

2017 Small Grant in Aid of Research – Annual Summary Report

Pursuing food and dealing with its cost: a fine-scale study on the foraging ecology of South African Inshore Bryde's whales.

Awardee: *Gwenith S Penry, Nelson Mandela University, Port Elizabeth, South Africa; gwenpenry@gmail.com*

Project collaborators: *Jacopo di Clemente (Accademia del Leviatano), Dr Paolo Segre (Hopkins Marine Station of Stanford University), Shirel Kahane-Rapport (Hopkins Marine Station-Stanford University).*

Summary Report

The prey type, energy requirements and foraging strategies of the inshore South African Bryde's whale are unknown. There are several threats to the survival of this small (~ 600) population; entanglement in coastal fishing gear, reduced prey availability and climate induced shifts in the marine ecosystem. This project aimed to test the viability of using suction-cup attached data loggers (Customised Animal Tracking Solutions, CATS) containing synchronised video and movement sensor technology to determine the foraging strategies, kinematics and use of the water column over different spatial and temporal scales. The long-term outputs from the data will be used to mitigate entanglements in coastal fishing gear through a better understanding of the depths and frequency of Bryde's whale foraging, inform catch quotas for small-pelagic fish based on calculations of the energy requirements of the whales, and to perform a comparison of balaenopterid whale kinematics.

Fieldwork was conducted between the 14th and 28th of April 2018 in Plettenberg Bay, South Africa, on sea state ≤ 3 . CATS were deployed using a 6 m carbon fibre pole from a 7.5m rigid-hulled inflatable boat. Identification photographs and associated data of the individuals encountered and tagged were collected.

A total of 64 hours and 734 km of effort was conducted on 12 sea days. We encountered 16 different individually identified Bryde's whales and successfully deployed and retrieved 7 tags. The length of tag deployment ranged from 3 – 20 hours and all deployments provided usable data to analyse. This includes data on speed, depth, acceleration, and underwater manoeuvres. Continuous video footage for the duration of the deployment was also recorded on the tag cameras, allowing for visual confirmation of feeding behaviour at various depths, prey types, and the movement of control surfaces.

Preliminary analyses of the tag data show that Bryde's whales dive to depths of 100 m, often performing lunges at depths of 60 m in a repeatable pattern characterized by high jerk and lateral rolls. The tag data also revealed that the Bryde's whales spend a significant time searching in-between lunges, and make many attempts at chasing prey before opening their mouth. This suggests that whales living in Plettenberg Bay may have high foraging costs. This information was not previously known and will allow for exciting new discoveries about this population. The identity of the prey being consumed at depth is still to be determined.

A manuscript is in preparation for publication in a peer reviewed journal and the results will be presented at the 2019 SMM conference in Barcelona.

We are grateful to the SMM for awarding this funding that contributed to a very successful field season and has enabled us to pursue the future continuation of the project.