

Final Evaluation Report

Your Details	
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Project Title	Assessing the effectiveness of freshwater habitat management in Serbia through population parameters, genotoxicity and parasite analyses of European pond turtle
Application ID	30709-1
Grant Amount	£6000
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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
Fieldwork activities on four localities that had been established as sites for CMR (capture – mark – recapture) studies on European pond turtles (Ludaš, Galovica, Kraljevac & Malo Crniće)				CMR studies were performed at a satisfyingly high level, resulting in high-quality data for most of the localities (Ludaš – 123 turtles, Galovica – eight, Kraljevac – 39, and Malo Crniće - 32), with an expected number of recaptures for every ongoing survey. The number of specimens at Galovica locality was due to the unfavourable conditions on the site (additionally elaborated within section 2 “unforeseen difficulties”).
Fieldwork activities on two localities that had been estimated as suitable sites for CMR studies on European pond turtles (Rudinje – Stara planina mt. & Čačak)				Rudinje was the site that had exceeded all our expectations, and we have provided the first data on population size. We have captured 69 turtles in total and have estimated the population size at 75 individuals. The desired pioneer study at the Čačak hasn't started in the scope of our project due to difficult conditions for the organisation (elaborated within section 2), so the field days were redirected to other localities (Ludaš, Galovica, and Kraljevac).
Blood sampling for blood parasite analyses and genotoxicity micronucleus test				After taking the standard measurements of individual turtles, blood sampling was performed in compliance with the highest standards in the field. In total, about 140 samples were collected during the fieldwork activities regarding the project. A trial sample of blood smears was dyed and inspected.
Removing and safe housing of caught invasive Red-eared sliders				During the fieldwork activities at the Galovica site, where an established population of red-eared sliders was previously known, additional basking traps were used, and four invasive turtles were caught. Besides that, unexpectedly, at the Malo Crniće site,

				we have recorded for the first time this invasive species, caught one adult male, and safely housed it at the turtle sanctuary in Apatin.
Noting the threatening factors on study sites & setting up meetings with the officials				Threatening factors were observed and noted for every site that we have worked on. The desired meeting with the officials of Malo Crniće municipality wasn't accomplished, but the promotion of the problem (illegal dumping site) was done by the social media platforms.
Promotion of the project via social media platforms, and on national television				Social media promotion was performed and is ongoing with an intention to prolonging it as long as possible, with a significant reach of 300+ people so far. We had a live television broadcast at national TV "Nova S" in the morning show, promoting turtle conservation and the problem of invasive turtles in Serbia.
Educational lectures and in person promotion of the project				Educational lectures were held in person at the Universities of Belgrade and Novi Sad, with honourable attendance of mostly students, 80 and 60, respectively. Besides that, lectures were held at Stara planina students camp (~70), and at protected areas Ludaš (~25) and Kraljevac (~20) for students, schoolchildren, and the managers.

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

At the start of activity season for European pond turtles in Serbia (second half of March), we started fieldwork at the locality nearest to the Belgrade – Galovica canal. Before setting up the funnel traps, we have observed active turtles that were basking. After 5 days of fieldwork with a small number of caught turtles, we were surprised by the snowfall in Belgrade and immediately drove to the canal to pick up all of our funnel traps with no turtles in them. After a series of relatively warm days ($\geq 15^{\circ}\text{C}$), we continued our work for 4 more days.

Relatively low capture rate (eight turtles in 9 field days) of European pond turtles on Galovica canal may be the result of unfavourable weather conditions, or, more likely due to concreting the canal bed, that was done by the public water management company "Srbijavode", which is in charge of the canal management. Concreting took place during the winter of 2020/2021 resulting in the physical separation of the canal water flow from the Sava River with the set of bars, just 500 m

from the confluence with the main flow. This change makes us think that this site would not be favourable for future fieldwork activities regarding European pond turtle research, as it most probably would not be particularly effective.

Another difficulty that was unforeseen during the writing of the project proposal, in the pre-pandemic times, was our inability to find suitable free accommodation at Čačak locality for a group of researchers during the COVID-19 situation. This resulted in a redistribution of the originally planned 7 fieldwork days on this locality to others, in the following manner: Galovica +2 days, Ludaš +3 days, and Kraljevac +2 days.

The illegal dumping site on the Malo Crniće locality, which was previously noted and reported, has changed its form in comparison to previous years. A huge pile of garbage that was previously present assuredly wasn't as big as it used to be. Some of the hard materials were removed, but we have a suspicion that the majority of light waste was burned. We haven't had an opportunity to set up a meeting with local officials, but we have reported the problem of illegal dumping site to the Ministry of Environmental Protection of Serbia and the Institute for Nature Conservation of Serbia, as well as promoted the problem on our social media platforms.

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

Continuation of long-term CMR studies on four important sites for European pond turtles in Serbia is of immeasurable value regarding the continuous collecting of high-quality data on population structures of this strictly protected species. With this approach of continual monitoring of selected populations, we are every year one step closer to the expert estimation on the conservation status of European pond turtle on a national level, which is still officially Data Deficient. We have a preliminary estimated overall population size for SNR "Kraljevac" at 137 individuals. For the newly investigated population at Rudinje locality on Stara planina mountain, where we have caught 69 individuals, the estimated population size is 75 individuals. This result shows that the Rudinje site was a great pick for a new population study and is very suitable for work.

A valuable set of samples and blood smears was collected, that will be used to investigate the parasite loads of different populations of European pond turtles from Serbia. In total, 140 samples were provided, and are in the process of analysing. Information on blood parasites and the results of genotoxicological analyses will be the basis for assessing freshwater habitat quality, and in relation to that – emphasise the importance of properly managing such habitats.

Educational efforts were highly rewarding in the terms of how many people (mainly students) were engaged and showed an exceptional level of interest in the topic. The most distinctive discussion was revolved around the topic on the problem of invasive red-eared sliders. The talk was every time initiated by defining the problem, from its roots to the impacts that it has on freshwater ecosystems, ending in very clear conclusions on how to cope with it and possibly diminish it. Other important topics have been discussed, including turtle biology and conservation, as well as the importance of freshwater habitats. The project itself, along with The Rufford

Foundation as the grantor, has been promoted on every lecture, and students have been informed and instructed in the process of grant functioning. Besides people that were engaged in the educational lectures, the group that has had the most impact on the project, and otherwise, are 11 students that have been included in fieldwork activities. They were trained to work with European pond turtles, and most of them showed interest in further involvement in such projects.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

During the different forms of educational lectures, students, schoolchildren and other civilians interested in the topic have had an opportunity to hear and discuss in detail the biology and ecology of European pond turtles, chelonian conservation, the problem of invasive species, and the importance of preservation of freshwater ecosystems.

In the means of visiting SNR "Kraljevac" and SNR "Ludaš lake", managers of those protected areas are representatives of local communities that were engaged in the work with European pond turtles and were well informed about our work, which includes the purpose and the goal of the project. They are inherently interested in the preservation of those protected areas and are consequently the best source of information to others in their surroundings about the importance of wetlands.

On the Stara planina mountain, we have talked to the residents of nearby villages (Rudinje, Ragodeš, and Temska). The purpose of those interactions was to inform them about the importance of still water bodies, such as ponds, in the conservation of European pond turtles which are particularly rare in their surroundings (found in only one pond in approximately 10 to 20 km range). Another point of talking with residents was to get information on how often they come across European pond turtles and are they aware of any other suitable habitat for them in nearby places.

5. Are there any plans to continue this work?

We are planning to continue the CMR studies within all populations that were covered by the scope of the project, to keep gathering high quality data on population structure and threatening factors that are related to European pond turtles and their habitats. In the coming years, these data will most certainly be the base for evaluating the vulnerability level of European pond turtles in Serbia, which is still regarded as Data Deficient in the terms of IUCN categorisation on a national level.

After the final analyses of blood samples (parasite loads and genotoxicity) which are planned for February and March 2022, we will reassess if some additional blood samples are needed.

Since the goals of the project are in line with the work on my PhD related research, it is desirable to continue with the activities. Further continuation of the work will be beneficial for the populations of European pond turtles in Serbia and gathered data will be used as material for my thesis.

To complete the story about environmental impacts on European pond turtle populations in Serbia, some additional samples will be gathered, such as tips of claws to detect the possible accumulation of heavy metals.

In the perspective of the team that has previously established deep connections in North Macedonia and has rooted a number of ecological research regarding herpetofauna, our wish is to start similarly oriented studies of semi-aquatic turtles in this country. North Macedonia is geographically connected to Serbia, forming the distinct area of the central inland Balkans with the clinal distribution of continental, sub-Mediterranean, and Mediterranean climate zones. This continual transition between climate zones is particularly interesting in a biological sense, especially concerning widely distributed species in the region, such as the European pond turtle. As we have visited potential localities suitable for long-term studies on semi-aquatic turtles, we will most certainly make efforts to initiate and sustain this kind of research in the near future.

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

Results of project outcomes will be presented at the European Congress of Herpetology, which will be held in Serbia in September 2022, within an oral presentation.

Also, gathered data will be processed and published in a peer-reviewed paper, which will be presented to the scientific community. The project financed by The Rufford Foundation will be acknowledged.

In addition to presenting the results of our work in a scientific manner, we will continue to promote it in public lectures, on social media, and in our conversations with students. This kind of promotion took place along with the other activities that were carried out under the auspices of the project and aroused considerable interest.

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

The project was done in 1 year, as anticipated by the project proposal.

Some activities were slightly rescheduled. For instance, we needed more time to execute field activities, due to unpredicted weather changes, and shortened time window in which lectures were finalised, due to available meeting days at universities.

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
Bookkeeping expenses	200	200		
Blood film making kit	200	142	-58	It was cheaper than expected.
Material for basking traps	150	117	-33	It was cheaper than expected.
Video camera	290	229	-61	We found camera on a discount.
Lectures (gasoline, pay toll, bus tickets)	400	436	+36	There was an increase in gasoline prices.
Promotional material	830	818	-12	
Car maintenance	220	220		
Field trip expenses for 4900 km	1400	1528	+128	There was an increase in gasoline prices. Therefore, we decided to spend the excess funds on this item.
Daily allowance (11 GBP x 5 pers. x 42 days)	2310	2310		
TOTAL	6000	6000		

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

First of all, a continuation of long-term population CMR studies is the most important consideration regarding European pond turtles in Serbia. Some populations have an excellent database that relies on previously collected data, others have a promising bright future, and all will be of immeasurable value in future conservation steps for this species.

Public promotion of the importance of wetland habitats, as well as the role of European pond turtles as the only autochthonous semi-aquatic turtle species in Serbia, should be continued. Raising the questions and providing instructions on how to cope with the problem of red-eared sliders encountered a positive reaction within lecture attendants, and surely should be further promoted systemically.

Having in mind that many students that were included in the project activities expressed a desire to continue similar work, further in-depth involvement of those students will be carried out in future work regarding European pond turtles. Also, new

students will have an opportunity to join the team during the activities and go through the basics of chelonian research practice.

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 used on printed t-shirts and sweatshirts that were the main portion of distributed promotional material. Alongside, the logo was placed on posters that were used to announce public lectures on universities.

The foundation has received a promotion on social media platforms in 'stand-alone posts' that were meant to inform the public about the charity funds that The Rufford Foundation is providing. Besides that, The Rufford Foundation was mentioned as part of other announcements accompanying the project.

During the presentation on every lecture, the results of the project, and The Rufford Foundation as the grantor, have been promoted. Having in mind the importance of such funding options, students have been informed and instructed in the process of grant functioning.

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

Bojana Nadaždin – as a president and legal representative of NGO "HabiProt", which was a carrier of the project finances, she was largely responsible for the liable financial management of the project throughout all planned activities.

Gorana Danon – as a skilled Doctor of veterinary medicine, her role was irreplaceable in performing the best practice regarding blood sampling, while maintaining every animal's welfare. Gorana also has provided valuable help in the fieldwork activities.

Vukašin Bjelica – was a member of many fieldwork activities and was involved in work with students.

Ivan Kovač – provided us with significant suggestions about Red-eared sliders care and husbandry and has accepted caught invasive turtles for quarantine and long-term care at the turtle sanctuary in Apatin.

Tatjana Grbović – was adviser and executor for social media posts. Her help was present from the commencement of social media platforms, through post targeting and text revisions.

Dr Ana Golubović – as the most skilled researcher has had a major role in advising and shaping the project concept, from the idea to the performance. Also, Ana has provided help in fieldwork activities, and in work with students.

Besides the expected team members, in total **11 students** were included in the fieldwork. They were trained to work with turtles, and are knowledgeable about the details of the project, the goals, and the perspectives of working on turtle conservation in Serbia. University of Belgrade: **Sara Arsenijević, Ana Bjelić, Milica Marković, Lena Žunić, Nevena Karleuša, Aleksa Jokić, Milica Kuzmić, Katarina Kilibarda,** and **Vasilija Merćep.** University of Novi Sad: **Igor Berak** and **Matija Zloporubović.**

12. Any other comments?

Thanks to The Rufford Foundation, valuable work on chelonian conservation in Serbia can continue, and we were able to provide greatly significant information and datasets that will be used in order to actively protect their populations and habitats.

We are also very grateful to the managers of the protected areas SNR "Kraljevac" and SNR "Ludaš lake", that were truly considerate and willing to enforce good practices in the protection of European pond turtles. They have provided us with logistics and technical support during our field activities.

The help of the great number of undergraduate students was remarkable, and they certainly have enriched the working environment with new energy. Thank you to all of them!



