CHINA COMMUNICATIONS CONSTRUCTION COMPANY CCCC CONSTRUCTION OF BERTH 19B AND ASSOCIATED INFRASTRUCTURE	
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4TH MONTHLY ENVIRONMENTAL MONITORING REPORT **20TH October – 19TH November 2025**	**A1**

4TH MONTHLY ENVIRONMENTAL MONITORING REPORT

Rev.	Date	Status	Prepared By	Reviewed By	Approved By
A1	20th November 2025	For Approval	Simon Nzuki	David Leo	Mao Honghui

Environmental Management and Monitoring Plan for Civil and Construction Works at Mombasa Port Berth 19B and Associated Infrastructure

4th Monthly Environmental Monitoring Report

October/November 2025

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Executive summary

Kenya Ports Authority (KPA) contracted China Communications Construction Company (CCCC) Limited to implement the construction of Container Berth 19B and associated infrastructure at Mombasa Port. As part of environmental performance of the project and in compliance with its Environmental and Social Management Plan (ESMP), Environmental Monitoring Plan as well as Environmental Impact Assessment (EIA) licence conditions, China Communications Construction Company (CCCC) Limited prepared and submitted an Environmental Management and Monitoring Plan (EMMP) to Kenya Ports Authority (KPA) and National Environment Management Authority (NEMA) in May 2025. The EMMP requires CCCC to prepare and submit Monthly Environmental Monitoring Reports to KPA and NEMA after commencement of the works. This report is therefore prepared in fulfillment of this condition and focuses on two environmental media: water quality and biological communities. Air quality and noise/vibration measurements will be obtained in the fifth month of monitoring (20th November – 19th December 2025), and will be included in the fifth monthly report.

Water quality monitoring was conducted at eight (8) monitoring stations (three (3) inshore and five (5) offshore). Parameters assessed included turbidity, Total Suspended Solids (TSS), pH, Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), and Perspective Degree. Results showed that the average turbidity and TSS readings 9.37 NTU and 11.02 mg/l, and 0 and 7.77 mg/l for inshore and offshore monitoring stations respectively. The high turbidity levels in inshore water quality are attributed to the ongoing port development activities, raw effluent discharging into the Port at Berth 14 and the storm water drain effluent (currently discharging raw sewage and industrial effluent from Mombasa West Mainland) as well as sediment load from upstream sources. The average Perspective Degree value for offshore monitoring stations was more than 26 times higher than inshore waters further indicating relatively low turbidity levels. Apart from the turbidity, TSS and Perspective Degree, the rest of the parameters (pH, DO and COD) were comparable. All parameters were within EMMP threshold values, providing reliable reference points for impact and compliance monitoring.

Biological monitoring was undertaken at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8). Monitoring conducted between 25th and 26th October 2025 recorded high macro algae cover of 28.3% ± 3.3 at Mombasa Marine Park and Reserve (MS8) and 46.7% ± 1.7 at Shelly Beach (MS4). Soft corals accounted for 28.3% ± 1.7 and 11.7% ± 1.7 in Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) respectively. Monitoring conducted between 8th and 9th November 2025 recorded a high cover of macro algae (33.3% ± 3.3), hard corals (20.0 % ± 5.8) and soft corals (16.7% ± 7.3) respectively at Mombasa Marine Park and Reserve (MS8). In contrast, macro algae (50.0% ± 2.9) exhibited the highest percentage cover followed by both hard corals, soft corals and sand substrate (10.0% ± 2.9) respectively at Shelly Beach (MS4). Fish family density was generally high in Mombasa Marine Park and Reserve (MS8), with 48.3 ± 20.5 indiv. /250m² and 41.7 ± 10.1 indiv. /250m² recorded during monitoring conducted on 25th to 26th October and 8th to 9th November 2025, respectively. At Shelly Beach (MS4), fish family density was relatively low, with 8.3 ± 1.8 indiv. /250m² and 10.0 ± 10.0 indiv. /250m² recorded during monitoring conducted on 25th to 26th October and 8th to 9th November 2025, respectively, compared to Mombasa Marine Park and Reserve (MS8). Invertebrate density was relatively.

The findings of the monthly monitoring activities are consistent with the baseline values and biodiversity monitoring results respectively, signifying strict implementation of the EMMP, which should be maintained throughout the project cycle.

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Acronyms

CCCC	China Communications Construction Company
CDL	Chart Datum Level
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
DWT	Deadweight Tonnage
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
ICT	Information and Communication Technology
KPA	Kenya Ports Authority
LAN	Local Area Network
NEM	North East Monsoon
NEMA	National Environment Management Authority
SCUBA	Self-Contained Underwater Breathing Apparatus
SEM	South East Monsoon
TSS	Total Suspended Solids

1 Background information

Kenya Ports Authority (KPA) contracted China Communications Construction Company (CCCC) Limited to implement the construction of Container Berth 19B and associated infrastructure at Mombasa Port. The project involves construction of Berth 19B with a Chart Datum Level (C.D.L) –13.5m design depth capable of handling 45,000 Deadweight Tonnage (DWT) containerized ships as well as associated infrastructure including electrical power supply, drainage and utility systems, navigational aids, security, Information and Communication Technology (ICT), Local Area Network (LAN) alarm detection system and dedicated data communication, portable water supply, fire pumping station, welfare building and alternative maritime power if required.

The project activities includes dredging works at the berth pockets and turning basin, land reclamation and ground improvement, construction of quay structures and associated furniture (e.g., fender systems and bollards), revetments under the quay deck and return edges as well as stacking yards and ports.

As part of environmental performance of the project and in compliance with its Environmental and Social Management Plan (ESMP), Environmental Monitoring Plan as well as Environmental Impact Assessment (EIA) licence conditions, China Communications Construction Company (CCCC) Limited prepared and submitted an Environmental Management and Monitoring Plan (EMMP) as well as Baseline Environmental Monitoring Report to Kenya Ports Authority (KPA) and National Environment Management Authority (NEMA) in May and August 2025 respectively. The EMMP requires CCCC to prepare and submit Monthly Environmental Monitoring Reports to KPA and NEMA at commencement of the works for a period of 24 months. This report is therefore prepared in fulfillment of this condition. This is therefore the fourth monthly report covering the period between 20th October – 19th November 2025 on implementation of the EMMP.

The report focuses on two (2) environmental media which are water quality and biological communities monitoring. Air quality and noise/vibration measurements are taken quarterly at the project site, CCCC office and Blue House Residence. Water quality monitoring included physical parameters and chemical parameters; the physical parameters were turbidity and Total Suspended Solids (TSS) while the chemical ones were pH, Chemical Oxygen Demand (COD), Dissolved Oxygen (DO) and Perspective Degree. Biological monitoring includes critical habitats i.e. coral reefs and benthic communities, seagrass beds, and fauna including fish and invertebrates.

2 Water quality monitoring

Water quality monitoring was undertaken from 25th October – 14th November 2025 at the eight monitoring stations (MS1-MS8) for the following parameters; turbidity, Total Suspended Solids (TSS), pH, Dissolved Oxygen (DO), Chemical Oxygen Demand (COD) and Perspective Degree. Monitoring was done for four days on dates 25th October, 1st, 7th and 4th November 2025. In the absence of dredging activities, monitoring is done once a week hence no monitoring on dates 20th, 21st, 22nd, 23rd and 24th October; and 2nd, 3rd, 4th, 5th, 6th, 8th, 9th, 10th, 11th, 12th, 13th, 15th, 16th, 17th, 18th and 19th November 2025.

3 Biological monitoring

Biological communities monitoring was carried out on 25th – 26th October and 8th – 9th November 2025 at the two (2) monitoring stations as per the EMMP and focused on MS-4 and MS-8, located in offshore waters at Shelly Beach area and Mombasa Marine Park and Reserve respectively.

4 Air quality and noise/vibration measurements

The first air quality and noise/vibration measurements will be obtained in month 5 of monitoring (20th November – 19th December 2025), and will be included in the fifth monthly report.

5 Results

5.1 Water quality monitoring from 25th October – 14th November 2025

This section presents the results for water quality monitoring for both the inshore monitoring stations (MS1-3) and offshore monitoring stations (MS4-8) for the monthly report period. These are summarized in Table 1 and 2 below and the summary of the raw data pooled for both the inshore and offshore monitoring stations for the entire month (Table 3). Both the physical water quality parameters i.e. pH, Dissolved Oxygen (DO) and turbidity, and the chemical water quality parameters i.e. Total Suspended Solids (TSS), Chemical Oxygen Demand (COD) and Perspective Degree were reported. Offshore monitoring stations reported insignificant change in parameters and the records are within the EMMP threshold value. All the inshore and offshore results are within the EMMP threshold values (Figure 1 and 2).

Table 1: Summary of the inshore (MS 1-3) monthly (25th October – 14th November 2025) sampling and analysis results for water quality parameters (pH, DO, TSS, Turbidity, COD and Perspective Degree) compared to baseline values and the EMMP threshold value (Source: Lahvens Limited, October/November 2025).

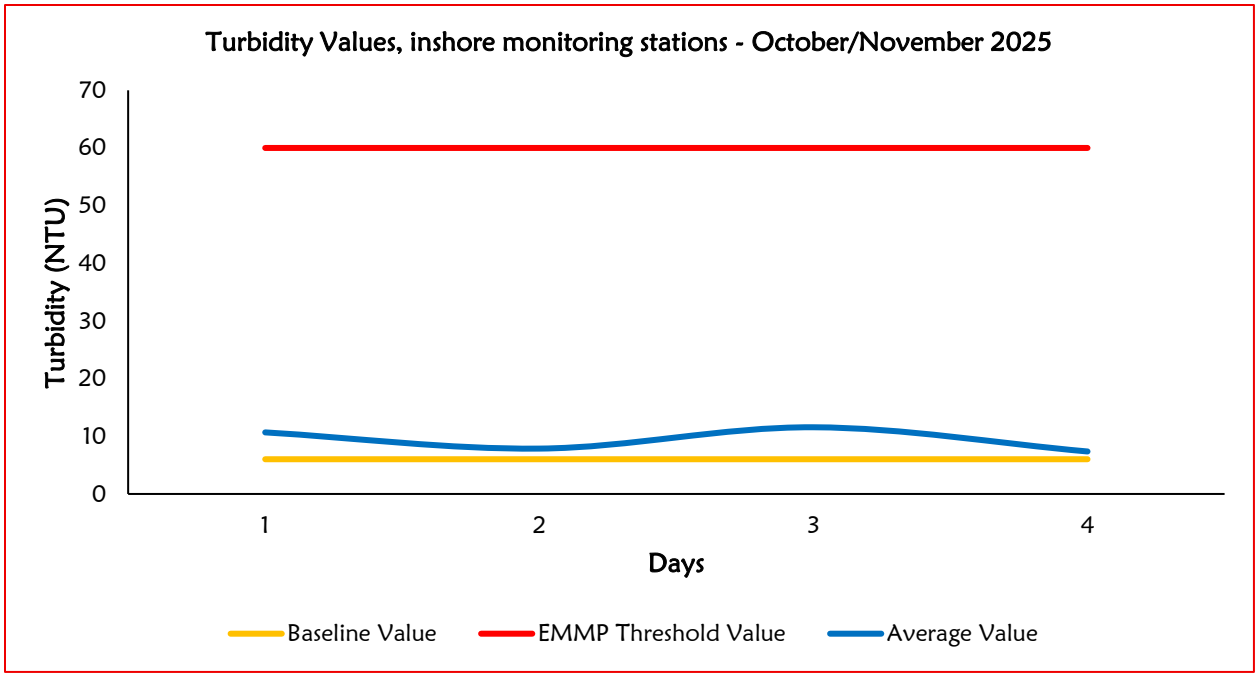
Parameters	Average Value	Baseline Value	EMMP Threshold Value	Comments
pH	7.96	7.95	6.6-8.8	All results are within the EMMP threshold value
Dissolved Oxygen	5.28	5.32	>4 mg/l	
Turbidity	9.37	6.02	+60 NTU	
Total Suspended Solids	11.02	16.13	+60 mg/l	
Chemical Oxygen Demand	11.99	10.46	50 mg/l	
Perspective Degree	0.30	0.33	-	

Table 2: Summary of the offshore (MS 4-8) monthly (25th October – 14th November 2025) sampling and analysis results for water quality parameters (pH, DO, TSS, Turbidity, COD and Perspective Degree) compared to baseline values and the EMMP threshold value (Source: Lahvens Limited, October/November 2025).

Parameters	Average Value	Baseline Value	EMMP Threshold Value	Comments
pH	8.11	8.10	6.6-8.8	All results are within the EMMP threshold value
Dissolved Oxygen	7.07	6.77	>4 mg/l	
Turbidity	0	0	+60 NTU	
Total Suspended Solids	7.77	9.06	+60 mg/l	
Chemical Oxygen Demand	8.95	8.28	50 mg/l	
Perspective Degree	8.00	8.00	-	

Table 3: Detailed summary of the daily water quality monitoring results for inshore and offshore monitoring stations across the water column (Source: Lahvens (K) Limited, October/November 2025).

Monitoring station	Sampling Depth (m)	Acidity/ Basicity (pH)	Chemical Oxygen Demand	Dissolved Oxygen	Perspective Degree	Total Suspended Solids	Turbidity
Inshore monitoring stations							
MS1	0.5	7.96	11.29	5.05	0.25	10.71	13.98
	3	7.96	11.67	5.10		11.33	9.30
	8	7.95	12.25	5.58		10.90	9.20
MS2	0.5	7.92	12.00	5.36	0.33	10.90	9.73
	3	7.96	11.90	5.40		10.78	9.88
	8	7.95	11.35	5.17		11.18	9.00
MS3	0.5	7.98	12.05	5.35	0.33	11.83	8.43
	3	7.98	12.41	5.33		11.00	7.43
	8	7.98	13.03	5.18		10.55	7.40
Offshore monitoring stations							
MS4	0.5	8.15	9.59	7.05	8.00	8.10	0.00
	3	8.12	9.50	7.09		7.40	0.00
	8	8.10	9.18	7.04		7.75	0.00
MS5	0.5	8.06	8.78	7.03	8.00	7.45	0.00
	3	8.09	8.68	7.04		8.28	0.00
	8	8.08	8.30	7.07		8.50	0.00
MS6	0.5	8.12	8.63	7.06	8.00	8.20	0.00
	3	8.10	7.85	7.08		8.35	0.00
	8	8.13	7.60	7.07		9.10	0.00
MS7	0.5	8.13	8.63	7.09	8.00	7.40	0.00
	3	8.13	10.13	7.11		7.28	0.00
	8	8.14	11.03	7.09		6.55	0.00
MS8	0.5	8.12	8.83	7.09	8.00	6.55	0.00
	3	8.10	9.00	7.09		8.08	0.00
	8	8.12	8.58	7.08		7.55	0.00



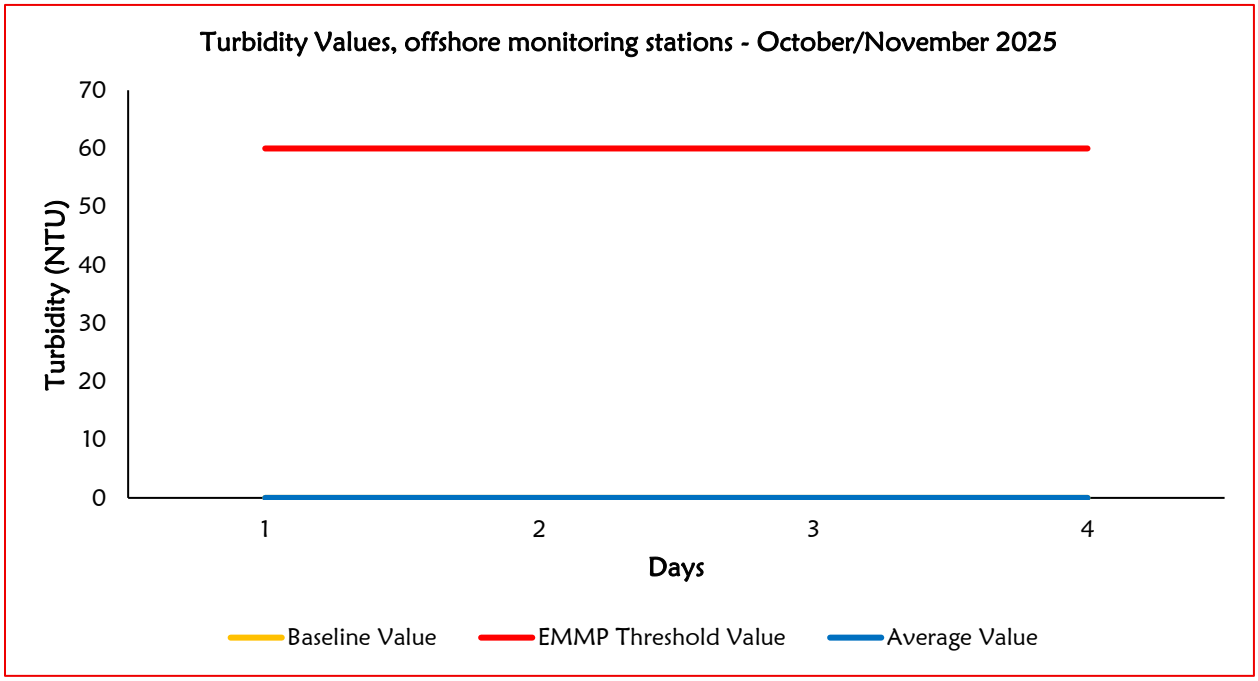
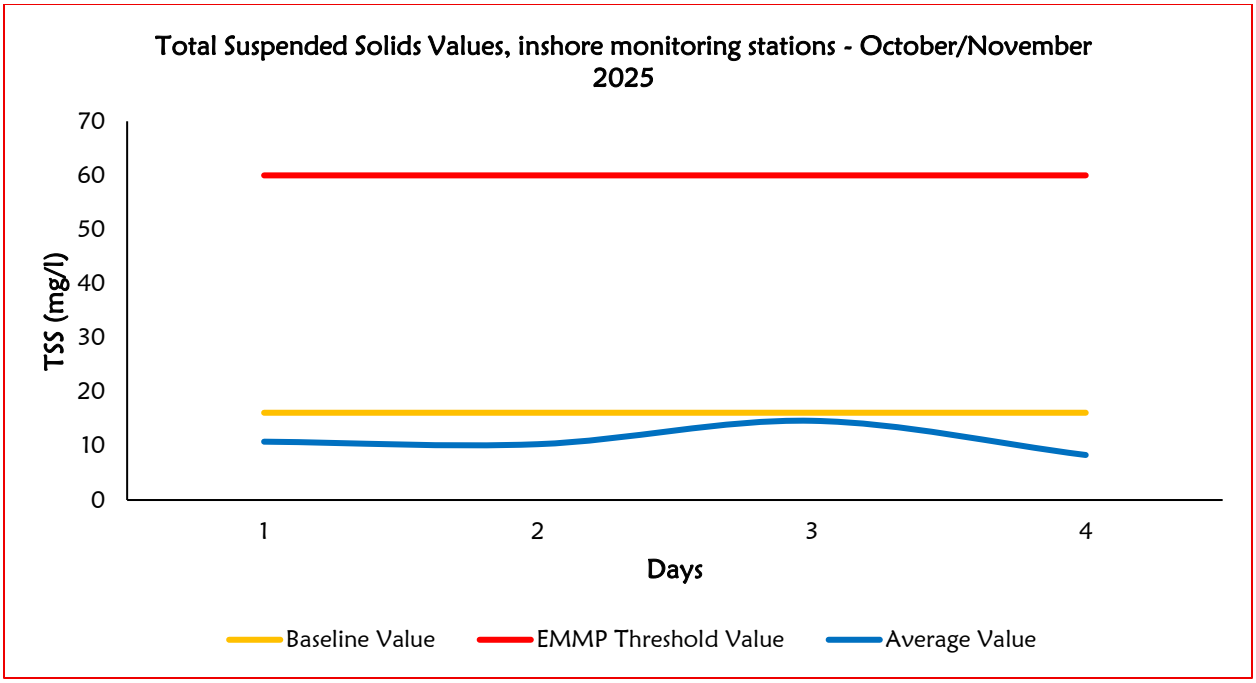


Figure 1: Turbidity values for onshore and offshore monitoring stations for the month of October/November 2025. The average value is the mean turbidity at -0.5m, -3.0m and -8.0m for the inshore and offshore monitoring stations (Data source: Lahvens Limited, October/November 2025).



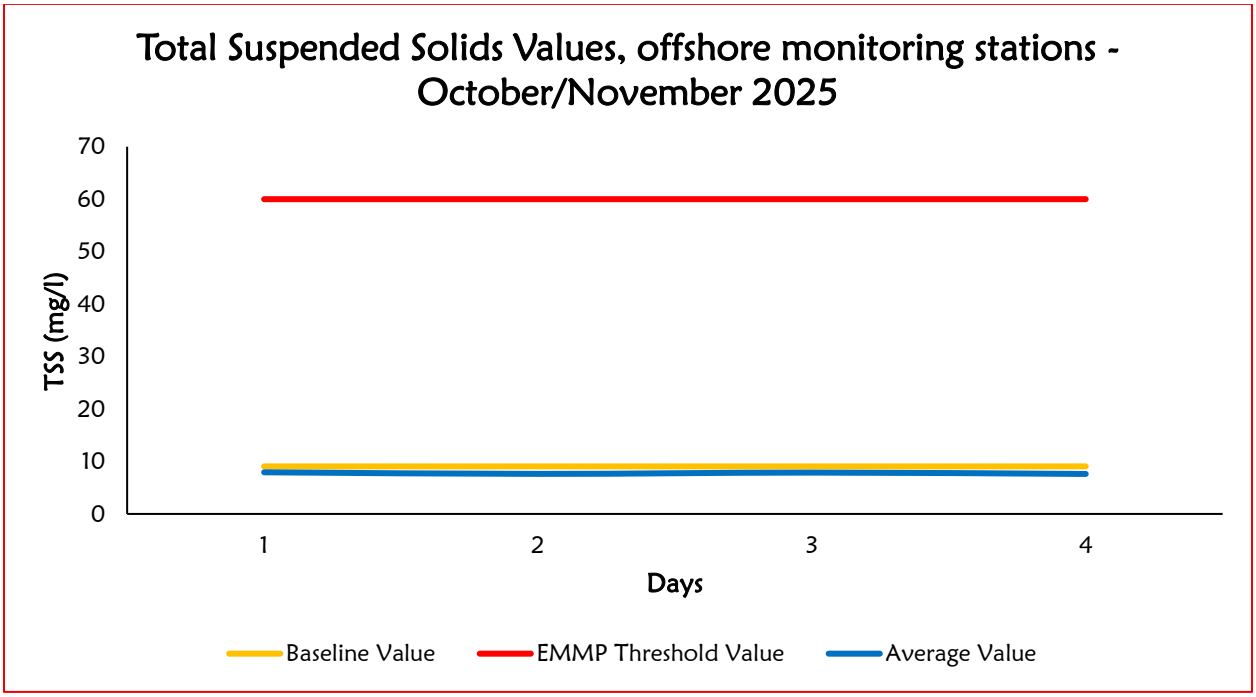


Figure 2: Total Suspended Solid values for inshore and offshore monitoring stations for the month of October/November 2025. The average value is the mean TSS at -0.5m, -3.0m and -8.0m for onshore and offshore monitoring stations (Data source: Lahvens Limited, October/November 2025).

5.2 Biological monitoring

The fourth monthly biological communities monitoring was undertaken on 25th – 26th October and 8th – 9th November 2025 targeting stations at Shelly Beach (MS4) area and Mombasa Marine Park and Reserve (MS8).

5.2.1 Biological monitoring between 25th and 26th October 2025

Fish assemblages, benthic characteristics and invertebrates' assemblages were surveyed in the two sites; Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8). These variables are indicators of coral reef health and can provide insight on short-term and long-term localized disturbances on the reef.

Fish abundance were counted using SCUBA-based underwater visual census along 50 × 5 m transects (n = 3 transects per site) covering an area of 250m² in each site. These transects were laid following the fringing reef which was perpendicular to the shoreline at both sites. A suit of 16 selected families which cover the full range of trophic group within a coral reef and their functional characteristics were identified to species level and enumerated. Species from 19 main coral reef families were recorded as present or absent.

Percentage cover of 8 major benthic categories; macro-algae, soft coral, turf algae, hard coral, halimeda, sand, crustose coralline algae and rubbles were assessed using a point-intercept method to the evaluate the benthic characteristics. A transect measuring 25m was laid and the type of benthic category underneath each point at 0.5m was noted giving a total of 50 points per transect. This was standardized to 100 points to get the percentage cover. Condition of the benthic substrate was also noted. Wafting above the benthic substrate raised any fine sediment settling on the benthic substrate that might impact on corals. Bleached, diseased or predated corals were also noted. Invertebrates' diversity and abundance was carried out along a 50 x 5 m transect. All invertebrates encountered were identified to the lowest taxa possible and enumerated.

Diving at both sites was carried out during ebb tide (spring tide) between 8.00 am and 11.00 am at both sites to maximize sea conditions. The survey at Mombasa Marine Park and Reserve (MS8) was conducted at depths 6 – 18m. One transect was done along the 6m contour, another one at 12m contour while the third was done along 18m contour. Shelly Beach (MS4) survey was conducted at 5 – 24m depth as well, with the 3 contour transects running along 5m, 10m and 24m depth. Visibility was estimated at 17m at Mombasa Marine Park and Reserve and 20m at Shelly Beach. Total dive time was 65 minutes at Mombasa Marine Park and Reserve and 80 minutes at Shelly Beach.

5.2.1.1 Benthic substrate

Macro algae (28.3% ± 3.3) and soft corals (28.3% ± 1.7) were the dominant substrate types at Mombasa Marine Park and Reserve (MS8) while Shelly Beach (MS4), was dominated by macro algae (46.7% ± 1.7) and turf algae (15.0% ± 2.9) substrate types. The pronounced dominance of macro algae in both Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4), may be attributed to reduced grazing pressure, which allows algae to proliferate and outcompete corals for space and light. The presence of turf algae at both sites, Mombasa Marine Park and Reserve (MS8) (16.7% ± 3.3) and Shelly Beach (MS4) (15.0% ± 2.9), suggests early colonization of degraded substrates previously occupied by soft or hard corals, potentially signaling a gradual shift away from healthy coral-dominated reef states. Corals at Shelly Beach (MS4) show signs of physical damage likely linked to increased fishing activity associated with the seasonal shift from the South East Monsoon (SEM) to the North East Monsoon (NEM), when calmer sea conditions favor artisanal fisheries. This is evidenced by visible scratch marks on the corals and a noticeable rise in the number of set gears in the area (Figure 4). In total, eight coral genera were identified across both sites. Sand cover (3.3% ± 1.7) was only recorded at Shelly Beach (MS4). Sand (8.3% ± 4.4)

and rubble (3.3 ± 1.7) substrates were only recorded at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) respectively (Figure 3).

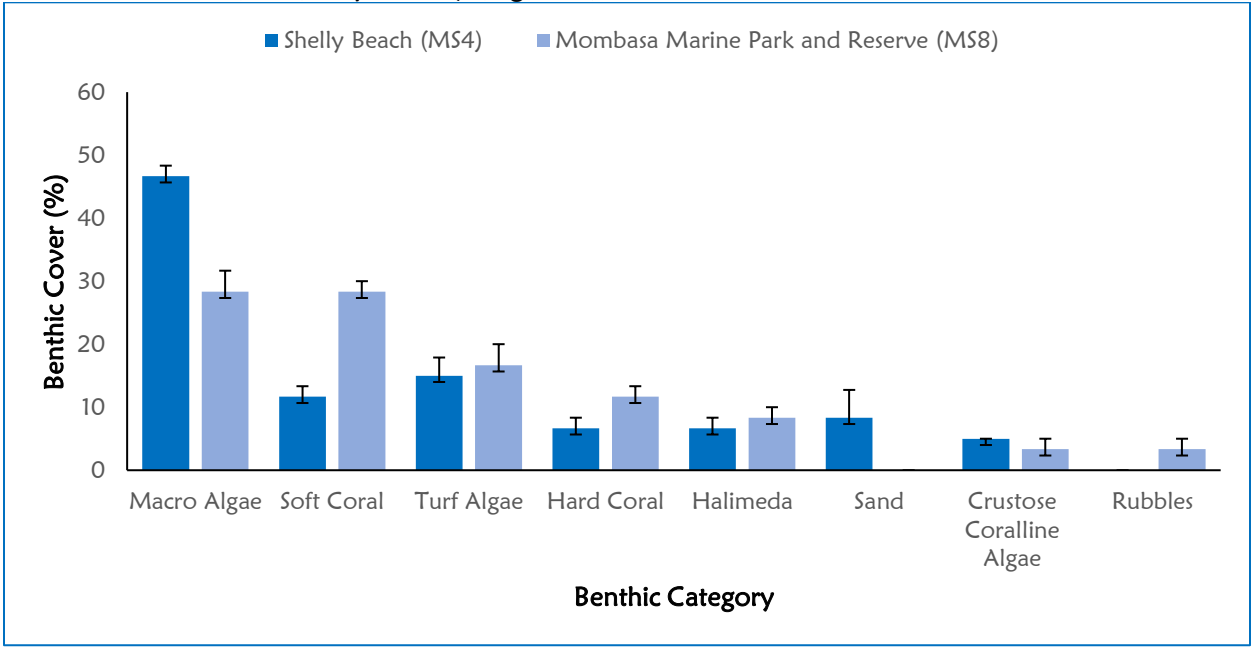


Figure 3: Benthic substrate characteristics at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

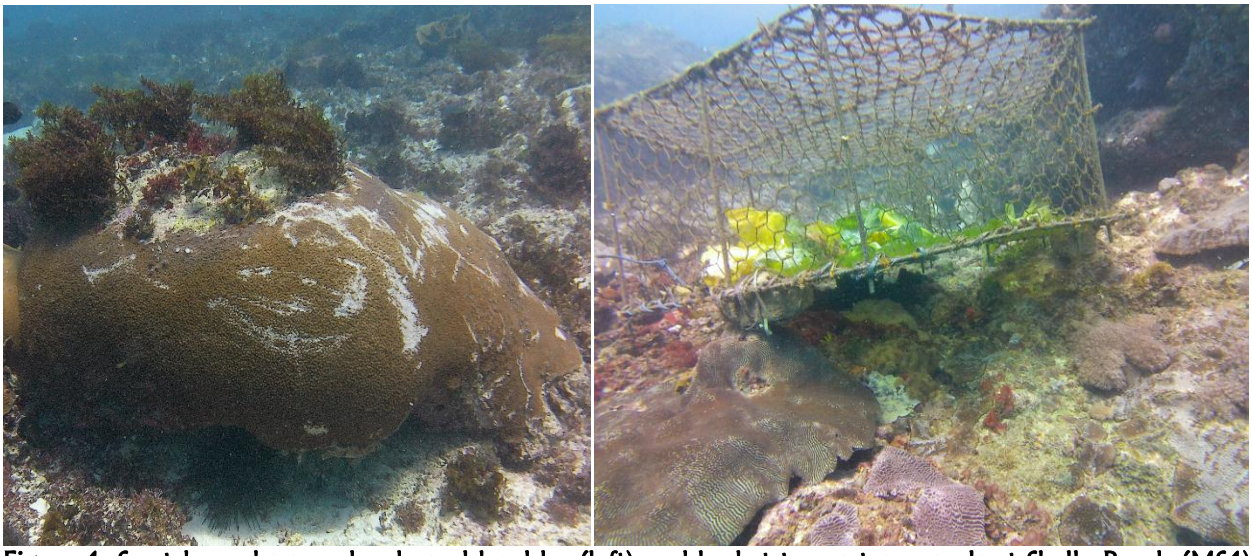


Figure 4: Scratch marks on a hard coral boulder (left) and basket trap set on corals at Shelly Beach (MS4) (Source: Envasses, October 2025)

5.2.1.2 Fish abundance

A total of 36 species were recorded from both Mombasa Marine Park and Reserve (28 species) and Shelly Beach (18 species). Mombasa Marine Park and Reserve (MS8) exhibited a relatively higher fish density (48.3 ± 20.5 indiv. /250m²), indicating a richer and more diverse fish assemblage compared to Shelly Beach (MS4) which recorded low fish density of 8.3 ± 1.8 indiv. /250m² as maximum density. A total of 13 fish families were recorded from both Mombasa Marine Park and Reserve (12 fish families) and Shelly Beach (10 fish families). Pomacentridae (48.3 ± 20.5

indiv. /250m²) and Lutjanidae (16.0 ± 3.1 indiv. /250m²) were the most abundant families at Mombasa Marine Park and Reserve (MS8) while in Shelly Beach (MS4), Labridae (8.3 ± 1.8 indiv. /250m²) and Acanthuridae (6.7 ± 0.9 indiv. /250m²) were the most abundant. Three common indicators of reef health such as Acanthuridae, Chaetodontidae and Scaridae fish families were present at both monitoring stations in low densities. Both Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) recorded low densities of planktivorous family, Acanthuridae, 10.7 ± 1.2 indiv. /250m² and 6.7 ± 0.9 indiv. /250m² respectively (Figure 5). Sighting of thousands of fish fingerlings and juveniles concentrated at a single point at Mombasa Marine Park and Reserve (MS8) signifies a rich nursery habitat, recent or ongoing spawning events, and seasonal recruitment pulse (Figure 6).

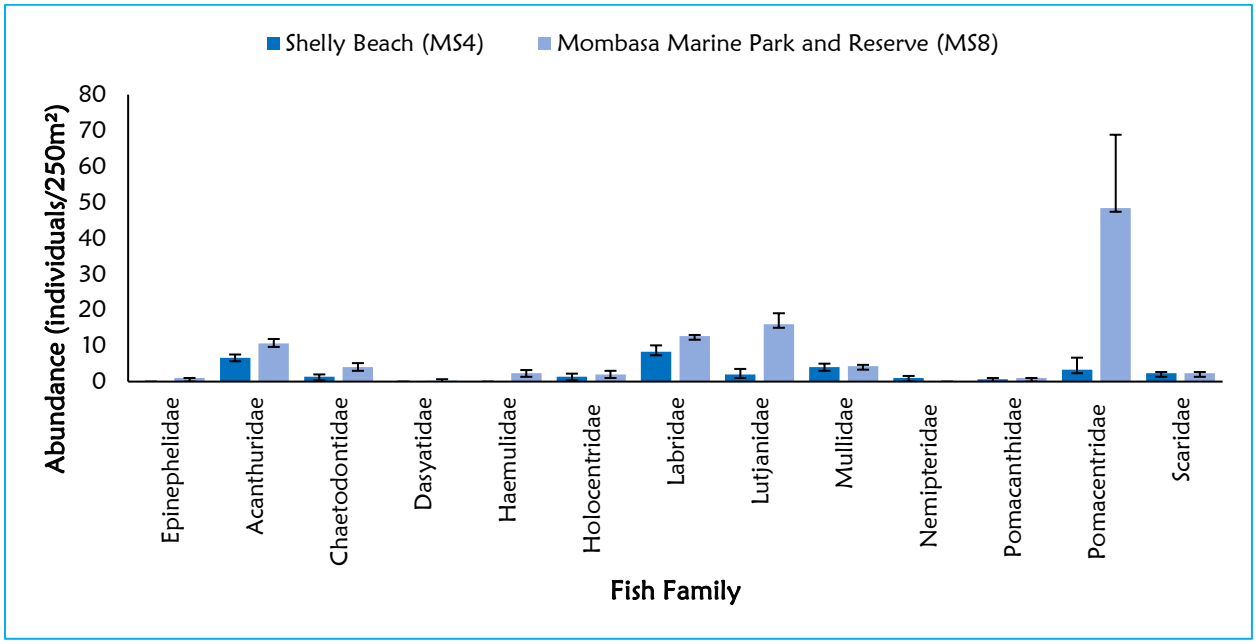


Figure 5: Fish species density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

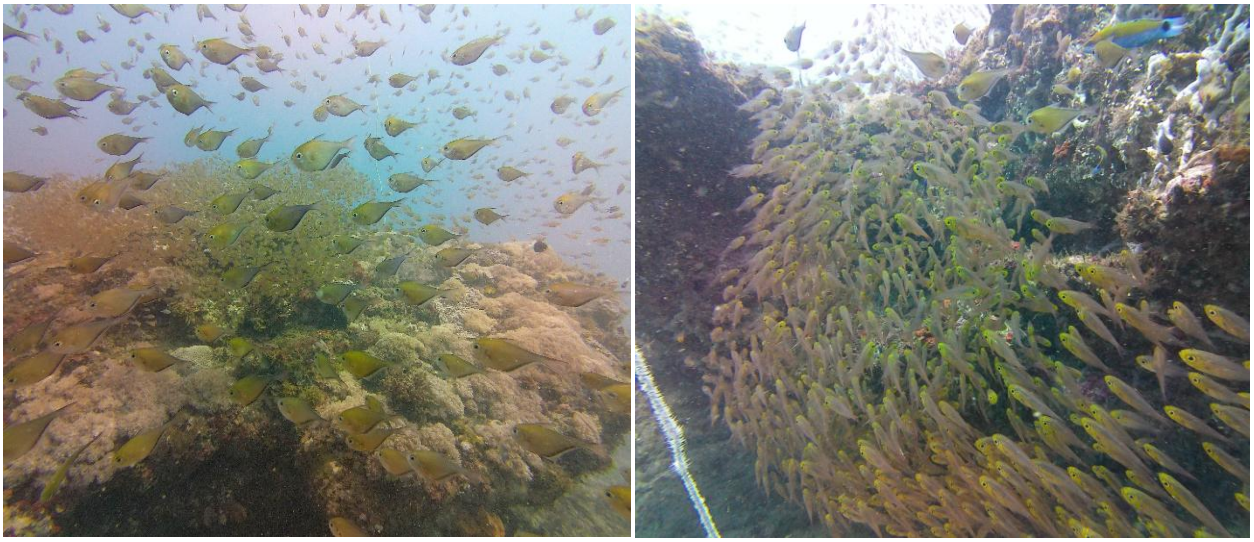


Figure 6: Fish fingerlings and juveniles at Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

5.2.1.3 Invertebrate species

Eight (8) invertebrates' taxa were observed at both Mombasa Marine Park and Reserve (5 taxa) and Shelly Beach (8 taxa). Echinometridae dominated both Mombasa Marine Park and Reserve (3.0 ± 1.5 indiv. /250m²) and Shelly Beach (13.3 ± 3.3 indiv. /250m²). The Echinometridae (*Echinostrephus molaris*) dominance primarily signifies heavy fishing pressure on their natural predators and can lead to the significant degradation of coral reefs. Cassidae (0.7 ± 0.3 indiv. /250m²), Palinuridae (1.3 ± 0.7 indiv. /250m²) were only recorded in Mombasa Marine Park and Reserve (MS8), while Shelly Beach (MS4) recorded Diadematidae (8.0 ± 1.2 indiv. /250m²), Oreasteridae (0.3 ± 0.3 indiv. /250m²) and Tridacnidae (1.3 ± 0.9 indiv. /250m²) in very low densities. (Figure 7). This may signify a stressed or environmentally disturbed ecosystem, often linked to overfishing, reduced fish populations that prey on urchins, and the potential for increased bioerosion in both monitoring stations.

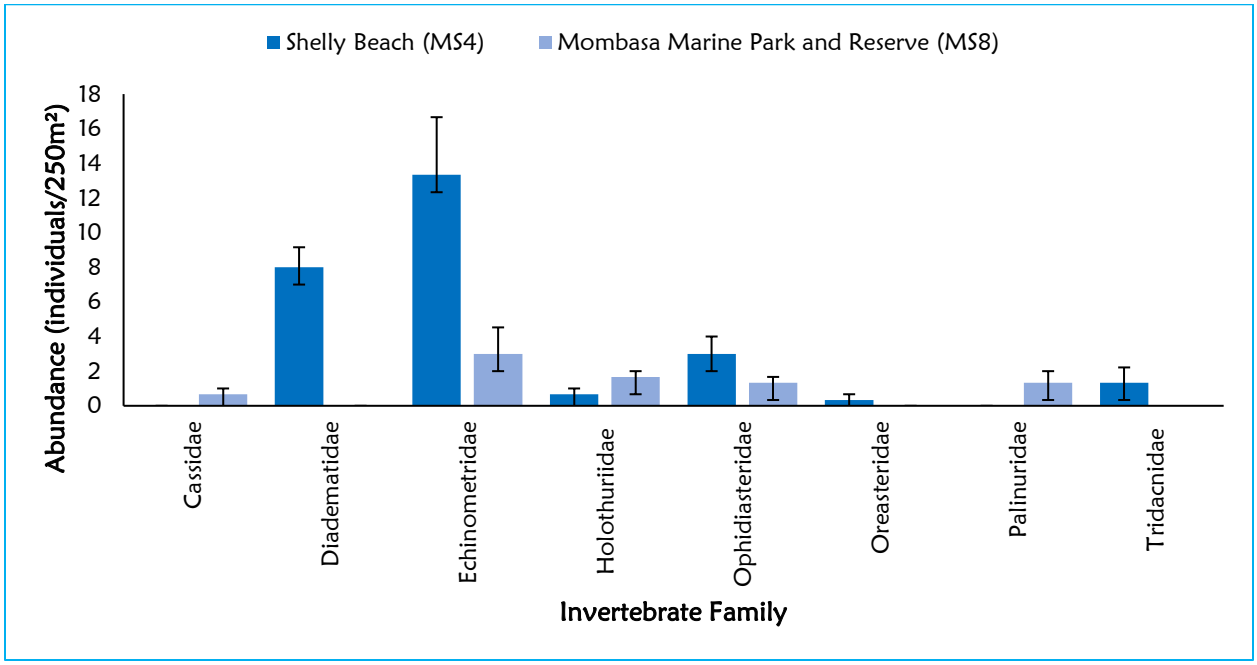


Figure 7: Invertebrates density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

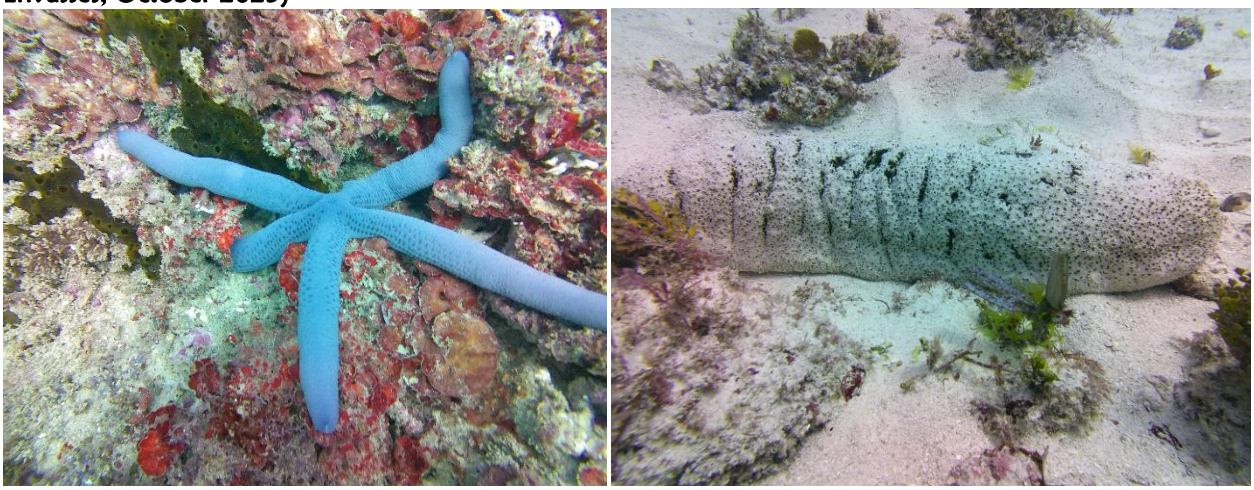


Figure 8: Ophidiasteridae (*Linckia laevigata*) (left) and Holothuriidae (*Holothuria atra*) (right) in Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) respectively (Source: Envasses, October 2025)

5.2.1.4 Endangered species

The monitoring reported sighting of endangered species, Holothuriidae (Black Sea cucumber) in both Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8).

5.2.2 Biological monitoring between 8th and 9th November 2025

Fish assemblages, benthic characteristics and invertebrates' assemblages were surveyed in the two sites; Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8). These variables are indicators of coral reef health and can provide insight on short-term and long-term localized disturbances on the reef.

Fish abundance were counted using SCUBA-based underwater visual census along 50 × 5 m transects (n = 3 transects per site) covering an area of 250m² in each site. These transects were laid following the fringing reef which was perpendicular to the shoreline at both sites. A suit of 14 selected families which cover the full range of trophic group within a coral reef and their functional characteristics were identified to species level and enumerated. Species from 19 main coral reef families were recorded as present or absent.

Percentage cover of 8 major benthic categories; macro algae, hard coral, soft coral, hard coral, turf algae, sand, crustose coralline algae, halimeda and rubbles were assessed using a point-intercept method to the evaluate the benthic characteristics. A transect measuring 25m was laid and the type of benthic category underneath each point at 0.5m was noted giving a total of 50 points per transect. This was standardized to 100 points to get the percentage cover. Condition of the benthic substrate was also noted. Wafting above the benthic substrate raised any fine sediment settling on the benthic substrate that might impact on corals. Bleached, diseased or predated corals were also noted. Invertebrates' diversity and abundance was carried out along a 50 x 5 m transect. All invertebrates encountered were identified to the lowest taxa possible and enumerated.

Diving at both sites was carried out during ebb tide (spring tide) between 8.00 am and 11.00 am at both sites to maximize sea conditions. The survey at Mombasa Marine Park and Reserve (MS8) was conducted at depths 6 – 24m. One transect was done along the 6m contour, another one at 12m contour while the third was done along 24m contour. Shelly Beach (MS4) survey was conducted at 5 – 26m depth as well, with the 3 contour transects running along 5m, 15m and 26m depth. Visibility was estimated at 17m at Mombasa Marine Park and Reserve and 25m at Shelly Beach. Total dive time was 75 minutes at Mombasa Marine Park and Reserve and 65 minutes at Shelly Beach.

5.2.2.1 Benthic substrate

At Mombasa Marine Park and Reserve (MS8), macro algae (33.3% ± 3.3), hard coral (20.0% ± 5.8), soft coral (16.7% ± 7.3) and turf algae (15.0% ± 2.9) were the dominant substrate type. However, at Shelly Beach (MS4), macro algae exhibited the highest cover at 50.0% ± 2.9 followed by both hard coral, soft coral and sand at 10.0% ± 2.9. The domination of macro algae and the presence of turf algae at both sites, Mombasa Marine Park and Reserve (MS8) (33.3% ± 3.3 and 15.0% ± 2.9 respectively) and Shelly Beach (MS4) (50.0% ± 2.9 and 8.3% ± 3.3 respectively) indicate a decline in coral cover, likely driven by environmental stressors, reduced herbivory, and nutrient enrichment, signaling a potential shift towards an algae-dominated, degraded reef state. Continued coral mortality at Shelly Beach (MS4) is evident by small patches of corals in boulders that were once thriving and increased macro and turf algae colonization in the reef area (Figure 10). Only Eight (8) genera of corals were recorded at both Mombasa Marine Park and Reserve and Shelly Beach area. The low cover of crustose coralline algae observed at both monitoring stations

may indicate reduced herbivory within the reef ecosystem. In the absence of other potential stressors such as sedimentation or high turbidity, which are typically associated with declines in crustose coralline algae, the reduced cover is most likely attributed to limited grazing pressure from herbivorous fish and invertebrates. Sand substrate was only recorded at Shelly Beach (MS4) (10.0% ± 2.9) while rubbles were only recorded in Mombasa Marine Park and Reserve (3.3% ± 1.7) (Figure 9).

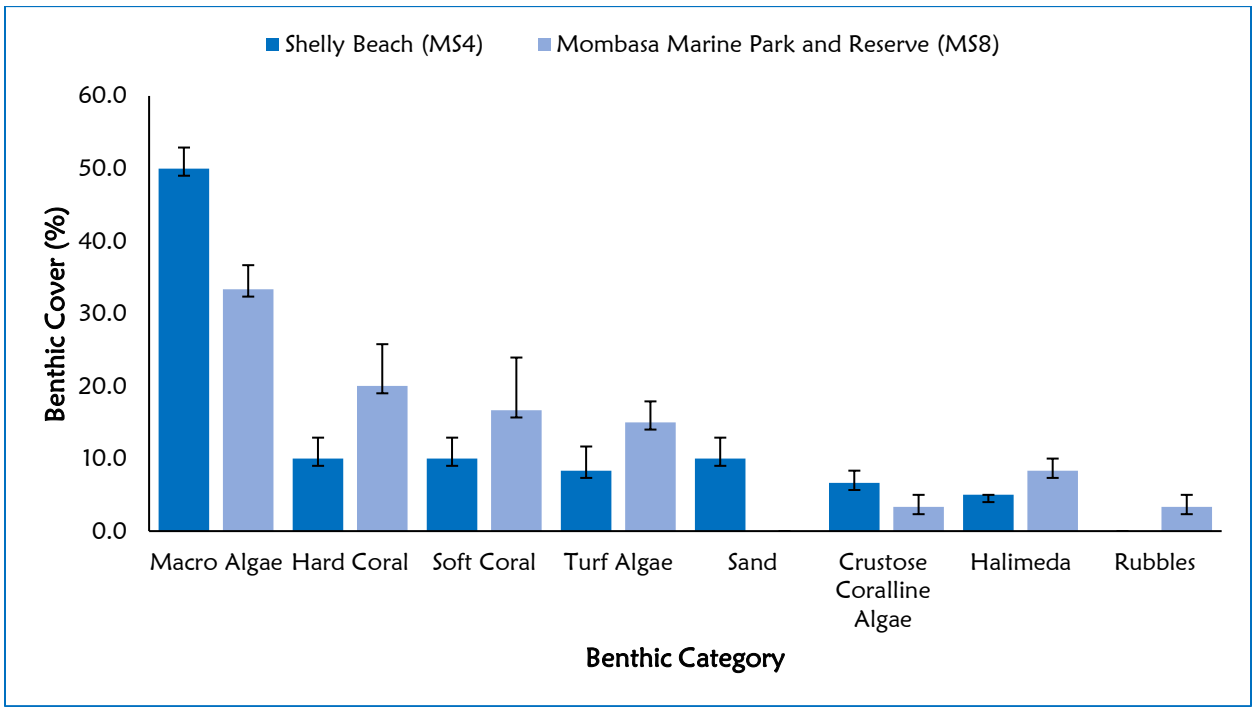


Figure 9: Benthic substrate characteristics at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, November 2025)

Figure 10: Coral reef area getting dominated by macro algae and turf algae (left) and dying coral patches (right) at Shelly Beach (MS4) (Source: Envasses, November 2025)

5.2.2.2 Fish abundance

A total of 36 species were recorded from both Mombasa Marine Park and Reserve (30 species) and Shelly Beach (16 species). Mombasa Marine Park and Reserve (MS8) recorded very high fish density (41.7 ± 10.1 indiv. / 250m²) while Shelly beach recorded relatively low fish density of 10.0 ± 10.0 indiv. /250m2 as maximum density. A total of 15 fish families were recorded from both Mombasa Marine Park and Reserve (14 fish families) and Shelly Beach (10 fish families). Pomacentridae (41.7 ± 10.1 indiv. /250m²), Lutjanidae (26.0 ± 9.9 indiv. /250m²) and Labridae (11.0 ± 2.3 indiv. /250m²) were the most abundant families at Mombasa Marine Park and Reserve (MS8) while Shelly Beach (MS4) was dominated by Pomacentridae (10.0 ± 10.0 indiv. /250m²), Acanthuridae (6.3 ± 0.7 indiv. /250m²) and Mullidae (5.3 ± 1.5 indiv. /250m²) respectively. Three common indicators of reef health such as Acanthuridae, Chaetodontidae and Scaridae fish families were present at both monitoring stations but at relatively low density. Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) recorded relatively low densities of planktivorous family Acanthuridae; 9.3 ± 2.0 indiv. /250m² and 6.3 ± 0.7 indiv. /250m²) respectively (Figure 11).

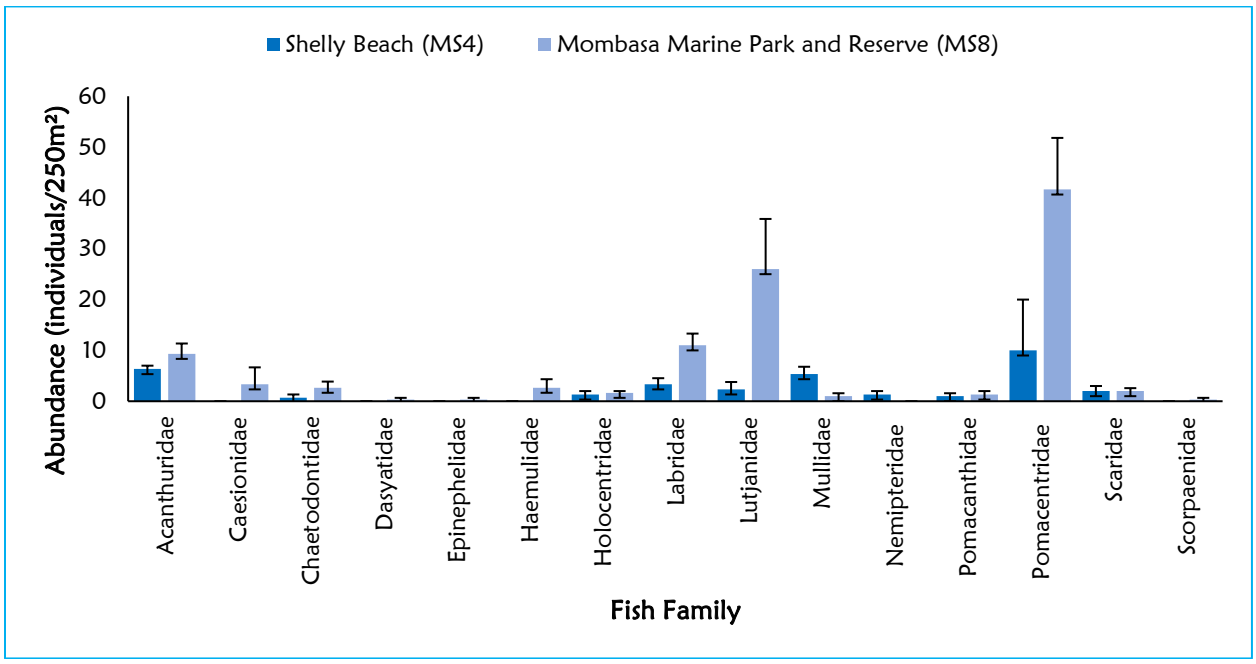


Figure 11: Fish species density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, November 2025)

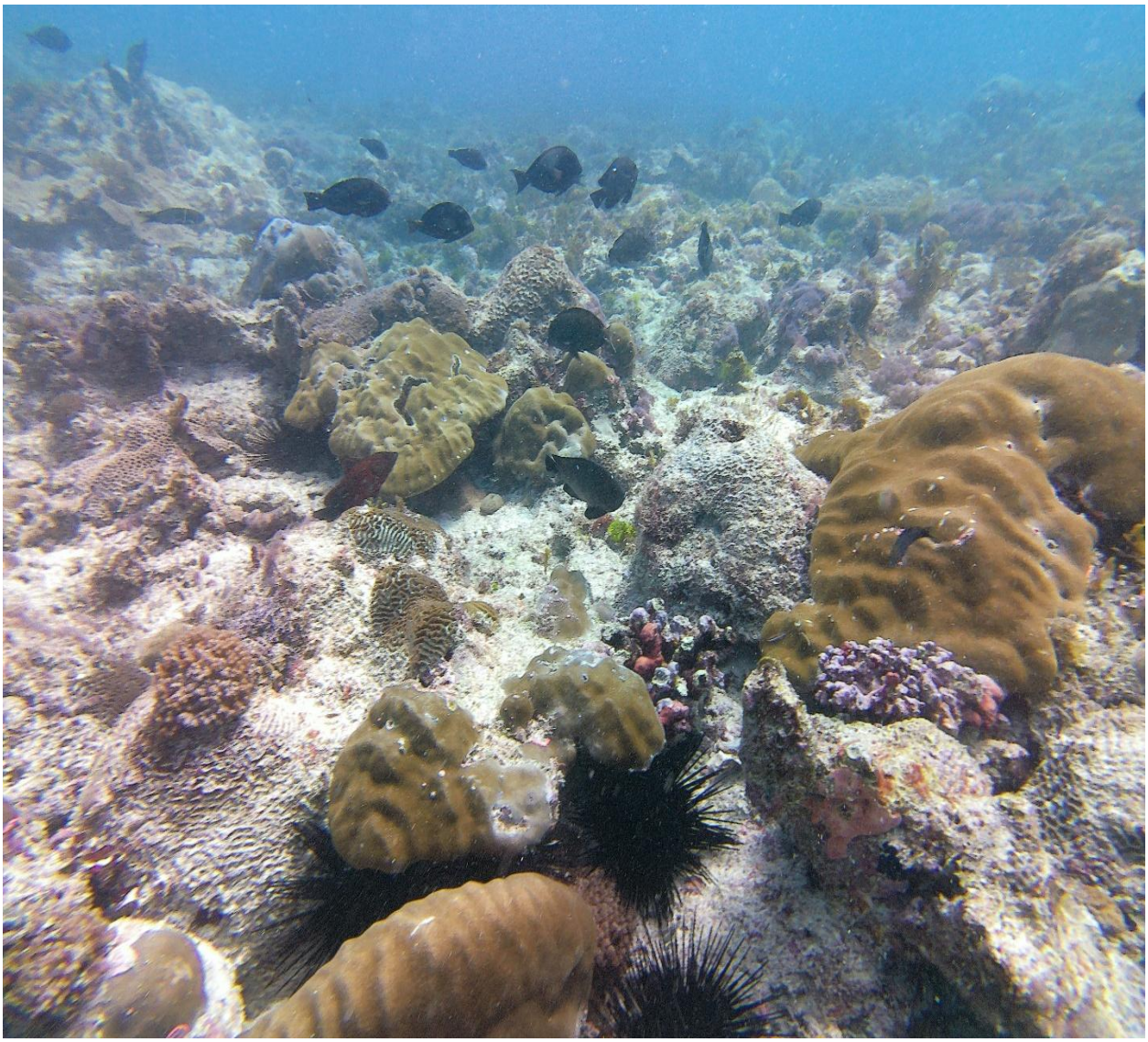


Figure 12: Pomacentridae (*Dascyllus trimaculatus*) at Shelly Beach (MS4) (Source: Envasses, November 2025)

5.2.2.3 Invertebrate species

Eleven invertebrates' taxa were observed at both Mombasa Marine Park and Reserve (7 taxa) and Shelly Beach (7 taxa). Echinometridae dominated both Mombasa Marine Park and Reserve (6.3 ± 1.9 indiv. /250m²) and Shelly Beach (17.0 ± 6.0 indiv. /250m²) (Figure 13). This may signify a stressed or environmentally disturbed ecosystem, often linked to overfishing, reduced fish populations that prey on urchins, and the potential for increased bioerosion in both monitoring stations.

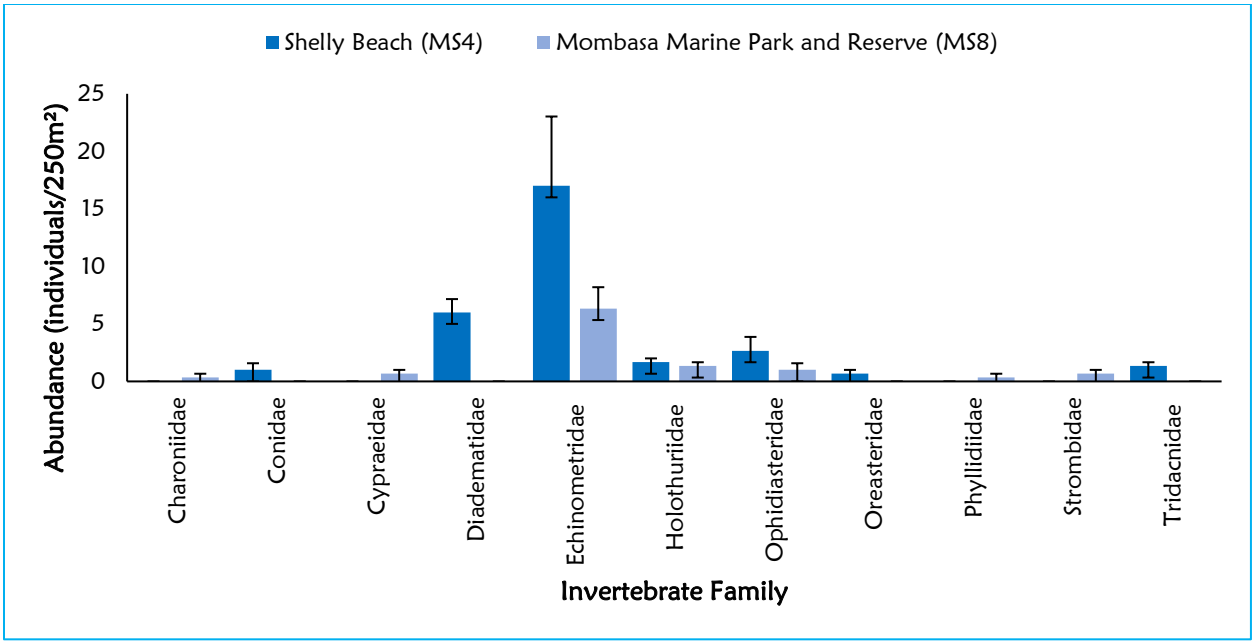


Figure 13: Invertebrates density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, November 2025)

Figure 14: Cypraeidae (*Cypraea tigris*) at Mombasa Marine Park and Reserve (MS8) (left) and Oreasteridae (*Culcita novaeguineae*) at Shelly Beach (MS4) (right) (Source: Envasses, November 2025)

5.2.2.4 Endangered species

The monitoring reported sighting of endangered species, Holothuriidae (Black Sea cucumber) within the Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4).

6 Conclusion

The findings of the monthly monitoring activities are consistent with the baseline values. Water quality parameters were all within the Environmental Monitoring Plan threshold values set for KPA Mombasa Port modernization projects. Biological monitoring results reflect expected ecological variability, with trends generally aligned to baseline conditions and previous months' observations. The dominance of macro algae and the presence of turf algae at both stations indicate persistent

ecological pressures, including reduced herbivory, fishing activity and nutrient enrichment. Coral cover remains comparatively higher at Mombasa Marine Park and Reserve, while Shelly Beach continues to show signs of coral stress and localized degradation. Fish and invertebrate assemblages similarly highlight healthier, more diverse communities within the Mombasa Marine Park and Reserve relative to Shelly Beach, where lower densities and signs of ecological disturbance, particularly elevated sea urchin populations, suggest ongoing anthropogenic and natural pressures. The sighting of endangered species such as Black Sea cucumber (*Holothuria atra*) in both monitoring stations underscores the ecological value of the surveyed areas and the continued need for implementing environmental mitigation measures throughout the project cycle. The findings from this monitoring period show no significant deviation from baseline conditions and confirm that project activities remain within acceptable environmental performance targets.