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The Maloti minnow *Pseudobarbus quathlambae* (Barnard, 1938) is not extinct in South Africa

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Despite concerted surveys, the Maloti minnow *Pseudobarbus quathlambae* (Barnard 1938) had not been recorded in South African waters for almost eighty years since the original collections were made at the type locality in the upper uMkhomazana River in 1938. The species was therefore declared extinct in South Africa, whereas extant populations were considered confined to various rivers in the Lesotho highlands. In April 2017, however, this species was rediscovered in the Mzimkhulu River system in KwaZulu-Natal. The rediscovery of a species that was considered locally extinct supports the need for extensive surveys to determine its distribution range, estimate population sizes, assess conservation status and implement effective strategies to ensure its continued existence in KwaZulu-Natal.

Keywords: conservation, KwaZulu-Natal, Mzimkhulu, redefin minnow, rediscovery

Introduction

The Maloti minnow *Pseudobarbus quathlambae* (Barnard 1938) is the only freshwater fish that was thought to have been exterminated in South Africa, presumably because of predation by brown trout *Salmo trutta* (Linnaeus, 1758) and rainbow trout *Oncorhynchus mykiss* (Walbaum, 1792), as well as habitat degradation (Jubb 1966; Skelton 1987). The Maloti minnow was originally described as *Labeo quathlambae* by Barnard (1938) based on specimens that were collected by RIP Vaughan, J Brown and L Hardingham from the uMkhomazana River, uMkomaas River system, in KwaZulu-Natal, where it was reportedly abundant in 1938 (Pike and Tedder 1973).

Subsequent surveys failed to find any specimens of the Maloti minnow in the uMkhomazana or elsewhere in South Africa (Crass 1960, 1964; Pike and Karssing 1995), leading some scientists to surmise that the species had gone extinct (Jubb 1966) and others to express doubt whether the species had ever actually occurred in South Africa (Crass 1977, 1985). Crass (1977, 1985), for example, asserted that the original specimens had probably been collected in Lesotho, where extant populations of the species were discovered in the Tsoelikane River in 1970 (Pike and Tedder 1973), in the upper Senqu and Moremoholo rivers in 1975 (Rondorf 1976), in the Mohale River in 1987 (Cambray and Meyer 1987) and in the Sani River in 1988 (Skelton 2000).

However, Skelton (1988) maintained that the uMkhomazana River was the type locality of *P. quathlambae* and that it had been extirpated from that locality, basing his

opinion on a letter written by Mr RIP Vaughan to Dr RA Jubb in 1966, in which he explicitly explained that: 'I remember the occasion when I went to the uMkhomazana River with J McVey Brown and Hardingham (both of whom have since died). Copland had nothing to do with catching these minnows. He either took or sent the specimens to Pietermaritzburg for identification.'

This short note serves to communicate the rediscovery of the Maloti minnow in KwaZulu-Natal, South Africa. The discovery was made on 26 April 2017 by Skhumbuzo Kubheka, Nkanyiso Ntuli, Sinazo Gqola and Nozipho Mkhabela, Ezemvelo KZN Wildlife, during a survey to map the distribution and determine the status of trout in the province. A follow-up survey from 22 to 27 May 2017 was conducted jointly by research teams from Ezemvelo KZN Wildlife and the South African Institute for Aquatic Biodiversity (SAIAB), when the species was found at two additional localities in the same river catchment. The fish were caught using a SAMUS electrofisher. A subsample of 15 specimens, measuring 56.1–80.2 mm SL and tissue samples for DNA analysis were collected during the second survey and were deposited in the National Fish Collection Facility at SAIAB (Catalogue numbers SAIAB 204589 and SAIAB 204590). The initial assessment of their identity was based on morphological measurements, which fell within the ranges described for *P. quathlambae* by Skelton (1988) (Table 1). All the specimens caught had bright orange patches at the base of the fins (Figure 1), which is consistent with the colour pattern of redefin minnows (Skelton 2001).

The newly found populations are currently known from two small streams in the Mzimkhulu River system in the UMzimkhulu Local Municipality in a catchment that is largely underdeveloped, with monoculture tree plantations being the major land use activity (Figure 2).

From a conservation point of view, the precise localities must remain undisclosed, because of the restricted geographic range of known populations, until suitable conservation measures for them have been put in place.

Table 1: Morphometric measurements of *Pseudobarbus quathlambae* from the Mzimkhulu River system in 2017, compared with data from Skelton (1988)

Measurement	Skelton 1988 (n = 32)		Mzimkhulu 2017 (n = 8)	
	Min	Max	Min	Max
Standard length (SL) (mm)	46.0	102.0	56.1	80.2
Head length (HL) (% SL)	22.7	27.1	27.1	30.2
Head depth (%HL)	59.9	69.4	60.5	67.3
Snout length (%HL)	33.3	39.3	30.5	40.0
Orbit diameter (OD) (%HL)	19.4	27.9	18.3	26.9
Post orbit length (%HL)	46.4	57.8	44.1	54.5
Predorsal length (%SL)	47.4	55.0	52.7	55.6
Postdorsal length (%SL)	45.0	52.6	35.5	39.7
Dorsal fin base (%SL)	10.5	13.5	11.4	12.7
Dorsal fin length (%SL)	17.7	22.0	19.4	23.8
Pectoral fin length (%SL)	15.5	21.7	17.3	21.0
Pelvic fin length (%SL)	12.8	16.7	15.7	16.9
Anal fin length (%SL)	15.1	20.0	17.5	20.3
Anal fin base (%SL)	8.9	12.1	9.2	11.1
Body depth (%SL)	20.0	25.5	21.6	24.4
Body width (%SL)	11.9	16.7	14.8	17.8
Caudal peduncle length (%SL)	22.8	28.2	21.2	25.6
Caudal peduncle depth (%SL)	9.9	12.1	12.5	14.4
Posterior barbel length (%OD)	34.2	80.7	33.3	80.0
Pectoral-pelvic length (%SL)	23.0	27.7	21.6	26.1
Pelvic-anal length (%SL)	12.7	17.5	15.5	17.4

The streams in which *P. quathlambae* was found had an average width of approximately 3 m and an average water depth of approximately 0.5 m, with boulders and cobbles as their dominant substratum (Figure 3). At the time of the surveys, the streams had slow to moderate water flow. The redfins co-occurred with two other cyprinids, Natal yellowfish *Labeobarbus natalensis* and bowstripe barb *Enteromius viviparus*.

The rediscovery of the Maloti minnow within KwaZulu-Natal supports the need for more comprehensive surveys to determine the extent of its occurrence, estimate population sizes, determine conservation status and identify effective conservation strategies to ensure the continued existence of the species here. *Pseudobarbus quathlambae* is a threatened species, classified as Endangered under the IUCN List of Threatened Species since 1977 (Skelton 1977, 1987; Swartz 2007). Immediate conservation measures should include securing the newly discovered populations and prohibition of the introduction of alien fishes, particularly trout *S. trutta* and *O. mykiss* and bass *Micropterus* spp., which are present in many rivers in KwaZulu-Natal.

Studies have been jointly initiated by Ezemvelo KZN Wildlife and SAIAB to integrate morphological and molecular data to determine the degree of divergence between the recently discovered KwaZulu-Natal populations of *P. quathlambae* and those from the Lesotho highlands.

This discovery is significant, not only being the rediscovery of this species in South Africa, but also the first record of the species in the Mzimkhulu River system. This confirms the assertion that the species was more widespread in the Drakensberg streams of KwaZulu-Natal at the time of its original discovery (Barnard 1938). It also supports the contention that the introduction of trout into Drakensberg streams was largely responsible for the extirpation of the species from the uMkhomazana and other Drakensberg streams (Jubb 1966, 1983; Skelton 1987). This is consistent with the negative impacts of trout reported from other river systems in southern Africa (e.g.



Figure 1: A specimen of the Maloti minnow (SAIAB 204589) from the Mzimkhulu River system showing live colour pattern and the distinctly small scales, which are the key characteristics of *Pseudobarbus quathlambae* distinguishing it from its congeners

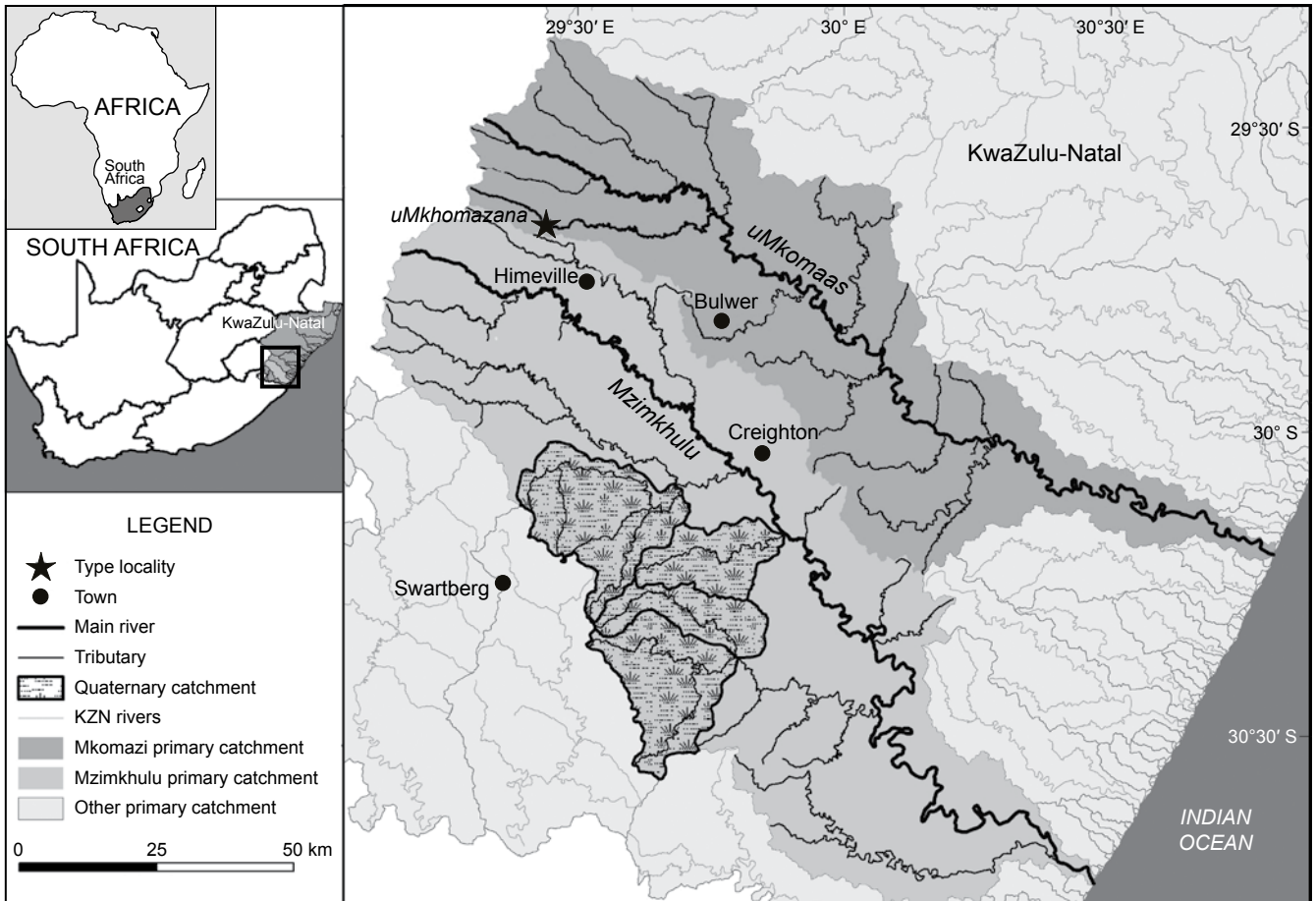


Figure 2: Map showing the type locality of *Pseudobarbus quathlambae* in the uMkhomazana River, uMkomaas River system, where the species has gone extinct, and subcatchments in the Mzimkhulu River system where the species was recently rediscovered



Figure 3: Photographs of habitats where specimens of Maloti minnow were collected in the Mzimkhulu River system

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Cambray 2003; Kadye and Magadza 2008; Kadye et al. 2013; Shelton et al. 2015).

The rediscovery of *P. quathlambae* within KwaZulu-Natal creates obligations and responsibilities for all parties, especially the conservation authorities responsible for the area, to ensure the long-term survival of the species in South Africa.

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