



Eradicating Alien Fish Species from Western Cape

The Cape Floral Kingdom is world renown for its botanical diversity, being the most species-rich (for its size) but also the most threatened of the world's six floral kingdoms. Yet it is the freshwater fish of the region that perhaps warrant the most cause for concern, because 15 of the 19 indigenous species are threatened, and nine of these are listed as critically endangered or endangered.

Sue Matthews reports from Cape Town.

Cape Nature Conservation (CNC) has now embarked on an ambitious rescue effort. Since invasive alien fish - along with habitat degradation and destruction - are considered largely responsible for the threatened status of indigenous fish, CNC plans to hit back by eradicating alien fish from high-priority rivers flowing through protected areas.

With funding from the Table Mountain Fund, administered by WWF-SA, a project will be undertaken to assess which rivers in the so-called 'Mega-parks' - the Cederberg, Gouritz and Baviaanskloof - as well as the Kogelberg and West Coast biosphere reserves and the Cape Peninsula National Park, are most suitable for alien eradication and rehabilitation work. Conservation International's Critical Ecosystem Partnership Fund, which is supporting many projects under the umbrella of the Cape Action Plan for People and the Environment, or CAPE, will then be approached for funding this work, which is generally quite costly.

UNIVERSITY OF CAPE TOWN PROJECTS

The effects of invasive alien fish in South Africa include predation, competition for food and space, habitat alteration, hybridisation and the introduction of diseases and parasites. To date, however, there have been no detailed studies in South Africa on most of these effects, so research is being con-

ducted within this project to increase understanding of the impact of predatory invasive alien fish. Darragh Woodford, an MSc student at the University of Cape Town, is investigating the impact of small-mouth bass *Micropterus dolomieu* on indigenous fish of the Rondegat River; a tributary of the Olifants River.

The Olifants River system is recognised as being a biodiversity "hot-spot" because it has 10 indigenous fish species, eight of which are endemic and threatened. The presence of smallmouth bass - a particularly destructive predator - is believed to be the main reason for the predicament of the endemic fish; indeed, this is regarded as the primary cause for the threatened status of endemic fish throughout the Western Cape.

"The Rondegat River is an ideal river to study the effects of invasive alien fish, primarily smallmouth bass, on indigenous fish," says CNC's Dean Impson, project leader of the broader study and co-supervisor of Darragh's project.

"The river rises in the Cederberg Wilderness Area, managed by CNC, and it has no instream or offstream dams, but about half way up there's a waterfall that the bass can't get up. Above the waterfall, very high numbers of indigenous fiery redfin, Clanwilliam redfin, Clanwilliam yellowfish and Cape galaxias are found in the river, but below the waterfall there are only bass and large yellowfish."



Dean Impson of Cape Nature Conservation's Scientific Services division

"The river banks are also very infested in the middle and lower reaches by invasive alien plants, mainly black wattle, blackwood and bluegums. These certainly reduce the amount of water in the river during summer base flows, and probably also have an affect on riverine fauna by being a foreign source of food. So Darragh's research will look at the effects of not just bass but also invasive plants on the indigenous fish, and in 2004 another student will be taken on to study their impacts on macro-invertebrates in the river."

"The Rondegat River is going to tell us, we hope, what effect alien fish and plants are having on the riverine fauna, and these findings will be used to inform the broader study"



The middle and lower reaches of the Rondegat River, which rises in the Cederberg mountains, are infested by invasive alien plants

on the Cape Floral Kingdom's rivers."

SMALLER PROJECTS

Two smaller projects by UCT Honours students have also helped to build the evidence against predatory invasive fish. In 2002, David Christie investigated the impact of smallmouth bass on the Cape whitefish, *Barbus andrewi*. This species is endemic to the Berg and Breede River systems and used to be widespread there, but now the only viable breeding population is in the upper Hex River, a tributary of the Breede. A road causeway splits a 9 km stretch of river into two, and acts as a barrier to upstream penetration by bass. In snorkelling surveys conducted during late summer, David could find no significant differences in riverine habitat between the two sections, but the change in fish as-

semblage was startling. In the upstream section, he found 345 Cape whitefish, numerous Burchill's redfin (*Pseudobarbus burchelli*) and Cape kurper (*Sandelia capensis*) – as well as five small bass, which must have been deliberately introduced since a previous survey in November 2001. Below the causeway the river was dominated by bass, and the only other fish David observed were five Cape whitefish.

This year another Honours student, Jeremy Shelton, looked at the impact of smallmouth bass on the indigenous fish community of the Witte River, which flows through the largely inac-

cessible Bain's Kloof. Bass have entered the river from the Breede River and have colonised a 6 km section in the lower reaches, but have been prevented from penetrating further upstream by a waterfall. During a snorkelling survey of five pools and three riffles above and below the waterfall, Jeremy counted 1667 Burchill's redfin and 353 Cape kurper in the upper section, but only 4 redfins and two kurpers, as well as 13 bass, below the waterfall. No marked difference in habitat could be found between the two sections,



*The smallmouth bass *Micropterus dolomieu* is a voracious predator.*



The endangered fiery redbfin Pseudobarbus phlegethon is endemic to the Olifants River system

which are exposed to few, if any, anthropogenic activities, so bass are considered the chief suspects in killing off the indigenous fish.

But has the effect of introduced bass been this severe countrywide?

“No, because there’s a big difference between the indigenous fish faunas of the Western Cape and up-country,” explains Dean. “Up-country, the small species and the juveniles of large species evolved in the presence of predatory indigenous fish like tiger fish, sharptooth catfish and predatory cichlid species, so they know what to do in the presence of bass – they have various anti-predator behaviours. Here, fish evolved in systems where there were no naturally occurring predatory fish. As a result, when smallmouth bass and rainbow trout were put into our

streams, they had a devastating impact. The indigenous fish didn’t avoid them – they probably swam right up to them instead!”

ANGLING VALUE

Smallmouth bass were first introduced to South Africa in 1937 to improve freshwater fishing, something which Dean says was quite understandable then.

“Many rivers in the Cape Floral Kingdom have no indigenous fish species of angling value, and back then they really didn’t know any better,” he concedes. “But for the last 20 to 30 years CNC has been aware that invasive alien fish are spreading their ranges, and we’ve wanted to identify some pilot areas where we could reverse the process.”

“We plan to target rivers in conservation areas, because we have control over what goes on there, and many of these rivers are rarely visited. The most likely candidates for rehabilitation work have no value for bass-fishing - most of the fish are only 15 to 20 cm long, so eradicating them in those rivers shouldn’t cause any conflict with anglers.

It’s clear that Dean is talking from experience.

DIFFICULT RELATIONSHIP

“CNC has had a difficult relationship with the bass-fishing fraternity until now, because there’s a perception that we are anti-bass,” he acknowledges. “That’s certainly not the case, but we don’t want to see bass being stocked into new areas. There are enough rivers and dams with alien fish species to cater for everybody.”

“Clanwilliam Dam, for instance, has very good bass-fishing, but in the Rondegat River just upstream the bass are so small that they’re not worth catching.”

Fortunately, CNC’s concerted efforts to raise awareness about the impacts of invasive alien fish have started paying off.

“As a gesture of goodwill, Peninsula Bassmasters has donated R10 000 towards the Rondegat River project,” says Dean, “so the future holds a lot of promise for an improved relationship with freshwater anglers.”



Question: Why is the tap water sometimes white when it comes out of the tap?

Answer: Air bubbles – due to the high pressure in the distribution system, any trapped air in the system will become dissolved in the water. As soon as the pressure is released by opening the tap, the bubbles reform, giving the water a white appearance. If you pour a glass of this water and allow it to stand, the water will clear from the bottom upwards as the air leaves the water.