

The Rufford Small Grants Foundation

Final Report

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

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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	Tatiana Ivkovich
Project title	Killer whale (<i>Orcinus orca</i>) habitat conservation in Kamchatka and Kuril Islands
RSG reference	14885-2
Reporting period	30.04.2014-30.04.2015
Amount of grant	£5957
Your email address	Tatiana.ivkovich@gmail.com
Date of this report	05.05.2015

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
To reveal the role of various fish species in killer whale diet during the summer months in Avacha Gulf, Kamchatka, and near Paramushir Island (Northern Kuril Islands, Okhotsk Sea).		We achieved all the tasks planned for this 1-year project. More data should be collected for Paramushir Island (Northern Kuril Islands).		As it was the first time when the data on killer whale feeding behaviour was collected near Paramushir Island it was not enough to get significant results on the role of various fish species in the diet. As for Avacha Gulf the opportunistic data from previous seasons were also used for the analysis and killer whale diet was studied in detail for July and August. We have prepared the draft of paper "Fish-eating killer whale (<i>Orcinus orca</i>) July-August diet in Avacha Gulf: are there any preferences?" for publication in a scientific peer-reviewed journal. Now we are working on final edits.
To map and characterise important killer whale feeding areas inside the study sites.			We achieved all the tasks planned for this 1-year project	We have mapped important feeding areas in Avacha Gulf of Kamchatka and characterised them. Then we made a hypothesis on feeding areas near Paramushir Island using these characteristics. The hypothesis was proved by our observations. The comparison of killer whale behaviour budgets between three different areas (Avacha Gulf, Commander Islands, Vancouver Island (using literature data)) proved the correlation between the characteristics we obtained and the intensity of feeding behaviour. We are planning to publish these results in a peer-reviewed scientific journal.
To evaluate the influence of prey abundance on killer whale behaviour and survival.			We achieved all the tasks planned for this one-year	We studied the influence of prey abundance on killer whale encounter rate, behaviour budget and survival in Avacha Gulf. The results were partly presented at the European Cetacean Society conference in Malta, March 2015.

			project	We are processing data from other years to get final results on killer whale survival and to prepare the paper for a scientific peer-reviewed journal.
To promote people's awareness about killer whale habitat degradation and the implications of aquarium captures on wild populations.			We achieved all the tasks planned for this one-year project	We worked intensively to promote public awareness through making informative posts on our pages in the web, through organising "Blackfish" movie screenings and discussions, holding popular educational seminars, spreading questionnaires, publishing a popular paper on the National Geographic Russia website, creating and showing a short movie about our studies to many audiences and creating informative booklets.

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

The logistics in the Russian Far East are difficult. This was our first time to organise work on Paramushir Island and due to problems with logistics, our field work there was shorter than we expected (2 weeks instead of 3 weeks). Still it was rather productive.

It appeared quite difficult to find information on salmon species abundance because of its commercial value. We mainly used data on salmon commercial catches provided by the North Pacific Anadromous Fish Commission (NPAFC). Now we are looking for the information on fishing effort as the catch rate would reflect fish abundance more precisely.

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

a. Killer whale diet and feeding hotspots

Avacha Gulf killer whales belong to the fish-eating ecotype as well as killer whale populations of Northeast Pacific. The diet of Northeast Pacific killer whales includes different species of salmon with significant preferences for chinook salmon (*Oncorhynchus tshawytscha*). We discovered that Avacha Gulf killer whales forage in July-August on various species of Pacific salmon with significant preferences for coho salmon (*O. kisutch*), which are relatively large and the second fattest but one of the least abundant Pacific salmon. Coho salmon has the longest spawning period in the Northwest Pacific as does chinook salmon in the northeast Pacific. Thus, it is available for longer period than other species. The second in importance was chum (*O. keta*) — less nutritious but one of the largest Pacific salmon and one of the most numerous salmon species in the study area in July-August. chinook and sockeye (*O. nerka*) are rare in Avacha Gulf during July and August. We suppose that the nutritional content, abundance and availability might influence fish-eating killer whale prey choice. Food preferences in one ecotype could vary between populations. It is important to consider the differences in diet for conservation planning.



Fig. 1 Coho salmon scale and killer whale female with sockeye salmon

We have determined that killer whale feeding hotspots are correlated with pronounced relief – with prominent capes and irregular bays and pronounced underwater relief. Such areas often have a higher concentration of migrating salmon and spawning Atka mackerel. Spawning salmon migrates along the coastal currents which are formed near capes and bays. Spawning Atka mackerel are concentrated around prominent capes. The pronounced relief could be helpful in hunting techniques. The results of our study provide evidence that killer whales spend more time feeding in these areas characterized by pronounced relief.

The draft of a scientific paper “Fish-eating killer whale (*Orcinus orca*) July-August diet in Avacha Gulf: are there any preferences?” was prepared from these results for a peer-reviewed journal.

b. Killer whale behaviour, prey abundance and a critical situation developing in Avacha Gulf

We found significant correlation between pink salmon (*Oncorhynchus gorbuscha*) abundance and killer whale behaviour in Avacha Gulf. Pink salmon have a 2-year life cycle with corresponding fluctuations in abundance: In odd years its biomass increases tenfold. In these years’ killer whales spend significantly more time resting and less time foraging.

Unexpectedly low abundance of spawning pink salmon (*Oncorhynchus gorbuscha*) observed in 2013-2014 coincided with an extremely low killer whale encounter rate in Avacha Gulf (Fig. 1). The comparison of killer whale occurrence frequencies across different field seasons in Avacha Gulf (July-August 2005-2014) showed a considerable reduction in 2013-2014. This substantial variation in killer whale encounter rate could indicate changes in area usage related to changes in ecosystem parameters.

These results were partly presented at the 29th Conference of European Cetacean Society, 23rd and 25th March 2015, Malta. The critical situation in Avacha Gulf offers a clear yet disturbing example of marine habitat degradation that has helped us to attract public attention to this problem.

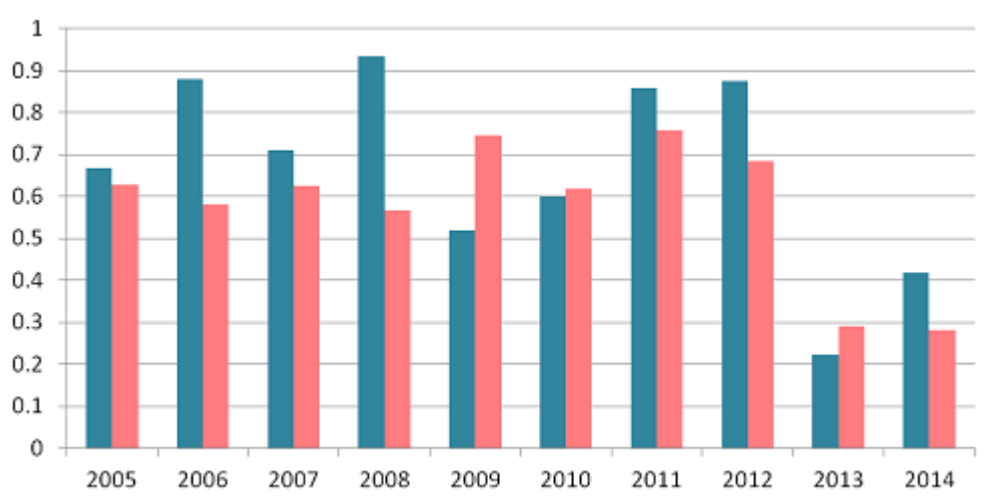


Fig. 1

- Variation in killer whale encounter rate, eastern Kamchatka, Avacha Gulf (number of days with killer whales/effort)
- Variation in pink salmon commercial catch rates around eastern and western Kamchatka (North Pacific Anadromous Fish Commission (NPAFC), 2014)

c. Promoting public awareness

We have attracted the attention of thousands of people to the problems of killer whale habitat degradation and captures for aquarium. The results of our questionnaires showed that almost all responders knew nothing about the importance of habitat conservation for the survival of cetacean populations. About 20% of responders were aware of aquarium captures from the point of view of animal suffering in captivity. We have participated in organising and participating in a formal discussion at four separate “Blackfish” movie screenings in Russia. At each screening I gave an oral presentation showing also the implications of captures on wild populations and spreading the information on the situation of live-captures in Russia. I also developed and organised four popular lectures, entitled “Meetings with killer whales”, that included substantial information on Pacific salmon and its importance for killer whales and wildlife in the Russian Far East. It appeared that the audience in the western part of Russia doesn’t know anything about Pacific salmon abundance in the eastern part of Russia. For these lectures I invented a unique game for children to make a model of a kelp ecosystem and to see how different species depend on each other. These lectures gained a lot of publicity and appeared to be an effective way to attract people to the problems of killer whales and their habitat conservation.

We have posted several short popular stories on the web devoted to our studies of killer whale feeding ecology, the problems of illegal poaching in the Russian Far East, killer whale food resources degradation and killer whale capture issues in Russia. The stories were mostly published on our Facebook page (<http://www.facebook.com/russianorca>, 6935 followers) and our Vk page (<http://vk.com/russianorca>, 1766 followers).

One of the young journalists who saw our posts was inspired to create a popular paper about our work for National Geographic Russia that considered the problems of killer whale habitat conservation and killer whale captures: <http://www.nat-geo.ru/nature/51870-kosatki-na-vstrechu-s-morskimi-bogami-aynov/#full>

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

We developed our contacts with local tourism organisations and local people involved in work with tourists. Some of these contacts evolved from our previous project and we expanded and strengthened them. Among them are KamchatKayaking Club, Orca-Diving Club <http://orca-diving.ru/en/>, Kamchatka Regional Sailing Federation and two individuals who are involved in the organisation of marine trips. On the one hand we promoted these organisations by mentioning them in the posts about our fieldwork. They in turn helped us in spreading the information and education. There is a high interest among tourists in visiting our field camp where we organise casual talks about our work considering problems of killer whale habitat conservation and killer whale captures for aquariums. Thus, local people benefitted by bringing tourists to our camp. We pay special attention to the importance of encouraging responsible marine tourism and whale watching by trying to influence tourists and tourism companies, and by showing benefits of this approach to tourism to local people in the community.

We also provide people involved in marine tourism and whale watching organisations with attractive, informative printed materials: e.g., booklets (Fig. 2) and calendars with killer whale facts.





Fig. 2 Our booklet that mention problems of killer whale food resource degradation and its influence on killer whale behaviour and survival.

We also made some attempts to build contacts with local poachers. Talking with them we realised that there was no way to change their behaviour through education and only strict and responsible management authority could help to stop illegal poaching in Kamchatka.

5. Are there any plans to continue this work?

It is important to continue the studies of killer whale feeding ecology in the Russian Far East and the promotion of public awareness about killer whale habitat degradation and captures for aquarium. We are planning to continue this work. We can't be sure that killer whales will definitely work as an "umbrella" to protect many other marine species but they definitely can attract public attention to the problems of Pacific salmon and Atka mackerel conservation in Russia – the species that are included into many important trophic chains.

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

We have already started to share the results of our work by presenting some of them at the ECS conference in Malta, 2015; by preparing booklets to spread them in the Russian Far East, mainly Kamchatka; by preparing a draft of a scientific paper "Fish-eating killer whale (*Orcinus orca*) July-August diet in Avacha Gulf: are there any preferences?".

The results of our behavioural observations were partly presented in the paper "The evidence for perceptual origin of the right-sided feeding biases in cetaceans" that was accepted by Journal of Animal Cognition.

We are also planning to prepare two more scientific papers and to present some of the results at the European Cetacean Society conference in Europe and Marine Mammal of Holarctic conference in Russia in 2016.

We also will publish popular notes about our results on our Facebook and VK pages.

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

The RGS funds were used approximately for 1 year. The majority of funds were used during the field season. One year is not enough for such a project and that is why additional data were gathered and considered from previous seasons. In any case we managed to make considerable progress in promoting public awareness during this project. And we hope to continue our work in future.

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.

£1 Sterling is approximately the equivalent of 59 Russian Rubles. Due to complicated economical situation in Russia in 2014 there was a variation in prices in comparison to our expectations in 2013

Item	Budgeted Amount	Actual Amount	Difference	Comments
Airplane return tickets from Moscow to Petropavlovsk-Kamchatsky	1970	2422	-452	Airplane tickets got higher than we expected
Per diem expenses	2770	1605	1165	We got additional co-funding from FEROP for per diem expenses. We used the difference to cover the increased expenses for air tickets and to buy underwater camera and HDD for data storage
Internet and telephone (communications during field season)	28	26	2	
Camp supplies	123	125	-2	
Fuel and motor oil for motorboat and electricity generator in the field camp	432	692	-260	We used more fuel and oil because during the first part of our expedition we had to use two stroke motor engines instead of four stroke engine that was under repair
Printing materials for educational work	133	214	-81	We used saved money to print out more booklets
Residential tent for the field camp in Avacha Gulf	501	492	9	
Underwater action HD camera	0	303	-303	We bought underwater video camera using saved money to film hunting killer whales and salmon migration in the rivers
HDD for video and other data storage	0	77	-77	We bought HDD for video and other data storage using saved money
TOTAL	5957	5957	0	

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

Our data on killer whale feeding ecology were collected during the short summer period (July-August) mainly in Avacha Gulf. To make accurate conclusions about differences in the role of fish species in killer whale diet and its correlation with killer whale survival and behaviour it is important to make observations in different seasons (spring, autumn) and localities other than Avacha Gulf of Kamchatka.

It is also important to check the universality of characteristics of killer whale feeding hotspots by collecting data in different localities.

We should study the possibilities of the propose role of killer whales as an umbrella species and evaluate the importance of killer whale key habitats for other species and for biodiversity conservation.

We should continue to promote public awareness about marine habitat degradation and hold popular seminars in different parts of Russia. It would be good to prepare a popular book about killer whales in Russia.

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

We used the RSGF logo in booklets (Fig.2) and in a calendar with killer whale facts.

We also used RSGF logo in acknowledgements for the video “Those who watch the whales” telling about our team and our field work. This video was distributed through the Internet and presented on video night at the 29th Conference of European Cetacean Society, 23-25 of March 2015, Malta.

We mentioned RSGF in acknowledgements in papers:

O. Shabalina, O. A. Filatova, T. V. Ivkovich, A. M. Burdin, E. Hoyt, 2015. Killer whales of southeastern Kamchatka and the Commander islands: dynamics of occurrence and movement between areas. Zoologicheskji Journal, 94(3): 1-13

Karina Karenina, Andrey Giljov, Tatiana Ivkovich, Yegor Malashichev, in press. The evidence for perceptual origin of the right-sided feeding biases in cetaceans. Journal of Animal Cognition.

In conference poster:

Tatiana Ivkovich, Mikhail Nagaylik, Evgenia Volkova, Alexander Burdin and Erich Hoyt, 2015. Reduction of killer whale (*Orcinus orca*) encounter rate in Avacha Gulf of Kamchatka (Northeast Pacific, Russia) in years with low salmon abundance. 29th Conference of European Cetacean Society, 23-25 of March 2015, Malta, conference abstract book, p 129

We also mentioned RSGF in short popular publications about this project on our Facebook page (<http://www.facebook.com/russianorca>, 6935 followers) and our Vk page (<http://vk.com/russianorca>, 1766 followers).