

Project Update June 2009

The Cape Floristic Region (CFR) of South Africa has long been renowned for its floral diversity and high level of endemism. More recent genetic studies have also revealed that all the major fish genera of the CFR have species complexes, suggesting that this region harbours much higher fish diversity and endemism than previously thought. For purposes of effective biodiversity conservation and management, an improved understanding of the phylogeography and ecology of the CFR's ichthyofauna is a fundamental prerequisite. The gap in our knowledge and the rapid decline of native fish species within the CFR provided ample motivation for the initiation of a comprehensive study of the Breede River system and other coastal rivers in the south coast of South Africa. Three major field surveys were conducted between November 2008 and May 2009, a period of low and relatively stable water levels, to collect tissue samples for genetic analysis, collect ecological and environmental data, map species distribution and estimate population sizes as well as determining potential threats to the species' future survival. A total of 172 sites from 58 rivers were sampled within the Gourits, Goukou, Duiwenhoks and Breede river systems as well as coastal rivers of the Agulhas Plain. Preliminary results suggest a non-random pattern in the distribution of the fishes along the longitudinal gradients of the rivers, as found in other riverine fish communities elsewhere.

This result provides a basis for developing effective conservation and management programmes in a catchment where complete abstraction of water and habitat degradation are some of the major threats to the species' survival. Predictions of more extreme events under climate change situations makes knowledge like this even more necessary. Preliminary results from genetic analysis have revealed presence of unique lineages within the three genera, *Galaxias*, *Sandelia* and *Pseudobarbus*. More new populations of the species within these genera have been found and mapped. While many of the new lineages appear to have very restricted ranges, it appears as if some of the lineages have managed to maintain a very wide range despite the current isolation of the river systems by marine and terrestrial habitats. The integration of the species' ecology and genetics in this study provided a basis for developing testable hypothesis about the possible mechanisms that facilitated the dispersal of these primary freshwater fishes to currently isolated river systems. However, larger sample sizes are needed to develop more robust conclusions.

Genetic analysis is in progress and two major field surveys are planned during low flows between October and December 2009 to fill in missing gaps. The study has successfully initiated public participation through engaging the local stakeholders (mainly the wine farmers through the Wine and Biodiversity Initiative) and working closely with researchers from CapeNature. This collaboration and engagement of stakeholders during the early stages of the study will inevitably increase the likelihood of success and implementation of project findings and therefore lead to positive long term outcomes.