

## Final Project Evaluation Report

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Your Details	
<b>Full Name</b>	Emina Šunje
<b>Project Title</b>	Establishment of the regional monitoring program for the Dinaric populations of alpine salamanders
<b>Application ID</b>	24291-B
<b>Grant Amount</b>	£10,000
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<b>Date of this Report</b>	07.02.2019

**1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.**

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Establishing the regional monitoring scheme for the long-term assessment of demographic changes in chosen populations of the alpine salamanders from the Dinarides				We managed to establish a clear and safe protocol for carrying out this pioneer project in the future. The only issue is that in Croatia the animals are not as active above ground as in B&H since in Croatia only 30% of field work visits revealed successful in terms of finding and marking individuals. This means that the time to estimate demographic changes in these populations is almost the double than expected.
Assessing the health of individuals in the wild (Rana virus screening)				All the screened individuals (n=108) were negative for Rana virus (78 tested from Bosnia and Herzegovina and 30 from Croatia).
Promotion of the project and the alpine salamander (in general) as an important animal resource				The mural made in Jablanica was far way more successful in achieving this objective but here we marked "partially achieved" because we did not manage to finish the planned promotional movie during this year.
Enabling colleagues in the region for conducting similar research in the future				The conducted (technical) education programme (workshop) was very useful for our regional colleagues. They learned how to use relevant software for data collection and population ecology analysis.
Education of students				We had two presentations on this project including a detailed lesson about CMR (capture-mark-recapture) techniques in ecological studies. One was done for students at the University of Zagreb and one for students at the University of Sarajevo.

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.**

We had several unforeseen difficulties:

- a) During the marking of the individuals on the first field work, the sedation (anaesthetic) protocol combined with our methodology of PIT tag insertion did not work as expected. We used the substance MS-222 as amphibian anaesthetic (approved from FDA) during the field work and, although it sedated the salamanders as expected, its duration was too short. Because of this, the animals would wake up in within 15 minutes after the PIT tag insertion in their bodies, and the wound that was made by the needle during this procedure was still opened which resulted in the rejection of the PIT-tag from the animal along with the urinary bladder or part of intestine (in 50% of individuals that underwent the procedure). Unfortunately seven individuals died because of this issue. This was noticed only during the first field work visit in Croatia (June 2018) because during the testing of the equipment and methodology (May 2018) we used clove oil as anaesthetic protocol instead of MS-222. The clove oil did not cause this problem because it kept the animals asleep for c. 15 hours which provided plenty of time for the wound to close (at least partially) and prevent the rejection of the PIT tag (during this trial in May 2018 we successfully chipped 18 individuals and all of them survived and are still alive). Due to the fact that 15 hours of sedation was too long to wait to release the animals after the PIT tag insertion in the field conditions, we switched from clove oil to MS-222 because we knew that it would last much less but we were unaware of this side effect. The problem was solved in a way that we stopped with PIT tagging of new individuals after we saw that this was happening and for the next field work we bought a surgical glue with which we were able to close the wound created during the PIT tag insertion and after this we did not have any more problems with the animals. We housed more than 20 individuals taken from the field after the PIT tagging in our laboratory to observe their recovery. All of them showed great progress and were released back to nature after 15 days.
- b) Another issue was that the salamander activity season in Gorski Kotar (Croatia) was quite bad in 2018. We managed to register salamanders during only two field work occasions (out of five performed) which meant that we did not collect enough data to estimate the population size in this area because we marked only 39 individuals. Fortunately on Mt. Prenj in Bosnia and Herzegovina during seven field work trips we marked a total of 78 individuals. This experience thought us that the estimated time required to collect the data for such kind of research is considerably higher than expected.
- c) I did not find time to apply for other funds that would support this project mainly due to the unforeseen obligations related to my regular job combined with my unplanned pregnancy. These private and unexpected events resulted in the fact that we did not manage to finish the planned promotional movie about the alpine salamander from Mt. Prenj although the initial activities for the realisation of this have been undertaken (e.g. the initial 3-minute long animation, which will be the beginning of the movie is done – we can send it to you if requested). We plan to finish this movie during the year 2019.

**3. Briefly describe the three most important outcomes of your project.**

- 1) Establishment of a safe protocol for a long term monitoring of demographic changes in alpine salamanders from the Dinarides.** This is the main and significant outcome that resulted from this project. The study that we conducted is a pioneer one, even in Europe in general, therefore it was very challenging to make things work. The CMR methodology, although an invasive technique, is the most efficient one to assess information that is crucial for the long term monitoring and conservation of endangered species. We can proudly say that we did a great job in learning with experience and overcoming the unforeseen difficulties we faced. I believe that we can also argue that we became one of the leading experts in Europe for these kind of studies, at least when it comes to the methodological and technical issues.
- 2) Collection of data required for the assessment of the IUCN conservation status for Dinaric populations of alpine salamanders.** The field work on Mt. Prenj resulted in collecting the first CMR data mandatory for the evaluation of the population size on Mt. Prenj (78 chipped individuals and four recaptures during the field work season). Unfortunately, not enough data were collected for the populations of Gorski Kotar during this study (see section 2.2). These data, in combination of data collected during previous Rufford grants (many of which is already published)<sup>1</sup> will be used to finally estimate the proper conservation status of Dinaric populations of alpine salamanders which deserve a separate conservation approach compared to their alpine relatives which are assessed as Least Concern. So far, Dinaric individuals were treated in the same way as the latter ones.
- 3) Publicity and education.** Thanks to the promotional activities conducted thorough this project (depicting the mural in the city of Jablanica, the presentation of this project during the Rufford Conference in Serbia in October 2018, presenting it on the annual herpetological meeting of the Austrian Herpetological Society (Vienna) – January 2018, combined with educational activities with students thorough the herpetological Association

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<sup>1</sup> **Šunje, E.**, Van Damme, R., Dušan, J., Mueller, M., Škrijelj, R., Helfer, V.: Morphometric characteristics of Alpine salamanders; a support for subspecies validation and conservation? *Amphibia-Reptilia*, DOI: 10.1163/15685381-20181051.

Bonato, L., Corbetta, A., Giovine, G., Romanazzi, E., **Šunje, E.**, Vernsi, C., Crestanello, B. (2018): Diversity among peripheral populations: genetic and evolutionary differentiation of *Salamandra atra* at the southern edge of the Alps. *Journal of Zoological Systematics and Evolutionary Research*, 2018: 1–16.

**Šunje E.**, Pasmans, F., Maksimovic, Z., Martel, A., Rifatbegovic, M. (2018): Recorded mortality in the vulnerable Alpine salamander, *Salamandra atra prenjenensis* (Amphibia: Caudata), is not associated with the presence of known amphibian pathogens. *Salamandra*: 54(1): 75-79.

in B&H (BHHU:ATRA) and our constant activity on social media) we garnered the attention of many worldwide known scientists, students, and public and local communities in the entire Balkan region. These stakeholders showed interest in this project and many others that BHHU:ATRA is conducting. After starting with this project, in our association we gathered 22 new members and worldwide scientific collaboration has been established on two upcoming research projects that are being conducted at the University of Antwerpen (Belgium) and the Radboud University, Nijmegen (Holland), both related to the alpine salamander. All these new networks are important for the continuation of this and other conservation work that we are doing as an Association (BHHU: ATRA). Thanks to these activities, we are educating professional staff in the region and enabling them to conduct similar research, thus actively participating in augmenting the number of conservation studies primarily in the Balkans.

#### **4. Briefly describe the involvement of local communities and how they have benefited from the project.**

The alpine salamander has been an unknown species for long time in the local communities. One of the project's priorities was raising the awareness of its existence and addressing the need to protect the habitats of the species in B&H since these are the only unprotected areas along the areal of the alpine salamander of the Dinarides (*S. atra prenjensis*). Thus, our decision was to paint a mural in the city of Jablanica which is perfectly located between the Čvrsnica and Prenj Mountains (habitats of the species in B&H). We painted a 15 m long mural of *Salamandra atra prenjensis* with the following note: "Protect Prenj and Čvrsnica - Protect me". The mural is located in the centre of Jablanica, on the main road across the main bus station from which there is an amazing view on the mountains inhabited by this salamander. Besides increasing awareness, we believe that the mural will enforce local tourism and bring a new atmosphere in this small city. The local community was extremely happy with this change and during the realisation of this part of project they expressed their positive view and support for protecting Čvrsnica and Prenj. This mural was promoted by one of the B&H's most popular media portal Klix.ba (<https://www.klix.ba/lifestyle/mural-posvecen-endemskoj-podvrsti-i-planini-prenj-osvanuo-u-jablanici/180426028>) [translated title: SEEKING PROTECTION. Mural dedicated to the endemic subspecies and the Prenj Mountain appeared in Jablanica].

Students (biology and veterinary studies), as part of the local community, benefited the most from this project. We had two field work trips with several of them (Haris Šukman, Haris Neziri, Smiljan Tomić, Armin Ganić) and one field work trip was made with a student from Montenegro (Dragana Šćepanović) who worked on the MSc thesis related to *prenjensis* project.

#### **5. Are there any plans to continue this work?**

We are very sure that we will continue the work on this project in the near future. During 2019 we will continue with field work for marking individuals, with the

equipment left from this project and the funds from BHHU:ATRA. We aim to apply for various international and local grants that would be potentially interested to support this project such as: The Whitley Wildlife Conservation Trust, IDEA WILD, National Geographic grants and also on local conservation grants as the one offered from the Federal Ministry of Environment and Tourism in Sarajevo (B&H).

**6. How do you plan to share the results of your work with others?**

Some of our results were already presented through presentations, scientific publications and conference attendance, not only locally and regionally but also in many parts of Europe. Currently, we are preparing the aforementioned report which we will send directly to IUCN.

All of our activities are accompanied by news on our website [www.bhhuatra.com](http://www.bhhuatra.com) and Facebook page @BHHUATRA. This year we also started an Instagram profile (BHHU\_ATRA) which also presents activities of our projects. Since the project activities related to the alpine salamander (*S. atra*) have been lasting since the founding of our association (since 2013, which is also why it is called "ATRA"), we decided to create an official project logo which will be used for all future activities.

**7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?**

Almost all the grant was used over the planned period of 1 year. A very small part of the funds that remained (ca £600) is planned to be invested in this project during 2019 for the production of the promotional movie that we already started (see section 2.3).

**8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
BIOMARK equipment for marking individuals	1279	1918	-639	There are two reasons for this difference: (1) BIOMARK made us a better offer for better equipment than the one initially considered; (2) the expenses revealed higher because we did not include shipping costs and custom expenses at the time we

				were planning the budget
Anaesthetic for amphibians	103	150	-47	We needed to purchase also the surgical glue (see details in section 2 of the report)
Common field work (marking first individuals) fuel and road tolls	217	253	-36	Additional fuel tank was required - we made a deviation of 300 km on the way back from Croatia to B&H
Common field work (marking first individuals) (daily allowance for 4 persons x 2 days)	605	908	-303	We prolonged the stay for one day more due to weather conditions (we waited a day more to be able to conduct the field work during the forecasted rainy weather which was announced a day after we planned the field work). Rainy days are preferred for the activity of the animals in this way increasing the number of found and marked individuals)
Education training (workshop): round trip costs for educator (Julien)	809	712	98	We overestimated the expenses of this trip
Education training (workshop): daily allowance (1 person x 3 days)	1350	1350	0	
Field works (Croatia) - fuel and road toll (Zagreb - Gorski kotar) 8 round trips	684	376	308	Only five visits in Gorski Kotar were done out of the eight planned (see section 2 of the report - bad season)
Field works (Croatia) - daily allowance (8 visits x 2 persons x 2 nights)	2000	1320	680	Only five visits in Gorski Kotar were done out of the eight planned (see section 2 of the report - bad season)
Field works (B&H) - fuel and road toll (Sarajevo - mt. Prenj) - 8 round trips	126	141	-15	Underestimated costs
field works (B&H) - daily allowance (8 visits x 2 persons x 2 nights)	680	625	55	During one field work visit an additional person was needed for logistics
Costs for mural (graffiti) in Jablanica	634	735	101	We had to rent the crane for an additional day of work (we underestimated the time needed to get this work done)
Terrariums (for individuals)	100	132	-32	We bought some additional

kept in captivity during the marking trial)				material for the maintenance of the salamanders (that was not initially planned in the budget) such as a catching net for insects (to catch food for the salamanders that were being kept in captivity for the purpose of the project)
Sterile cotton swabs (for <i>R. virus</i> analysis) and other field work equipment (gloves, anti-fungicide and similar)	78	44	34	We overestimated the number of samples we would have
<i>R. virus</i> analyses		22	-22	We did not include the packing and shipping costs (dry ice and polyester boxes) of the material (swabs) to the laboratory that did the analysis (in Belgium)
Web page maintenance	400	308	92	We got a discount by our web maintainer (Ruud Laamers)
Movie production		701	-612	Initially this cost was supposed to be covered by BHHU:ATRA (herpetological association in B&H) but we did not get additional funds for this project (see section 2 of the report) therefore we plan to invest the remaining money of this project in the movie making (we expect to finish the movie during this year - 2019) since we already engaged in its realisation and so far we have invested 150 pounds out of the 700.6 which is going to be its final cost - see details in section 2 of the report)
Roller poster (x 2)	20	9	11	Only one poster prepared for the Rufford conference in Serbia (October 2018)
Administration costs	915	654	361	We saved a lot of administrative costs by paying contractors with cash. The lawyer we engaged for the preparation of contracts (Ahmet Efendić) did not charge his services and did the work pro bono.
<b>TOTAL:</b>	<b>10000</b>	<b>10357</b>	<b>-168</b>	

**9. Looking ahead, what do you feel are the important next steps?**

As we consider that all previous projects related to *prenjensis* are going in the right direction, the main important step is finding the means for the continuation of the project and its expansion in Montenegro, as well as the inclusion of additional people that will work on similar studies. Our plan is to continue with lectures, education and promotion in order to strengthen our team and getting new members focusing on the student community which will choose this type of research as their future BSc or Msc theses. Our mural in Jablanica affected positively the local community, so we will continue to cooperate with them and raise awareness in order to maintain and support the idea of a future national park which will include the salamander habitat in B&H.

**10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?**

The Rufford Foundation logo was painted in Jablanica as a part of the *prenjensis* mural. It was regularly used on the web-page ([www.bhhuatra.com](http://www.bhhuatra.com)), Facebook page (BHHU ATRA), and all PowerPoint presentations we had for the purpose of project promotion as well as on the poster presentation during The 3rd Rufford Small Grants Conference for Balkan countries "Explore and protect the natural beauty of Balkans". We designed certificates with the Rufford logo that we gave to all the people who have significantly helped with the depicting of the mural in Jablanica: Halebić family, Haris Šukman, Himzo Sinanagić (artist) and Jablanica HPP (technical support). The logo will also be displayed in the upcoming movie about alpine salamander from Mt. Prenj.

**11. Please provide a full list of all the members of your team and briefly what was their role in the project.**

**Emina Šunje, Msc** – project leader and manager. In charge for purchase of equipment, field work organiser, and educator. I am additionally in charge for data analysis and reporting.

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**Adnan Zimić, Msc** – project member, field work organiser and in charge for the project promotion, field researches on Mt. Prenj and Gorski Kotar, mural painting in Jablanica, and social networking.

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**Julien Courant, PhD** - Julien was the main trainer during the regional workshop for the education of professional staff in Zagreb and holder of lectures for the students of the Universities of Sarajevo and Zagreb. Julien assisted two field works and has a big contribution to data analysis.

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**Frank Pasmans, Ph.D** – Frank was in charge for conducting Rana virus analysis in his laboratory at the University of Ghent. Frank will also be in charge for writing a scientific correspondence on this topic.

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## **12. Any other comments?**

I would like to thank you the Rufford Foundation for the amazing opportunity that you created for all of us by supporting this project through these years. It fully changed my life and my career path and I am eternally grateful to you because of this. Thanks to you I can say that I am finally working on what I have always been dreaming in my life. You opened me the doors and enabled me to make a successful career as a conservation biologist. I send you my best regards and I really hope you are also satisfied with the outputs that are being generated through this project.