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	Albert Chakona
Project title	Distribution, status and conservation of a recently described, extremely narrow range endemic cyprinid, *Pseudobarbus skeltoni*, from South Africa
RSG reference	14304-2
Reporting period	2014-2016
Amount of grant	£5930
Your email address	a.chakona@saiab.ac.za
Date of this report	09 May 2016

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
Verify the distribution and estimate the population size of the Giant redfin, *Pseudobarbus skeltoni*			✓	Prior to this project, the giant redfin was only known from two tributaries of the Breede River system (the Upper Riviersonderend and the Krom - a tributary of the Molenaars in the Upper Breede). Historical records in the National Fish Collection at the South African Institute for Aquatic Biodiversity (SAIAB) in Grahamstown indicate that the giant redfin was collected in the lower sections of the Wit River in 1975 (Chakona & Swartz, 2013). Fish surveys in 2014 and 2015 revealed that native fishes have been extirpated from the Lower Wit River which has now been invaded by the non-native *Micropterus* spp. and *Clarias gariepinus*. The 2014-2015 surveys led to the discovery of a third remnant population of the giant redfin in the Tierkloof River in the Upper Breede. Given that comprehensive surveys were conducted across the Breede River system between 2008 and 2015, the Upper Riviersonderend, Krom and Tierkloof populations probably closely represent the remaining natural range for the giant redfin. The strongest population and largest individuals occur in the Upper Riviersonderend where large deep pools provide ideal habitat for this species. These remnant populations are however persisting precariously in river reaches that face a great risk of being invaded by non-native fish species that are abundant in the main stream sections of the rivers.
Characterise the biology, habitat use and feeding ecology of *P. skeltoni*			✓	Habitat use and feeding ecology of the giant redfin was evaluated in the Upper Riviersonderend where the species co-occurs with its congener (*P. burchelli*) and an anabantid (*Sandelia capensis*). A manuscript on the feeding ecology and habitat use of *P. skeltoni* has been completed and is currently under review (*Ecology and Evolution*).
Assess the conservation status of *P. skeltoni*		✓		The potential historical range of the giant redfin was reconstructed based on the distribution of the remnant populations and genetic data. It was inferred that the potential historical range of this

				species encompassed the main stream sections of the Breede and Riviersonderend, or that the species at least used the main stream sections of the rivers as conduits for dispersal. This species has been extirpated from much of its inferred historical range. A manuscript on the conservation status of *P. skeltoni* is in preparation. The species is likely to fall within the highly threatened categories of the IUCN (Endangered or Critically Endangered) due to its very restricted distribution range and the fact that remnant populations are not secure from invasion by alien species (*Clarias gariepinus*, *Micropterus* spp., and *Oncorhynchus mykiss*).
Identify conservation measures to ensure future survival of *P. skeltoni*			✓	Building of barriers and eradication of aliens have been identified as the immediate conservation measures required to secure the remaining populations of the giant redfin. In recognition of the urgent conservation need, a conservation plan for the giant redfin is being drafted in collaboration with CapeNature (the regional conservation agent in the Western Cape Province of South Africa) and various local stakeholders. Several models for conservation plans exist, with either a Biodiversity Management Plan for Species (BMP-S) as defined in Section 43 of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) of South Africa, or an IUCN Action Plan for Species, being appropriate tools for conservation of the giant Redfin. Both the BMP and the Species Action Plan is focused on ensuring successful implementation of effective strategies to prevent loss of threatened species. The aim of these conservation plans is the long term survival of the target species in the wild within its natural habitat. Whichever conservation plan is decided on, the study has contributed significantly to establishing detailed baseline information required to draft a planning document, identify conservation interventions and enable the implementation thereof.

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

No difficulties were encountered during this study.

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

Comprehensive surveys have allowed us to more accurately map the current distribution of the giant redfin, estimate population sizes of the remnant populations, characterise habitat use and feeding ecology of this species and identify key threats to the future survival of this species. This information is already being used for the development of scientifically-based management decisions to prevent extinction of this highly threatened species. The strong collaboration between the research team from SAIAB and CapeNature (the regional conservation agent) and sharing of data between these key institutions and regional stakeholders increases the likelihood for the adoption and successful implementation of conservation recommendations. One manuscript has been submitted for peer-review and two additional manuscripts are in preparation.

The project strengthened the collaboration between SAIAB and CapeNature and stimulated further research to map the distribution ranges and assess the conservation statuses of a number of other newly identified historically isolated lineages and recently described species of endemic stream fishes in the Cape Fold Ecoregion. Thus far, we have completed and submitted a Biodiversity Management Plan (BMP) for the Barrydale redfin to the Department of Environmental Affairs (DEA), South Africa. The Barrydale redfin is a recently discovered unique lineage within the *Pseudobarbus burchelli* complex (Chakona et al., 2013; Swartz et al., 2014). Although currently lacking official species status, this unique lineage is critically endangered due to its narrow distribution range and the multiple impacts in the Tradouw catchment. The research team is currently investigating drafting a conservation plan for the giant Redfin and either a BMP (based in national norms and standards according to Section 43 of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004), or a Species Action Plan (based on IUCN guidelines) will be produced.

Additional outcomes of this project include catchment-wide surveys in the Verlorenvlei River system to map the distribution and assess the conservation status of the recently described Verlorenvlei redfin, *Pseudobarbus verloreni* (Chakona et al., 2014). Distribution data from this project was also used by CapeNature to compile detailed Protected Area Management Plans (PAMPs) as required by the National Environmental Management: Protected Areas Act (Act 57 of 2003).

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

This study is a continuation of the work that the Principal Investigator started in 2008, with support from the Rufford Foundation (Reference: 59.04.08). As much of the land in the Cape Fold Ecoregion is privately owned, involvement of local communities is a key requirement to ensure that surveys are effective and increase the likelihood of adoption and successful implementation of conservation strategies. The study has involved stakeholders from its inception, making it the first aquatic project to engage with land owners and conservation authorities to identify long-term solutions to prevent further loss of remnant populations of threatened stream fishes of the Cape Fold Ecoregion. There is growing awareness among farming communities, land owners and conservation authorities of the existence of unique diversity of stream fishes in the region and the key factors that threaten the future survival of this biodiversity heritage. There is willingness from wine farmers, through the Wine and Biodiversity Initiative, to adopt good farming practices in order to protect and ensure recovery of critical habitats. In February 2016, Albert Chakona (SAIAB) and Martine Jordaan (CapeNature) held a workshop to provide information on the state of aquatic biodiversity in the Cape Fold Ecoregion and identified key taxa and populations that require immediate conservation

attention. We are also providing information to BirdLife South Africa which has initiated a campaign to establish the Moutonshoek Protected Environment (Western Cape Provincial Gazette No P.N. 3/2016; 15 January 2016) to enable sustainable management and conservation of the Krom Antonies River (the only remaining strong-hold of the Verlorenvlei redfin) and the Verlorenvlei Estuary (a Ramsar conservation site) in line with the National Environmental Management: Protected Areas Act 57 of 2003.

5. Are there any plans to continue this work?

Yes. Ongoing monitoring of the stability of remnant populations of threatened fishes of the Cape Fold Ecoregion is a critical requirement to establish long-term trends and provide early warning in cases where negative trends or invasions are identified. Successful eradication of alien fishes to extend the range of native fishes was recently conducted by CapeNature in the Rondegat River. Similar interventions are required to ensure continued survival of the Giant redfin and many other taxa that are persisting precariously in upper catchments of rivers that are not secure from potential invasion by alien fishes. CapeNature has also embarked on a strategy to identify Priority Rivers for alien fish management in the Cape Fold Ecoregion and data from the current project will feed into this process and provide important decision making support.

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

Findings from this project will be disseminated through workshops (one has already been conducted at CapeNature), peer reviewed publications, conferences, posters, popular articles, informal interactions with stakeholders and posting on the SAIAB website. In addition, the project has been included in a ”quarterly highlights” document from CapeNature Scientific Services which has been disseminated at Director Level in the provincial Department of Environmental Affairs (DEA) and to the provincial DEA minister.

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

This was a two year project (2014 – 2015) which was fully supported by the Rufford Foundation grant, with additional support from the Mohammed Bin Zayed Foundation.

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
Field surveys: car hire and fuel	2000	2235	-235	This was within range of the original estimates
Field surveys: accommodation and subsistence	2000	2117	-117	This was within range of the original estimates
Stable isotope analysis	1680	1080	600	Fewer samples of the giant redfin were included due to conservation concerns
Expendable supplies	250	465	-115	This was within range of the original estimates

Total	5930	5797	133	This was within range of the original estimates

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

DNA-based studies have uncovered several historically isolated lineages of stream fishes in the Cape Fold Ecoregion (Chakona et al., 2013; Swartz et al., 2007, 2009). There is need for expediting the description of these newly identified species, and assessing their conservation statuses as many of them are narrow range endemics.

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

Yes, the logo was used in presentations at workshops and conferences. The RSGF has been and will be acknowledged in all popular articles and publications from this study.

11. Any other comments?

We are grateful for the support from the Rufford Foundation. Without this support, this work would have not been possible. We anticipate the publications and at least one BMP-S will be produced from this project. Submitted manuscripts and those in preparation are listed below.

Kadye WT, Chakona A, Jordaan M (*under review*). Assessing niche and coexistence patterns to identify conservation needs of a new redfin minnow *Pseudobarbus skeltoni* from a global biodiversity hot spot. *Ecology and Evolution.*

Chakona A, Gouws G, Swartz ER, Kadye WT, Jordaan M (*in prep*). Incorporating molecular data in reconstructing former distribution ranges of threatened stream fishes from a global endemic hotspot. Target journal: *Diversity and Distributions*.

Chakona A, Kadye WT, Jordaan M (*in prep*). Status assessment and conservation plan for the Giant redfin, *Pseudobarbus skeltoni*, from the Cape Fold Ecoregion of South Africa. Target journal: *Biological Conservation*.

Jordaan M, Chakona A, Kadye WT (*in prep*). Status assessment and conservation plan for the Verlorenvlei redfin, *Pseudobarbus verloreni*, from the Cape Fold Ecoregion of South Africa. Target journal: *Biological Conservation*.