

## Introduction

The Knysna Seahorse, *Hippocampus capensis*, is a species of seahorse which is highly endemic to a select few estuaries in the southern Cape. They are listed as endangered on the IUCN List of Endangered Species. They are the only species of seahorse found in South Africa and have been recorded only in the Knysna, Keurbooms and Swartvlei estuaries. *Hippocampus capensis* has many distinguishing features. They have prehensile tails which they use to grip onto grasses and other materials. This is how they tolerate tidal movements and strong currents. They have eyes that can move independent of each other, one looking backwards and one forward. Their heads are shaped like that of a horse. They also have the features that define them as fish: gills, swim bladder and fins. They don't have scales, rather a body covering similar to that of an insect (exoskeleton). These animals are protected by certain laws but still many of them are being removed from their natural habitat and put into aquariums, where most of them die, due to lack of knowledge about their ecology. These animals are visual hunters and require light to feed. If left in the dark for too long they will simply not eat and, thus, starve. They have no true stomachs and are, thus, grazing continually. Their diet consists mainly of small crustaceans; copepods and isopods.

These animals are also intriguing in that the males carry the babies in a true pregnancy, complete with internal fertilization. The males hold the eggs in a pouch made up of tissues with a capillary network. This network supplies the oxygen and fluids to the developing embryos. The males also give birth after two to three weeks. Only a few hours after the male has given birth, the female will deposit more eggs in his pouch.

## Study Area

The physical area studied for this project started at the confluence of the estuary where the Keurbooms and Bitou Rivers meet/ divide. The Bitou River was surveyed higher up as well, east of the N2 (between the N2 Bridge and the land formation). The largest and most dense *Zostera* beds were found further down the estuary, mainly at the base of the land formation. This land form is the last stretch of land that divides the Bitou and Keurbooms Rivers. These *Zostera* beds were deemed a good place for the seahorses to be found due to the fact that this is their main habitat type. The first study/sampling site was lowest on the estuary, in the largest *Zostera* beds that were found. The GPS coordinates for a square around the *Zostera* bed were taken. A set sample site area was not given due to the sampling being very random. The project was aimed at finding whether or not there are seahorses in the area. For this reason, the sample sites did not have to be the same size because they were not being compared. Also, the sample site sizes were dependant on the *Zostera* beds found and the beds in the different sites were different in sizes. The area on the lowest part of the estuary had a depth of approximately 1m all around. The depth would change depending on the distance from the shoreline as well as the tide. Closer to the shoreline, it would become shallower, and a higher tide would create deeper waters in all parts of the river. The water type is very much a mix between saltwater and brackish water. The Keurbooms River water was very stained by tannins. These leach into the water from trees which are situated very close to the river as well as leaves that fall into the water. Heavy rains and cold water could have affected the conditions of the river and this could have been why no seahorses were found.

Three pipefish were found, one in the largest study site and two in the second study site (up the Bitou). The areas sampled in the Bitou River were much smaller than the area sampled in the estuary. The largest sampling site was approximately.....in size, the other two approximately 10m<sup>2</sup>. As mentioned above, this was because of the difference in size and density of *Zostera* beds. In the second sampling site, two test samples were done to see if it was worth sampling. Slightly higher upstream from the Bitou River sampling site, a large

amount of bent-back shrimp was found. As this is one of the main food sources for the seahorses, the area directly below this “hot spot” for food was chosen for surveying. The third sampling site is even further up the Bitou River. This site was chosen because of word of mouth that seahorses used to be found there regularly. During the time of this project, Plettenberg Bay experienced heavy rains. This had an effect on the size, depth and shape of the Bitou River and estuary for some time. After the heavy rains, the Keurbooms River also had a few changes. There were many more sand banks and a lot of debris floating and on the river bed that was washed down. The water was also more fresh water than salt and this had a major effect on the sampling done directly after the rains. Minimal living organisms were found at all on the sampling done 2 days after the rains. As the river stabilized, more was found. During the time when the boat was unavailable due to river conditions, land sampling was done. An area was chosen close to the second sample site and sampling was done for both seahorses and food sources. These samples yielded few results in the form of organisms, the main animals found were Sand shrimp (*Palaemon peringueyi*), Longsnout pipefish (*Syngnathus temminckii*), and common estuarine fish. There were no seahorses found in the land based survey.

A map of the rivers and estuary is given below, with the general sampling areas marked out on it. Due to the changes in structure of the rivers and estuary that have happened in the years since this map was taken, it will not be 100% accurate. It does, however, give an idea of the areas sampled. The sample sites are in colour coded boxes. Also included on the map are the rivers and their direction of flow, the location of the N2 in relation to the rivers and a compass (upper right hand corner).

Figure 1: A map of the Bitou and Keurbooms Rivers/ Estuary and the areas that were sampled during the seahorse project.



## Methods and materials

The method of survey used for this project was decided upon by the two researchers – Carly Appleby and Carolina Lottino – under the supervision of Luigi Lottino. The original method used by Lockyear () was thought by some of the researchers to be too destructive for this project. So the net was changed, as well as the method of sampling. No strict guideline was used in the sampling. The sample sites were chosen for the dense *Zostera* beds that are found. The larger of the two sites is made up entirely of *Zostera*; the floor can not be seen. The initial planning for the project was broken into groups – The research, the mapping and the surveys. The research was an ongoing thing and carried on even while the surveys were being done. The mapping was completed before the surveys and was basically the GPS coordinates of the four corners of each of the sample sites. The surveys were delayed due to weather and water conditions. The sampling was done by dragging the net through various water depths and densities of *Zostera*. Two people were needed to drag the net, three people would search carefully for organisms caught in the net and one person was the scribe. Those picking through the net would call out to the scribe as animals were found and the scribe recorded all data on the survey sheets.

## Results and conclusion

The purpose of this project was to determine the presence or absence of Knysna seahorses in the Keurbooms/ Bitou River/ estuary. The results were that no seahorses were found. This, however, does not imply that they seahorses are not there. There were many problems experienced during this project. The methods used could have had an influence on the findings. The last survey took place over a much longer time period, it had many more team members looking for the seahorses under water through goggles. However, the sampling was done in the same way in each site and the data were recorded in the same way for each sample.

## Team members

There were three main members on the project who were involved in everything from the planning and project proposals to the sampling and report writing. A few of the ORCA Foundation volunteers would assist in a sample (on occasion).

Listed below are all of the participants and their roles throughout the project:

- Carly Appleby – Research, project proposal, GPS mapping, transportation to and from river, data sheet design, sampling, all scribing and report writing.
- Carolina Lottino – Research, project proposal, GPS mapping, data sheet design, sampling, boat driving, summary writing.
- Sean Samer – Research, GPS mapping, sampling, assistance on boat (anchor, managing equipment etc.).
- Luigi Lottino – Sampling, mentor for students doing project, net construction.
- Cassandra Cardiff – Sampling.
- Tracy Meintjes – Mentor to students doing project, project supervisor, boat familiarization with students.