

Rockpool Tourism in Watamu Marine National Park

A Rocha Kenya
Conservation & Science Report

by

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INTRODUCTION

Intertidal habitats are areas that occur between the low tide mark and the highest limit of the influence of the sea (Gladstone and Sebastian, 2009). They are affected by the tidal cycle periodically being exposed at low tide and inundated at high tide (Hutchison et al, 2010). The occurrence of these areas as interface between land and sea and having varying environmental conditions has led to creation of various microhabitats such as crevices, boulders and rock pools (Thompson *et al*, 2002). This provides niches for diverse and distinct species assemblages including different life history stages. Intertidal habitats form extensive feeding, breeding, resting, spawning and nursery areas for numerous marine animals, including fish and crustaceans, as well as birds, reptiles and mammals (Ranglely and Kramer, 1995, Bradshaw et al, 2000).

Rocky intertidal areas are easily accessed by humans (Gladstone, 2006) and have diverse and unique creatures and habitats making them appropriate passive recreation areas as well as areas for resource extractions and environmental education. Visitors' use of rocky intertidal pools for recreation purposes have been previously recorded (Murray et al, 1999, Keough and Quinn, 1998) and the effects on these habitats highlighted (Murray et al, 1999, Addessi, 1995). Local disturbances may interact with climate change impacts to alter biodiversity and act in synergy with other global disturbances, ultimately compromising both the ecological and aesthetic values of these areas. While it may be beyond our ability to control global phenomenon, we can restrict local disturbances to ensure continued provision of biodiversity and socio-economic roles of rocky intertidal platforms.

Watamu Marine National Park (WMNP) has uniquely rich and diverse stretches of intertidal rocky platforms (Figure 1) which are interspersed with sandy patches. The biodiversity that occur in these areas includes both resident and transient species that use these areas as nursery grounds for their juveniles and feeding grounds. Several studies have been carried out to document this diversity. Sindorf et al, (2013) recorded 56 species of both resident and transient fish species. Other studies have also recorded high diversity and abundance of corals, echinoderms, seagrass, seaweeds and molluscs (Sluka et al, 2013). All these studies highlight the importance of intertidal rock pools both as unique habitats that contribute significantly to the park biodiversity and perform important ecological roles as well as their potential as passive recreation sites. There are several human uses of intertidal rocky platforms in Watamu Marine National Park including access to the sea for fishing and scuba diving, educational visits and tourism. These habitats have been overlooked in the overall protection of the park, exposing them to various unrestricted human activities that may compromise their integrity and aesthetic value.

The current study aimed at assessing tourists' activities carried out in the intertidal rocky platforms in the park, describing how these activities interact with these environments and assessing the biodiversity and abundance of the target species. The output of this study will provide baseline information in developing management strategies for the park and act as a basis of other studies on marine habitats and human use interactions.

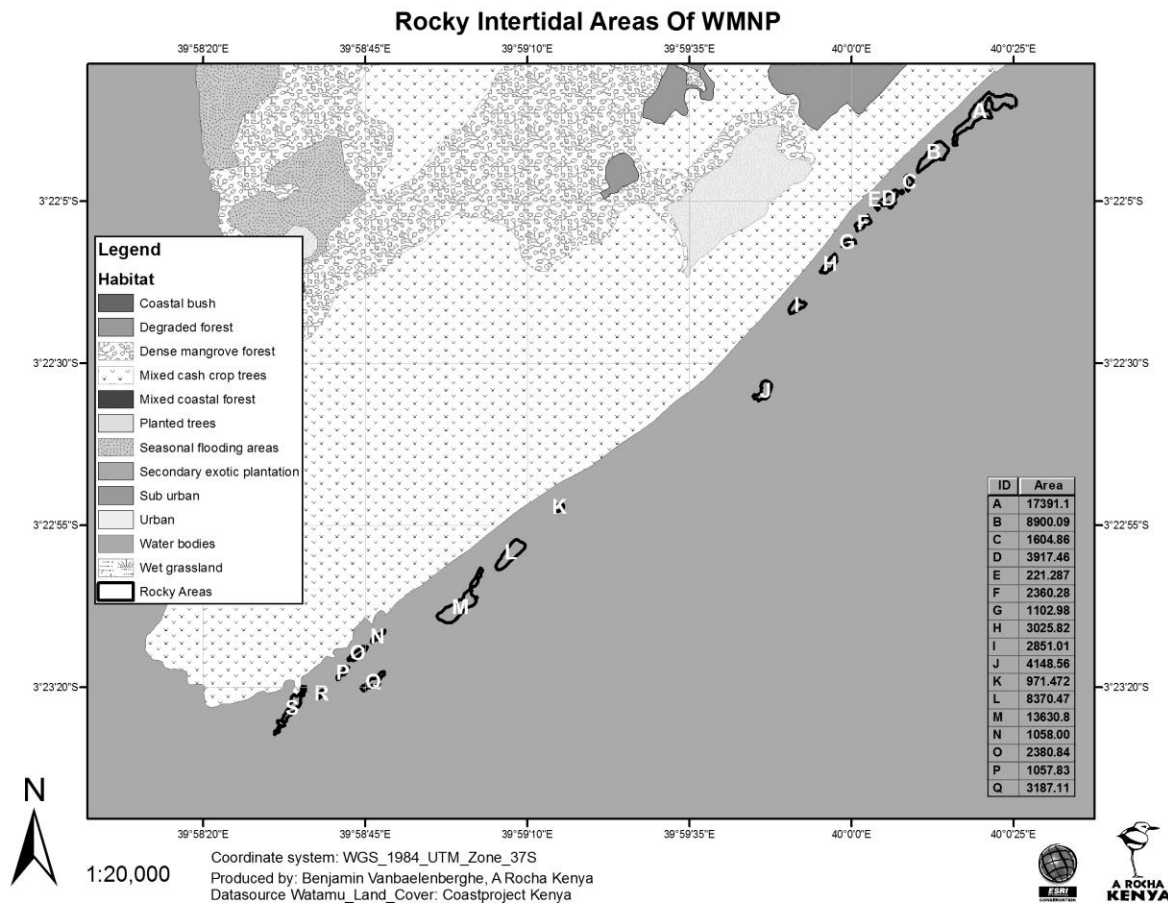


Figure 1: Rocky intertidal Areas of WMNP

METHOD AND MATERIALS

The study was carried out in four patches of rock pools; Turtle Bay (A and B), Plot 34(L and M), Garoda (N, O and P) and Rock Point(S). Participatory observation was used where investigators joined a tourist group and observed the interaction of tourist and guides with the environment noting the main tourist activities. Informal interviews with guides were also conducted. Each site was surveyed for two days for approximately two hours each day.

Ecological survey of the main target species for tourism was carried out by placing 1m² quadrat in a coordinate system using random number list. Species which were earlier identified through our observations as target for tourism were identified and placed in their main groups and enumerated. These were corals, giant clams, birds, moray eels, cowries, and starfish. Statistical analyses were performed using Microsoft Excel. All surveys were carried out during low tides when the rock pools were exposed.

RESULTS

The present survey recorded several activities that are carried out in the rock pools around Watamu Marine National park. A total of 75 tourists were observed during 8 hours of observation for all sites combined. Turtle Bay rock pools recorded the highest number of tourists and guides compared to other

sites followed by Rock Point, Plot 34 did not record any tourists or guides (Figure2). The tourists activities observed include feeding moray eels, passive and exploratory observing of rockpools creatures, touching and poking of creatures. In two separate occasions at Rock Point tourists were observed picking starfish taking pictures and return them. Guides also mentioned watching reef sharks that occasionally came to feed on the shallows sea grass beds more specifically at plot 34 rock pools. However this was not observed in this study. Species mostly targeted for tourism included moray eels, seastars, giant clams, corals, shells (especially cowries) and birds.

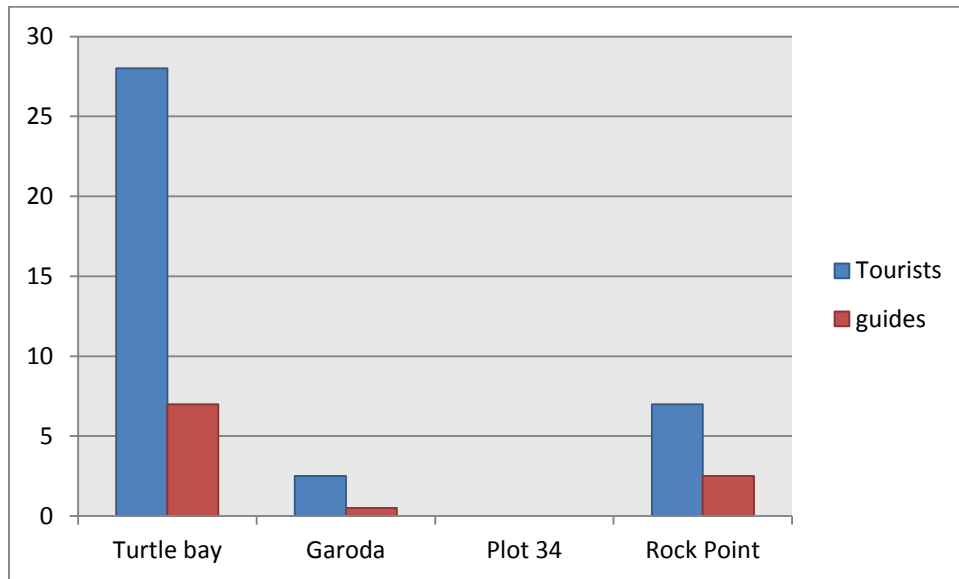


Figure 2: Mean Number of tourists per day in different sites

Tourists interacted with marine components through touching living species such as sea star and giant clams, poking and turning rocks, and feeding moray eels. Feeding moray was only observed at Turtle Bay rock pools and was recorded as the highest frequency activity (Figure 3).

A total of six target groups were recorded across all the study sites. Coral colonies were the most abundant target group that were observed across all the study sites. Rock Point was the most diverse site, recording all target species and the most individuals compared to the other sites. Garoda was least diverse, recording two target species and a total of five individuals. Starfish was the rarest target species, recorded only at Rock Point. (Figure 4)

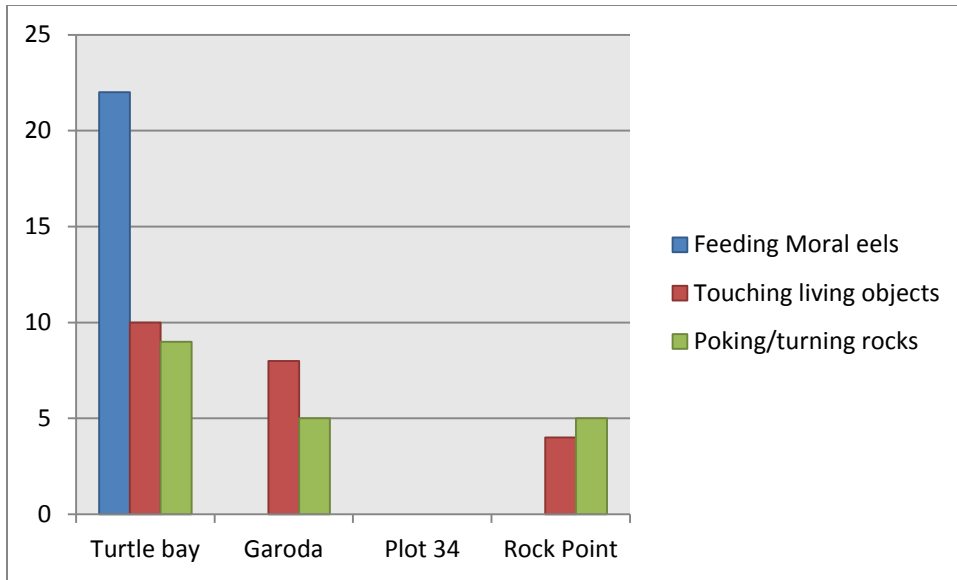


Figure 3: Frequency of tourists' interaction with rock pools

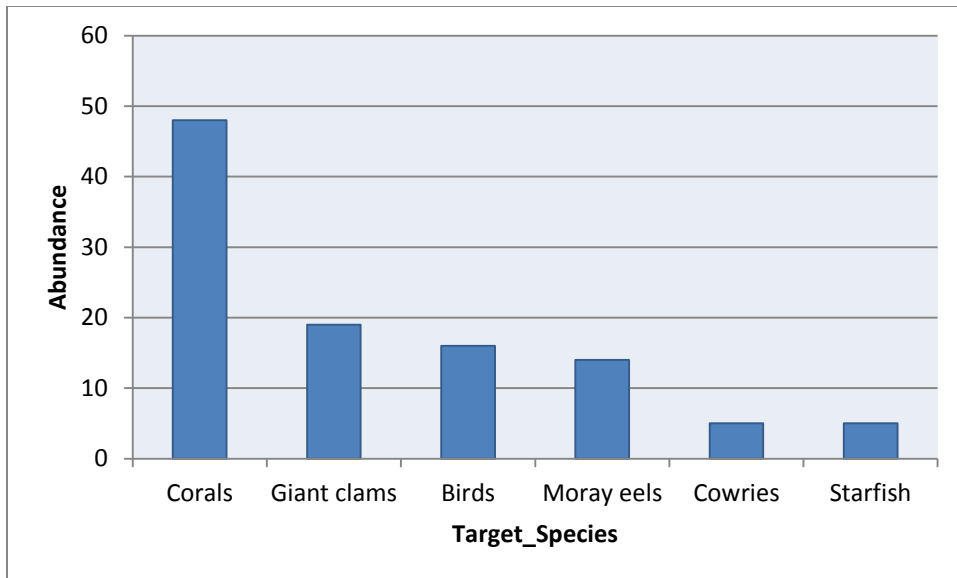


Figure 4: Total numbers of individuals sampled

Tourists and Guides perceptions

Guides take rock pool tourism just as an opportunistic activity taking tourists along showing them around, and in the process trying to sell them snorkelling trips and other terrestrial safaris. They therefore do not have designated charges and code of conduct. They have limited knowledge on the structure, diversity and processes within these habitats therefore only focussing on a few species they are well versed with. A guide also mentioned about collection and selling of seastars and shells by other guides. However, they knew that it is wrong to carry out any form extraction from the park hence always do it when they have too. Some guides were observed to know exactly where to take tourists to show them specific organisms. This was observed in viewing sea stars and moray eels. For moray eels these were mostly found congregate in few pools due to constant feeding. Three sea stars were

observed congregating near each other at Rock Point. However, it was not ascertain whether this was natural occurrence or they were pooled by guides. Tourists on the other hand enjoy rock pooling because it was easy to do, it didn't require a lot of planning, equipment and other logistics and can also be done just outside their hotels. They mainly do it away from their prior holiday plans.

Interview from curio shop vendors around Watamu indicated that most of the species sold which included molluscs shells, shark teeth and corals were not obtained in the park but outside and were brought by fishers.

DISCUSSION AND RECOMMENDATIONS

Different habitats within an ecosystem perform different ecological roles that contribute to the overall integrity of the whole ecosystem. The connectivity of marine habitats has been widely documented (Beets et al, 2003, Ogden and Zieman, 1977, Hemminga et al, 1994, Marguiller et al, 1997) and its importance in the exchange of biotic and abiotic materials (Gillanders et al, 2003). The connectivity of intertidal rock pools to other systems is evident from the presence of transient species as well as juvenile of other habitats. The current study documented various unrestricted tourists activities some of which may pose as threats to the integrity of these habitats.

Difference in tourists' number among the study sites can be attributed to proximity of a tourist hotel and the diversity and abundance of target organisms. Turtle Bay rock pools have high tourists number due to the several hotels located nearby as well as high diversity and abundance of the target organisms. Rock Point even though had higher diversity and abundance of target organisms than Turtle Bay it is isolated and therefore recorded less number of tourists. Garoda on the other hand has limited diversity and abundance of the target organisms and even though it is close to a hotel it was less visited by tourists.

Periodic disturbances due to trampling and exploratory manipulation of substrate and organisms have been reported to cause significant impact on rocky intertidal communities and populations in other locations (Murray et al, 1999). Several activities observed such as poking clams and touching corals that have potential to harm the species and eventually affect the biodiversity of these systems. The current high biodiversity and uniqueness of these areas provide an appropriate opportunity of use of these areas as passive recreation sites. However, reduction of this biodiversity will reduce the aesthetic values of these areas and therefore loss of both recreational and biodiversity functioning. Proximity to hotels was observed to affect the number of tourists that visits these areas. Promotion of pro-environment rock pool tourism to other areas across the park is recommended.

For sustained provision of rocky intertidal of both recreational and biodiversity values, there is need for the development of management strategies for the intertidal rocky platforms in Watamu Marine National Park. The management of rocky intertidal habitats could be easier than the open water due to their accessibility (Thompson et al 2002) and therefore regulation can be more easily monitored. To ensure sustainability of tourism activities and customer satisfaction it is important to develop guidelines and code of conduct, training, identification resources, and guide certification. We recommend that A Rocha's current rockpool environmental education activities for primary school students be extended more broadly to include the entire Watamu community.

A more detailed study on the human use patterns of the rocky platforms should be carried out to understand other human activities that have impacts on these habitats. Detailed biodiversity assessment should also be carried out to establish a biodiversity baseline, indicator species chosen, and monitoring commenced. This should also include previously overlooked species such as avifauna. Periodic monitoring of tourists' activities, human use and their impacts to the habitats and change in biotic assemblage should also be undertaken to develop adaptive management strategies.

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