

Title of abstract: Trap fishers' perception of changes in coral reef ecosystem services

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Background:

Tropical coral reefs are changing under the pressure of on-going human activities and these changes are likely to continue. However, reefs also underpin important benefits, known as ecosystem services, which contribute to the wellbeing of millions of people. Ecosystem services are born out of the interactions between social and ecological systems and therefore understanding how they respond to current ecological and social change is likely to be complex. Knowledge in this area will however be essential in jointly managing for functioning coral reef ecosystems and human wellbeing. Specifically, how people perceive changes in ecosystem services can influence the decisions that they make with implications for reef condition. To date few studies have investigated how people perceive changes in coral reef ecosystem services and to what extent those changes matter. This talk will present research from the Seychelles to explore the following questions: 1) have, and if so what, changes do coral reef fishers perceive in ecosystem services; 2) do perceived changes in ecosystem services affect priorities; and 3) how do social characteristics correlate with perceptions of change?

Methods:

Data were collected on the three main inhabited islands of the Seychelles (Mahé, Praslin, La Digue). Coral reefs in the Seychelles, like many in the West Indian Ocean region, were affected by large scale coral bleaching in both the 1998 (>90% mortality of live coral cover) and 2016 (>70% mortality of live coral cover) marine heat waves. In partnership with the Seychelles Fishing Authority, we conducted 51 semi-structured interviews with coral reef trap fishers to understand perceptions of change in four coral reef ecosystem services. These were fishery, coastal protection, habitat and recreation services that in previous research were shown to be relevant in this context. Interview questions also sought to capture how fishers' prioritised different services to make a comparison with a similar ranking exercise conducted in 2008 (24 interviews conducted by C.C. Hicks in the same areas in partnership with the Seychelles Fishing Authority). Questions seeking to understand levels of trust in different sources of information about the sea, as well as demographic and socio-economic characteristics of interviewees were also included.

Results:

Habitat services were ranked most important by fishers (49%), followed by fishery services (25%), coastal protection (18%) and recreation (2%). More than three quarters of the interviewed fishers identified a change as having occurred in three of these services. This equated to 78% for both coastal protection and fishery services and 75% for habitat services.

In comparison, only 59% of participants commented on a change in recreation services. Of these changes, 41% of fishers thought that those in habitat services were most concerning or important, compared to 27% for fishery services, 8% for coastal protection and 2% for recreation. There was no change in how trap fishers prioritised services when comparing, at the population level, between ranking exercises in 2008 and 2018. However, prioritisation of services was more homogenous in 2018 than in 2008 with fishers more consistently ranking habitat services first, followed by fishery services, coastal protection and recreation.

For fishery services, change was experienced by interviewees in their daily activities and as such often incorporated descriptions of ecological change, for instance that the fish were moving further out, and changes in the participants' own behaviour, for example that they had to fish in different areas. In contrast, changes in coastal protection were predominantly observed as an increase in coastal flooding and erosion with little involvement from fishers themselves. Habitat services were also perceived to have declined with changes in coral condition, algae, water quality and water temperature. Changes in recreation services were connected to changing relationships on land and the perception that people didn't socialise as they used to. However, coastal erosion was seen to have affected areas that were previously important for relaxation. Similarly, changes in habitat services were brought up in relation to changes in the fishery.

Perceptions of change were associated with different social and demographic characteristics, notably age which was correlated with perceived changes in fishery, coastal protection and habitat services but not recreation. Younger fishers were more likely to highlight changes in coastal protection and habitat services, whereas middle-aged and older fishers were more likely to highlight changes in fishery services. Engagement in other activities in the marine environment such as free-diving and scuba-diving were also correlated with perceived service changes, notably changes in habitat services. Fishers were more likely to trust their own knowledge and experience of the marine environment (92% of participants) but nearly half of those interviewed also trusted information from friends and other fishers (49%), and locally relevant official organisations (47%). They were least likely to trust information from the newspapers or other media outlets (16%) or information from the internet (10%).

Conclusions:

These results show that people are perceiving changes in coral reef ecosystem services as might be expected following widespread coral mortality. However, these changes are complex and inter-dependent. Changes were associated with factors that were both social and ecological in nature and relationships between services are likely to be important. Comparisons with historic data reveal that perceived changes have not altered how services are prioritised at a population level. However, the homogenisation of ecosystem service ranking would indicate that there has been a shift in the relative importance of services with habitat services more consistently ranked as the most important for fishers. Finally, changes in ecosystem services were perceived differently by different types of people and though fishers are likely to engage with wider sources of information about the sea, these results suggest that personal experience of change may be significantly more important. Given that many ecosystem service approaches adopt methods that capture social or ecological change, these results highlight the importance of using multi- and inter-disciplinary approaches to fully understand how ecosystem services are and will continue to change in the future. Further work should investigate how perceived changes in ecosystem services are linked to decision-making by resource users in the marine environment and the likely impacts of these changes on the wellbeing of diverse coastal communities.