

Project Update: July 2015

The first thing you learn about the sea is ... not to rush it ... Unseasonably large swell rolled into False Bay this past summer, accompanied by the howling south-easterly winds more typical of the season. This makes working at sea with heavy equipment, winches and infinitely breakable cameras tricky – and means that you have to keep a beady eye on the forecasts at all times (not, of course, that the forecasts prove accurate all the time!)

Eight transects were conducted across False Bay, resulting in over 300 photographs of the seafloor that I will use to investigate the distribution of key invertebrate groups in the region. These photo samples were achieved by lowering a steel frame equipped with a downward-facing GoPro camera (set to photo-time-lapse) to the seafloor, where photographs were taken at set intervals. The GoPro sits in a customised housing that can go to 250 m depth, and once the camera has taken photographs of the seafloor for 30 seconds at one point along the transect, we haul it to the surface, steam 185 m further and then lower it again – and so the process repeats itself, for several kilometres along a single transect. I try to work from shallow to deep sites, moving against the depth gradient of the bay.

This is the starting point for my project: the marine invertebrates (think of groups of species like anemones, sea stars, mussels and octopuses) are key prey items for many fish in the same region. Understanding their distribution gives insight into the patterns of fish distribution in the bay. Some of these invertebrates (such as the West Coast rock lobster *Jasus lalandii*) are also targeted commercially and require ongoing monitoring to understand changes in their population size and distribution over time.

Here are some photos from field data collection:



Left: Our “jump camera” – a custom-made steel frame with a downward-facing camera to capture images of the seafloor and the invertebrates inhabiting the region. **Middle:** Fieldwork volunteers steady the jump camera between deployments. **Right:** A jump camera selfie – the view from the camera as we check between deployments that all is still operational.

Objectives

1. *Use stereo - BRUV and jump cameras to survey the relative abundance and diversity of invertebrates in False Bay. This will be used as a method-development phase for coastal invertebrate monitoring and will represent the first photographic/film record of benthic animals in False Bay.*

Fully achieved - First GoPro jump camera survey of False Bay. 400 photos achieved over eight transects. Sampling methodology pioneered for South African temperate waters. These data form PhD Chapter 2 and will contribute to a scientific paper.

2. *Use stereo - BRUV to survey the relative abundance, diversity and size measures of fish in False Bay.*

Partially achieved - Survey is currently underway and will be completed by August 2015. Pilot deployments completed in 2014 with the Department of Agriculture, Forestry and Fisheries (DAFF) on *RS Ellen Khuzwayo* and in 2015 on *Sargasso*.

3. *Establish biotopes for False Bay based on invertebrate and ichthyofauna data, and determine the relevance of these biotopes as a proxy for biodiversity monitoring.*

Partially achieved - This forms Chapter 4 of the PhD and is earmarked for completion in 2016. Datasets for Chapters 2 and 3 (above) need to be collected before this section can be analysed.

4. *Establish the extent to which fishing activity and anthropogenic pressures on biodiversity correlate with biotopes of conservation importance.*

Not achieved - This forms the final chapter (Chapter 5) of the PhD and is earmarked for completion in 2016.

5. *Use stereo - BRUV data in a regional conservation plan to establish management and conservation scenarios for False Bay.*

Partially achieved - This and the objective above form part of the same, final chapter (Chapter 5) which is earmarked for completion in 2016.

As per the original application, this is a PhD project: "I intend to start my PhD project in 2014, which will run for 3 years. This period will serve to address several key conservation issues, but it will also allow me to continue my awareness work and expand on my education projects" (excerpt from original application). The delays listed below slowed initial progress but the overall project has remained on course.

- a. Delays in the implementation of fieldwork were as a result of particularly difficult and dangerous ocean conditions in False Bay in 2014 and early 2015. Unseasonably large swell in summer 2014, combined with typical high wind conditions, reduced sea-going opportunities. Field surveys were still achieved, but over a longer time period. This required careful monitoring of suitable field conditions.
- b. Much of 2014 was spent constructing the support equipment necessary to conduct fieldwork. Delays in the capstan-winch construction and vessel seaworthiness tests for the South African Maritime Safety Authority (SAMSA) slowed fieldwork, but made sure that fieldwork could be achieved safely and sustainably once going. As a

PhD project, the work is spread out over three years and therefore, careful set-up in the first year is critical to ensuring the work can be conducted adequately over the project duration.

Outcomes

- a. The first remote imagery survey of benthic, macro-invertebrates in False Bay. This is also one of the pioneer projects to test a new system of conducting seafloor photo-surveys, using a “jump camera” and its first application in South Africa. The dataset achieved will update previous surveys conducted in the 1950s and will highlight vulnerable species and regions of the bay. 400 photos have been collected, analysed and archived for reference.
- b. The first stereo-BRUVs survey of ichthyofauna in False Bay is currently underway. This builds on a growing dataset of video footage for fish in the region, which contributes to ongoing management recommendations and conservation planning.
- c. Future outcome (2016): A conservation plan for the False Bay region based on updated biodiversity information collected using only non-extractive, remote imagery techniques.

Beneficiaries

- a. Training opportunities provided for South African National Parks (SANParks) Table Mountain National Park scientific services (Mbulelo Dopolo) and interns. This project forms part of the ongoing development of sustainable, non-extractive means of marine monitoring in South Africa.
- b. Education around reef fish and shark vulnerability and fisheries sustainability to False Bay residents through public talks, publications and social media.

Future Plans

By virtue of being a PhD project, this work will run for a minimum of 3 years. The hand-in date is earmarked for 2017. This will result in 1) a PhD thesis and 2) scientific publications. However, my involvement in the region in the long-term (I have been working in False Bay since 2012) means that there are plans to 1) make remote imagery monitoring an annual programme for SANParks and management authorities (I am currently underway with making this achievable) 2) involve student groups such as the Organisation for Tropical Studies (OTS) in smaller, ongoing research projects in the region that are based on my findings and recommendations. Moreover, significant efforts in public awareness based on my project mean that I would like to 1) continue to generate film and photographic work that highlights conservation issues in the region and 2) run programmes in public awareness through talks and publications. The current work has already raised several issues; including, enforcement of the current MPA by management agencies, education and attitudes of fishermen (commercial and recreational) in the region and conflict with non-extractive users of False Bay. Therefore, I envisage another 2 years of work on the PhD and thereafter, the translation of the findings into management and public awareness. All this work is also tied into coast-wide research that I am involved with as part of the South African Environmental Observation Network (SAEON) and so the integration of remote imagery research is planned

for the long-term in South Africa.

The completion of this PhD by 2017 is the primary objective, and the most important step at this stage. This means that the remaining two chapters will be written up in 2016, after all field data collection is completed in 2015. For this, all remaining funds will be utilised. More broadly, the next step will be to integrate my findings into management recommendations and the planning of SANParks for the region. From an education perspective, the next step will be to solidify the place of content on reef fish and sharks in False Bay in awareness programmes and in the media locally.

Sharing Results

Scientists and resource managers:

- a. **Scientific publications** – at a minimum, each PhD chapter will form a publication.
- b. **Talks and training** – ongoing training on our research vessel *Sargasso* by hosting interns and scientific services (currently underway).
- c. PhD thesis to meet the requirements for graduation at the University of Cape Town.
- d. Conference presentations – registration at relevant conferences. Those already attended are listed below. It is expected that I will present at two more conferences in 2015 (Symposium of Contemporary Conservation Practice and the Southern African Shark and Ray Symposium) and a new list of conferences for 2016 and 2017 will be decided later this year.

Public awareness:

- a. **Film** (<https://vimeo.com/laurendevos>) in conjunction with film-partner Otto Whitehead (<https://twitter.com/ottowhitehead>)
- b. **Social media** (https://twitter.com/lauren_de_vos and the Save our Seas Foundation social media channels for the on-going transmission of content to public)
- c. **Photography** (<https://twitter.com/jorisvanalphen> for the Save our Seas Foundation Summer 2015 magazine “Fighting for Reef Fishes” by way of example)
- d. **Public talks** (a list of talks to date is available below)

The Rufford Foundation logo is placed on every PowerPoint presentation and funding acknowledgements page, and is mentioned as a funder, at every talk given. A list of talks where the Rufford Foundation was acknowledged to date is available below. Several more talks and two more conferences are lined up for 2015:

Scientific conferences:

- DE VOS L, WATSON R, SANGUINETTI C, ATTWOOD CG, GÖTZ A. Baited remote underwater video system (BRUVs) survey of the relative abundance and seasonal diversity of ichthyofauna in False Bay. 15th Southern African Marine Science Symposium, Stellenbosch, 15th -18th July 2014.
- DE VOS L, WATSON R, GÖTZ A, ATTWOOD CG. A first baited remote underwater video system (BRUVs) survey of the seasonal diversity and relative abundance of chondrichthyans in False Bay, South Africa. Sharks International Symposium, Durban, 2nd - 6th June, 2014.
- DE VOS L, ATTWOOD CG, GÖTZ A, BERNARD ATF, WINKER H, PARKER D. Cameras for

conservation: using BRUVs for a new sea view. Aliwal Shoal Marine Protected Area Forum, Kwa-Zulu Natal, South Africa, 11th -14th Feb 2014.

- DE VOS L, BERNARD ATF, GÖTZ A AND ATTWOOD CG. 2015. Mapping biodiversity in False Bay: integrating underwater camera technology into marine spatial planning. Rufford Small Grants Conferences Southern African Conference Proceedings. Kirstenbosch National Botanical Gardens. 16th -17th April 2015.

Public awareness:

- DE VOS L. A new age of exploration. PROBUS. Westlake Golf Estate. 9 March 2015.
- DE VOS L. (ongoing) Save our Seas Foundation Shark Education Centre Marine Explorer's Club.
- DE VOS L. What underwater cameras reveal about False Bay, Wild Card Magazine Event. 15th October 2014.
- DE VOS L, WHITEHEAD TO, BENJAMIN AS. *Coast*. Film Premiered 15th October 2014.
- DE VOS L. Sea View. Film Premiered 15th October 2014.
- DE VOS L. Workshop host: SANParks MPA rangers snorkel day with I AM WATER ocean conservation trust, 17th October 2014.
- DE VOS L. False Bay on Film, Muizenberg Festival Science Talks, 9th October 2014.
- DE VOS L. An Ocean Safari. Oakhill Primary. Talk in collaboration with UCT Ma-Re. 23rd Sept 2014.
- DE VOS L. An Ocean Safari. Sun Valley Primary in collaboration with UCT Ma-Re, 22nd Sept & 23rd Sept 2014.
- DE VOS L. An Ocean Safari. Islamic Home School. Talk in collaboration with UCT Ma-Re. 18th Sept 2014.
- DE VOS L. Shark Spotters snorkel day & lecture with I AM WATER ocean conservation trust, 22nd August 2014.
- DE VOS L. South African marine science. I AM WATER conservation trust lecture, 25th Apr 2014.
- DE VOS L. The Life Aquatic. SciFest Africa National Science Festival Lecture Series, 1820s Settlers National Monument, Grahamstown, South Africa, 13th March 2014.
- DE VOS L. SciFest Africa UCT Ma-Re DiscoverSea Tent, 11th – 19th March 2014.
- DE VOS L. Cape Town Environmental Education Trust, 25th Feb 2014.
- Conferences & functions
- EZEMVELO KZN WILDLIFE SYMPOSIUM OF CONTEMPORARY CONS. PRACTICE, Howick, 3rd -7th Nov 2014.
- 15th SOUTHERN AFRICAN MARINE SCIENCE SYMPOSIUM, Stellenbosch, 15th -18th July 2014.
- SHARKS INTERNATIONAL SYMPOSIUM, Durban, South Africa, 2nd -6th June 2014.

- ALIWAL SHOAL MARINE PROTECTED AREA FORUM, Aliwal Shoal, South Africa, 11th – 14th Feb 2014.

Comments

The project is well underway and, despite difficult field conditions in 2014 and early 2015, is expected to carry on and achieve the objectives outlined. Funding from the Rufford Foundation has been crucial in getting this project off the ground successfully, and the remaining funds will be used to complete fieldwork this year and continue the awareness work initiated. Additionally, my attendance at the Rufford Foundation conference in Cape Town was a particularly rewarding experience. Connection to a funder that supports a wide variety of conservation scientists facilitates networking and the establishment of a vital support base. I have found this a highly rewarding network to be a part of, and look forward to moving my project forward. I intend to keep the Foundation updated on progress until all the funds are used and, even though this is a three---year project as opposed to the typical one---year funding cycle for projects supported by the Foundation, it will be worth tracking the progress of this project to its full completion at PhD submission.