

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

Thank you for your help.

**Josh Cole Grants**

**Director**

#### Grant Recipient Details

|                            |   |
|----------------------------|---|
| <b>Your name</b>           | Stacy Lindshield  |
| <b>Project title</b>       | Determining Effect of Anthropogenic Disturbance on Habitat Value for the Endangered West African Chimpanzee in a Savannah Environment at Fongoli, Senegal |
| <b>RSG reference</b>       | 12129-1   |
| <b>Reporting period</b>    | May 5 – June 25, 2014   |
| <b>Amount of grant</b>     | £4665   |
| <b>Your email address</b>  | slind@iastate.edu   |
| <b>Date of this report</b> | June 24, 2014   |

**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   |
|---|--------------|--------------------|----------------|--|
| Assess savannah habitat value for chimpanzees                             |              |                    | X              | See question 3.  |
| Create a habitat value map  |              | X                  |                | Presently, we are using GIS software to rank habitats according to their resources and risks at the Fongoli study site.  |
| Enhance conservation strategy at Fongoli, Senegal                         |              | X                  |                | Study findings are relevant to the issues of crop-raiding, pathogen transmission, water contamination, and habitat loss, four conservation problems for chimpanzees in Senegal. Disseminating these results later in 2014 (see below) is essential to fulfilling this objective. |
| Communicate findings to the Senegalese chimpanzee conservation community  |              | X                  |                | We will present our results at a Senegal chimpanzee conservation workshop scheduled for late 2014 and encourage other project leaders to use our habitat value approach to assess conservation threats for other chimpanzee communities.   |
| Disseminate findings to the broader academic and conservation communities |              | X                  |                | Two manuscripts describing this study will be submitted for peer-reviewed publication in late 2014. In addition, we aim to publish project outcomes in a national conservation action plan that is scheduled for publication in two years.                                       |

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

Overall, we are pleased with the project's progress. One unexpected challenge that emerged after the field work phase of this study was the higher labour investment required to complete the nutritional analyses of food samples. Without funding to cover these unanticipated labour needs, we needed additional laboratory time to complete the analyses. Thus, our project timeline was delayed by several months.

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

*We quantified the impact of habitat quality on food intake and feeding rate in adult male chimpanzees, thus enabling us to better understand how savannah-dwelling chimpanzees respond to patchy savannah habitats and anthropogenic disturbance.* Adult males increased feeding efficiency in open-canopy habitats with higher temperatures and solar radiation, perhaps as a strategy to minimise heat stress and dehydration. In addition, they consumed more food in locations closer to drinking water sources. Overall, Fongoli chimpanzees fed less from trees that were closer to anthropogenic features, namely as mines, villages, roads, and cropland. However, they did not avoid food patches in such risky areas all together. When they visited these patches, it was to forage for the highest-energy food (ripe fruit and seed of the baobab (*Adansonia digitata*) tree) that was available during the study period.

*We identified spatial and temporal components of overlapping resource use between humans and chimpanzees at Fongoli.* The Fongoli chimpanzees did not entirely avoid food and water sources at areas actively used by people, such as mines and cropland, but tended to use these areas when there was a lower probability of face-to-face encounters with humans. We suspect that this is a conflict management strategy. For cropland, this strategy is possible because there is a short (3-4 months) period between planting and harvesting staple crops. Fongoli chimpanzees can freely forage for wild plant foods in cultivated areas after the harvest. There are important temporal patterns involved in artisanal gold mining as well. Mining ceases during the wet season when excavation pits are inundated with water. During this period, chimpanzees can use the habitats around mines with little chance of encountering people. When the mines are active, the community mining associations prohibit excavation during the same two days each week. It is likely that the Fongoli chimpanzees recognize this pattern, or at least monitor human activity around mines while foraging, as they only visited food sources at mines during these no-work days.

*Sharing these findings with active members of the Senegal chimpanzee conservation community is a key outcome that we aim to achieve in the months ahead.* We use a mapping approach to represent the relationships between patchy, savannah habitats and chimpanzee foraging behaviour. The base vegetation map that we are using, courtesy of Gray Tappan and the United States Geological Survey, is available to all members of our network. This accessibility may encourage other project leaders to develop such “chimpo-centric” habitat maps for their study areas. Second, visualizing high and low value habitats across geographic space may enhance the understanding of our results for this diverse audience of researchers, conservationists, and land managers.

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

Although we used a research approach to chimpanzee conservation, several members of the local community benefited from this project in terms of job income and health care. We were able to hire one research assistant from the Fongoli village and provide him with health care, meals, and work gear. In addition, we frequently transported seriously ill people to the nearest hospital and covered the costs of health care and treatment, especially for young children suffering from malaria during the rainy season. Furthermore, this project cultivated our collaboration with Dr Papa Ibnou Ndiaye of Cheikh Anta Diop University (CADU) and resulted in one master’s thesis project. Landing Badji, a graduate student at CADU, conducted his thesis on the nutritional ecology and conservation of Fongoli chimpanzees. Landing is now assessing the impact of a corporate gold mining project on chimpanzees near Niokolo-Koba National Park in Senegal.

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

Continued investment in the conservation of chimpanzees in Senegal is critical to their survival during the 21<sup>st</sup> Century. The explosion of the gold mining industry over the last 5 years in south-eastern Senegal has deepened the conflict between humans and chimpanzees, primarily because of the greater demand for natural resources (e.g., water, land for cultivation, timber, and range land, charcoal) from a rapidly-growing human population. We will continue to study the behaviour and ecology of Senegalese chimpanzees to gain a more nuanced view of how these savannah-dwelling populations respond to their environments and to habitat disturbance. In particular, we are now studying chimpanzees in Niokolo-Koba National Park, the only protected park for this great ape in Senegal. These neglected chimpanzees must be monitored, studied, and conserved, as this population may function as a source of new immigrants for chimpanzee communities in unprotected areas.

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

We aim to share our findings with a broad audience to maximize the impact of this research. To reach an academic audience, our goal is to publish a minimum of two peer-reviewed articles about this study. Technical reports describing how these findings inform chimpanzee conservation strategy will be sent to our contacts in governmental agencies and NGOs in Senegal. In addition, we plan to reach a larger conservation audience through including key results in a national chimpanzee conservation action plan, which is scheduled for publication within the next 2 years.

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

The Rufford Small Grant (RSG) funded a major portion of fieldwork for this project on savannah chimpanzee habitat selection and conservation at Fongoli, Senegal. Specifically, the RSG supported our field data collection at Fongoli from September 2012 to February 2013. This project began in September 2011 with support from the Leakey Foundation. Currently, we are analysing and interpreting data, and preparing to disseminate results through peer-reviewed publications, reports for conservation organizations, and presentations at local workshops and professional conferences. We expect to complete the project in late 2014 or early 2015.

**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.**

Monthly average exchange rate between USD and GPD from September 2012 to February 2013: 1.22 USD=1.00 GBP (source: [www.exchange-rate.org](http://www.exchange-rate.org))

| Item      | Budgeted Amount | Actual Amount | Difference | Comments   |
|-----------|-----------------|---------------|------------|--|
| Travel    | 2448            | 2463          | (15)       |  |
| Fuel      | 342             | 318           | 24         |  |
| Equipment | 604             | 724           | (120)      | The unexpected purchase of GPS equipment was required. |

|              |             |             |              |   |
|--------------|-------------|-------------|--------------|---|
| Food         | 1073        | 1263        | (190)        | We purchased more communal food for the research team than originally |
| Subsistence  | 921         | 924         | (3)          |   |
| Other Costs  | 1496        | 1363        | 133          |   |
| <b>TOTAL</b> | <b>6884</b> | <b>7040</b> | <b>(171)</b> |   |

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

Securing the future survival of chimpanzees in Senegal requires that we manage, conserve, and study chimpanzee populations inhabiting protected and unprotected lands. Chimpanzees in protected areas, namely Niokolo-Koba National Park, may be critical to maintaining population sizes outside of the park through the process of migration, so long as migrants can reach chimpanzee communities in unprotected areas. Also, we must continue to invest in chimpanzee projects outside of the national park, as it is unreasonable to assume that we can afford to give all chimpanzees in Senegal the same level of protection as found at Niokolo-Koba, and the majority of Senegalese chimpanzees reside outside of the park’s boundaries. In this vein, we recommend conservationists take the following steps:

1. Conduct long-term research on chimpanzees in Niokolo-Koba National Park.
  2. Conserve and manage chimpanzee migration routes.
  3. Develop a management strategy for crop-raiding behaviour.
  4. Improve waste management at artisanal gold mines.
  5. Assess impact of gold mining on drinking water quality for chimpanzees.
1. *Research at Niokolo-Koba National Park.* An important next step in chimpanzee conservation is to contrast population dynamics (e.g., rates of birth, death, and migration) and conservation threats between protected and unprotected areas in Senegal. Although Niokolo-Koba is protected, it is not void of anthropogenic disturbance; threats include poaching, livestock grazing, and the potential for gold mining. Establishing a long-term research project within Niokolo-Koba should reduce these threats and improve our understanding of savannah chimpanzee ecology.
  2. *Conserving migration routes.* The recent increase in human population density and mining activity in south-eastern Senegal will lead to a greater demand for natural resources and concomitantly increase the loss of chimpanzee habitat. Amidst this changing landscape, land managers will need to protect migration routes (i.e., biological corridors) for chimpanzees to prevent population isolation.
  3. *Crop-raiding.* This study highlights that in unprotected areas, such as the Fongoli site, there is a need for more research on the drivers of crop-raiding behaviour. Incipient crop-raiding is a serious threat for Fongoli chimpanzees, because farmers tend to kill agricultural pests, such as vervet and patas monkeys, and baboons. Although Fongoli chimpanzees do not consume crop foods, increasing habitat encroachment may create a critical threshold in food scarcity that leads chimpanzees to search for new food sources, such as pith of corn and millet stems or peanut. Future research on such a “tipping point” needs to be addressed. In addition, project leaders ought to be prepared to manage this problem in case of emergent crop-raiding behaviour.
  4. *Waste management.* Overlapping habitat use between humans and chimpanzees, and poor waste management at artisanal gold mines, increases the risk of pathogen transmission between these two species. The lack of latrine use or burying of human faecal material may bring chimpanzees into direct contact with infectious agents, such as the *Giardia* parasite. We recommend that researchers assess the social and economic factors that contribute to current waste disposal conditions and develop strategies to improve these conditions in close

consultation with miners to minimize the risk of zoonotic disease transmission and produce cleaner working conditions.

5. *Water quality assessment.* Gold miners and chimpanzees share the same water supply at Fongoli. The streams and rivers that miners use for sluicing are drinking water sources for Fongoli chimpanzees. In addition to water contamination issues related to poor waste management (see above), mercury is another potential pollutant. We need to immediately assess the severity of this problem at Fongoli using ecosystem and public health approaches.

**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?**

The Rufford Small Grant Foundation is acknowledged in publications and presentations. The RSGF logo was featured on lecture slides during four academic presentations between 2013 and 2014. We will continue to use the logo in this manner for future presentations. Furthermore, RSGF will be acknowledged in all publications resulting from this study. Finally, RSGF was acknowledged in an online article [here](#) that publicised our study.

**11. Any other comments?**

The RSGF website is an excellent resource. We have been in contact with other chimpanzee researchers due to the transparent and searchable qualities of the funded project database.