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. 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	Michael Liles
Project title	Enhancing Nest Protection of the Critically Endangered Hawksbill Turtle in the Bahía de Jiquilisco-Xiriualtique Biosphere Reserve, El Salvador
RSG reference	9467
Reporting period	1 April – 31 December, 2011
Amount of grant	£5,337
Your email address	mliles@gmail.com
Date of this report	31 March 2012

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
Formation of local hawksbill conservation network			X	A local hawksbill conservation network of approximately 75 egg collectors and fishers (i.e. local assistants) was successfully formed.
Connect hawksbill nest payments to hatching success			X	Payments for egg protection were connected to hatching success for 40 hawksbill nests.
Protect at least 30 hawksbill clutches that achieve a hatching success of 70%		X		A total of 40 hawksbill clutches were protected that achieved a hatching success of less than 70%.
Increase local egg collector interest in developmental process and fates of nests			X	Via observations and interviews, local egg collectors that participated in the project demonstrated an overall increase in interest regarding the developmental process and fates of nests.
Employ participatory approach to fully engage local residents in project activities			X	Coastal residents, particularly local assistants, participated in all aspects of project activities, including monitoring and data collection.

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

Developing a modified payment scheme to shift payments for hawksbill nest protection from eggs to hatchling production was more difficult than anticipated. Delayed payments (i.e. payments until nests hatch) and elevated levels of risk associated with an unfamiliar payment scheme that focused on hatchling production (i.e. variable payment) rather than number of eggs (i.e. fixed payment) made achieving consensus on an appropriate balance between payments for eggs and hatching success a challenge. To facilitate discussion and resolve uncertainty, we held a total of four information-sharing meetings, instead of two as anticipated, to encourage egg collectors to voice their opinions, concerns, and suggestions. These extended opportunities for discussion allowed for healthy debate and modifications of the proposed payment scheme that gave it local validity, increased support, and ultimately enhanced effectiveness.

Nesting levels of hawksbills in the Bahía de Jiquilisco-Xiriualtique Biosphere Reserve (Bahía) in El Salvador were considerably lower in 2011 than those documented during previous seasons, with fewer than half of the nests recorded in 2010. Hawksbills nest on 2-3 year cycles and the fact that substantially fewer nests were documented in 2011 likely represents a natural fluctuation in the

nesting cycle. Low nesting levels resulted in a reduced number of local egg collectors searching for hawksbill nests, which contributed to extended transport times of some nests relocated to hatcheries or to the *in situ* protection area at Las Isletas beach.

This project achieved the first-ever *in situ* protection of sea turtle nests on a public beach in El Salvador, demonstrating its feasibility in the Bahía. However, nests incubated in natural conditions (i.e. *in situ*) confront threats that are often controlled in artificial incubation environments (i.e. hatchery), such as predation. Of the first 10 hawksbill nests incubated in the *in situ* protection area, a total of 353 eggs from 8 nests were predated by snakes and crabs. To mitigate nest predation, we reburied hawksbill clutches relocated to the *in situ* nest protection area inside enclosed cylindrical wire cages (30 cm X 60 cm), which successfully deterred predation in the remainder of relocated hawksbill nests.

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

Formation of local hawksbill conservation network

At the start of the project, we held four information-sharing meetings with community members of the Bahía to discuss and request input on our vision of the project's objectives, activities, and desired outcomes. When possible, we incorporated community concerns and suggestions into project activities. During these initial meetings, we facilitated the formation of a network of approximately 75 local egg collectors and fishers, hereafter called local assistants, who were interested in participating in project activities and in protecting hawksbill turtles. Active participants were given a hawksbill conservation t-shirt to foster a sense of unity, motivate collective action, and disseminate a continuous conservation message among disperse and often remote communities.

Connecting nest payments to hatching success

In El Salvador, hawksbill eggs not purchased by hatcheries for protection are sold for consumption; however, payments for nests traditionally are tied to eggs not hatchling production. This project successfully piloted the first-ever use of nest conservation payments tied to hatching success in El Salvador. In previous years, hawksbill nests were purchased from local egg collectors for protection at £1.90 per dozen eggs. To begin to shift economic incentives provided for nest conservation from eggs to hatchling production, we presented four alternate nest payment options to local egg collectors in the Bahía for their consideration at the start of the project (Table 1).

Price/doz	Base Earnings	Price/hatchling	---------- Hatching Success ----------			
			70%*	80%	90%	100%
£1.90[a]	£24.71	–	£24.71	£24.71	£24.71	£24.71
£1.74[b]	£22.65	£0.03	£26.11	£26.61	£27.10	£27.60
£1.58[b]	£20.59	£0.05	£26.13	£26.92	£27.71	£28.50
£1.43[b]	£18.53	£0.07	£26.14	£27.23	£28.32	£29.41
£1.27[b]	£16.43	£0.09	£26.16	£27.54	£28.93	£30.31

Table 1. Potential earnings from traditional and modified payment schemes based on the mean hawksbill clutch size of 156 eggs (13 dozen). [a]Traditional payment scheme. [b]Modified payment scheme based on hatching success. *Mean hatching success of hawksbill clutches in the Bahía in 2008.

The majority of egg collectors voted for the modified payment scheme that offered £1.58 per dozen eggs and £0.05 per hatchling. Discussions by egg collectors during the voting process suggested that this option was of moderate risk but still had higher base earnings than some other options. According to this option, two payments were made to egg collectors for protection of relocated and *in situ* nests; the first payment was for the total number of eggs protected and was administered immediately, and the second payment was made according to the number of live hatchlings produced.

A total of 40 hawksbill nests (7,689 eggs) were protected during this project; 20 nests (3,981 eggs) were relocated to the local hatchery at La Pirraya and 20 nests (3,708 eggs) were incubated at the *in situ* protection area at Las Isletas beach (Table 2, Figure 1). The total number of hawksbill nests protected surpassed our anticipated total of 30 nests; however, these nests achieved a hatching success of 40%, not 70% as expected. Prolonged handling of nests by local assistants in the Las Isletas area and a high temperature spike at La Pirraya hatchery likely contributed to this low hatching success, which will be remedied in 2012. The 40 hawksbill nests were encountered by a total of 18 local assistants, with one individual having encountered 8 nests. We recorded the total number of times that a local assistant asked about their nest during the incubation period. Interviews with participating local assistants suggested that during previous years very few, if any, egg collectors asked about the fate of their nests after selling them for protection because there was no incentive for them to do so. By connecting nest conservation payments to hatching success, there was now an economic incentive that increased interest in maximizing the number of hatchlings produced. Of the 40 hawksbill nests protected, there were only 4 nests that were not inquired about by the local assistants that found them. The majority (n = 15) of local assistants demonstrated increased interest in their nests between day 45 and 60 of incubation, which we used as learning opportunities to discuss hawksbill biology and egg development.

	Hatchery	*In situ* Area	Total
Nests	20	20	40
Eggs	3,981	3,708	7,689
Hatchlings	2,076	954	3,030
Hatching success (%)	52	26	40

Table 2. Number of hawksbill nests, eggs, hatchlings, and hatching success in the La Pirraya hatchery and Las Isletas beach in situ protection area in the Bahía in 2011.

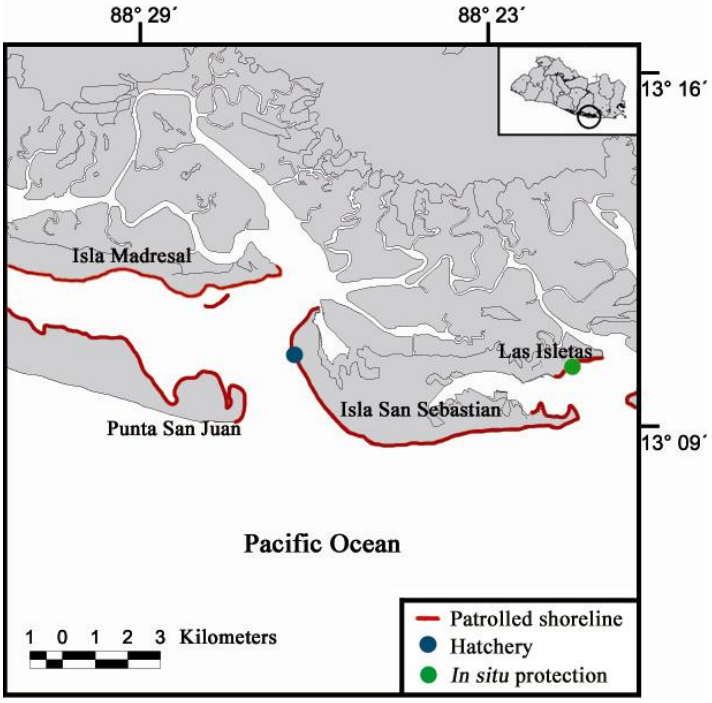

Figure 1. Hawksbill monitoring areas in the Bahía, with patrolled shoreline marked in red, hatchery in blue, and *in situ* protection area in green.

Local capacity building via direct participation in research and conservation activities

Achieving and maintaining desired hawksbill turtle conservation outcomes requires collaboration among diverse stakeholders and collective action towards conservation goals. We used meetings and training workshops as platforms for encouraging coastal community involvement in, and joint-ownership of, all aspects of project activities, and for raising local awareness about the critical status of hawksbill turtles in the eastern Pacific Ocean. Many local assistants participated directly in research activities, such as flipper tagging, morphometric measurements, and nest-site data collection. To unite and motivate members of local communities to protect hawksbills, we held the "First Hawksbill Festival in the Bahía de Jiquilisco" in which over 400 adults, youth, and children participated. Activities of the festival included local dance groups, face painting, puppet show, and Miss Hawksbill competition among three local schools.

To gain a better understanding of local attitudes and perspectives toward hawksbill conservation in the Bahía, we interviewed 22 local assistants from the area. Through the use of semi-structured interviews, respondents had the opportunity to expand on issues that they felt were particularly relevant or important. By allowing the respondents to guide the interview process, each discussion was unique and intimately tied to the contexts that defined their daily lives. From this diversity in responses, four themes emerged that were common across all interviews: (1) *in situ* nest protection is possible as long as there are payments for nests and agreement among egg collectors about the rules, (2) lack of support and political will by authorities is hampering the effectiveness of conservation efforts, (3) egg collectors will sell hawksbill eggs for consumption if there are no other economic alternatives (i.e. conservation programs to purchase nests), and (4) primary threats to hawksbills in the area (e.g., blast fishing, egg consumption, and contamination) are working in concert to impede hawksbill recovery.

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

As previously mentioned, residents of local communities were involved in all aspects of project activities. The local hawksbill conservation network was composed of 75 local assistants who assisted with research and conservation activities to strengthen local capacity and joint-ownership of outcomes. A total of three local residents were hired as local staff: one local coordinator to supervise on-the-ground project activities and two hatchery managers to oversee and manage operations at the hatchery and *in situ* protection area. Aside from the economic benefits the local assistants (£977.20) and staff (£1,634.67) received from the project, they also played an important role in the development and execution of the "First Hawksbill Festival in the Bahía de Jiquilisco" in which over 400 local children, youth, and adults participated.

5. Are there any plans to continue this work?

This project was extremely important in that it demonstrated the feasibility and effectiveness of engaging local residents in all aspects of project activities and the importance of connecting nest protection payments with hatching success. Based on the results of this project, we will continue to encourage the direct participation of local assistants in research and conservation activities to further strengthen local capacity and foment long-term resource stewardship. In addition, we will use the lessons learned from this project to continue to shift nest protection payments from eggs to hatchlings so that incentives are awarded for hatchling production not egg protection only. The

incredible success of the "First Hawksbill Festival in the Bahía de Jiquilisco" demonstrated the potential of these types of events to motivate and unite local residents around hawksbill conservation initiatives. Together with local assistants and other interested residents, we will continue to hold annual hawksbill festivals in the Bahía.

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

We have already begun disseminating the results of this project on a national and international level. Nationally, we received press coverage of the "First Hawksbill Festival in the Bahía de Jiquilisco" by the leading newspaper outlet in El Salvador, El Diario de Hoy (http://www.elsalvador.com/mediacenter/play_video.aspx?idr=6709; http://www.elsalvador.com/mwedh/nota/nota_completa.asp?idCat=47862&idArt=6385601; http://www.elsalvador.com/mwedh/nota/nota_completa.asp?idCat=47673&idArt=6413400). Additionally, we co-organized a panel on sea turtle conservation in the Bahía in July 2011 where we presented the preliminary results of the project and the importance of the Bahía for the survival of hawksbills in the eastern Pacific Ocean. In January 2012, we completed a comprehensive technical report of hawksbill conservation activities in the Bahía in 2011, which included the activities supported by the Rufford Small Grants Foundation (RSGF), which we presented to the Ministry of the Environment and Natural Resources of El Salvador. On an international level, we presented preliminary results related to nest-site selection by hawksbills in the Bahía in 2011 at the International Sea Turtle Symposium in Huatulco, Mexico on March 13-16, 2012.

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

The RSG was used during the period of April – December 2011. This coincides with the hawksbill nesting season and was the same timescale as the period anticipated in the grant proposal.

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
(1) Hatchery site preparation, materials, and construction	254	233.98	-20.02	Hatchery materials cost less than anticipated.
(2) Local hatchery managers (7 months)	1863	1840.47	-22.53	Hatchery managers started 2 days later than expected.
(30) Hawksbill clutches protected	988	977.20	-10.80	Hatching success was lower than anticipated, so total payments were less.
(1) Thermometer to determine use of shading	44	107.71	63.71	The thermometer needed was of a higher quality than anticipated, which was more expensive.
(5) Thermochron iButton temperature data loggers	64	68.93	4.93	

(1) Thermochron iButton connectivity kit	32	33.47	1.47	
(2) Field notebooks for data collection in hatchery	6	4.72	-1.28	
(100) Latex glove pairs for hawksbill clutch relocation to hatchery	3	3.21	0.21	
(50) Plastic bags for hawksbill clutch relocation to hatchery	3	2.78	-0.22	
(1) Sign for hatchery to promote project	32	68.24	36.24	The material on which the sign was printed was more expensive than expected.
(3) Headlamps with red light	86	91.88	5.88	
(32) AAA batteries for headlamps	9	9.06	0.06	
(2) Information-sharing meetings with local communities	127	51.86	-75.14	We budgeted for the rental of meeting sites, but the communities made them available free of charge.
(2) Training workshops to build local capacity	127	51.86	-75.14	We budgeted for the rental of meeting sites, but the communities made them available free of charge.
(120 gallons) Fuel for boat	304	394.09	90.09	Fuel prices increased by nearly £0.75 during the project, so the cost of the 120 gallons of fuel was more expensive than anticipated.
(75 gallons) Fuel for vehicle	190	246.30	56.60	Fuel prices increased by nearly £0.75 during the project, so the cost of the 75 gallons of fuel was more expensive than anticipated.
Food	953	957.13	4.13	
(100) T-shirts with hawksbill conservation message	252	194.11	-57.89	The business that printed the t-shirts gave a significant discount on printing costs.
Total	5337	5337	0.00	**1.5783 USD/GBP**

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

Based on the results of this project and other hawksbill conservation activities in the Bahía in 2011, the following list delineates priority next steps for hawksbill conservation in El Salvador:

1) Determine thermal profiles of hawksbill nesting beaches, hatcheries, and nests

2) Estimate the sex ratios of hatchling hawksbills
3) Examine social factors influencing nest protection strategies

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 all materials produced, including the La Pirraya hatchery sign, t-shirt design, and "First Hawksbill Festival in the Bahía de Jiquilisco" banners. We publicly acknowledged the support provided by the RSGF at the International Sea Turtle Symposium, during the "First Hawksbill Festival in the Bahía de Jiquilisco," and during interviews with the local newspaper El Diario de Hoy.

11. Any other comments?

We would like to thank the RSGF for their support of this project and hope to collaborate again in the near future on activities that will further contribute to the recovery of the hawksbill turtle in the eastern Pacific Ocean.