

Final Evaluation Report

Your Details	
Full Name	Jelena Brnovic
Project Title	Research of a critically endangered species of European eel in Skadar Lake in Montenegro
Application ID	33936-2
Date of this Report	20.04.2022

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
Procurement of equipment and fisherman/boat driver engagement				<p>The project budget was mainly spent on fieldwork: fuel, food, drinks, equipment, an employment contract with a fisherman.</p> <p>Since we managed to preserve and maintain most of the equipment we purchased during the implementation of our first Rufford project, on this occasion to implement activities planned by the second Rufford project, in order to increase efficiency in fieldwork, we enriched our equipment with additional tools such as fieldwork and laboratory equipment (fishing traps (pots), receiving fishing nets, boots, waterproof jackets, backpacks, weight scales, fish ichthyometer, fish containers, lamps, drone, gastric lavage pumps, ethanol storage solutions, gloves, etc.).</p> <p>Due to the scope of our research project, as we already mentioned when we applied for our second Rufford project, we needed to hire a professional fisherman/boat driver - employment contract with a fisherman (essential work payment that includes renting a boat and a fisherman as a guide and driver for the whole day for each of the planned terrains on the lake). This type of contract engagement paid off more now for us because if we have hired a fishermen/boat driver by paying him subsistence per day, it would have been more expensive for us, and we wouldn't be able to import that cost in this project budget in relation to the number of terrain and the days we need to spend on the lake.</p> <p>So, this way, we managed to hire him</p>

				for the entire time of our project implementation for this affordable amount of money.
Establishing cooperation with relevant and relevant institutions and organizations as well as obtaining the necessary permits for scientific research				<p>To realise our project in general, it was necessary for us to obtain a permit for scientific research work. Accordingly, we established and strengthened cooperation with the National Parks of Montenegro - Skadar Lake National Park, which gave us a positive opinion for our scientific research project. On that occasion, they offered us all their logistical and technical assistance.</p> <p>We received a permit for a scientific research project from the Environmental Protection Agency, so we also established cooperation with them. We also received great support from the professors of ichthyology from our Faculty of Natural Sciences and Mathematics / Department of Biology, and one of the professors from the faculty wrote a recommendation for our project during the application.</p> <p>Also, very important for our project is the cooperation with the Ministry of Agriculture, Water Management and Forestry - Directorate of the Directorate of Fisheries, which is also working on its protection in Montenegro and establishing cross-border cooperation with the Republic of Albania with which we share Skadar Lake.</p> <p>It is also important to mention the support of the Idea Wild Foundation, as well as the non-governmental organisations Environmental Youth Association "Green Center", Montenegrin Society of Biology Students, and Green Home.</p> <p>All this established cooperation with all the above institutions and organisations has contributed to the success of our project.</p>
Fieldwork and Research of diet analysis of European eel				Our research location was Lake Skadar, in which the fishing pressure on European eels is the largest. Considering that in the previous project we managed to sample a total of 84

			<p>individuals from nine localities in the Skadar Lake, with the help of a non-invasive passive method for eel hunting - eel pots (trap), this year we bought additional equipment, and it increased our chances of sampling potentially larger number of individuals. Our first objective was to sample the minimum number of 50 individuals, but with the help of additional equipment and the participation and help of local licensed fishermen, we managed to sample 91 individuals. When you take into account the ecological niche of European eel together with its phenological aspects, when selecting the sampling sites, we were guided by the selection of points – sites that reflected different characteristics of certain parts of Skadar Lake with their various ecological characteristics (littoral, pelagian, river delta, sub-custral springs, inhabited places). While performing sampling, we specifically explained those sites with different environmental factors that were found at each site, so that we could expect different sampling results on different locations.</p> <p>For every eel individual that we caught with the non-invasive method - eel fishing traps (pots), we measured the following:</p> <ul style="list-style-type: none"> - length-weight ratio (LWR) and a conditioning factor (K)), photographed, and also we wanted to collect samples of its diet for the first time in Montenegro with the pulsed gastric lavage (PGL) method, to determine the dominant items in the diet of this species, and to educate public about the protection of eels and also other species that are important in the food chain and for the preservation of the biodiversity of Skadar Lake. <p>According to Waters et al., 2004. The PGL method is recommended as a non-lethal technique to collect diet samples from fish. The PGL procedure</p>
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			<p>uses pulses of water to flush the stomach contents from a fish. Fundamental to the process is the method of delivering water pulses; for which hand pumps and compression pumps are used.</p> <p>Unfortunately, our experience in research to determine the dominant items in the diet of this species, by sampling the stomach contents of individuals with the PGL method in the fieldwork, did not give us the desired result.</p> <p>We concluded that this PGL non-invasive method, which includes the use of conventional and classical apparatus for sampling gastric contents in fish, in relation to the anatomy of the eel, could not be adequately and efficiently used on this occasion.</p> <p>Therefore, we concluded that this would be an extremely invasive method of examination in terms of eels due to its anatomy of the oral apparatus, so we did not continue this measurement but concluded that it is inadequate, so we hope that our attempt and experiment, even if it has not proved successful, the data should be used to stimulate and encourage scientists to make adequate non-invasive apparatus for rinsing gastric contents targeted to eels and its oral apparatus.</p> <p>The problems were:</p> <ul style="list-style-type: none"> - primarily, the eel individuals we managed to find on our fieldwork were small in body size, and we could not sample their stomach contents. - due to the anatomy of the eel, elongated thin jaws, and small oral cavities, it was not possible to place the gastric lavage apparatus adequately and in the shortest possible time to keep the individual out of the water as short as possible, and because of the softness of its skin, as well as its exceptional mobility, it was almost impossible to keep it in the field in order
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			<p>to sample gastric contents on the spot with the help of gastric lavage, so we only succeeded several individuals to sample gastric contents, but unfortunately, the amount of that content was not large and sufficient to be tested.</p> <p>Since the determination of eel diet in the field was extremely difficult for the above reasons, and in order not to expose eel individuals to prolonged stress, we decided on another approach to research her diet by examining gastric contents.</p> <p>Commercial licensed fisheries who have permits to catch this fish, in accordance with their possibilities, donated a certain number of individuals to us for scientific purposes of determining its diet.</p> <p>And in this way, we have established cooperation with licensed commercial fishermen who will also benefit from our data.</p> <p>All collected data in the laboratory and information after sorting them out will be compared with the data of eel populations from the previous project researched locations and given to institutions such as National parks of Montenegro, Faculty of Natural Sciences and Mathematics, Ministry of Agriculture and Fisheries, Environmental Protection Agency and the public through the media and research gate site.</p>
<p>Educational part, production of propaganda material and educational workshops in primary and secondary schools, as well</p>			<p>When we talk about the public dissemination of data and educational part, we managed to do the following: the project is presented by students and members of NGO Ecological Association of Young "Green Center" which are included in the project. We also participated in regional TV stations, where the project is also publicly presented. Our goal was to present the eel in Montenegro as a critically endangered species and to discuss the</p>

			<p>problems of its protection. We had lectures in primary and high schools, on faculty of science and mathematics, and educative workshops for locals.</p> <p>Also, with this project as with the last one, we continuously disseminated crucial information and educated our Montenegrin society with promotional materials about the conservation of the European eel (<i>Anguilla anguilla</i>) in Skadar Lake, so we printed leaflets for this project, which contained information about the project, the aim of the project and its relevance for the conservation of this highly endangered species. Leaflets were distributed during our lectures, workshops, and locals.</p> <p>For our project we used these types of propaganda materials in our project, such as printed t-shirts, leaflets, and posters as an awareness-raising method because during the field research on the previous project, we noticed that a small number of surveyed fishermen with whom we had the opportunity to talk, did not know the degree of endangerment of this eel species, general biology, and the importance of its protection.</p> <p>We managed to establish cooperation with 17 licensed fishermen who are fishing from a boat on the water and with 40 licensed anglers who fish from the shores. During their survey at the beginning and end of the project, we realised that our educational material had a positive impact on raising their education and awareness. Because of that, we continued this type of usage of propaganda material as a way to quickly, efficiently, and entertainingly animate and provide people with the key information on the endangerment and significance of this species for the biodiversity of Skadar Lake in one place.</p> <p>Our t-shirts and sweatshirts were printed, with the project logo and RSG logo, including the logos of all other</p>
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				<p>crucial and relevant institutions in Montenegro that supported our research project.</p> <p>We can now proudly say that these t-shirts also contributed to our project because of our visibility and the visibility of Rufford foundation logo, so now we encouraged other young researchers to apply for Rufford small grants in their field of studies, which will help them in making their specialist, master's and doctoral thesis.</p> <p>So far, we noticed that in primary and secondary schools, in general, the topic of endangered species in Montenegro is not a current topic at all, and in public apart from our engagement with the previous project, is little mentioned.</p> <p>Given that Skadar Lake is located near the capital Podgorica, young people that are living in the surrounding villages of Skadar Lake, attend schools in the capital city, so we implemented educational workshops in several schools where we distributed about 30 educational posters and about 150 education flyers.</p> <p>Also, we held a lecture at the Faculty of Biology, where we could present to young scientists our research project and the possibility of applying for their research work at The Rufford Foundation for other endangered species in Montenegro.</p> <p>We planned to organise our workshop on the topic of European eels within the "Open Days of Science in Montenegro", but because we already organised a workshop with the University of Montenegro/ Department of Biology students, and elementary and high school students, we shifted the focus of our activities to do as much fieldwork as possible, given that the weather conditions in that month served us and were suitable for fieldwork.</p>
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<p>Conservation part of the project and cooperation with relevant institutions, as well as production and shooting of a short documentary about our scientific research project and raising awareness of the importance of protecting this endangered species of fish</p>			<p>We planned to reach the very top of the government, the decision-makers, with the help of people who work in the Ministry of Ecology of Montenegro.</p> <p>In Montenegro, there has been a change of government twice in the last year, which has caused a political crisis, so we are working in difficult conditions. Unfortunately, the environmental issues are not in the focus they should be in now.</p> <p>Regardless of the above, our successfully established cooperation with relevant institutions gives us hope that when the political crisis is resolved, environmental issues will come next, and thus the protection of endangered species.</p> <p>In addition, on the second small grant project, we managed to make a cooperate with associates from relevant and influential institutions such as the: National Parks of Montenegro - Skadar Lake National Park, Faculty of Natural Sciences - Department of Biology, Ministry of Agriculture, Water Management, and Forestry - Directorate of Fisheries, Environmental Protection Agency, Idea Wild, Ecological Youth Association Green Center, Montenegrin Society of Biology Students and Green Home.</p> <p>Although the eel is on the list of critically endangered species in the world, this status isn't the same in Montenegro, so it has not helped us much to protect it, because it's overfishing continues.</p> <p>But this year, Environmental Protection Agency is making a new Nation Red List for fish, in which we hope that eel will get its new bigger conservation status.</p> <p>Also, with great pleasure, we can inform you that we have managed to make the first short documentary film on the topic of conservation and protection of critically endangered European eel species in Montenegro for the first time. We had support of:</p>
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			<p>National Parks of Montenegro - Skadar Lake National Park, Faculty of Natural Sciences - Department of Biology, Ministry of Agriculture, Water Management, and Forestry - Directorate of Fisheries, Environmental Protection Agency, Idea Wild, Ecological Youth Association Green Center, Montenegrin Society of Biology Students and Green Home.</p> <p>It will be publicly available for everyone to watch on television as well as on the YouTube channel of the Environmental Youth Association "Green Center".</p>
Cooperation with the media and our public appearances on national television			<p>Also, we are proud to say that we had support from a National TV station, and they made an interview for our project in order to spread the important information in public and to raise awareness and the importance of preserving the eel as a critically endangered species.</p> <p>We managed to point out to the public the factors that are harmful to this critically endangered species of eel, both globally and locally in our country, to raise awareness of the importance of its protection and the importance to stop poaching as one of the highest threats to this and other species of fish in our waters.</p>
Workshop			<p>What makes us especially happy is that we managed to gather representatives of relevant institutions and organisations at the final project activity - our final workshop. Those representatives are very important for our future cooperation and dissemination of the results of our project. We are extremely glad that the workshop was attended by representatives of the Environmental Protection Agency - Milka Rajkovic Mitrovic, Center for Hydrometeorology and Seismology - Luka Mitrovic, Professor of Hydrobiology at the Faculty of Science, University of Montenegro, Department of Biology - Jelena Rakocevic, Bankvac organization -</p>

			<p>Natasa Kovačević, NGO green home - Anastasija Lalević, our dear friends from the Natural History Museum of Montenegro - Suzana Malidžan and Snežana Dragičević, as well as our dear professor of biology - Bogić Gligorević.</p> <p>We are most glad that the representative of the Skadar Lake Fishermen's Association - Nikola Vujanović, was present at the workshop. He is also working on a project with the NGO Green Home, whose focus is the protection of eels on the river Bojana. We have successfully established cooperation with him and planned our future common terrains and that is of big importance to us for our future research. Our first short educational documentary about the protection of eels in Skadar Lake and Montenegro was premiered at our final workshop, and on that occasion, we are especially glad that eminent scientists and representatives of relevant institutions participated in making of this movie, such as representatives of the national parks of Montenegro - Skadar Lake National Park, - director Aleksandar Bulatović and expert associate for fisheries - Stevan Marić, Environmental Protection Agency of Montenegro - expert associate for environmental protection - Milka Rajković Mitrović, Ministry of Agriculture, Forestry and Water Management, Directorate of Fisheries - Director-General Katarina Burzanović and NGO Green Home - Director Azra Vuković.</p>
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2. Describe the three most important outcomes of your project.

a). We are especially pleased that we managed to raise the level of awareness about the preservation of eels in Montenegro, through cooperation with national TV and the media, which published information about our project on portals and in newspapers.

b). The great success of our project is that we have strengthened cooperation with institutions from our first Rufford project such as National Parks of Montenegro - Skadar Lake National Park, as well as established cooperation with new relevant institutions such as the Ministry of Agriculture, Water Management and Forestry - Directorate for Fisheries, Environmental Protection Agency, Ecological Youth Association Green Center, Montenegrin Society of Biology Students, Idea Wild and Green Home. Cooperation with these institutions is crucial and essential, as is cooperation with NGOs and the civil sector, which also points to problems with the conservation of endangered species in Montenegro, including the European eel.

c). What makes us most proud is that we managed to produce for the first time in Montenegro to make a short documentary on the preservation and protection of European eels in Skadar Lake, which will have an additional release and availability on YouTube and TV stations, will positively affect the spread of important information and raising awareness of the importance of protecting this endangered fish species.

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

- Unstable weather conditions affected the dynamics of our project, so we redirected the planned days we were supposed to use in the field work to make propaganda and educational material, and with the arrival of better weather conditions, we continuously conducted field activities.
- Problems with poachers. Since the problem of criminals is always difficult to solve, we spent more time on the lake in our next field activities, and in solving this problem, cooperation with local fishermen who visited our networks of opportunities to go to the field meant a lot to us. But still, because of the thefts that took place, we no longer marked our eel traps with buoys, instead we marked them with plastic bottles that were less noticeable, but enough for experienced fishermen who came with us to know where we put them. Although the GPS location we updated on the phone is accurate in most cases, there were periods with more clouds and wind, so due to water turbidity and waves, we were not able to accurately find our fishing nets. We solved this problem by additionally placing inconspicuous bottles to mark the place of the set species.
- For a conservation part of our project, we had difficulties, because of the political situation in our country. In Montenegro, there has been a change of government twice in the last year, which has caused a political crisis, so we are working in difficult conditions. Unfortunately, the environmental issues are not in the focus they should be in now. Regardless of the above, our successfully established cooperation with relevant institutions gives us hope that when the political crisis is resolved, environmental issues will come next, and thus the protection of endangered species.

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

As we mentioned above in the objectives, we made nice cooperation with a decent number of locals fishermen that are in contact with habitats where specimens of *Anguilla anguilla* were caught. In a conversation with local people from these old fishermen villages, we realised that these people live for hundreds of years from hunting and selling fish, including eels that are the most expensive on the market today. It was for this very reason that at the very beginning of our visits and conversations, it was very difficult for us to reach their awareness to stop with overfishing of this species because of its critical vulnerability. Over time, we managed to make a progress and an influence on their awareness of the importance of preserving not only the eel but of the entire fish fund of the Skadar Lake. So, in the end, we managed to make a cooperate with many of them and to get on-field information about where we can find more eel in those parts of Skadar Lake. They also helped us in the project by visiting our fishing nets when we were not able to go to the field, which meant a lot to us in the realisation of this project. It meant a lot to us that the fishermen donated a certain number of eels to us for scientific research purposes. Local fishermen benefited from our project through constant conversations and education on the importance of protecting the preservation of the entire fish fund in Skadar Lake, including this globally endangered species and its natural habitat.

5. Are there any plans to continue this work?

This year's research also represents an extremely significant contribution to the conservation of critically endangered eel species in Skadar Lake, it also represents a contribution in the scientific sense as well as in the educational one. We look at this project as the start of a long-term study about European eel populations in Skadar Lake in Montenegro. We think that we achieved to initiate a good start for the plan of conservation of this species in Montenegro by making the cooperation with relevant institutions in Montenegro who are essential for influencing decision-makers to protect this species by law. Also recognising the fact that the public awareness for the protection of this species has been spread up to a specific level gave us encouragement to keep our activities alive. Our short documentary movie about eel conservation in Montenegro is now going to be spread and available to the public so we plan to make more conservation attractive videos which will influence people to make them more aware of their environment. We plan to expand the area of eel research in Montenegro, so that in addition to Skadar Lake, we would also cover the river Bojana, where eels are also on the verge of survival. As if independent of the project, we will continue with educational workshops, because only by spreading awareness of the importance of protecting this species of fish can we influence decision-makers in our country.

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

Results of the study will be available in different forms for different target groups. The local authorities will receive a scientific report, scientists will be informed via Research Gate, local population via workshops and propaganda material. Also, a

very large auditorium is informed and will be continually informed by our short documentary movie about European eel conservation and protection importance.

Some of the biology students that are included in this project will use project results in their future MSc theses that are planned to be publicly available for all to see on their Research Gate accounts. <https://www.researchgate.net/profile/Milos-Dziknic>.

Also, since I have been permanently employed at the Natural History Museum of Montenegro since this year, I will soon be able to open a Research Gate profile to publish data from a scientific research project.

Our promotional material everyone can find on this link
<https://drive.google.com/drive/folders/14io0u601nXeluUnHTi5DKloQFlcBQIFb?usp=sharing>

School presentation educational workshops:
<https://drive.google.com/drive/folders/1vzH-ULT6WgMHV2waeGWpOj-pMRQyTUEA?usp=sharing>

Also, newspaper reports and press clipping about our project

INKS:

<https://www.dan.co.me/podgoricom/radionica-u-os-sutjeska-nauka-jos-nije-otkrila-sve-o-jegulji-5097945>

<https://mladiniksica.me/odrzana-edukativna-radionica-na-temu-tajanstvena-vrstaribe-u-skadarskom-jezeru/>

https://www.vijesti.me/vijesti/drustvo/581634/niksicki-i-podgoricki-osnovci-ucili-o-jegulji?fbclid=IwAR06WLZSkre_av-oOlbhZLpntqMvYbqi5AMYaBtKaMr9A5Z5QUeFizewaQ

We plan to keep sharing the ongoing activities by using social media tools such as Facebook pages and Instagram accounts and public awareness activities. This will enable us to promote the Montenegro eel project and Rufford Foundation to a wider community.

And everyone can inform about our project on our NGO's Facebook page links

- <https://www.facebook.com/eumzelenicentar/>

- <https://sr-rs.facebook.com/CGDSB/>

And what makes us most proud is that we managed to produce for the first time in Montenegro to make a short documentary on the preservation and protection of European eels in Skadar Lake, which will have an additional release and availability on YouTube and TV stations, will positively affect the spread of important information and raising awareness of the importance of protecting this endangered fish species.

YouTube link of our documentary film:

<https://www.youtube.com/watch?v=3ztLDfojiAA>

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

- To educate more students in order to provide bigger team for the next stage of research.
- To share our results through Research Gate with other institutions and scientists in the neighbouring countries because the European eel is a critically endangered species on a global scale.
- To continue the research on new locations in Montenegro, especially river Bojana where is the next high overfishing of eel recorded.
- To continue cooperation with key institutions to establish a further plan for the protection of this endangered fish species
- To write a new project proposal for the next stage so we can continue with the research and bring it to the next level.

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 used during the whole duration of the project. The logo is printed on the leaflets, posters, and t-shirts, that were prepared during this project and also in our documentary movie about European eel conservation importance in Montenegro with cooperation and support from relevant institutions from Montenegro and organisations such as the National Parks of Montenegro - Skadar Lake National Park, Ministry of Agriculture, Water Management and Forestry - Directorate for Fisheries, Environmental Protection Agency, Ecological Youth Association Green Center, Montenegrin Society of Biology Students, Idea Wild and Green Home

Rufford Foundation received publicity during this project in newspapers, during our fieldwork, lectures we have made on the Faculty of Mathematics and Natural Sciences – Department for Biology, several primary and high schools, meetings with locals, fishermen, local communities and researchers, workshops, and Institutions such as National Parks of Montenegro - Skadar Lake National Park, Ministry of Agriculture, Water Management and Forestry - Directorate for Fisheries, Environmental Protection Agency, Ecological Youth Association Green Center, Montenegrin Society of Biology Students, Idea Wild and Green Home.

Also, our short documentary will be shown on TV stations as well as on the YouTube channel of the Ecological Youth Association "Green Center", where the Rufford logo is also shown in a transparent way, and there is additional publicity from a wider audience.

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

Project team:

Jelena Brnovic, MSc - project manager, member of NGO Ecological Association of young "Green centre

Katarina Burzanovic, MSc - Director General of the Directorate for Fisheries in the Ministry of Agriculture, Water Management and Forestry

Milos Dziknic - project assistant, Spec. sci. biology - ecology. Director of NGO Ecological Association of young "Green centre".

Vidosava Popovic, BSc - student of Master degree in faculty of natural science and mathematics department of biology, University of Montenegro.

Supervisors:

Drago Marić - full Professor at University of Montenegro, Faculty of natural sciences and mathematics, department of biology

Vera Biberdžić - Museum advisor at Natural History Museum of Montenegro

Simon Vukčević - fishermen-boat driver

Zoran Džiknić - technical and logistical support in field work

Milivoje Brnović - technical and logistical support in field work

Velimir Brnović - local fisherman

Dušan Vukčević - local fisherman

Nikola Vukčević - President of the Association of Commercial Fishermen

Aleksandar Bulatović - Director of National Parks of Montenegro

Stevan Marić - Expert associate in fisheries in the Skadar Lake National Park

Azra Vuković - Director of NGO Green Home

Milka Rajković Mitrović - Coordinator of the Nature Protection Sector in the Environmental Protection Agency

10. Any other comments?

We are very thankful to The Rufford Foundation because it has recognised the problem of this kind and gave us the opportunity to upgrade our previous research. Rufford Foundation is one of the first foundations that funded the work on this problem in Montenegro. It helped a lot in collecting very valuable data and it helped me and my team to develop our skills and improve our knowledge. The data and samples we collected are unique and important for future work for the protection of this critically endangered species of European eel in Montenegro. We are also grateful to all the institutions and organisations that helped us to realise our project even more successfully through cooperation with them.