The Rufford Foundation
Final Report

Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Jovana Tomanic
Project title	Resolving conflict between invasive Blue crab (*Callinectes sapidus*) and Montenegrin small – scale fisheries
RSG reference	25894-1
Reporting period	July 2018 - July 2019
Amount of grant	4410£
Your email address	Tomanic01@hotmail.com
Date of this report	31.7.2019

1. Please 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
Data collection about distribution and abundance of blue crab				-All planned fieldwork has been successfully implemented. In the last year along the Montenegrin coast, 21 field trips were made. - With good cooperation with fishermen, in addition to setting up our traps, we also collected data of distribution of blue crabs from other fishing tools such as gillnet and trammel net . -Up to July 2019, data on 420 specimens of blue crab of different maturity stages has been collected. - The largest abundance of this species was recorded in Ada Bojana area and in canal of Port Milena, where we recorded more than 50 individuals on only one rock, and such abundance was kept along the entire channel. -A smaller abundance was recorded in the Jaska River, followed by only 10 individuals recorded in the Bay of Kotor, in Sutorina and Morinj and two specimens in the protected area of Tivatska solilla.
Fishermen education and cooperation				This is probably the biggest success of this project. We informed a large number of fishermen about the problem with blue crab but also the goal that we have accomplished is education of fishermen that this species is edible and transferring them the potential ways of its usage for human consumption. So far, we had feedback from several fishermen that they use this species for food, which they documented with some pictures. We shared leaflets and talked with them during the whole project period and some of them recognised the importance of this problem.
Interview with local				During the fishermen interviews, we have

fisherman				come up with significant data that will surely be useful for us for later research. -The negative impact that blue crab make is that it destroys fishing tools and their catches. After a large catch of this species in a gillnet or trammel net, fishermen can throw it away because it is not usable afterwards. This is a problem that is of economic importance to fishermen. Such nets are expensive to buy/make and of course it is even worse because the catch is destroyed as well. - During the interviews, blue crab abundance was examined over the years based on the memory of fishermen. - We concluded that the species was appeared on the Bojana River in 2007/08 when it was caught by a local fisherman. -Also, we found out that in the summer month's species enters the waters with a small salinity which made possible the massive catches in Port Milena and Ada Bojana in June 2019. -Through conversations with fishermen, we also recorded the highest daily catches of the blue crab and it was about 300 individuals per day, with an average weight of about 400 g per crab. Interviews helped us to find out that three more alien species were caught by fishermen in the last few years. Most fishermen told us that the catch of the lobster has dropped, so we proposed the blue crab catching instead, so the lobster population has time to recover. -It's very difficult to sell the blue crab because our local community is not familiar with this species, so they can't sell it for a price bigger than 2euros / kg to people who want to try it. We suggested to propose the tourists it as a speciality, so the price can be increased during the summer season as Montenegrin coast is visited in high numbers by foreigners.
Informing relevant national andinternational researscher about the project				By attending the major conference on fisheries science in the Mediterranean named FishForum (held on 10-14th December 2018 at FAO Headquarters in Rome, Italy in GFCM/FAO organisation)

				and presenting a poster named Non-indigenous fish and crustaceans species along the Montenegrin coast (South Adriatic) -We attended on the workshops that were held in the premises of the Institute of Marine Biology. The workshop was organised as part of the INTERREG ARIEL project and one of the agenda items was the problem of invasive and introduced species, where the problem of blue crab was also presented.
Informing local community in Montenegro				During the project, we visited 11 primary and secondary schools along the Montenegrin coast. Through the presentations, we introduced pupils to the problem of invasive species and the problem of blue crab which currently affects Montenegro. During the conversation with students, we received high-quality feedback that few of them referred to something about blue crab and also told us the locations where they saw it, which also helped us. Education activities were supported by sharing the promotional material, leaflets and t-shirts, which were given to the pupils.

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

Because of the bad weather conditions (winds and rain), as well as the tourist season, some fieldwork could not be done as predicted, but on the first occasion, when the time allowed us, they were completed.

Another of the negative situations that we encountered, and that made difficulties for us in the project realisation, was the situation that two traps were stolen. When we went to pick up traps at one of the locations near Budva, we did not found them at the place where they were set up 2 nights before.

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

1. We, as a young scientists and local scientific institutions with whom we co-operated during this project activities (Institute of Marine Biology) and shared experiences, made a clear picture of distribution and abundance of blue crab that will facilitate the way for further fight with this invasive species.

2. Second outcome will be raising of awareness of fishermen and local people through education, lectures and materials. We shared education leaflets during

interviews with fishermen and other social groups. In this way, they achieved scientific knowledge about the crab and how to use it in their interactions with the species.

3. Participating on the workshops and at the FishForum conference organised by FAO and GFCM in Rome, Italy. As it was international conference with high number of scientists dealing with fisheries and marine conservation all around the Mediterranean, we found it very important to present our data there and share experiences with others dealing in this area of ecology. The abstract of the poster presentation is published in the official conference's book of abstracts and available to others to see our work and contact us in order to establish a cooperation.

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

We tried to involve the local population as much as possible in the project. We found it important as locals have interactions with this species often due to the fact that it inhabits coastal zone, where a lot of people go for different kind of recreational activities. During lectures in primary and secondary schools, through the presentations we held as well as through promotional materials (t-shirts, cups and flyers), students and pupils got informed about this problem and they achieved knowledge about problem with alien species of the Adriatic Sea, especially about the blue crab. We recommended to the biology teachers to give more attention to such conservation problems, as they are often caused by insufficient information of locals who can keep such species as pets or similar.

During fieldwork we talked with a certain number of fishermen and told them about the problem with blue crab and how this one can negatively affect the other native crabs in the ecosystem. Many showed interest and helped us to get necessary data as this affect them directly by causing economic loses. During the interview, every fisherman was educated that a blue crab is edible, but on the other hand, they referred to all the negative consequences that this species can do to the ecosystem which they observed, and therefore we talked about the importance of exploiting this species. During the conversations, most fishermen realised that by selling this crab they can increase their income from fisheries.

Also, scientific institutions were included. We exchanged with them data and experiences about distribution and abundance of blue crab. Currently, we are finishing a preparation of a scientific paper regarding the new species along the Montenegrin coast with the other local scientists dealing with this theme. It should be sent to the one of the relevant journals soon. The project team benefited as well because of getting experience in this type of fieldwork and research which can help them in the future work in this or even in other areas.

5. Are there any plans to continue this work?

We can say that in a year of the duration of this project, high quality morphometric data has been collected. This research is one of the first contributions to the knowledge of the ecology of the blue crab population in Montenegro. Because of

that, this work will also be the basis for further research which is certainly necessary in order to contribute to preserving and protecting native biodiversity.

In the future, we will continue collecting data in order to track patterns in abundance and possibly discover new locations where this species spread. What is also obligatory, is to continue to raise awareness of the local community and local fishermen about the importance of this species exploitation as an important step for conservation of the native diversity. That should make possible that the species current abundance decline or at least stay at the same level.

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

This data will be used for my PhD studies and will be published as a scientific paper in some of the regional journals, which will help other scientists that are dealing with this problem in the Mediterranean.

We already shared project results with Montenegrin institutions which have interest in this field of conservation as it is Institute for Marine Biology and the scientists who do crab research and protection of marine habitats within it.

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

Grant was used from July 2018 to July 2019 as it is predicted by project timescale.

8. Budget: Please 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.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Additional expenses	100	110	+10	
Boves and ropes for traps 100m	100	102	+2	
Scales for weight crab measurement, persise calliper	150	94	-56	We didn't find electronic calliper and we by cheaper one
Computer for data	400	355	-45	
Bait for traps	100	114	+14	
Traps	700	563	-137	Traps was cheaper than we expected
T-shirts, cups and flyers	1400	1385	-15	
Total fuel (school presentations,	620	720	+100	

meetings and fieldwork)				
Daily allowance (4 persons x 21 field work x 10 £)	840	967	+127	
Total	**4410**	**4410**		

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

- Monitoring of the blue crab population patterns in this part of the Adriatic Sea, especially in the term of abundance which is an indicator of success of its invasion.
- Keep on the established cooperation with fishermen and scientists.
- Try to collect data on other invasive species occurred in Montenegrin sea.
- Try to find fund from local institutions to organise more educational presentations for locals in the upcoming period, as they often organise different activities in the terms of education.

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

The logo has been printed on the interviews. It was a part of each presentation for schools, as well as a part of the leaflets, cups and t-shirts that were developed within this project. The Rufford Foundation received publicity during our fieldwork, lectures on several primary schools and meetings with the representatives of state institutions. It was noted at the poster presentation of the mentioned conference on fisheries. The foundation will also receive publicity in the next period though mentions in my thesis and scientific publications.

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

Jovana Tomanic- project coordinator responsible for the complete project management, for the organization and realization of the fieldworks, quality of scientific research and school presentation.

Cetkovic Ilija-, spec. of ecology - helped in fieldwork and meetings with the representatives of the competent institutions, he was responsible for setting up traps, collecting samples and biological data

Ana Jevremovic- BSc in biology- was collecting the questionnaire data among fishermen community. She was involved in the fieldwork activities, too.

Stefan Ralevic- spec. of biology helped in preparing of educational material and he took part in the school presentations and fieldworks activities.

Olivera Markovic- researcher of laboratory for ichthyology and marine fisheries in the Institute of Marine Biology, project consultant

Ivo Knezevic and Milan Milic are local fishermen from the area of Ada Bojana who took participation during the project in the fieldwork activities. With their help, we could follow the blue crab hunting in some other fishing tools gears like gillnet and trammel net either from their own gears or from their colleagues too.

12. Any other comments?

We would like to thank the Rufford Foundation for the financial support and the opportunity given to all of us in this project, which is difficult to obtain in our country.
As the team leader, I also want to thank to my team for the support, energy, patience and time invested into this project.







The Rufford Foundation
www.rufford.org






The Rufford Foundation
www.rufford.org