

# OBSERVATIONS OF A MEMBER OF THE VOLUNTEER TEAM ASSISTING WITH THE MANUAL REMOVAL OF SPOTTED BASS FROM THE THEE RIVER.

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## **Introduction**

The removal of invasive fish in prioritised rivers of the Cape Floral Region is an imperative task as these fish have proved to be the largest single factor impact on freshwater aquatic animal diversity in this area. Predacious alien fish (e.g. bass spp.) breed quickly and are the greatest contributing factor to the homogenisation of endemic fish and other aquatic animal diversity in the CFR. The only viable management option to date is the use of a piscicide which is non-selective and kills most organisms which breathe under water including indigenous fish, certain amphibian life stages and invertebrates. It is an aggressive, short durational conservation measure with prominent results. The degree to which the piscicide affects indigenous animal species is lower in rivers where the treated area has been monopolised by invasive fish. In such rivers little native aquatic life other than a few surviving invertebrates, amphibians, crabs and adult indigenous fish remain. These animals can be rescued depending on resources available and the cost of losing a few remaining individuals can be outweighed by the conservation benefit which will be gained by repatriation of threatened species into the rehabilitated area. Rivers with recent infestations of invasive fish species are a great cause for concern as the native animal life is far greater and the conservation loss will be higher if the river is rehabilitated with non-selective methods.

Being a keen freshwater conservationist with B.Sc degree in Conservation Ecology and a background in fishing and animal behaviour studies, I had been looking for a way to get involved in the research of possible, more selective alternatives to remove invasive fish from the highly threatened waters of the Cederberg. In January 2011 I consulted with a fish conservationist and ecologist, Sean Marr from the Freshwater Unit of UCT who put me in contact with Riaan van der Walt who was working as Project Manager for the first ever manual removal attempt of invasive fish in South Africa (taking place in the Thee River, Cederberg). This tributary of the Olifants River is a high priority fish conservation zone with 6 indigenous fish species, one of which is critically endangered and all of which are threatened with local extinction due to a recent infestation of spotted bass/smallmouth bass hybrids (called spotted bass in this report).

I became involved with the manual removal of the Thee River invasive fish from January 2011 to April 2012. The initial stage of my involvement was as a volunteer on as many as possible one-day excursions (up to three days per month during summer) to manually remove the bass via hand nets. At this stage hand netting was the most effective method as most of the larger fish had been removed and we were left with the remaining bulk of juvenile to three year old bass. Removal occurred in teams of two who would snorkel with hand nets and scoop up the interestingly 'docile' spotted bass. This method (invented by Craig Garrow) might sound a difficult task, but it has certainly proved to be most effective due to the 'unafraid' behaviour of bass when confronted under the water. The Thee River is a newly invaded system with no natural enemies for the bass (e.g. fishermen, natural predators etc.). For the invasive predator fish there is an abundant food source of indigenous invertebrate, amphibian and fish diversity. As the underwater hand netting of bass progressed I was inspired to see how these indigenous animals re-colonised the more impacted, lower half of the rehabilitation section.

Optimal snorkelling occurred between riffles in the deeper pools and thus eradication mainly occurred in the deeper pools. After about a total of 150 bass were removed over one-day sessions, we were witnessing bass colonising pools which have been cleared two to three weeks before. This was a good sign as it proved that if older and more dominant bass are removed from the spotted bass's preferred habitat (larger pools) sub-dominant bass will take their place and swim out from their less preferred habitat (the riffles). This finding gave us renewed hope to be able to eradicate the last of the bass. As the work progressed I became aware that there was a change in the behaviour of some remaining non-juvenile (1-3 years) bass. Some bass were starting to swim away from the hand net or would hide under rocks or undercut-banks on a more frequent basis. However, it also became apparent that we could have removed most of the older (spawning capable) fish by January 2012 and that the possibility of removing the last spawning capable fish during the last spawning season (Oct-March, 2011-2012) was becoming a real possibility. I thus consulted with Craig Garrow (conservationist, aquatic ecologist and business man) and Riaan van Der Walt (CapeNature, GCBC Project Manager) to support three intensive removal outings in which I and another assistant, Shaun Sauls, would camp out by the river enabling us to remove bass at any time of the day over 5-day sessions.

The possibility of successfully putting closure to the manual removal project during the last removal season was the biggest driving force behind their support and three 5-day sessions proceeded between January and April 2012. Before the five-day camping sessions we had been snorkelling mostly during the day on one-day sessions. Getting the go-ahead for doing more long durational removal sessions was a great opportunity for me to test my hypotheses that night time snorkelling with the use of underwater spotlights could lead to greater eradication success. My hypothesis: Due to their diurnal behaviour, bass are sleepy at night. This finding together with possible photosyntropism ('hypnotic attraction') effect of underwater spotlighting during night time, bass could be rendered more prone to being scooped up with hand nets whilst snorkelling. At this stage it seemed that we needed a breakthrough in selective removal to eradicate the remaining, more evasive non-juvenile bass.

I thus went to work collecting detailed data of fish removal (time of effort, time of catch, locations, fish sizes etc.) to get an indication of catch per unit effort for day and night comparison. I also tried to spread the times of removal effort evenly over the three five-day sessions in order to make statistical comparisons of manual removal success. We had time on our hands so we worked through the river in more detail (including riffles) than before and snorkelled the rehabilitation section (2.2km<sup>2</sup>) two times during each of these 5-day sessions.

### **Results of five-day sessions:**

In-water removal effort during five-day sessions was an average of 19 hours per session. 34% of the in-water removal effort occurred during night time conditions (19h00 – 06h00). A total amount of 51 spotted bass were removed. During the first five-day session we removed 37 bass, the second five-day session we removed 12 bass and the third five-day session we removed 2 bass. This gives an average of a 75.45% drop in numbers between consecutive five-day sessions. The first and only juveniles of the last spawning season were spotted at their 'nest' during the first five-day session. These fish seemed oblivious to human presence and were scooped out equally easily during night and day conditions. Non-juvenile ( $1 \leq$  year old bass) fish amounted to 52% of the total number of

bass removed. 70% of non-juvenile bass were scooped out during night time with the use of underwater lights and hand nets.

## **Conclusion**

With results indicating a radical decline in spotted bass numbers and 70% of the total amount of non-juvenile fish removed during night time conditions, I conclude that these three sessions have heavily impacted on the last of the spotted bass (if not totally exterminated) and that my hypothesis relating to night time removal efficiency, could have been proven valid.

## **Suggestions**

Future monitoring for spotted bass in the Thee River should take place before the end of the winter and during the next season to get an indication on whether there still are bass and if there are, it could help to find out where they come from. If more than one or two bass are found one must look at invasion pathways such as possible back waters which stock the river after periods of rain and high flow or whether the lower weir is solid as a barrier against the upwards migration of bass or humans etc. The river vegetation must be opened up strategically at selected places to increase ease of accessibility and reduce wear and tear to wetsuits and other gear such as backpacks. (Possibilities of making a fish friendly viewing pathway for keen fish lovers who want to see a plethora of indigenous fish could be discussed (bearing in mind that wetsuits could be a source of EUS)). Vegetation clearing must be done by trained specialists who leave natural perching places for birds, enough cover for the fish, frogs and insects and cut down nothing more than that which needs to be cut for accessibility. A permanent weir should be built which should remain migration-proof against bass which migrate from downstream until means can be found to rehabilitate the main stem of the Olifants River.

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