

## The Rufford Small Grants Foundation

### Final Report

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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. 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
<b>Your name</b>	Stephanny Arroyo-Arce
<b>Project title</b>	Habitat selection by jaguar ( <i>Panthera onca</i> ) in Tortuguero National Park, Costa Rica
<b>RSG reference</b>	11673-1
<b>Reporting period</b>	May 2012 – April 2013
<b>Amount of grant</b>	£5627
<b>Your email address</b>	<a href="mailto:sturnina@gmail.com">sturnina@gmail.com</a>
<b>Date of this report</b>	May 3 <sup>rd</sup> , 2013

**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 identify the habitat types selected by jaguar in Tortuguero National Park.			X	The coastal habitat was clearly selected by the jaguar despite that it was the less available habitat in comparison to the other three habitats including primary forest, secondary forest and wetlands. We identified 13 jaguars including five females, seven males and one cub. All the individuals were reported using the coastal habitat at some point during the execution of this project - with the exception of one female that was captured only in the interior of the Park.
To identify the landscape variables related to the habitat selection by jaguar in Tortuguero National Park.			X	The most important landscape variable related to the habitat selection was the presence of marine sea turtles. It was observed that the probability of jaguar occurrence increased with the presence of marine sea turtles, which is consistent with the predictions <i>a priori</i> .
To analyse the spatial and temporal interactions of jaguar in Tortuguero National Park ( <i>new objective</i> ).			X	The jaguar presented a social behaviour in the coastal habitat of Tortuguero National Park, characterised by an evident home-range overlap between males and to a lesser extent between females.
To identify the landscape variables relevant for the occurrence of jaguar in the buffer zone of Tortuguero National Park ( <i>new objective</i> ).			X	The most important landscape variable related to the occurrence of jaguar in the buffer zone was forest covert. It was observed that the probability of jaguar occurrence decreased in those communities whose landscape was dominated by agricultural activities (e.g. banana and pineapple plantations) where forest covert was minimal, which is consistent with the predictions <i>a priori</i> .
To identify the main threats face by jaguars in Tortuguero National Park			X	The main threat face by jaguars was the illegal hunting of their prey species; one of the most conflicted

and its buffer area ( <i>new objective</i> ).				areas was located in the south-western edge of the Park.
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

We have had to face three main constraints during the field work. First, setting up the camera-traps in some sectors of the study area has been a challenge. In some occasions we were unable to get to the primary sampling units previously chosen, that because the characteristics of the area hinder the entry as it is a swampy area. In these cases, we decided to set up the cameras as closer to the initial location as possible. Second, we also have faced resistance from the hunters and poachers in the park, mainly because a total of eight camera traps have been stolen in the different sectors. Finally, the weather conditions have had a negative effect on the camera traps leading to the malfunction of six of them. All of the stolen or damaged camera traps were replaced with new ones which represented an unexpected expense.

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

First, we conducted the first camera-trap survey in the all Tortuguero National Park. Based on this study, we were able to identify 11 prey species including paca (*Agouti paca*), white-lipped peccary (*Tayassu pecari*), Central America agouti (*Dasyprocta punctata*), red brocket deer (*Mazama americana*), nine-banded armadillo (*Dasybus novencinctus*) and green sea turtle (*Chelonia mydas*) among others. Camera trapping allowed us to identify 11 ocelots (*Leopardus pardalis*) including six males and one female – due to the quality of the photo we were unable to determine the gender of the other four individuals. We also indentified 13 jaguars (five females, seven males and one cub). Additionally, we were able to register the first report of a puma (*Puma concolor*) in Tortuguero National Park.

Second, we were able to describe the social behaviour of jaguars in the coastal habitat of Tortuguero National Park, a felid that has been categorised as a solitary and territorial species. This particular behaviour could be related to the high availability of prey – specifically marine sea turtles. It is important to point out that Tortuguero National Park hosts one of the largest remaining green sea turtles (*Chelonia mydas*) colony in the Atlantic, around 17,402 to 37,290 nesting females per year.

Third, in the buffer area of the Park we identified the most critical site in relation to the conflict between humans and jaguars, specifically the communities located at the south-western edge of the protected area. The conflict could be related to a decline in the natural preys due to an increase in the illegal hunting, this situation may be forcing the jaguars to explore new areas outside the protected area.

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

We gave talks about the project to the communities located in the buffer area of the park. The key purpose of these activities was to raise awareness of the research being carried out within the Tortuguero National Park and its buffer area in order to promote people’s interests and participation in the project. We also used the funding to hire two local field assistants who helped us during the execution of the project.

**5. Are there any plans to continue this work?**

This project should be considered as an initial effort to generate baseline information regarding the status of conservation of the jaguar in the Tortuguero National Park. Therefore, at the end of this project we will seek to continue the project in Tortuguero National Park, specifically, we will focus our study in the coastal habitat of the Park in order to continue studying the social behaviour of the jaguar as well as the relationship between the felid and the marine sea turtles. We are also seeking to expand the jaguar conservation efforts to Barra del Colorado Wildlife Refuge, located on the northern edge of the park and which is part of the same Jaguar Conservation Unit, where limited information have been generated regarding the species. The present study and the future plans to continue this work will allow us to answer critical gaps in our understanding of the jaguar population in the Tortuguero Conservation Area (ACTo). It is expected that wildlife managers of the ACTo will use the information generated as a complementary tool to make practical management and conservation actions of the jaguar in the area.

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

We are planning to share the main results of this investigation to the key stakeholders of the area, the general public and the scientific community. In this respect, we are planning to give a workshop to the tourist guides of the Tortuguero National Park (around 100 guides) at the end of June 2013; the main goal is to provide accurate information regarding the conservation status of jaguars in Tortuguero National Park and to answer questions about the relationship between the felid and the marine sea turtles; we will give a similar workshop to the staff of the ACTo and the communities located in the buffer area of the Park. Further, we will publish the main findings in mass media that are readily accessible to the general public; so far we have published a report summary in Global Vision International blog and an article in Global Post; we are also seeking to publish the main findings on a national media. Furthermore, we are preparing a series of articles for publication in scientific journals which will address different topics including habitat selection, diet analysis, relationship between jaguars and marine sea turtles, social structure of the felid, among others. Finally, we will seek to present the research at different national and international conferences and symposiums regarding wildlife management and conservation of carnivores.

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

The initial project duration was 1 year (from January 27<sup>th</sup>, 2012 to December 21<sup>st</sup>, 2011), including pre-surveys. However, we were able to secure the money needed to execute the field work until June 2013. Our project has the support from Liz Claiborne Art Ortenberg Foundation Jaguar Research Grant Program, Rufford Small Grants Foundation, Idea Wild, U.S. Fish & Wildlife Service and Global Vision International.

**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
2 local monitors @ £126 monthly salary/8 months	1008	900.34	-107.66	We will use the £107.66 left to hire one local monitor for the final field trip scheduled for June 2013.

2 monthly trips @ £155 gas cost for field boat/per trip/8 months	1240	1447,53	+207,53	The transportation by boat was granted for free by Global Vision International. Therefore, we decided to spend the money to pay for the gas cost for field vehicle, boat taxis and bus tickets.
4 oil changes for field boat @ £19 per change	38	38	0	
1 meal @ £4/2 people/3 meals per day/100 days	1200	1028	-172	We will use the £172 left to cover the costs of food for the rest of the project.
30 Trophy Cam 8MP Brown Night Vision @ £186 each	1860	1860	0	
30 security cable locks for cams @ £14 each	140	140		
120 Rechargeable batteries AA for cams @ £1.90 per battery	76	76		
4 sheet of printing paper @ £25 each	50	50		
6 printing ink cartridges @ £5 each	15	15		
<b>Total</b>	5627	5555.87	-72.13	We will spend the £72.13 to help cover part of the cost of food and to hire one local monitor for the final field trip scheduled for June 2013.

**Exchange rate: 1 Costa Rican colon = 0.0012 pound sterling**

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

We are planning to apply for a Second Rufford Small Grant, and we are also looking for additional funding, in order to secure the continuity of the project. In this respect, we believe the most important next steps are: a) to disseminate the information obtained to key stakeholders in order to facilitate decision-making regarding the proper management of the species; b) to continue the project in Tortuguero National focusing on jaguar behaviour; c) to expand the jaguar conservation efforts to Barra del Colorado Wildlife Refuge where limited information has been generated regarding the species; and d) to share the main results to the general public and the scientific community.

### 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?

RSGF logo was used in every material produced that was related to this project, including the following:

1. A note about the project in Global Vision International blog.  
 (<http://gvicostarica.blogspot.com/2012/habitat-selection-by-jaguar-panthera.html>)



you are the difference

## GVI Costa Rica Coastal Rainforest and Community Programmes

Welcome to the Coastal Rainforest Research, Wildlife Conservation & Community Projects blog, where you can keep up to date with all the projects and information from GVI in Costa Rica

Global Vision International (GVI) is a non-political, non-religious organisation, which through its alliance with over 150 project partners in over 30 countries, provides opportunities for volunteers to fill a critical void in the fields of environmental research, conservation, education and community development.

### Facts and Figures Quepos Community Project

- Ongoing education support to over 330 primary school students within 2 local schools (2011-2012)
- 227,400 hours of Primary School students hours taught (2011-2012)
- Over 1700 hours of English

### HABITAT SELECTION BY JAGUAR (*Panthera onca*) IN TORTUGUERO NATIONAL PARK AND ITS BUFFER AREA, COSTA RICA

Me gusta A 21 personas les gusta esto.

*The following blog post comes from one of GVI's research partners in Costa Rica, Stephany Arroyo-Arce. Stephany is a Costa Rican biologist conducting jaguar research in Tortuguero National Park, and has camera traps placed throughout the park to study the jaguar population. We work closely with Stephany through our valued partnership with Panthera, an international organization working for the protection of wild cats and their ecosystems. As a portion of Stephany's camera traps are near to our Jalova research station, Stephany often visits the station to stay with us, and GVI staff and volunteers assist her in getting to her cameras and collecting the latest data. Read on to learn more about Stephany's research and findings:*

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2. Workshop for park rangers on the use of non-invasive techniques to study jaguars.

**TALLER TEÓRICO-PRÁCTICO**  
**TÉCNICAS NO INVASIVAS PARA EL ESTUDIO DE JAGUARES**

**23 de setiembre del 2012**

**PROGRAMACIÓN**

Hora	Tema	Encargado
8 a.m. a 11 a.m.	- Protocolo para la instalación de cámaras trampa y estaciones de olor (teórico-práctico) - Organización de la base de dato	Roberto Gramajo
<i>Refrigerio</i>		
11:15 a.m. a 12 p.m.	- Protocolo para la recolecta de moldes de huellas (práctico)	Stephanny Arroyo-Arce
<i>Almuerzo</i>		
1 p.m. a 2 p.m.	- Protocolo para la colecta de heces de jaguar (teórico-práctico)	Stephanny Arroyo-Arce
2 p.m. a 3 p.m.	- Identificación de jaguares en base al patrón de manchas (práctico)	Stephanny Arroyo-Arce Roberto Gramajo

con el apoyo de






3. Invitation to the communities located in the buffer area of the Tortuguero National Park to attend a talk about the jaguar conservation efforts carried out in the Park.

## COMUNIDAD DE TORTUGUERO

Se les invita a participar a las charlas sobre jaguares:

1. Los proyectos de conservación llevados a cabo por Global Vision International (GVI) en el Parque Nacional Tortuguero.

*Roberto Gramajo*

2. Presentación de la investigación "Selección de hábitat y hábitat potencial del jaguar en el Parque Nacional Tortuguero y su área de amortiguamiento".

*Stephanny Arroyo Arce*

3. Reduciendo los conflictos entre el ser humano y los grandes felinos en Costa Rica.

*Daniel Corrales*

**SÁBADO  
21 JULIO**

LUGAR: Escuela de Tortuguero

HORA: 2:00 PM

**¡ENTRADA GRATIS!**



Para mayor información contactarse con:

Stephanny Arroyo Arce  
sturnina@gmail.com  
tel. 88255499

Roberto Gramajo  
tel. 89552549

Con el apoyo de:





4. An article about the project published in GlobalPost.  
(<http://www.globalpost.com/dispatch/news/regions/americas/costa-rica/130401/jaguars-feast-green-sea-turtles-tortuguero-park>)

The screenshot shows a news article on the GlobalPost website. The article is titled "Into the Costa Rican wild: Jaguars feast on sea turtles" and is dated April 7, 2013. The author is Monica Quesada. The article includes a large photo of a jaguar and a video player. The page also features a navigation menu, social media sharing options, and a "Most Shared" sidebar with various news snippets.

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Monica Quesada | April 7, 2013 06:00

## Into the Costa Rican wild: Jaguars feast on sea turtles

Jaguars normally live alone — but in Costa Rica's Tortuguero park, where more than a dozen roam together, preying on endangered green turtles.

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Alex.  
PHOTO BY: Courtesy of Stephanny Arroyo, La Claiborne Art Ortenberg Foundation Jaguar Research Grant Program, The Rufford Small Grant Foundation, US Fish & Wildlife Service, Idea Wild

TORTUGUERO, Costa Rica — A sole pair of sea turtle tracks is all that punctuates the serenity of sand along the protected beach on this Central American country's Caribbean side.

What do you think?

1	0	1	0	0
Must read	Surprising	Tragic	Inspiring	Odd!

Find out more at [nutter.com](http://nutter.com)

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**11. Any other comments?**

I would like to thank The Rufford Small Grants Foundation, Liz Claiborne Art Ortenberg Jaguar Research Grant Program at Panthera, Idea Wild and U.S. Fish & Wildlife Service for the financial support provided to this project. I gratefully acknowledge all the staff and volunteers of Global Vision International (GVI) for their support throughout the execution of this investigation. We also thank the Ministry of Environment and Energy and National System of Protected Areas for giving us permission to work in Tortuguero National Park and for their logistical support.