

Distribution, status and conservation of a recently described, extremely narrow range endemic cyprinid, *Pseudobarbus skeltoni*, from South Africa

**Project progress report
August 2014**

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The research team wishes to acknowledge and thank the Mohammed bin Zayed Species Conservation Fund and the Rufford Small Grants for Nature Conservation for their generous funding and support without which implementation of this project would have not been possible. Lary Fischer (a local land owner) is thanked for providing access to and for giving us his boat for sampling the lower Wit River. Staff at CapeNature Hottentots Holland Nature Reserve and CapeNature Tweede Tol camp site are thanked for providing camping space and access to the rivers. Tony Booth and Roger Bills are thanked for providing some of the sampling equipment that were used for this project.



Background

The present study builds on a growing body of work that was initiated in 2008 to document the diversity and map the distribution of stream fishes in the south-western Cape Floristic Region (Figure 1). Prior to this research, the south-western CFR was thought to have only four native primary freshwater fish species, *Barbus andrewi*, *Pseudobarbus burchelli*, *Galaxias zebratus* and *Sandelia capensis*. Recent studies have however revealed existence of four deeply divergent lineages within *P. burchelli*, nine historically isolated lineages within *G. zebratus* and at least two deeply divergent lineages within *S. capensis* in this region [1]. Many of the newly discovered lineages are severely threatened due to small known population sizes and restricted distribution ranges. The Giant redbfin, in particular, discovered in 2009 and described as *Pseudobarbus skeltoni* [2] is only known from two localities where its survival is threatened by presence of alien fishes. As for many newly described species, information about the exact distribution, ecology, biology, population size and conservation status of *P. skeltoni* is virtually lacking. This knowledge gap is a major impediment to the identification and implementation of effective conservation strategies to ensure persistence of this species and other freshwater fishes in the CFR.

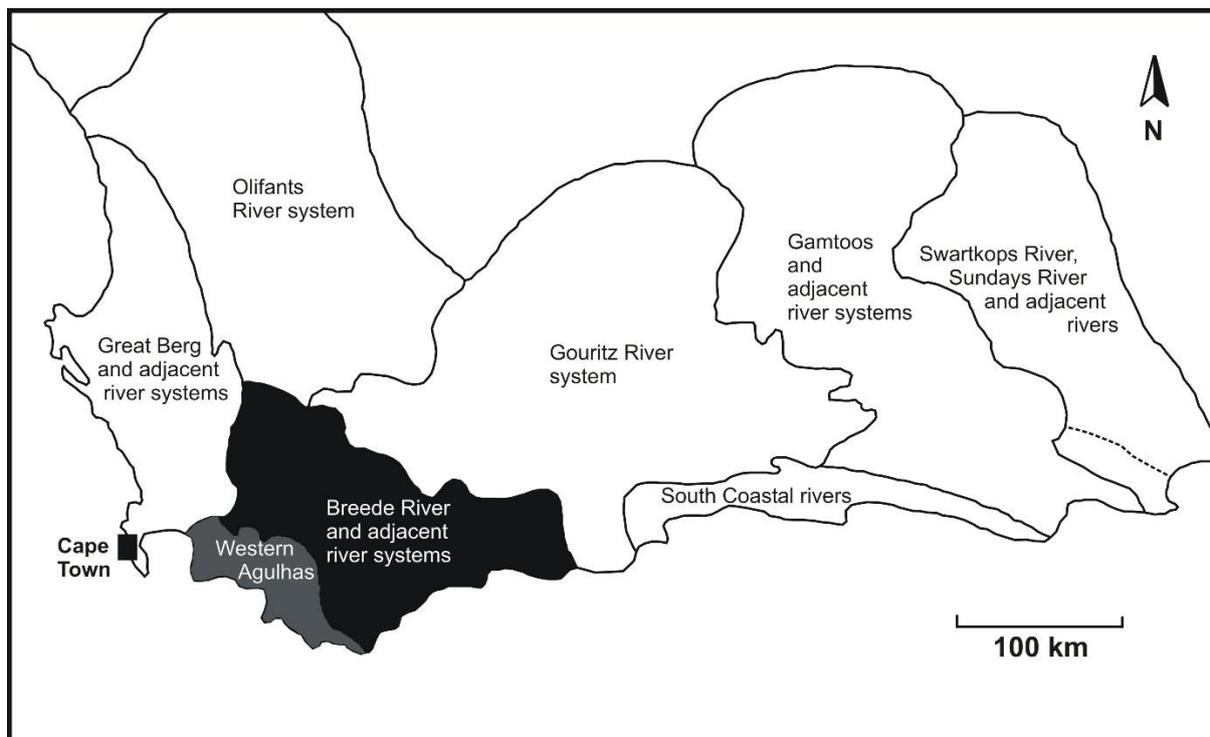


Figure 1: Map of the southern tip of Africa showing the major biogeographic regions of the Cape Floristic Region of South Africa and the location of the south-western Cape Floristic Region (highlighted in grey and black).

The Cape Floristic Region: why should we care?

Seventeen (85 %) of the 20 currently described freshwater fishes in the CFR are endemic to this region. These fishes are however facing a variety of impacts including hydrological modifications, degradation of habitats and widespread invasion of the rivers by alien fishes that predate on and compete with native fishes. These impacts have collectively resulted in several local extinctions in a number of mountain tributaries and extirpations of almost all main-stem populations of native freshwater fishes. The purpose of the present study is to generate scientific data and provide information that will guide decision makers on how to protect native freshwater fishes of the CFR. Sound knowledge of species life histories, ecology, population size and distribution as well as an understanding of the social component that interacts with the environment are fundamental requirements for the design and implementation of effective conservation strategies. Specifically, the study aims to update information about the population size and distribution of *P. skeltoni*, characterise this species' habitat and feeding ecology, assess its conservation status, identify major threats and determine appropriate measures to mitigate them.

Progress of the project to date: Upper Riviersonderend

We undertook a comprehensive field survey of the Upper Riviersonderend and the Witte Rivers in March 2014. A total of nine localities were sampled in the Upper Riviersonderend (Figure 2) to: (i) determine the presence and abundance of the Giant redbfin, (ii) collect samples for stable isotope analysis and (iii) identify major threats to the species. Captured fishes were identified, counted and measured, and were immediately returned to their habitat alive (except for small subsamples that were retained to collect tissue samples for stable isotope analysis). Data for stable isotope analyses were collected from all potential food sources including detritus, periphyton, macrophytes and invertebrates as well as from co-distributed fishes. The Upper Riviersonderend is characterized by deep pools (Figure 2a,b,c,d) that provide important habitat for the Giant redbfin and the co-distributed Breede lineage of the *Pseudobarbus burchelli* complex [1]. While no alien fishes were found in the sampled reaches in the Upper Riviersonderend, the presence of the sharp tooth catfish (*Clarias gariepinus*) and black bass (*Micropterus* spp) in the Teewaterskloof Dam poses a great risk to the Giant redbfin as there are no barriers to prevent invasion of the Upper Riviersonderend by the alien species. There are conservation concerns as the deep pools in the Upper Riviersonderend would provide ideal habitats for these alien fishes. Analysis of stable isotope data and assessment of the conservation status of the Giant redbfin has commenced.



Figure 2: a, b. Deep pools are common in the Upper Riviersonderend and they provide important habitat for aquatic taxa (fishes, crabs and amphibians); c, d. researchers setting fyke nets in the Upper Riviersonderend; e. the Giant redbfin (right) co-occurs with the Breede lineage (left) of the *Pseudobarbus burchelli* complex; f. sub-adults of the Giant redbfin (two specimens at the bottom) co-occur with those of *P. burchelli* (top specimen; note differences in head profile).

Progress of the project to date: Lower Wit

Historical records in the South African Institute for Aquatic Biodiversity (SAIAB) indicate that the Giant redbfin was previously collected in the Lower Witte River in 1975 [2]. We sampled the Lower Wit River in March 2014 to: (i) document the fish species present in this section of the

river and (ii) determine feasibility of rehabilitating the Lower Wit for possible re-introduction of the Giant redbfin. A combination of gill nets and fyke nets were used for sampling (Figure 3). No indigenous fishes were found in the main-stem river section in the Lower Wit. Small mouth bass (*Micropterus dolomieu*) is abundant in the deep pools in the Lower Wit.

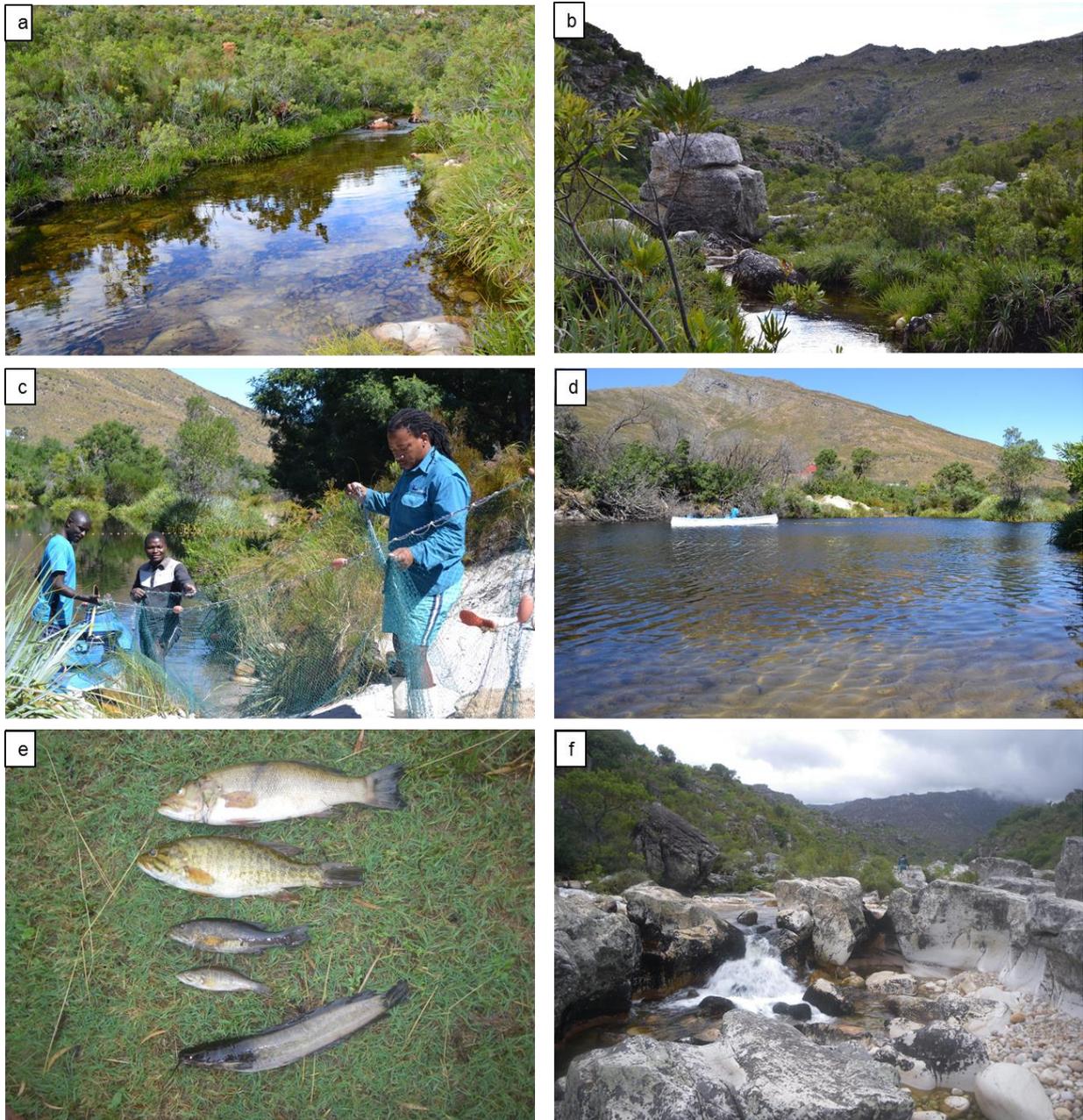


Figure 3: a,b. Habitats in the Lower Wit bear striking resemblance to those in the Upper Riviersonderend; c,d. Preparing and setting gill nets in the Lower Wit; e. Small mouth bass (*Micropterus dolomieu*) and sharptooth catfish (*Clarias gariepinus*) were the only species of fish captured in the Lower Wit during this survey; f. a small waterfall barrier that marks the upper limit of alien fishes in the Wit River (native fishes are found immediately above this barrier).

Next steps

- another field survey is planned for November-December 2014. The aim of this survey is to map the upper limit of the Giant redbfin in the Upper Riviersonderend
- examination *Pseudobarbus* specimens in the National Fish Collection at SAIAB will be done to determine presence of the Giant redbfin in historical collections
- assessment of the conservation status of the Giant redbfin following IUCN criteria
- submission of manuscripts for peer review
- a seminar/workshop will be held in 2015 to communicate research findings to stakeholders and research community and to get stakeholder input

References

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