May 10, 2016

Dear Dr. Wible,

We are writing to gauge your interest in a manuscript we are preparing for consideration as a Policy Forum in *Science*. We present a new way to quantify the adaptive capacity of coupled natural-human systems and our work, which focuses on coastal fishing communities on the US west coast, is directly aimed at operationalizing new policies for sustained economic growth based on the use of natural resources.

We believe this piece could change the way coupled natural-human systems are governed. It introduces a tractable, generalizable method to quantify the complexity and adaptive capacity of the social and ecological components of food systems. This contribution is analogous to the first depiction of a food web by Darwin centuries ago. Now, we depict the “tangled bank” of socio-economic interactions, revealing the human connectivity in the food webs from which we extract living resources. In this piece, we use our novel research as a springboard to discuss new policies aimed at sustainable natural resource use, accounting for the connectivity of socio-economic systems. It uses US west coast commercial fisheries as a case study, demonstrating how our novel method can facilitate informed planning for, and responses to, environmental and economic shocks such as natural disasters, large-scale market setbacks, and climate change. While policy makers have made great steps to account for natural complexity—for example, the US Endangered Species Act recognizes that critical habitat is essential to recovery planning—there is a gaping hole in our ability to do so for social systems. This work begins to close that gap.

This piece is particularly suited to *Science* for several reasons. (1) At this time, **national and international marine ecosystem-based fisheries management policies** are being implemented, calling for the design of fishery ecosystem plans but remaining surprisingly silent on how to link fishermen, fisheries, and fish stocks in order to encourage thriving social and ecological systems. (2) Our methods for quantifying the connectivity of socio-economic systems, while novel, use existing data. Hence our approach can be **quickly adopted** by government agencies tasked with policy design. (3) The **key innovation** of this piece lies in the operationalization of decades-worth of Complex Adaptive Systems theory applied to coupled natural-human systems, moving beyond theory to practice in clear and targeted ways, aimed at improving the governance of social and ecological systems in the face of human population growth, technological advances, and global climate change.

We hope that this brief introduction to our work will give us the opportunity to submit a manuscript for review and we welcome any questions.

Yours sincerely,

Emma Fuller1,

Jameal Samhouri2,

James Watson3,

and Simon Levin1

1Princeton University, USA

2NOAA, Northwest Fisheries Science Centre, USA

3Stockholm Resilience Centre, Sweden