

VULNERABILITIES OF A SOCIO-ECOLOGICAL SYSTEM TROUGH THE LENS OF A BIO-ECONOMIC MODEL

Emily Quiroga and Benjamin Blanz

October 11, 2021

Abstract

We develop an analytical framework to assess the vulnerabilities of a socio-ecological system (SES) and apply it to a bio-economic model. Our framework allows us to quantify the impact that multiple drivers or benefactors have on an SES. It also enables us to distinguish between impacts of positive and negative exposures in an SES. This distinction allows us to find the effects that improve well-being, as well as those that decrease it. Our findings provide insight into how to focus resources to counteract negative impacts. We apply this framework to a bio-economic model calibrated to the North Sea flatfish fishery. We quantify the vulnerabilities of fishers' profits to multiple drivers and benefactors and identify which of them have the most impact on profits. Our work forms a bridge between the multidisciplinary area of vulnerability assessment and the bio-economic modelling domain, fostering an interdisciplinary research that helps to increase the understanding and knowledge regarding the concept of vulnerability.