

Final Evaluation Report

Your Details	
Full Name	Nenad Zlatić
Project Title	Monitoring and assessment of the serpentinite floristic diversity with the focus on the endemic species and <i>Paraceterach marantae</i> (L.) R. M. Tryon (Pteridaceae)
Application ID	37639-1
Date of this Report	December 31, 2023

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
Species identification				During the project and after 10 field surveys in the area of the Brdjanska Gorge, a total of 119 plant species belonging to 35 families were identified.
Determination of the number, sociality, and permanence of species				For each of the identified species, the number, sociality, and permanence were determined based on phytocenological recordings and the use of the Braun-Blanquet method.
Taking photos of species				All identified species and habitats were photographed, creating a virtual herbarium with data from the field. Some of the images was used for promoting material, presentations, banners, etc.
Mapping of endangered, rare, and endemic species				The mapping was carried out using a mobile application (Terenska app) provided by the Institute for Nature Conservation of the Republic of Serbia.
Determination of the main negative impacts on the plant populations				Based on IUCN standards, the main negative impacts on species populations in the Brdjanska Gorge were assessed. One of the main influences is the specificity of the habitat, which is rocky, and the introduction of pollutants originating from the landfill located in the immediate vicinity. The main negative impacts recorded during the project include changes in vegetation dominant tree species, trampling by mountaineering and research expeditions, damage from rodents, road construction, and eutrophication due to the proximity of the city landfill.
Installation of information boards				The installation of information boards was carried out in the territory of Brdjanska Gorge as a means of raising awareness among the local population and tourists about endangered and rare species, with a focus on <i>Paraceterach</i>

				<i>marantae</i> .
Lectures on rare and endangered species				Lectures on rare and endangered species were conducted at Gornji Milanovac Gymnasium, located in the municipality where Brdjanska Klisura is situated, and at the Faculty of Science, University of Kragujevac, within the framework of the SBD members. Also, the lectures were accomplished on First conference of SBD held in Kragujevac.
Preparation and publication of the manuscript				The project was implemented until the end of 2023, during which the collected data were prepared for publication in a nationally significant journal. The national journal publishes articles once a year in June. Due to the time constraints for obtaining data, it was not possible to publish the paper in 2023. Therefore, the publication of results is planned for 2024.
Protection of serpentinite habitat				After conducting activities such as species identification and assessment, delivering lectures to the local community, posting banners with information, contacting the Environmental Protection Office in Gornji Milanovac, and reaching out to the Institute for Nature Conservation of the Republic of Serbia, awareness has been raised. Steps will be taken in the future to better protect the habitat at the researched locality.

2. Describe the three most important outcomes of your project.

a). The first most significant outcome of our project lies in the successful mapping of plant species, with a special emphasis on determining the abundance of *Paraceterach marantae*. This process not only allows us to gain a clear picture of the distribution of this endangered plant species but simultaneously provides a deeper understanding of the factors influencing its vulnerability. Identifying these key factors will serve as a foundation for developing effective conservation and habitat management strategies. I believe that this outcome will directly contribute to biodiversity preservation, provide information for decision making regarding the protection of specific areas, and serve as a basis for educating the local community about the importance of conserving endangered species. Additionally, the project results can serve as a foundation for further collaboration with other researchers, institutions, and nature conservation organisations, opening perspectives for future research projects. This outcome represents a crucial step toward sustainable biodiversity management in the serpentine habitat at the Brdjanska Gorge.

b). The second most significant outcome of our project is the successful establishment of contact with the Institute for Nature Conservation of Serbia. This collaboration is of exceptional importance as it provides us access to resources and expertise crucial for preserving natural habitats. The Institute for Nature Conservation of Serbia plays a key role in directing habitats towards the protection network at the national level. This opportunity not only provides additional protection to specific habitats but also sets standards and conditions essential for preserving biodiversity. Through this collaboration, our project not only contributes to the protection of local habitats but also has a broader impact, leaving a lasting influence on the preservation of natural heritage at the national level. This connection with the Institute for Nature Conservation of Serbia not only aids in creating stronger protection frameworks but also establishes the foundation for further strategic management of natural resources.

c). The third most significant outcome of our project lies in the successful education of the local population and community about the importance of preserving the serpentine habitat in the Brdjanska Gorge. By informing about the presence of endangered and relict species, as well as edaphic endemics, we are creating awareness about the biodiversity of this region. This education not only raises awareness about nature conservation but also guides the local community towards active participation in protecting these ecosystems. We expect that informed citizens will become key actors in long-term biodiversity conservation efforts, supporting sustainable management and promoting a responsible attitude towards the natural environment. Education becomes a fundamental outcome that not only enriches the local community with knowledge but also builds strong support for the preservation of the serpentine habitat in Brdjanska Gorge.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

The challenges we faced during the project implementation were mainly related to the procurement of equipment from abroad, which was complicated due to the current situation and events in Eastern Europe. Fuel prices varied significantly due to the energy crisis at the beginning of the year, but such circumstances were anticipated during the project description. Additionally, obtaining permits from state authorities took a considerable amount of time. Our advice to future grant recipients is to first seek permits and documents from nature protection services, ensuring clarity on which services can assist them before initiating the project. Despite the composition of our research team, we overcame all challenging circumstances and managed to complete the project within the specified 1-year timeframe.

4. Describe the involvement of local communities and how they have benefited from the project.

This initiative has not only played a pivotal role in preserving the environment but has also yielded substantial advantages for the engaged local communities. To fortify the empowerment of these communities, the project instigated a comprehensive series of educational lectures focusing on sustainable practices and environmental conservation. Collaborating with local schools and partnering with members of SBD

Stevan Jakovljevic, these lectures aimed not only to effect immediate changes but also to foster a lasting culture of sustainability within the communities involved.

5. Are there any plans to continue this work?

Of course. The conducted research is fundamentally exploratory in nature to familiarise ourselves with the species present in the given habitat. A total of 119 species were recorded; however, in addition to the species that were the subject of our research, species with a higher level of endangerment according to the IUCN were also recorded. Much more time is needed to map endangered species, determine their abundance, and assess the current state of populations. An interesting fact is that out of the 119 identified species, 80 of them have no designated IUCN status, even though they are known to be endemic and obligate serpentinophytes, i.e., characteristic only of serpentine habitats. Numerous species either went unrecognised, or there is insufficient data available. Maximum efforts are required to protect such habitats rich in endemic species because people lack insight into real data and the status of populations of endangered species due to the limited number of researchers engaged in conservation biology.

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

So far, the results have been presented at the Gornji Milanovac Gymnasium, First conference of Serbian biological Society „Stevan Jakovljević“ and the Faculty of Sciences, University of Kragujevac, within the framework of the SBD society. The project results will be published in a national journal in 2024. Additionally, a portion of the results and photographs will be shared on social media on the page of the Serbian Biological Society's Stevan Jakovljevic from Kragujevac. Furthermore, all information related to the project will be available on the Rufford Foundation's website. There are several more lectures planned for students of biology and ecology at the Faculty of Sciences, University of Kragujevac during 2024.

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

An important next step in the project implementation would be a more in-depth exploration of habitats and mapping the abundance of endangered species, with a particular focus on those categorised as 'Not Evaluated' by IUCN. Additionally, it is crucial to pay special attention to species considered relict and locally endangered, whose numbers are decreasing according to research. Establishing additional collaboration with local communities can be key for gathering information and support. Furthermore, habitat analysis, providing data on climatic and other ecological factors influencing species preservation, is essential. Public education on the importance of species conservation and the development of monitoring and evaluation systems should also be included in the upcoming steps.

8. 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 prominently featured in all aspects of our project. We proudly displayed it on slides during lectures at the Gymnasium in Gornji Milanovac. We also remembered to include it in presentations held within the Serbian Biological Society by Stevan Jakovljević in Kragujevac. The promotional material was enriched with its presence - on t-shirts, pens, cards, flyers, and all other items that we distributed to participants in our presentations. Additionally, banners placed along the Brdjanka Gorge prominently feature the Rufford Foundation logo.

9. Provide a full list of all the members of your team and their role in the project.

<p>Nenad Zlatić</p> 	<p>In my role as a project manager, I assumed the responsibilities of planning, setting objectives, defining project scope, crafting a comprehensive project plan, allocating resources, and ensuring the project remains on course. Additionally, I closely monitored the project's progress and effectively managed any arising risks and issues.</p>
<p>Dr. Milan Stanković</p> 	<p>In his capacity as an administrative team member, his role revolved around managing essential administrative tasks crucial for the project. This included, maintaining project documentation, tracking project expenses, and undertaking various other administrative functions. His contribution in this administrative role played a significant part in the project's overall efficiency and success.</p>
<p>Dr. Branko Arsić</p> 	<p>As an integral part of the project team, his involvement in GIS mapping and data acquisition, focusing on location-based information, held immense significance. His expertise played a crucial role in georeferencing data and crafting detailed maps, which were essential for the project's success.</p>
<p>Dr. Mirjana Grujović</p> 	<p>In her capacity as a team leader, she not only supervised our project team to ensure their efficient operations, meeting deadlines, and maintaining a consistent level of high-quality work but also took on the crucial responsibility of crafting the final project report. Her leadership and guidance were instrumental in fostering team cohesion and productivity, resulting in the successful accomplishment of our project objectives.</p>
<p>Igor Stanković</p>	<p>His primary responsibility encompassed the creation of visually captivating and cohesive designs for a wide range of project materials, encompassing flyers, brochures, reports, and promotional content. Through his efforts, he significantly improved the materials' readability and successfully conveyed</p>



the intended tone and message of the project. In doing so, he played a key role in ensuring that project information was not only engaging but also highly informative, effectively reaching and resonating with the project's target audience.

10. Any other comments?

I extend my heartfelt gratitude to The Rufford Foundation for their generous funding, which has been instrumental in making this research project a reality. This project would simply not be possible without their invaluable assistance.

On behalf of all the dedicated collaborators involved in this endeavour, I want to convey our sincere appreciation to The Rufford Foundation. Your commitment to environmental conservation is not only shaping the present but also laying the foundation for a more sustainable and biodiverse future.



Figure 1. Brdjanska Gorge. **Figure 2.** Serpentinite bedrock.



Figure 3. Serpentinite habitat. **Figure 4.** City landfill in Brdjanska Gorge.



Figure 5. Species *Paraceterach marantae*. **Figure 6.** Distribution of *Paraceterach marantae* and the landfill in the back in Brdjanska Gorge.



Figure 7. *Halacsya sendtheri* (endemic species). **Figure 8.** Waste on the habitat originating from the city landfill.



Figure 9. Information board No. 1. **Figure 10.** Information board No. 2.



Figure 11. Information board No. 3. **Figure 12.** Information board No. 4.



Figure 12. Information board No. 5. **Figure 13.** Promo material (Gymnasium in GM).



Figure 14. Promo material. **Figure 15.** Presentation with Rufford Foundation logo.



Figure 16. Lectures in the Gymnasium in GM. **Figure 17.** Attendance during lectures.



Figure 18. Lectures in the Conference of SBD. **Figure 19.** Attendance during lectures in the conference room.



Figure 20. Promo material (Faculty of Science). **Figure 21.** Lectures in the Faculty of Science.



Figure 22. Attendance during lectures in the classroom.