

Barbel, a catfish on the move

by Dr Jim Cambray

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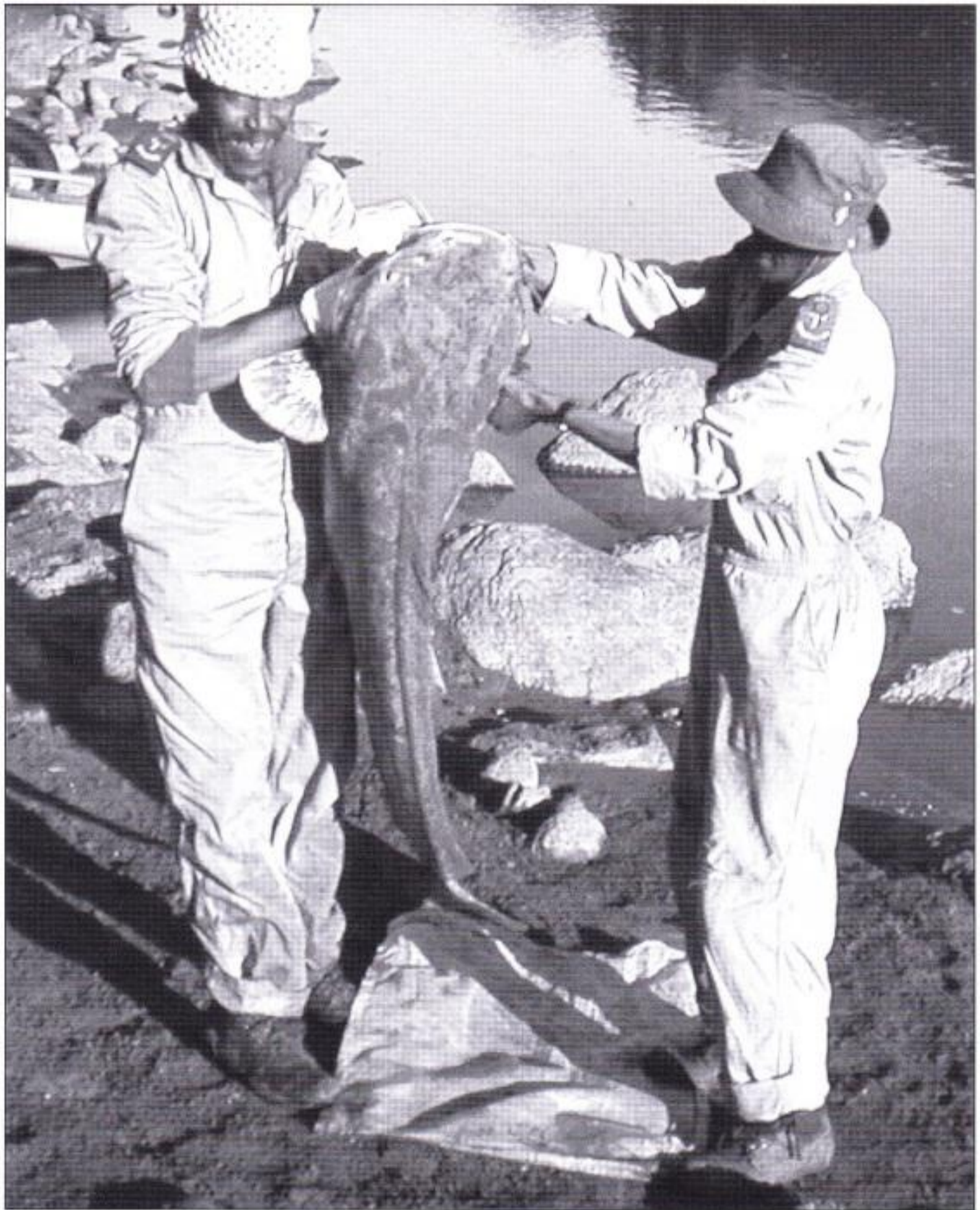
Distribution

The sharptooth catfish or, as its more frequently termed in South Africa, the barbel, *Clarias gariepinus* (Burchell, 1822), is a widespread African freshwater fish species which naturally occurs in many water bodies from the Nile to the Orange River. Aquaculturists, farmers, anglers and engineers have helped to increase the range of this catfish species into many rivers in South Africa where it did not naturally occur and is now an **alien species**. If you move an indigenous fish species out of its natural home range, that is the rivers where it occurs naturally, it becomes an alien fish species and may negatively impact on the new ecosystem.

Biology and ecology

Barbel and its relatives have good colonising abilities due to their airbreathing adaptations, omnivorous diet, their ability to move overland and burrow during droughts. The walking catfish, *Clarias batrachus*, spread very quickly in the south-eastern section of the United States (Courtenay & Stauffer, 1984) which clearly shows the invasive potential of these catfishes. Similarly barbel soon colonised the Great Fish River after the Orange River was connected to the Fish River via the Orange-Fish tunnel (Cambray & Jubb, 1977). Specimens lodged at the Albany Museum clearly show that this species is spreading, aided by interbasin transfers, legal and illegal movement by anglers, farmers and aquaculturists.

There have been a number of studies on the biology and ecology of barbel (eg Bruton, 1976, 1978, 1979a,b,c,d, Bruton and Allanson, 1980, Clay 1982, Quick and Bruton, 1984, Cambray, 1985). It is a very hardy species and occurs in a wide variety of habitats but does best in floodplains, large slow flowing rivers and in lakes and dams. This species is also known to survive under the harshest conditions in drying rivers and lakes due partially to its accessory air-breathing organs (Bruton, 1979c). It can tolerate a range of water temperatures from 8-35°C, a wide range of salinities and low oxygen levels (Safriel and Bruton 1984). The ability of this species to move overland makes it a high-risk escapee from farm and aquaculture dams, even off-channel dams. Barbel are omnivorous and will eat and/or swallow almost anything aided by a large terminal mouth and four pairs of barbels. I once found a 8cm in diameter round stone in the stomach of an Orange River catfish. It probably heard a splash opened its mouth and swallowed. Barbel's pack-hunting behaviour has been well documented by Bruton (1979b) and Merron (1993). The effect of this pack-hunting behaviour on fish species that have not evolved with barbel would probably be devastating. If you have ever seen and heard the smacking of a large pack of barbel hunting at dusk and forcing fish into the shallows then you will fully understand just how efficient barbel pack-hunting can be.



A large barbel, 24kg, collected by Nature Conservation staff, Andries Kalsen and Sydney Cramer, during a survey of the Augrabies Falls area, Orange River.

All photographs copyright Dr Jim Cambray.



The Orange Fish tunnel inlet situated in the Gariiep Dam on the Orange River, a conduit for introducing barbel into the Fish River.



The large gape of a barbel indicates that it can ingest a wide range of prey items, even small boulders!

Invasive aliens

Barbel are a very hardy, large fish species and as such have the potential to significantly impact on a range of aquatic biota including amphibians and water fowl. The extent of the impact that this alien catfish is making on the rivers it has been introduced into should not be underestimated and urgently requires study. Ironically, the illegal introduction of catfish into some dams has impacted on the sport fisheries for another alien, the North American bass species that had previously displaced the indigenous fish species! There is also a serious potential impact on our indigenous freshwater eels. Education of the public, including anglers and farmers, is urgently required.

To illustrate the seriousness of the introduction of catfish the Global Invasive Species Programme (GISP) lists the Indian catfish as an example of one of the top hundred 'World's Worst Alien Invasives.' Our barbel is very similar to the Indian one and thus can be regarded as a very dangerous fish to introduce outside of its natural range. Barbel have even been introduced into parts of the Amazon in South America where it is causing major problems. This was complete madness as there are many indigenous catfish species in the Amazon. Why take an African catfish there?

Interbasin transfers

By using water-carrying tunnels to connect rivers together, called interbasin transfers, engineers have helped the spread of catfish in South Africa. When the Orange River was connected to the Fish River it was considered an engineering feat but at the same time an ecological disaster. Not only water moved along the Orange-Fish tunnel, but so did the Orange River fish species and amongst these were barbel. Once in the Fish River, anglers caught them and started to move them around the Eastern Cape with disastrous consequences. As most people know this species is almost indestructible and one can put it in a wet sack and easily move it hundreds of kilometres. People seem to be contravening Nature Conservation ordinances all the time and what they do not know, and in some cases do not care about, is that they are doing long-term ecological damage by moving alien fish around our country. This is what I have called 'ecoterrorism.' If the alien fish breed and are successful it is next to impossible to remove them. If one tries it is very expensive and such attempts can easily be nullified by another man and a bucket of aliens. This is a 'biospill' or biological pollution. It can spread upstream, downstream and up into tributaries. This is unlike a once-off chemical spill that may kill the main channel fish and other biota, but which are able to recolonise from tributaries after the river dilutes the poison. In contrast the 'biospill' can be long-term and end in extinctions. People need to understand just how serious it is to move live fish around.

Aquaculture

Farming magazines and aquaculturists have also helped to spread barbel. Articles proclaiming that barbel have great potential as an aquaculture species help in spreading this catfish. However, for many farmers the catfish have not lived up to this reputation and what we are left with are ponds full of catfish which eventually escape and colonise nearby rivers. As an example, one farmer along the Kouga River, a tributary of the Gamtoos River in the Eastern Cape, illegally introduced barbel into his dam. They escaped - which they are very good at - and have now spread throughout the Gamtoos and have possibly resulted in the extinction of the redfin minnow, *Pseudobarbus asper*, in the system. The tragedy of this one ill-conceived introduction by one person is that the magnificent



The author holding a barbel which had been illegally introduced by an angler into the Kowie Catchment area, home of the endangered anabantid, the Eastern Cape Rocky.



Some barbel can become quite obese, here is a 25 kg specimen.

Baviaanskloof Wilderness area now has another alien fish species in it and thus another threat to the indigenous species that a wilderness area should, in theory, protect!

The future

What of the future? Well education is required and this is why I have given so much time and effort to this aspect of freshwater fish conservation and alien fish species. But in the end it will be up to all those people out there with a bucket full of alien fish and where they put them. One of the endangered fish species I work on, the Eastern Cape Rocky (*Sandelia bainsii*) is facing extinction in the near future due to anglers introducing aliens. They even have introduced aliens into special sanctuary areas that were set aside for the Eastern Cape Rocky! How we overcome this hurdle is a major stumbling block for those people who are trying to conserve what we have left of our indigenous freshwater fish species.

It is often said that anglers and conservation scientists must work together. I fully support this. This is what FOSAF is doing with the yellowfish initiative. This is a wonderful venture, let us hope that some anglers do not make alien fish of them! Anglers, engineers and aquaculturists have made barbel aliens in many rivers in South Africa to the detriment of indigenous species. It is truly time to stop moving live fish around our country.

If you catch a barbel while out flyfishing please keep a record of where you caught it and let me know the location (*J.Cambray@ru.ac.za*).

Editor's note: While it seems politically incorrect to mention the major reasons, apart from tunnels that effect inter-basin water transfer, for the translocation of fish species into areas where they did not occur before, clarity should be given.

One of the reasons is that some freshwater anglers fish not only for recreation but also for food and this is believed to be one of the reasons why carp in particular, have been moved from place to place. As Dr Cambray has pointed out, barbel can be transported for hundreds of km protected by a wet sack. Carp are almost as hardy.

The second reason, privately acknowledged to me by aquatic scientists, is that bait fishers who participate in angling competitions receive extra points for the greatest number of species hooked and landed. There is thus an incentive to have as many fish species available at any given competition venue and to transfer them accordingly. Fly fishers, in contrast, long ago accepted in this province and elsewhere the conservation principle of zoned areas for different fish species and this journal has carried numerous articles down the years stressing the need to protect and nurture the areas not yet invaded by alien predatory species.

In one respect, carp are potentially even more of a threat to indigenous fish species than barbel. Several years ago I accompanied Dr Kas Hamman of Cape Nature Conservation, an authority on threatened indigenous fish species, to an interview with another esteemed aquatic scientist. Professor Mike Bruton. Prof Bruton, formerly with the JLB Smith Institute of Ichthyology at Rhodes University, now heads up the scientific and environmental section of a major cellular phone network. Dr Hamman and I were hoping to get funding for a book on the threatened indigenous fish species

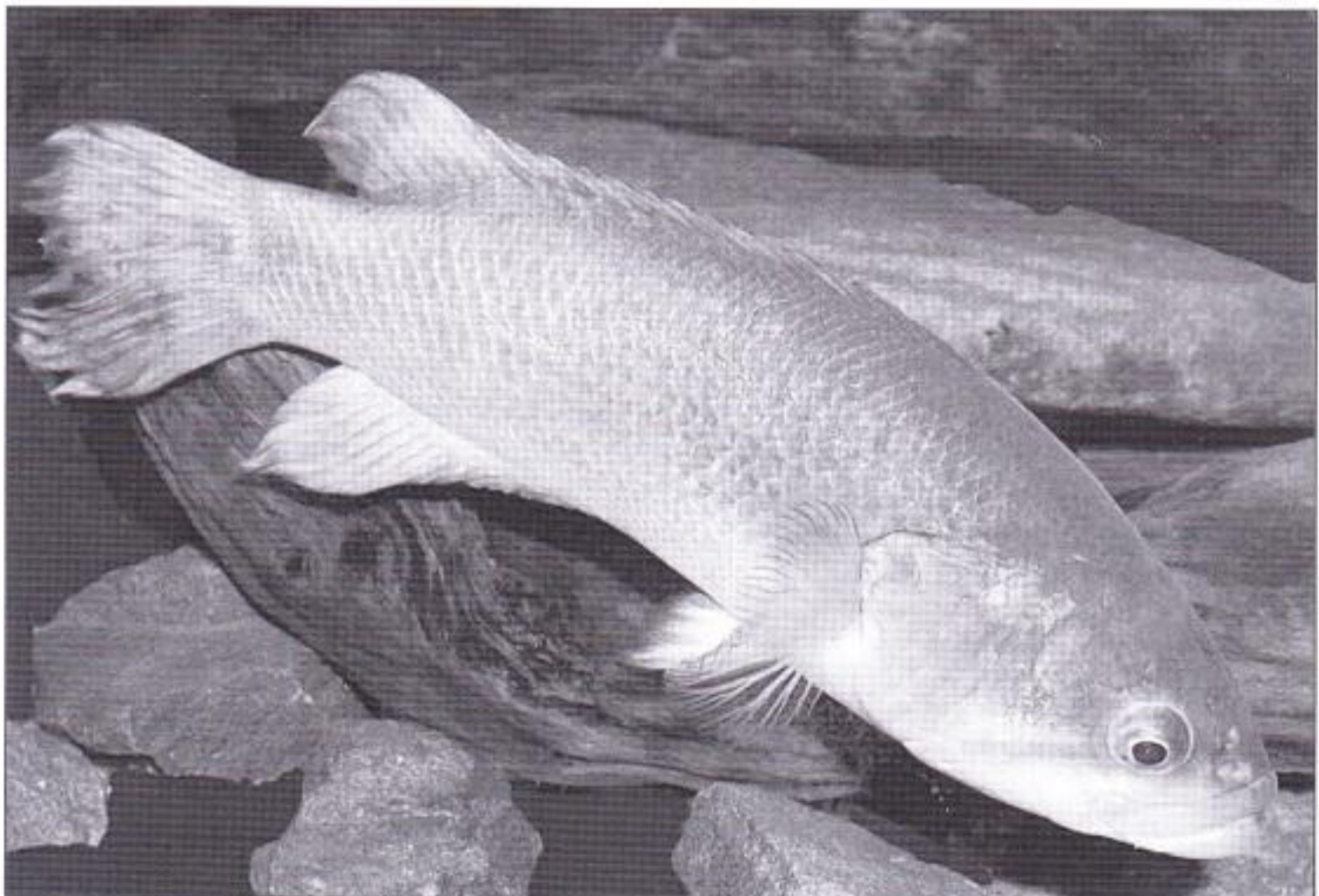
of the Cape province.

During the interview Dr Hamman, clearly distressed, mentioned that carp had been introduced into the Sedgefield lakes near Knysna, a renowned bass fishing venue. He pointed out that while indigenous minnows could survive the predations by bass by hiding in the inaccessible margins of the lakes, carp change the habitat because their method of feeding quickly roils the water.

The introduction of barbel and carp into the Theewaters Kloof dam near Villiersdorp has significantly impacted on what was once regarded as probably the finest bass venue in the country.

But, before we mourn the loss of that fly fishing opportunity, let us mourn an even greater loss. Two years ago I attended the annual meeting of Fosaf's Yellowfish Working Group in the Cederberg. The conference venue was on the banks of the Groot River, a tributary of the Doring. Most of the delegates were fly fishers whose quarry of choice is our indigenous yellowfish. Unpacking in great haste they tackled up, charged down to the river and pulled out one stunted bass and bluegill after the other. We were all left to ponder on what the fishing for the magnificent Clanwilliam yellowfish must have been like a century ago.

During the conference, I asked why no representatives of the bait fishing fraternity were present and was told that over a period of years, repeated invitations had been sent to the relevant angling organisations to attend but there had never been any response.



The endangered Eastern Cape Rocky.