

News from the Field:

Ben Taylor and Adam Southern

Saudi Arabia: Pollution impacts of the Al Lith Aquaculture Facility

Ben Taylor and Adam Southern conducted an investigation of pollution impacts of the Al Lith Aquaculture Facility, using invertebrate indicator species, as part of their MScs in International Marine Environmental Consultancy at Newcastle University



Tridacna sp found along transect

Aquaculture production is currently increasing to meet global food demands. However aquaculture facilities are known to produce by-products known as fish farm wastes (FFW), consisting of unconsumed food and fish excreta. These FFW can be a major source of pollution when released as effluent into the natural environment.

The study I conducted with the support of the KAUST and the TAA focused on the National Aquaculture Group (NAQUA) facility near Al-lith, Saudi Arabia. NAQUA is one of the largest aquaculture facilities in the world. It produces an estimated 35,000t yr⁻¹ of shrimp *Litopenaeus vannamei* in 250km² of inland marine lakes. The aims of the project were, firstly to conduct a baseline study of benthic mega invertebrates in the reefs of the Al-lith bay. Secondly, to investigate use of two separate invertebrate indicator techniques, to assess whether any differences between the sampled reefs could be attributed to NAQUA's FFW effluent. The first indicator was a scuba diving based visual population census recording any invertebrate >5cm long; the second indicator was a stable isotopic analysis of carbon and nitrogen taken from the tissue of specific invertebrates.

In brief, the study provided the baseline of benthic mega-invertebrates distribution in the region of Al-lith, enabling future secondary studies and further monitoring. The combination of the two indicators,

stable isotopes and population census techniques, indicated spatial differences between the invertebrate communities centred on the site closest to NAQUA effluent. Furthermore, a majority of the results coincided with previous investigations which described FFW impacts on invertebrates, which suggests that marine invertebrates may be impacted by NAQUA effluent. Although the study did not directly investigate the effect of the aquaculture facility on the local community, anthropogenic pollution impacts the surrounding environment, hence it can be detrimental to dependent communities. For this reason it is important that potential sources of pollution are rapidly and effectively assessed, to allow for the appropriate remediation and mitigation of impacts, for the environment and the community that it supports.

Overall the project provided me with valuable consultancy and field experience, which not only taught me useful new research, organisation and leadership skills, but also gave me the ability to deal with new challenges. One of the major obstacles faced during the project was the lack of scientific documentation on the invertebrates inhabiting the region prior to conducting the fieldwork. Overcoming this challenge through a flexible methodology and exchange with project partners gave me a new found confidence in my scientific abilities, allowing me to achieve aspired targets through hard work, adaptability and determination which will be essential for my career. Conducting the research in Saudi Arabia gave me a unique, raw and truly wild experience of the Red Sea, especially when we were exploring potentially virgin reefs or diving with whale sharks, as well as invaluable moments sharing cultural exchanges with the local people. Thank you once again to the TAA for making this possible.

(Ben & Adam)