



Global Re-introduction Perspectives: 2011

More case studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Re-introduction of endangered Berg-Breede whitefish to the upper Berg River in the Western Cape Province of South Africa

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Introduction

The Berg-Breede whitefish (*Barbus andrewi*) is a large cyprinid endemic to the Berg and Breede River Systems of the Western Cape Province of South Africa that prefers large rivers and deep pools (Skelton, 2001). The species was originally widespread in both systems but is now common in less than 5% of its original range which is almost entirely within the Breede system (Impson, 2007). The species is listed as Endangered (Tweddle *et al.*, 2009). The introduction of the predatory smallmouth bass (*Micropterus dolomieu*) from the U.S.A. in the 1940's into both systems for angling purposes led to a slow collapse of recruitment of this long lived species (Impson, 2007). CapeNature, the provincial conservation agency for the Western Cape Province, considered the species extinct in the Berg System by 2000. In comparison, the Breede system has very low numbers of whitefish in lotic environments, due to alien fish invasions and habitat degradation, but there are very large populations in Brandvlei and Sandrif dams. The Berg River Dam (130 million m³) in the upper Berg River was completed and started filling in 2007. *B. andrewi* from Brandvlei Dam were re-introduced from 2007 - 2008 in the hope of establishing another large population of this species in its former distribution range.

Goals

- Goal 1: To create a further large population of this Endangered species in its former distribution range, through re-introduction.
- Goal 2: To determine whether the re-introduction has been a success though fish surveys.
- Goal 3: To involve freshwater fish stakeholders in the re-introduction process for awareness and education purposes.



Berg-Breede whitefish (*Barbus andrewi*)

- Goal 4: To determine via fish surveys whether the species re-establishes itself downstream of the dam.

Success Indicators

- Indicator 1: Re-introduce at least 500 adult fish into dam during filling.
- Indicator 2: Involve a range of fish and dam stakeholders in the re-introduction.
- Indicator 3: *B. andrewi* successfully recruits in the dam and is a significant component (>10%) of the ichthyofauna.
- Indicator 4: Successful re-introduction can help downlist species from Endangered status (increased overall population size, area of occupancy, number of sub-populations).
- Indicator 5: Species is surveyed in increasing numbers below dam, where it is currently absent.

Project Summary

Feasibility: The Berg River Dam is a large water body that offer significant opportunities and constraints to a successful re-introduction of *B. andrewi*. The opportunities include the dam being within its natural distribution range, the dam providing unpolluted waters and varied habitat for all life history stages, the new dam providing a nutrient rich environment (as drowned plant material decays) for this omnivorous species, the inflowing river providing excellent spawning habitat, the large dam providing habitat for hopefully an extremely large population of this species (over 100,000 fish) and finally angling benefits for anglers that enjoy catching indigenous fish species. South Africa's National Yellowfish Working Group promotes wise use and conservation of large cyprinids of angling value, such as *B. andrewi*. The species is also readily available in the Brandvlei Dam, where it is often a dominant component of anglers catches. Angling tournaments at the venue have been utilized by the conservation authority to provide fish for stocking purposes. The two dams are about one hour apart by car on good transport systems, allowing fish to be quickly transported between sites and stocked. The re-introduction was discussed at the Environmental Monitoring Committee (EMC) for the Berg River Dam (required as part of the Record of Decision for the dam) and was supported.

The constraints are substantial and mainly concern the ability of the species to establish a viable founder population in the presence of invasive alien fishes that elsewhere have caused its demise. The only habitat, however, where this species has held its own with alien fishes and has a huge population (estimated to be well in excess of 100,000 adults) has been in Brandvlei Dam, which also has sizeable populations of *M. dolomieu*, largemouth bass (*M. salmoides*), carp (*Cyprinus carpio*) and bluegill sunfish (*Lepomis macrochirus*). However, unlike Berg River Dam, Brandvlei Dam is fairly turbid which is thought to provide *B. andrewi* juveniles with some protection in terms of visual isolation, as the bass species are known visual predators that favour clearer water. Brandvlei Dam now has a new fish invader, sharptooth catfish (*Clarias gariepinus*), which was illegally stocked by anglers in the 1990s. Anglers catches show that it is now flourishing in the dam with unknown impacts on *B. andrewi*. The impact of this large predator, growing in excess of 30 kg on *B. andrewi* in this dam urgently needs to be quantified.

Implementation: The completion of the Berg River Dam, a major water supply to Cape Town, in 2007 was the major factor resulting in implementation. The re-introduction of *B. andrewi* was presented as a proposed action to the EMC for the dam in 2006 and was accepted. The proposed introduction was discussed amongst scientific and management colleagues at CapeNature, and a simple plan of action was identified that involved



Stocking in the Berg River Dam

securing adult fish from Brandvlei Dam for re-introduction purposes. It was recommended that interested EMC stakeholders and local angling groups should participate in the re-introduction. Three stockings of adult fish were undertaken, the first on 17th October 2007 of 20 fish, the second on 1st November 2007 of 15 fish, and a final stocking on 9th February 2008 of between 60 - 80 fish. There was excellent participation from a range of stakeholders, including representatives from bait angling (Boland angling clubs), artificial lure angling, flyfishing groups (e.g. Jonkershoek Flyfishing), TCTA (the dam manager) and CapeNature.

Post-release monitoring: The universities of Leuven, Belgium and the Western Cape, South Africa have undertaken a collaborative monitoring program in the dam since its closure in 2007 that has included an annual fish survey (with nets set for one day overnight). Surveys were initially done by fyke net to minimize fish mortalities and were unproductive; thereafter a mixed fleet of gill nets were used successfully. A total of 13 *B. andrewi* of 20 - 30 cm were caught on three occasions (in 2008, 2009 and 2011)(Sean Marr pers. comm.), showing that they had survived the introduction. However, the lack of juveniles caught is of major concern, because the caught fish are likely to have been the stocked fish, as this species grows slowly (one year old fish are <10cm).

Major difficulties faced

- The Berg River Dam catchment already has several alien fish species (*C. gariepinus*, *C. carpio*, *L. macrochirus*, rainbow trout (*Oncorhynchus mykiss*) and *Micropterus dolomieu*), which may proliferate in the dam quicker than *B. andrewi* and prevent its successful recruitment.
- Because of the large size of the dam, and competing fish species, it was important to introduce as many *B. andrewi* as possible to maximize survival of stocked fish, enhance spawning success and the number of juveniles produced, whilst adult alien predatory and competitive fish species were still present in low numbers. This required a well planned and supported fish

Fish



Smallmouth bass (*Micropterus dolomieu*)

catching operation, which was never attained due to insufficient capacity at the conservation agency (one permanent fish scientist at the time).

- *B. andrewi* caught by bait anglers during a tournament on 9th February 2008 were placed in keep nets and only made available after the tournament. Some fish carried injuries from the nets and handling, and may have died from stress and disease after being introduced into the Berg

River Dam.

- CapeNature and other fish research agencies are not capacitated to readily undertake comprehensive fish surveys of dams at regular intervals. Unfortunately for this project, there are many fish research priorities more deserving of attention for the limited funding and resources available.

Major lessons learned

- Fish-introductions in this province need to be better planned and managed in future and will likely be undertaken in accordance with Biodiversity Management Plans for Species as required for endangered species by South Africa’s National Environmental Management: Biodiversity Act of 2004.
- Fish re-introductions should adhere as closely as possible to guidelines in the IUCN booklet.
- Good opportunities for re-introduction should, however, not be ignored if there are good merits for utilizing them, as surveys to quantify success of the introduction may determine decades later that the initiative was well worthwhile. However, a competent team of experts should address the proposal first with a written report explaining why the action was authorized and implemented.

Success of project

Highly Successful	Successful	Partially Successful	Failure
		√	

Reason(s) for success/failure:

- Reasons for project adequately evaluated by fish scientist, but no formal project proposal submitted to CapeNature’s Wildlife Advisory Committee, which would have increased credibility.

- Good use of stakeholders involved in dam management and angling for local fish species allowed re-introduction to take place.
- Recent preliminary fish surveys indicate that the species is present in the dam.
- Future stockings of species into dams, should focus on dams in natural distribution range free of alien fishes. An offstream dam on the nearby Paarl Mountain Reserve, downstream of the Berg River Dam, meets these requirements and is currently being assessed for re-introduction purposes.

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