

Of trout and minnows, and conservation of the upper Berg River

by Adriaan Sieberhagen
University of Stellenbosch

I caught the most peculiar looking little fish about five years ago, high up in the Elandspad River in the south-western Cape. It was definitely not a small trout or bass, and we were completely baffled by its appearance. Two small pairs of barbels protruded from its mouth, and its head was covered in small wart-like tubercles. But its most significant feature was the bright red colour of the base of its fins. That gave it away. I had heard of redfin minnows before, and if any fish was worthy of this descriptive name it was the one I had just caught. This was later confirmed with the help of Prof. Paul Skelton's book, *A complete guide to the freshwater fishes of Southern Africa*. According to the book there are seven different species of redfin minnows; the one I had caught was Burchell's redfin, or *Pseudobarbus burchelli*. I also learned that this species, as most of the other redfins, has become threatened due to habitat destruction and the impact of introduced predatory fishes.

A few months after this episode, I explored a small tributary of the Smalblaar River near Worcester with my backpack and fly rod to establish just how far up trout could be found. The first hour I managed to catch quite a few decent ones, and the prospects looked good. The gradient, however, soon became steeper, and as I came to a section of small waterfalls I wondered whether trout would be able to surmount these natural obstacles. Above these the river flattened out again, and there were a few small, but promising, pools. After a few careful casts that did not produce anything I went to lie on a ledge that overlooked the pool. What I saw took my breath away. No, it was not a two lb trout cruising around, and thinking of it now, I hope this pool will never see a trout. Instead, there were literally hundreds of redfin minnows swimming around in the crystal clear water. The rays of the afternoon sun resulted in the most spectacular display of the bright red patches on their fins, and for at least an hour I lay there spellbound, feeling privileged to witness these unique and beautiful little fish in their pristine surroundings. On my way back I thought about the implication of what I had just observed. No matter what I would rather have liked to believe, the abundance of redfins in this stretch of stream, contrary to their absence lower down where trout abound, forced me to consider the reality that trout are in our streams at the expense of some of the indigenous inhabitants.

Then, four years ago, I undertook a project on freshwater fish distribution of the mainstream of the Berg River as part of an Honours degree in Conservation Ecology at the University of Stellenbosch. Dean Impson of the Western Cape Nature Conservation Board co-supervised the project, and our main aim was to determine if the highly-threatened whitefish *Barbus andrewi* still occurred here. There are four indigenous freshwater fish species in the Berg River. The whitefish is the largest, attaining a size of up to 60 cm or 3.4 kg. The Berg River has its own species of redfin minnow, aptly called the Berg River redfin (*Pseudobarbus burgi*), which reaches about 12 cm. The other two species are also relatively small, with the Cape kurper (*Sandelia capensis*) attaining about 20 cm, and the Cape galaxias (*Galaxias zebratus*) only a minute 5 cm. The Cape kurper and



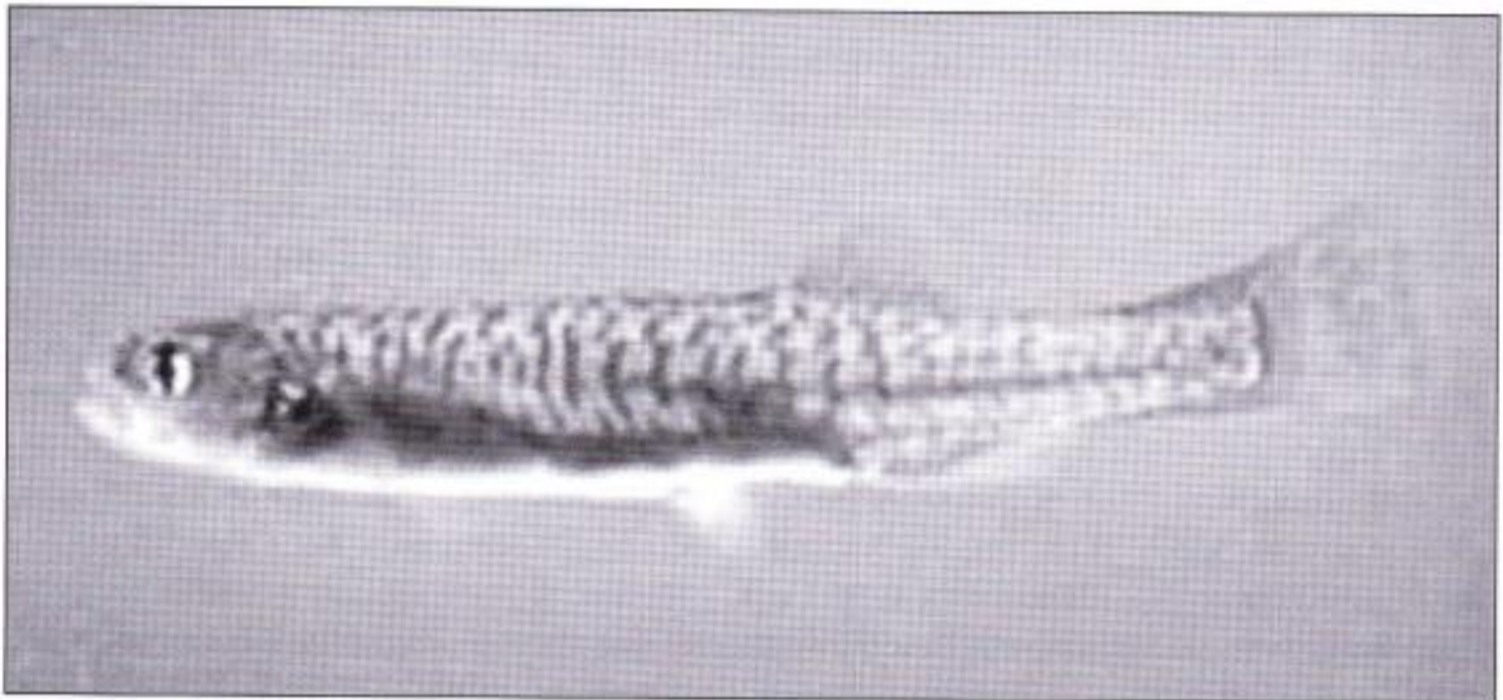
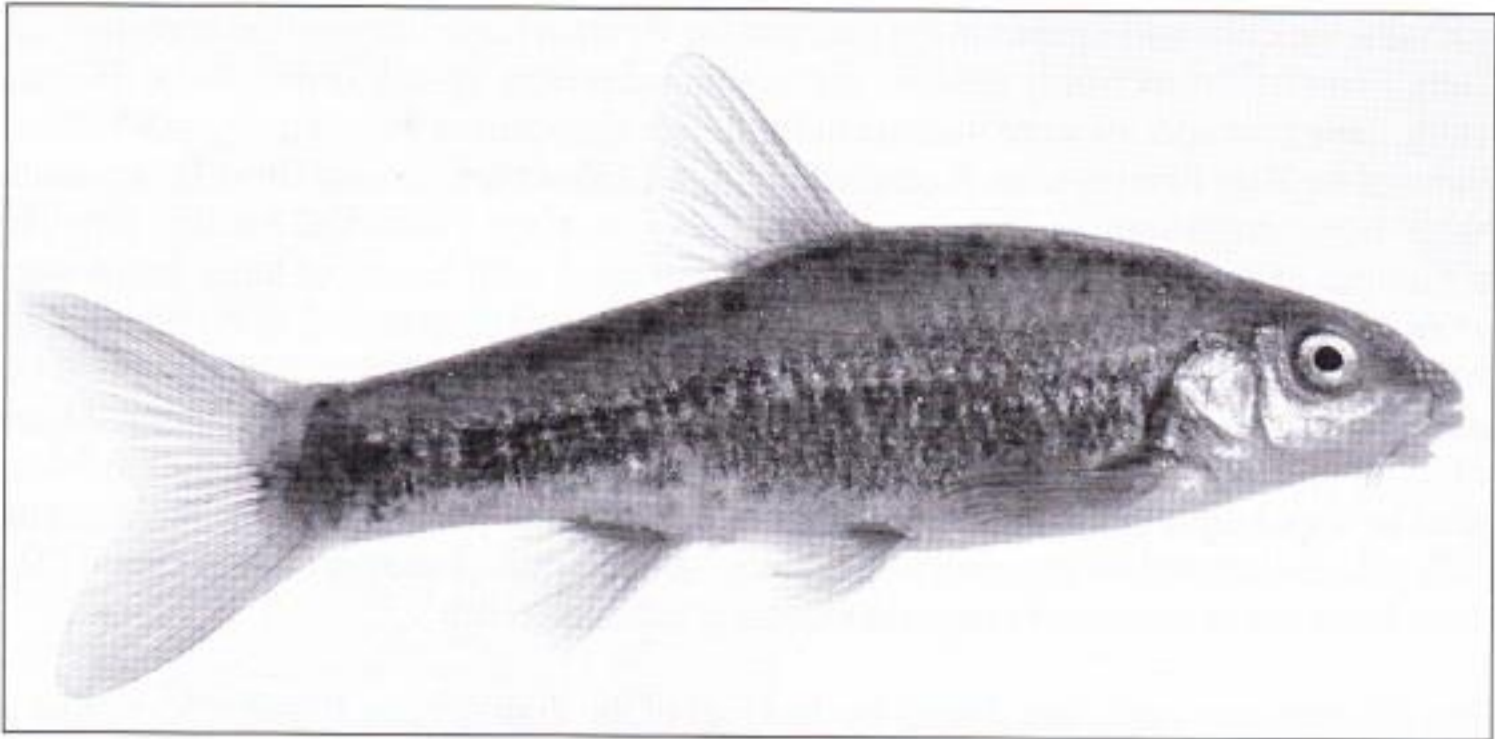
The upper Berg River, once home to the now-extinct Witvis.



Water diverted into the upper Berg River from the Theewaterskloof Dam introduced barbel, the sharptooth catfish - a formidable predator.

galaxias are quite widespread in the rivers of the Western Cape whereas the whitefish and Berg River redbfin each only occur in one additional nearby system respectively. Historically, these four species were widespread and very abundant in the mainstream and tributaries of the Berg River system. A description from 1934 of the river near Groot Drakenstein, taken from an old copy of *Piscator*, the journal of the Cape Piscatorial Society, provides a glimpse of the picture: "Clean stony runs alternated with basins of large water-worn stones and long deep pools, fringed with palmiet rushes and overhanging trees and bush, silt beds being confined to the backwater. The bed was in splendid condition and the dire effect of soil erosion had not begun to appear. There was a large population of indigenous fishes. Shoals of witvis up to about 4 lb in weight, and rooivlerk minnows amounted to thousands of individuals. The Cape kurper lurked under all favorable stones or swam boldly in the open water, and the little galaxias haunted the marginal weedy areas." In the words of another early observer: "The Berg River has an excessively large population of indigenous fish".

But this was way back, and during the last half of the 20th century a dramatic decline in both the distribution and abundance of indigenous fish species in the Berg River has occurred. The Berg River redbfin is now listed as "Critically Endangered" in the 1996 IUCN Red List of Threatened Animals, and the whitefish as "Vulnerable". The Western Cape Nature Conservation Board (WCNCB) actually regards the Berg River population of whitefish to be on the brink of extinction. The other two species, due to their much wider geographic distribution in other systems are not in the Red Data list, but there is also much concern about their local demise in the Berg River itself. During the course of the project, we examined the fish communities at different sites along the Berg River, from the upper reaches in the Franschhoek Mountains down to just below Piketberg, using techniques such as snorkelling, gill and seine netting, and of course rod and line angling. But from most of the Berg River, mainstream, indigenous species were completely absent. Only in the relatively undisturbed upper reaches of the river did we find the Berg River redbfin, Cape kurper and Cape galaxias. The whitefish were not recorded once during our surveys, strengthening fears that this species might have become extinct in this system. The reason for their dramatic decline is a complex "cocktail" of contributing factors. Like every biological community in a river, the indigenous fish species are influenced by various physical, chemical and biological factors to which they have become adapted through long periods of natural selection. These natural conditions in the Berg River were completely altered by man during the last century, and the bottom line is that the indigenous species are unable to survive under the new set of conditions. Let's consider the biological changes that have occurred in the Berg River. A total of eight fish species not indigenous to the Western Cape Province were recorded during our surveys. These are rainbow trout, large- and smallmouth bass, bluegill sunfish, carp, Mozambique tilapia, banded tilapia and sharptooth catfish. Large predatory species never occurred naturally in the Berg River, and the indigenous species never developed the necessary behavioural adaptations to cope with the predatory threats of bass species. The impact of these alien fish species, which include direct predation and/or competition for food and space, is one of the major reasons for the threatened status of indigenous species in the Berg River. Especially significant is the fact that there is such a variety of alien species present, which between them occupy every part of the river, from the clear fast flowing mountain streams (e.g. trout) through the middle river (e.g. smallmouth bass) down to the slow flowing turbid lower reaches (e.g. carp, sharptooth catfish).



Fish species indigenous to the Berg River: Top: Berg River redfin; middle: Cape galaxias, and bottom: Cape kurper.

The quality of habitat has also deteriorated significantly through the activities of man. These are mostly associated with agricultural or industrial activity. Excessive water extraction exceeding the natural flow, characterised the Berg River for a long time, and this often left only stagnant pools during the dry summer months. Today the situation is completely reversed, and flow is regulated by the Theewaterskloof-Berg River interbasin transfer scheme (IBT), which supplements the water of the Berg River from the Theewaterskloof Dam on the Riviersonderend River. Water is delivered during the dry summer months when irrigation demand is highest and the water chemistry (pH, conductivity, nutrient status and temperature) of the Theewaterskloof Dam water is also somewhat different to the water of the upper Berg River. The biota is therefore subjected to the combined effects of an unnatural increase in discharge and unfamiliar water chemistry. Many aspects of the lifecycle of indigenous fish species, such as reproduction, are intimately linked with the natural conditions of flow and water chemistry, and these changes can be expected to have a profound effect on them. Other factors that contribute to habitat degradation also exist, such as the physical disturbance of the riverbed with bulldozers and the canalisation of the river due to flood control embankments, pollution from the effluents from towns and their industries, siltation, entrophication, mineralisation etc.

Attempts to rehabilitate the Berg River for its indigenous fishes face two major practical constraints. The first constraint is the management conflict that exists when a river is intensively utilised. Many indigenous fish species have no major immediate economic value, and it would be unrealistic to expect that their requirements should weigh more than those of agriculture and industry, which contribute to economic growth and job creation in the region. The second constraint is the extreme difficulty of eradicating alien fish species. Any efforts such as habitat rehabilitation and restocking will prove fruitless if alien fishes remain in their present numbers. It is a sad fact that most of the Berg River is now lost for its original inhabitants, and that there is very little that we can do about it.

However, the study showed that the very upper reaches of the Berg River, above the outlet of the Theewaterskloof-Berg River IBT present an opportunity to actively conserve at least three of the four indigenous species. This part of the river represents the only remaining habitat in the main stream for the Cape kurper, Berg River redbfin and Cape galaxias, and as such it deserves to be managed as a sanctuary with their requirements in mind. Good news is that it falls within the La Motte Forest reserve and is managed as a catchment area by the Western Cape Nature Conservation Board. In addition, Dewdale trout farm which manages flyfishing in the upper Berg River, is eager to see this area protected as an indigenous fish sanctuary.

Invasive alien vegetation such as pines and black wattle is already being removed through the Working for Water programme, and as far as alien fish species are concerned, we are very fortunate that smallmouth bass have not found their way up here. Rainbow trout are, however, present in moderate numbers, and pose a significant threat to the long-term survival of the fragile community of indigenous species that still occurs here.

To help our unique and threatened indigenous fishes here, we plan, with nature conservation, to reduce the numbers of trout in this section of river during summer by focused angling efforts. It is not envisaged that we will be able to completely eradicate trout from this area, but through sustained and focused angling effort, the resultant reduction in their



The upper reaches of the Berg River where populations of indigenous minnows still exist.

numbers might decrease predation and competition to such an extent that indigenous species can recover to their former abundance. It should be noted that the project does not threaten the thriving trout fishery below the tunnel that is being managed by the Dewdale trout farm.

Being an avid fly fisher for trout and a conservationist of indigenous species I am aware of an apparent conflict that exists. But I do not agree with those conservationists who say that the introduction of trout into our rivers was a mistake. Conservation is more than just the preservation of species; it is the wise management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. It would be a mistake not to recognise the economic opportunities that fly fishing for trout and the associated tackle and tourism industry present in the Western Cape. This, however, can only be done with a clear conscience towards future generations if our indigenous species are thoroughly protected in sanctuaries such as the upper Berg River. I urge everyone to take a further step in the journey of becoming a more "complete" fly fisher by getting to know the original inhabitants of our rivers and through becoming actively involved in their conservation.

P.S. Anglers who would like to find out more about how they can assist in the creation of a sanctuary for indigenous fish species in the upper Berg River can contact Dean Impson of the Western Cape Nature Conservation Board at 021 8668019/082 4140020.

