

**Title:** Characteristics of Modelling Fisheries as Socio-Ecological Complex Adaptive Systems

**Names of authors:** Alexander Holdgate and Melania Borit

Mono-disciplinary research approaches to problems arising from the fisheries sector has led to the development and implementation of atomistic management schemes. The consequence of such schemes has been a number of unintended and undesirable socio-economic and ecological outcomes (e.g. gross overfishing, fishing down of marine ecosystems, alteration of food web dynamics and volatile rent generation for fishers). To date, one-dimensional fisheries management approaches have failed to address the complex and integrated human-biological dimensions of fishery systems.

Many scientists now acknowledge that problems within fisheries have to be investigated under 'social-ecological' and 'complex-adaptive' system frameworks. As such, fisheries are being referred to in the recent literature as 'social-ecological complex adaptive systems' (SECAS). However, in order to ascertain if SECAS theory is indeed the correct framework to use in order to investigate issues within fisheries, there has to be a clear identification of the features and characteristics of fisheries that are complimentary to SECAS theory i.e. why and how the features and characteristics of fisheries lend themselves to SECAS theory.

An extensive systematic literature review is carried out to assess the compatibility of the features and characteristics of fisheries to the features and characteristics of SECAS. Subsequently, using the same research methodology, we aim to identify the most appropriate fisheries modelling techniques to be used for holistic and integrated fisheries management approaches from a SECAS perspective.

**Keywords:** Complex Adaptive System; Fisheries Management; Modelling; Socio-Ecological System; Systematic Literature Review.

**Corresponding author:** Melania Borit ,The Norwegian College of Fishery Science, University of Tromsø – The Arctic University of Norway (UiT), Norway, melania.borit@uit.no