

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	Andrii Zamoroka
Project title	Estimation of soil Coleoptera extinction rate in steppe remnants of Burshtyn Opillya and implications for their restoration and conservation
RSG reference	21831-1
Reporting period	2017-2018
Amount of grant	£4,855
Your email address	st.naturalist@gmail.com
Date of this report	17.04.2018

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
1. Inventorying of the steppe remnants on Burshtyn Opillya.				During project realisation I identified 35 steppe remnants on Burshtyn Opillya with total area 4.635 km ² (0.6% of the region). I revealed that the average area of the separate patch is 0.13 km ² . The steppe remnants were intensively exploited in the past for grazing, hay harvesting, forest plantations, small quarries and the recreation activity. The current exploitation is significantly less compared with the past. For instance, 28.6% patches are not exploited by humans at all. The changes in the steppes exploitation have caused a rapid overgrowing them by the thermophilous brushwood what is a new threat for the steppe habitats.
2. Soil Coleoptera study in the steppe remnants on Burshtyn Opillya.				During field studies I accomplished 144 expeditions within Burshtyn Opillya for steppes inventorying and soil coleoptera study. I selected 12 steppe remnants where I set up 25 plots for coleoptera study. At the present, I have processed 78% of samples and identified 309 species of beetles, whose part or full life circle is spent in soil and its surface. Additionally, big amount of environmental data was collected (e.g. vegetation composition, plants biomass and coverage, temperature, humidity, acidity, et cet.).
3. Estimation of biodiversity levels and extinction rates of soil Coleoptera of the steppe patch.				I found the most diverse fauna of soil coleoptera in localities of Kasova Hora (157 species) and Mezhyhirskyi Kamin (119 species), which are the most well preserved.

			<p>The lowest diversity is in pesticide contaminated locality of Field Island (36 species). Due to habitat fragmentation, degradation and loss, the soil coleoptera richness is 4.4 times less.</p> <p>I proposed generalised scheme of soil coleoptera extinction on the steppe remnants which comprise several stages:</p> <p>Stage 0 – typical for the steppe remnants exceeding 0.5-1.0 km² with the highest species diversity (e.g. Kasova Hora locality).</p> <p>Stage 1 – typical for the steppe remnants with area 0.1-0.4 km², with intermediate spatial heterogeneity of habitat and the weak grazing practices. The beetle diversity is 25-30% less in comparison with stage 0.</p> <p>Stage 2 – typical for the steppe remnants with area less than 0.1 km², with low spatial heterogeneity of habitat and the intensive grazing practices and weak pesticide contamination. The crucial role in coleoptera extinction play stochastic factors due to decreasing of the steppe remnant area. The loss of diversity reach 50-70% in comparison with stage 0.</p> <p>Stage 3 – the total extinction take place in very small steppe patches under the permanent pesticide contamination. Some soil coleoptera can recolonise the patch in periods between using of pesticides.</p>
<p>4. Preparation of scientific justifications for conservation of the steppes remnants.</p>			<p>I prepared 11 scientific justifications for the steppe remnants conservation. I officially called the local authorities, whose competence in decisions, for conservation of selected steppes sites. For this, it was engaged local communities through NGOs, mass media, local authority and Halych National Park.</p>

			<p>On June 2nd 2017 in Rohatyn District Council, we organised a meeting with authorities, representatives of local communities and mass media for steppes conservation in the region of Burshtyn Opillya.</p> <p>At the present, it is preserved two steppe remnants (Kasova Hora and Kuropatnytskyi Kamin) with total area 154 ha (initially it was agreed only 80 ha). Both localities were transferred under management of Halych National Park. Unfortunately, Ozeriany Village Council rejected my request for conservation of two steppe localities in total area 13 ha. Finally, Bilshivtsi Local Community Council is still considering the scientific justifications for conservation of five sites in total area of 45 ha.</p>
5. Publishing the results the study in scientific monograph and popular brochure.			<p>Since exchange course of EUR had fluctuated in Ukraine, the prices for printing services were dramatically changed. A significant part of the budget (see below) was spent to preparation and publishing of scientific monograph. Thus, popular brochure on steppe conservation is remain unpublished.</p>
6. Preparation of the program for the steppe Coleoptera restoration and conservation.			<p>I prepared roadmap for the steppe coleoptera habitat conservation. I described it in details in chapter 11 of the monograph. Here I presented the main features of the roadmap.</p> <ol style="list-style-type: none"> 1) All the steppes remnants on Burshtyn Opillya are scattered within large territory and completely isolated from each other. The maximum distance between the steppe remnants exceeds 50 km. 2) 80% of the 35 steppe remnants are aggregated in seven separate clusters. 3) The steppe remnants in each clusters are situated relatively closely to each other. Thus it makes it possible to construct migrating corridors within each cluster.

			<p>4) Several clusters of steppes could be united by migrating corridors in a large supercluster.</p> <p>5) For the corridors to be maintained it needs active managing of the ecosystems including the traditional land using, hay harvesting, the weak grazing practices and legal prescribed burning of the dry vegetation.</p> <p>6) For the migrating corridors improving it needs to reveal the gene flow between soil coleoptera populations using tools of landscape genomics.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

In general, there were no unforeseen critical difficulties that would have prevented the project from being implemented. During the project there were minor difficulties, for example, in one of the expeditions in our transport a wheel was pierced. During the year there was a fluctuation of the euro exchange rate from 28 UAH/EUR up to 35 UAH/EUR and then to 30 UAH/EUR. Thus, the prices were also fluctuated.

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

1. Conservation outcome. I prepared 11 scientific justifications and officially called to the local authorities, whose competence in decisions, for conservation of selected steppes sites. The conservation regime was established on two localities (Kasova Hora and Kuropatnytskyi Kamin) with total area of 154 ha. Both localities were transferred under management of Halych National Park.

I prepared roadmap for further conservation of the steppes remnants and the steppe soil coleoptera restoration on Burshtyn Opillya. It includes constructing of the migrating corridors, diverse types of management for maintains of habitats and benefits for local communities participating in conservation actions.

2. Research outcome. During the project I collected large amount of scientific data. These include qualitative and quantitative compositions the soil coleoptera communities, environmental variables, number and quality of the steppe ecosystems. In general, I found 309 species of soil coleoptera which inhabit the steppe remnants on Burshtyn Opillya. I estimated the extinctions rate of the soil coleoptera and evaluated the reasons of the extinction. The main results of the project are highlighted in the scientific monograph "The steppe biota of Burshtyn Opillya".

3. Public related outcome. The local NGOs, mass media, authorities, Vasil Stefanyk Precarpathian National University and Halych National Park During was engaged to

promoting and implementation of the idea of steppes conservation on Burshtyn Opillya.

On June 2nd 2017 in Rohatyn District Council, I organised a meeting with authorities, representatives of local communities and mass media for steppes conservation in the region of Burshtyn Opillya (see my previous report <https://www.rufford.org/files/21931-1%20October%202017.pdf>).

On September 25th 2017 on Ivano-Frankivsk Regional TV it was discussion on the conservation of locally rare animal species and ecosystems including steppes as biodiversity hotspots (<http://galtv.if.ua/video/pro-golovne-v-detalyah-ivano-frankivshyna-yedyna-oblast-bez-chervoyi-knygy>).

On February 26th 2018 in Halych District Newspaper it was published article highlighted the state of the steppe conservation on Burshtyn Opillya (http://galslovo.if.ua/index_old.php?st=6492).

Bachelor and masters undergraduate students of the Biology and Ecology Department of Vasyl Stefanyk Precarpathian National University were engaged into the field researches and preparing of the scientific justifications for steppe habitat conservation. One master student under my supervision completed the master theses on "Microhabitat Distribution of soil Coleoptera on Kasova Hora" and received the master's degree.

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

We created the space of discussion and collaboration on the base of Halych National Park for effective interaction with local community trough engagement of NGOs, mass media and authorities. In cooperation with all stakeholders, it was created strategy of the roadmap for future constructions of the steppe remnants connecting network and its conservation on Burshtyn Opillya.

5. Are there any plans to continue this work?

A year is too short term for wide conservation of the steppes on Burshtyn Opillya. The main purpose is creating small local reserves connecting into one functional network. These need the further studies and conservation actions including the following:

- 1) Detecting the gene flows for different coleoptera species between the steppe remnants using tools of landscape genomics;
- 2) Revealing the most relevant migration corridors interconnecting isolated steppe remnants and improving their management;
- 3) Further conservation of the steppe remnants on Burshtyn Opillya in cooperation with local communities;

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

The result of the project will be shared in the local community via published monograph, mass media, and social networks.

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

The project, as planned, was implemented during the year from April 2017 to April 2018. The grant was used during three stages: 1) money for the field and laboratory equipment was spent during April – May 2017; 2) money for expeditions was spent during May – October 2017; 3) money for monograph publishing was spent during January – February 2018.

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
Backpack	235,3	224,9	+10,4	The item was cheaper
Entomological Forceps	58,8	58,8		
Field conservative	117,8	117,8		
Metallic tape measure	8,8	8,8		
Plastic banks	88,5	88,5		
Plastic Containers	88,5	88,5		
Plastic pitfall traps	58,8	58,8		
Portable hygrometer	117,8	-	+117,8	I bought other item which includes additional functions (see below)
Portable illuminometer	117,8	117,8		
Portable PH meter	176,5	176,5		
Portable Pyrometer (+ hygrometer)	73,5	191,3	-117,8	I bought one device instead two, which includes functions of hygrometer and thermometer (pyrometer).
Ziplocks	25,4	25,4		
Entomological pins	147	100	+47	The item was cheaper
Eppendorf tubes, 2 ml	118	118		
Ethanol, 96%	177	177		
LED lamp of outer	74	74		

circular lights				
Microscope USB-camera	147	147		
Transport rent including payment for driver and fuel expenses	1782,5	1765,8	+16,7	The item was cheaper
Bank fee	-	18,7	-18,7	The item of expenditure was not provided
Foodstuff	176,5	165,7	+10,8	The item was cheaper
Laptop	475	446,41	+28,59	The item was cheaper
Brochure preparation and publishing	118	-	+118	The costs was transferred to the monograph publishing.
Monograph preparation and publishing	472	685	-212,79	The item was more expensive than expected, what have caused by the dramatic fluctuation of the UAH/EUR exchange rate in January – February 2018.
Total:	4855	4855	0,00	

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

As I have mentioned above, there are several steps for the further steppe conservation on Burshtyn Opillya:

- 1) Detecting the gene flows for different coleoptera species between the steppe remnants using tools of landscape genomics;
- 2) Revealing the most relevant migration corridors interconnecting isolated steppe remnants and improving their management;
- 3) Further conservation of the steppe remnants on Burshtyn Opillya in cooperation with local communities;

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 Rufford Foundation logo was used in the scientific monograph "The steppe biota of Burshtyn Opillya".

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

Nadia Shumska – the author/co-author of chapters 2,3,5,9 in the scientific monograph "The steppe biota of Burshtyn Opillya".

Iryna Dmytrash-Vatseba – the author/co-author of chapters 1,2,3,4,9,10 in the scientific monograph "The steppe biota of Burshtyn Opillya".

Vasyl Malaniuk – the author/co-author of chapters 5 and 9 in the scientific monograph "The steppe biota of Burshtyn Opillya".

Volodymyr Buchko – the author/co-author of chapters 8 and 9 in the scientific monograph "The steppe biota of Burshtyn Opillya".

Nazar Smirnov – the co-author of chapter 8 in the scientific monograph "The steppe biota of Burshtyn Opillya".

12. Any other comments?

I wish to thank the Rufford Foundation for funding this project.