the international workshop »Conservation of cave biodiversity in Southeast Dinaric Karst«, Shkodër, Albania, 29. 10. 2016 (photo: Gregor Aljančić).

Slika 1. A: Tečaj vrvene tehnike na plezalni steni »Rock Tirana« v Tirani, Albanija (foto: Magdalena Năpăruș-Aljančić); B: Udeleženci mednarodne delavnice »Varstvo jamske biotske raznovrstnosti na jugozahodu Dinarskega krasa«, Skadar, Albanija, 29. 10. 2016 (foto: Gregor Aljančić).

4. International team visits: In addition to visits from Slovenia to Albania and Montenegro, three most perspective young Albanian biologists were invited for a short study visit to Slovenia. The program was adapted according to their field of interest in nature conservation, visiting a wide range of nature conservation and research institutions, meeting their Slovenian colleagues, active in research and conservation of subterranean biodiversity, herpetology, bats and large mammals.

However, an important outcome of the project was the extension of an informal trans-boundary *Proteus* conservation network (Aljančič et al. 2014), connecting five conservation NGOs in Albania (Năpăruș-Aljančič et al. 2016). Capacity building performed during this project included training on the conservation of groundwater, which was explained through cases of pollution and their impact on groundwater biodiversity in Slovenia, showing similar examples in the study area. Particularly valuable was the involvement of partners and local communities in fieldwork (information on caves and karst springs, sources of pollution), as well as outreach activities. Conservationists from Albania and Montenegro were invited to advocate protection of karst biodiversity, and groundwater, their main source of drinking water.

The above described project had several outcomes related both with scientific and capacity building activities, which have enhanced a long needed exchange of information, knowledge and practice between the northwest and southeast Dinaric karst. In the scientific part of the 2016 project we reconfirmed the presence of proteus environmental DNA trace at several sites in Montenegro, pointing at the extension of its range as far as to the NW edge of Skadar Lake. We also sampled the subterranean invertebrate fauna of selected caves in the Skadar/Shkodra Lake Basin (samples in determination at specialists), improving the general knowledge on the subterranean biodiversity of the study area (Năpăruș-Aljančič et al. 2017).

The overall outcomes of the project showed that the activities performed during the capacity building were bringing an added value to the scientific part of the project, building bridges and trustworthy partners for future international

conservation actions and research in the Southeastern Dinaric karst.

Further capacity building is needed to support countries such as Albania and Montenegro – in order to establish their research infrastructure, to start more ambitiously the study and conservation of a potentially very rich spot of the subterranean biodiversity.

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