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Title: Interannual changes in the distribution, biomass and life history dynamics of the Channichthyidae around the sub-Antarctic Island of South Georgia.

Supervisors: Dr William Reid, Dr Martin Collins* and Dr Phil Hollyman* (*British Antarctic Survey)

Framework: the first semester October-December inclusive is largely taken up with taught modules, however Covid-19 contingency planning means the first three weeks of October in 2020/21 academic year will provide opportunities to begin planning the main project (MST8025). This preparation will be completed by early March (including formal proposal for summative assessment), data gathering and analysis will be in the period March-June, with July to mid-September devoted to writing up. The main outputs are a research paper, a literature review and oral presentation due by mid-September. The research paper is assessed by External and Internal Examiners who are not involved in project supervision.

Duration of Research Project: preparation during October-February, intensive work during January-September 2021.

The Project: Managing marine environments requires a detailed knowledge of life history processes and how species respond to environmental fluctuations. Global climate change and large-scale climate oscillation are known to have an impact on the distribution of marine species. The impact of these large-scale processes is not uniform across the marine environment which has resulted in regional "hotspots" being identified where species may be at more risk. The sub-Antarctic island of South Georgia is home to an endemic fish fauna which is at the extreme of their physiological range and is one of the fastest warming marine environments on the planet. The family Channichthyidae or ice-fish show a unique adaptation to the polar environment through the loss of haemoglobin, making them susceptible to future warming. The main objective of this project is to investigate the interannual changes in the distribution, biomass and life history processes in relation to environmental variables (e.g. sea surface temperature, surface primary productivity) in the 3 closely related species of icefish, *Chaenocephalus aceratus, Champsocephalus gunneri* and *Pseudochaenichthys georgianus* (Fig. 1). These occupy different ecological niches and will potentially respond to environmental fluctuation in different ways. The project will use data collected on the ground fisheries surveys around South Georgia over the last 30 years and larval fish collections from the last 20 years. The results are expected to feed into the long-term management of the commercial fisheries for *C. gunneri* and the marine environment around South Georgia.

Fig. 1: *Champsocephalus gunneri* is targeted in a commercial fisheries around South Georgia.

Eligibility: You need at least an upper 2:1 BSc degree in a relevant subject, a good understanding of statistical analysis, experience of using R and be an independent worker with good organisational skills.

To Apply: Admission to the MRes in Marine Ecosystems Research is via https://www.ncl.ac.uk/postgraduate/courses/degrees/marine-ecosystems-governance-mres/#profile with a personal statement of your career aspirations and skills you would bring to the work, CV and a proposal (including scientific rationale, objectives, methodology,

outline budget, any health, safety or ethical [e.g. animal or human subject analyses] issues and timetable). The proposal needs to be discussed with the supervisors before the application (email: william.reid@newcastle.ac.uk).