

A choice experiment application to estimate willingness to pay for controlling excessive recreational fishing demand at the Sundays River Estuary, South Africa

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ABSTRACT

The Sundays River Estuary, situated in the Eastern Cape, South Africa, has excessive recreational demand for estuarine services, specifically recreational fishing. The estuary has been over-fished, putting its sustainability at risk. Various management interventions may be required in order to save it, but how is this to be done without reducing welfare? The main aim of this paper is twofold: first, to assess and comprehend the economic value of the estuarine resources at stake; and, second, to propose policy measures to redress the situation (excessive demand, specifically recreational fishing). An application of a choice experiment reveals that the physical size of fish stocks is a very important predictor of recreational choice at the Sundays River Estuary, and it is recommended that demand be curtailed through an increase in the boat license fee for using the estuary of ZAR174 per annum.

Keywords: Estuary, demand management, recreational attributes, recreational fishery, choice experiment

INTRODUCTION

The Sundays River Estuary, situated on the east coast of South Africa, is a dynamic ecosystem that provides a host of services, particularly recreational, but excessive demand for some of these services has disturbed the balance within the system (Day, 1980). Nowhere is this more apparent than with respect to the fish stocks (Wooldridge, 2010). Three main species are targeted in the Sundays River estuary: the spotted grunter (*Pomadasys commersonii*), the dusky kob (*Argyrosomus japonicus*), and the white steenbras (*Lithognathus lithognathus*). The stock status of the dusky kob and white steenbras is believed to be collapsed, while the stock status of the spotted grunter is considered over-exploited (Cowley et al. 2009). The most recent research available on the adult dusky kob population suggests that it is between 1 and 4.5% of the non-impacted (original) population, a level that could be below the recovery threshold for this species (Griffiths, 1997). The populations of these species have declined radically during the last decade due to the popularity of the Sundays River Estuary for recreational fishing. The drop in the fish stock population numbers makes these three species particularly vulnerable, jeopardising their sustainability in the long-run.

In order to restore the targeted fish species to a level where harvesting is equal to maximum sustainable yield, management has to be aware of the choices that recreational users make when visiting this estuary (Hay et al. 2008). The Sundays River fishery faces a trade-off between the short-run (current) human recreational predation demands for targeted fish in the estuary, and the need for sustainability of the fishery into the long-run. Management intervention, through the use of an

appropriate mechanism, is required in order to control recreational demand, and allow the fishery to replenish.

The aim of this paper is to contribute to this management intervention by assessing the economic value of the recreational resources at stake at the Sundays River Estuary and recommending policy measures to redress the situation (specifically, excessive recreational fishing). The aim is achieved through the application of a choice experiment (CE).

The biophysical and socio-economic characteristics of the Sundays River Estuary

The Sundays River Estuary (33°43' S, 25°25' E) is situated in the Eastern Cape, South Africa, approximately 40 km northeast of Port Elizabeth (see Fig. 1). The estuary is approximately 20 km long, and permanently opens and discharges at Algoa Bay, into the Indian Ocean (MacKay and Schumann, 1990).

The Sundays River Estuary contains 2 types of microalgae, namely phytoplankton and benthic microalgae. Phytoplankton forms the base of the food chain in the estuary (Unit for Integrated Environmental and Coastal Management: IECM, 2010). The most dominant vegetation types found in this estuary are reeds and sedges, which cover an area of 29 ha (IECM, 2010). Extensive salt marshes are precluded because of the narrow channel-like morphology of this estuary. The salt marsh covers an area of 21.7 ha (IECM, 2010). Submerged macrophytes include pondweed in the upper reaches and eelgrass in the lower reaches of the estuary. Twenty zooplankton species can be found in the Sundays River Estuary. Ichthyoplankton (fish larvae) also forms part of the zooplankton and 17 species from 11 families can be found in this estuary (IECM, 2010). Despite the limited area of mudflat available in the estuary, mud prawn (an example of invertebrate macrofauna) can attain high densities in localised areas (IECM, 2010). The Sundays River Estuary has a high fish species richness – 51 species representing 27 families of fish have been recorded (Cowley et al., 2009). Marine migrants make up 53% of the total number

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