

Rocky platforms of Watamu Marine National Park, Kenya

Biodiversity, conservation, and education



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Abstract

Watamu Marine National Park, Kenya is renowned for its beautiful beach and nearby coral reefs. In addition, visitors to this national park are often observed exploring rockpools at low tide and an unofficial guide trade has developed around this activity. With the exception of some historical literature, little to no research has been completed in these rockpools and so there has been no assessment of conservation needs. A project was started in December 2012 to study the biodiversity of these rockpools, identify threats, suggest possible conservation interventions, and begin developing education products for use in the local community to raise awareness of these habitats. The initial phase of the project, completed in February 2013, focused on major taxonomic categories of organisms. Biodiversity included all three major algal phyla, lower animal forms such as sponges and corals and higher animal forms such as echinoderms and vertebrates. An educational package was developed and tested with both adult NGO workers and a group of 50 primary school students and their teachers. A guide to these major taxonomic groups was produced as well as presentation resources. Phase 2 of the project focuses on quantifying the abundance and biodiversity of these major taxonomic groups and is currently focusing on corals, fishes (both resident and juvenile reef fish), and echinoderms. Coral studies have identified a population of *Anomastrea irregularis*, an EDGE coral species. Potential threats to rockpool biodiversity include overuse by tourists, runoff from land-based development, and poaching. Conservation activities include quantifying the full range of biodiversity, monitoring changes spatially and temporally, and continuing education of guides, tourists, and the local community.



Background

Early studies of Watamu Marine National Park (WMNP) divided rocky intertidal areas into two distinct zones: platform and cliffs (Jones 1969). This expedition to the park described these habitats generally, including some basic descriptions of where these zones occur and note mostly higher-level taxonomic biodiversity. Since this expedition, there does not appear to have been any studies published focusing on this habitat in this marine park. Additionally, for East Africa, there appears to be little attention to these rocky intertidal zones. A Rocha Kenya is a Christian conservation NGO based on the shore of WMNP. We began our investigations into the rocky platforms of WMNP in January, 2013 with a basic survey of major taxonomic groups. We then began to focus on each of the taxonomic groupings to gain a deeper insight into their biodiversity and abundance.

Fish

With all of the studies done on fish communities in the rocky intertidal, few have focused on tropical shores and fewer on those in the Western Indian Ocean region (see Durville & Chabanet 2009). This study describes for the first time the low-tide fish assemblage of rocky platform habitats in the Watamu Marine National Park and attempts to determine the contribution of these habitats to offshore reefs and artisanal fisheries.

We report only on a portion of the study due to space constraints and here focus on biodiversity. Ten sites were sampled with some large rocky platforms constituting more than one site and small ones closely located combined. In order to obtain a random sample for ichthyofaunal richness and abundance, 1x1m quadrats were placed in patches using a coordinate system and random numbers list. Two minute fish counts were performed for each quadrat, during which time two observers actively searched pool areas and recorded all fish present. Photos were taken of any fish for which definite field identification was not possible for later analysis.

Over a period of 20 days, 244 individuals in 47 different species were observed in the 78 quadrats sampled. Of these, 26% were in the family Gobiidae, 18% in Blenniidae, 16% in Pomacentridae, and 14% in Labridae. An “incidental sightings” list of all species observed in the rocky intertidal, not just those that happened to occur in sampled quadrats, was compiled over the course of the study, resulting in a more expansive list of 56 species. Of the observed species, 37.5% were seen as juveniles and adults, 51.8% were seen only in a juvenile or sub-adult stage/size, and 10.7% were only observed as adults. The figure to the right shows the relative contribution of each size class to commercial industries, as determined by Anam & Mostarda (2012).

Hard Corals

The generic biodiversity and density of hard corals was studied in six rocky platforms labelled A, J, L, M, Q and S on the site map. The majority of corals observed in the 26 transects which covered an area of 1067.1 m² were in the genera *Porites* (44.7%) and *Pavona* (17.6%). We found 23 colonies of *Anomastrea irregularis* in these transects, with numerous colonies observed outside transect boundaries. This species so far has not been observed anywhere else in WMNP besides these rocky platforms. This species is listed as Vulnerable on the IUCN Red List and is an EDGE species – Evolutionarily Distinct and Globally Endangered according to a categorisation developed by the Zoological Society of London.



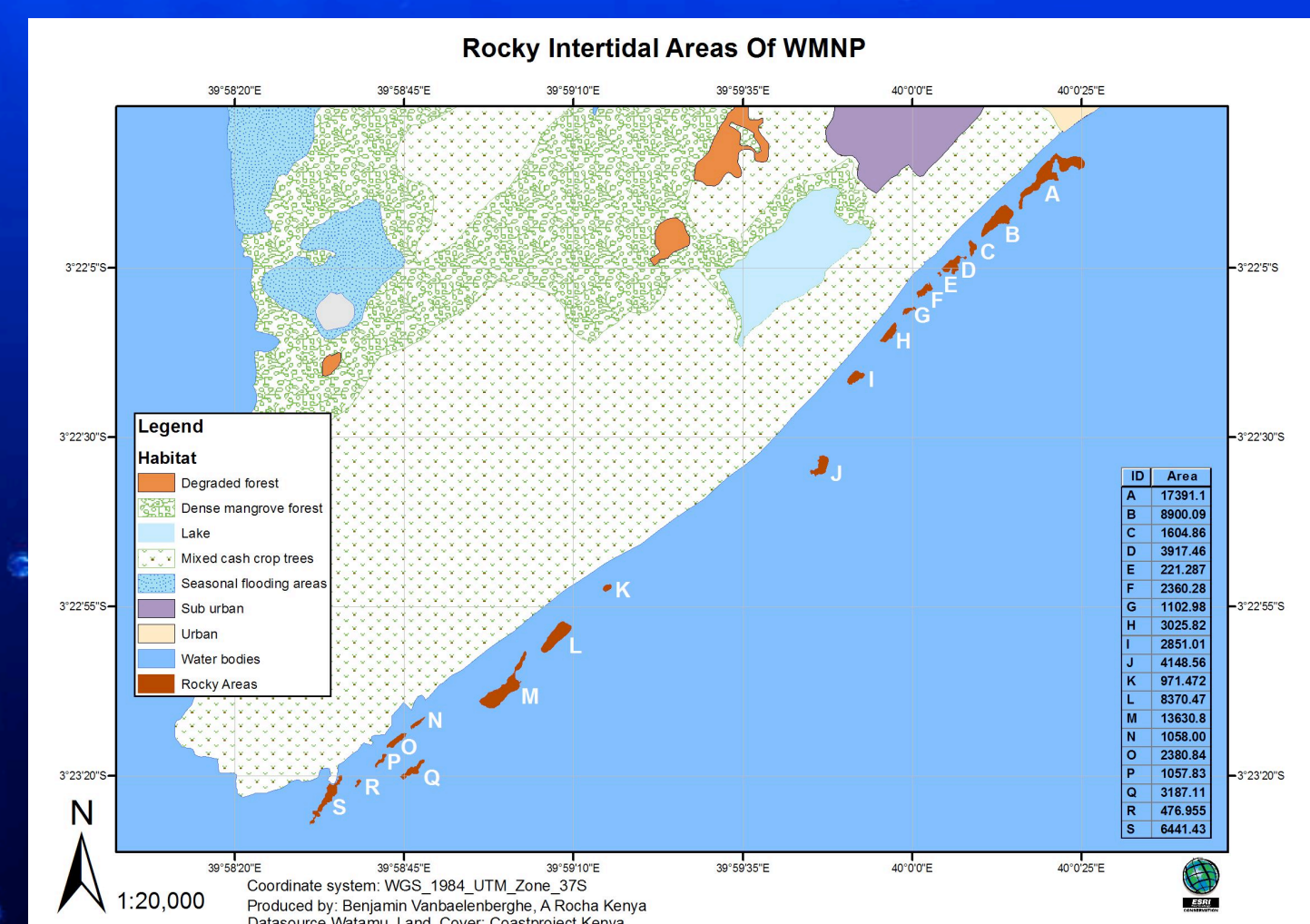
Anomastrea irregularis

Coral Genera	Colony Frequency
<i>Acropora</i>	1
<i>Alveopora</i>	19
<i>Anomastrea</i>	23
<i>Astreopora</i>	2
<i>Coscinarea</i>	2
<i>Favia</i>	37
<i>Favites</i>	28
<i>Gonastrea</i>	2
<i>Leptastrea</i>	2
<i>Pavona</i>	60
<i>Platygyra</i>	1
<i>Porites</i>	152
unknown	11

Conservation and Education

A Rocha Kenya’s Marine Conservation and Research Programme will continue to study these rocky platforms in the coming years to determine the full range of biodiversity present. We are in the process of identifying threats to this habitat which may include overuse by tourists, runoff from land-based development, and poaching. Interventions for specific species such as *Anomastrea irregularis* or the habitat as a whole will be devised and implemented with local partners and the management authority, Kenya Wildlife Service.

Educational programmes for local communities, schools, and tourists have already begun. These include rockpooling during open days at our residential centre, school outreach programmes bringing local schools to visit the rocky platforms, and celebrating World Ocean’s Day with a guided rockpool tour in front of the larger hotels on the beach. A guide to the major taxonomic groups was developed and used in these educational programmes and with each increase in research rigour, we are developing new guides and resources for education at lower taxonomic levels.

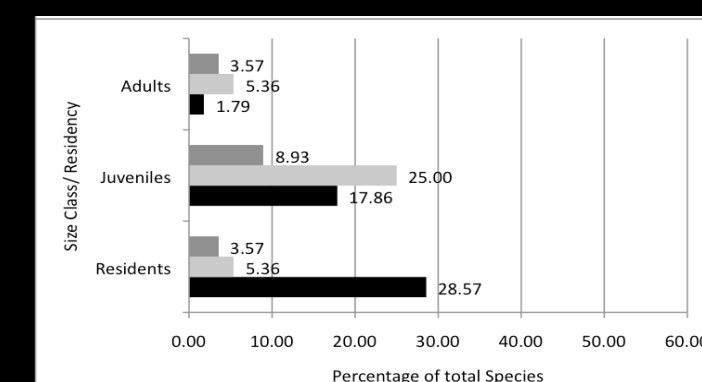
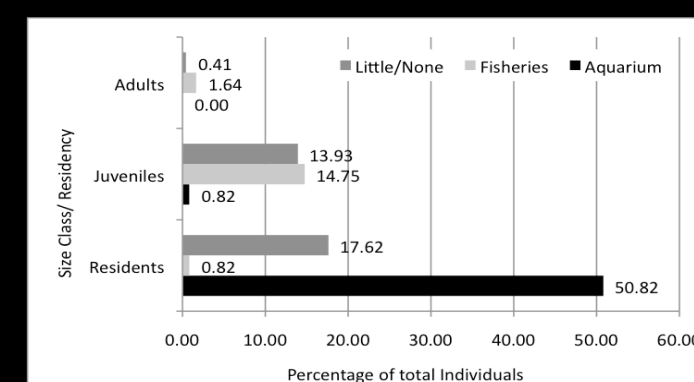


Echinoderms

Biodiversity and abundance of echinoderms in rocky platforms was enumerated using 10 m x 1 m transects at eleven sites. Species lists were augmented by identifying any species found outside of transects. One hundred and fifty one transects were completed revealing 3 brittle star, 4 starfish, 1 sea cucumber, and 5 sea urchin species. The most abundant echinoderms were the brittle star *Ophiocoma scolopendrina* and the sea urchins *Echinometra mathaei* and *Echinothrix diadema*.

Echinoderm species

Brittle stars	Starfish	Sea cucumbers	Sea urchins
<i>Amphiura dejectoides</i>	<i>Linckia guildingi</i>	<i>Actinopygma mauritiana</i>	<i>Diadema setosum</i>
<i>Ophiocoma scolopendri</i>	<i>Monachaster sanderi</i>		<i>Echinometra mathaei</i>
<i>Ophiomastix venosa</i>	<i>Nardoa variolata</i>		<i>Echinothrix diadema</i>
	<i>Protoreaster lincki</i>		<i>Toxopneustes pileolus</i>
			<i>Tripteneustes gratilla</i>



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