	CHINA COMMUNICATIONS CONSTRUCTION COMPANY CCCC CONSTRUCTION OF BERTH 19B AND ASSOCIATED INFRASTRUCTURE
ENGINEERING, PROCUREMENT AND CONSTRUCTION OF BERTH 19B AND ASSOCIATED INFRASTRUCTURE TENDER NO. KPA/004/2024-2025/PDM	DOCUMENT NO. **CCCC/BERTH 19B/EMP/03** **A1**
3RD MONTHLY ENVIRONMENTAL MONITORING REPORT **20TH September – 19TH October 2025**	

3RD MONTHLY ENVIRONMENTAL MONITORING REPORT

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

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

3rd Monthly Environmental Monitoring Report

September/October 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 first quarter of monitoring (20th October – 19th November 2025), and will be included in the fourth 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 were 7.65 NTU and 25.82 mg/l, and 0 and 11.88 mg/l for inshore and offshore monitoring stations respectively. The high turbidity and TSS 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 22 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 27th and 28th September 2025 recorded a high macro algae cover of 70.0% ± 2.9 at Mombasa Marine Park and Reserve (MS8) and 33.3% ± 3.3 at Shelly Beach (MS4). Soft corals accounted for 13.3% ± 3.3 and 21.7% ± 4.4 in Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) respectively. Monitoring conducted between 11th and 12th October 2025 recorded a high cover of soft corals (38.3% ± 4.4) and macro algae (23.3% ± 1.7) at Mombasa Marine Park and Reserve (MS8). In contrast, macro algae (48.3% ± 1.7) exhibited the highest percentage cover followed by soft corals (11.7% ± 1.7) at Shelly Beach (MS4). Fish family density was generally low and high in Mombasa Marine Park and Reserve, with 10.3 ± 8.4 indiv. /250m² and 43.3± 23.3 indiv. /250m² recorded during monitoring conducted on 27th to 28th September and 11th to 12th October 2025, respectively. At Shelly Beach (MS4), fish family density was relatively low, with 28.0 ± 9.3 indiv. /250m² and 7.0 ± 1.0 indiv. /250m² recorded during monitoring conducted on 27th to 28th September and 11th to 12th October 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
NEMA	National Environment Management Authority
SCUBA	Self-Contained Underwater Breathing Apparatus
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 third monthly report covering the period between 20th September – 19th October 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 daily from 21st September – 18th October 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. The monitoring activities scheduled for 20th September 2025 was suspended due to ongoing dredging operations during that period. Additionally, the planned dates of 28th September, 5th October, 12th October, and 19th October 2025 coincided with Sundays, when monitoring activities are not currently conducted.

3 Biological monitoring

Biological communities monitoring was carried out on 27th – 28th September and 11th – 12th October 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 the first quarter of monitoring (20th October – 19th November 2025), and will be included in the fourth monthly report.

5 Results

5.1 Water quality monitoring from 21st September – 18th October 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 (21st September – 18th October 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, September/October 2025).

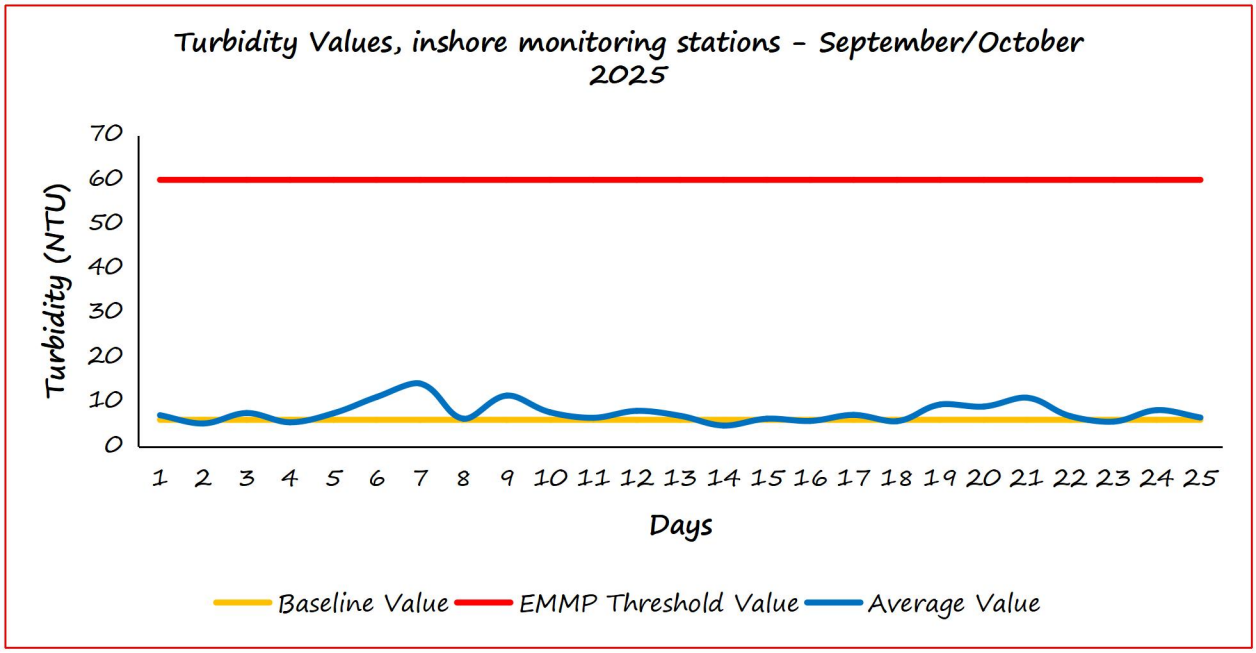
Parameters	Average Value	Baseline Value	EMMP Threshold Value	Comments
pH	7.97	7.95	6.6-8.8	All results are within the EMMP threshold value
Dissolved Oxygen	5.01	5.32	>4 mg/l	
Turbidity	7.65	6.02	+60 NTU	
Total Suspended Solids	25.82	16.13	+60 mg/l	
Chemical Oxygen Demand	15.31	10.46	50 mg/l	
Perspective Degree	0.35	0.33	-	

Table 2: Summary of the offshore (MS 4-8) monthly (21st September – 18th October 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, September/October 2025).

Parameters	Average Value	Baseline Value	EMMP Threshold Value	Comments
pH	8.09	8.10	6.6-8.8	All results are within the EMMP threshold value
Dissolved Oxygen	7.05	6.77	>4 mg/l	
Turbidity	0	0	+60 NTU	
Total Suspended Solids	11.88	9.06	+60 mg/l	
Chemical Oxygen Demand	11.40	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, September/October 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	7.94	16.2	4.95	0.32	27.38	8.29
	3	7.91	14.78	4.97		23.75	8.11
	8	7.96	15.62	4.93		24.84	7.63
MS2	0.5	7.97	15.5	5.07	0.38	25.39	8.19
	3	7.97	15.34	5.01		26.53	7.50
	8	7.97	15.68	5.06		23.65	7.04
MS3	0.5	7.99	15.62	4.85	0.36	27.57	7.82
	3	7.99	14.56	4.97		26.12	7.06
	8	7.99	14.48	5.23		27.12	7.19
Offshore monitoring stations							
MS4	0.5	8.08	12.68	7.06	8.00	14.87	0.00
	3	8.08	12.74	7.06		14.29	0.00
	8	8.08	11.58	7.07		12.79	0.00
MS5	0.5	8.09	11.68	7.07	8.00	13.05	0.00
	3	8.08	11.76	7.08		12.99	0.00
	8	8.09	11.54	7.07		12.54	0.00
MS6	0.5	8.09	10.7	7.08	8.00	11.87	0.00
	3m	8.09	10.94	6.68		11.24	0.00
	8m	8.09	12.02	7.08		12.07	0.00
MS7	0.5	8.09	10.64	7.09	8.00	9.70	0.00
	3	8.09	10.3	7.09		8.68	0.00
	8	8.10	10.92	7.09		11.46	0.00
MS8	0.5	8.09	11.32	7.08	8.00	11.11	0.00
	3	8.09	11.22	7.09		10.95	0.00
	8	8.09	10.9	7.09		10.64	0.00



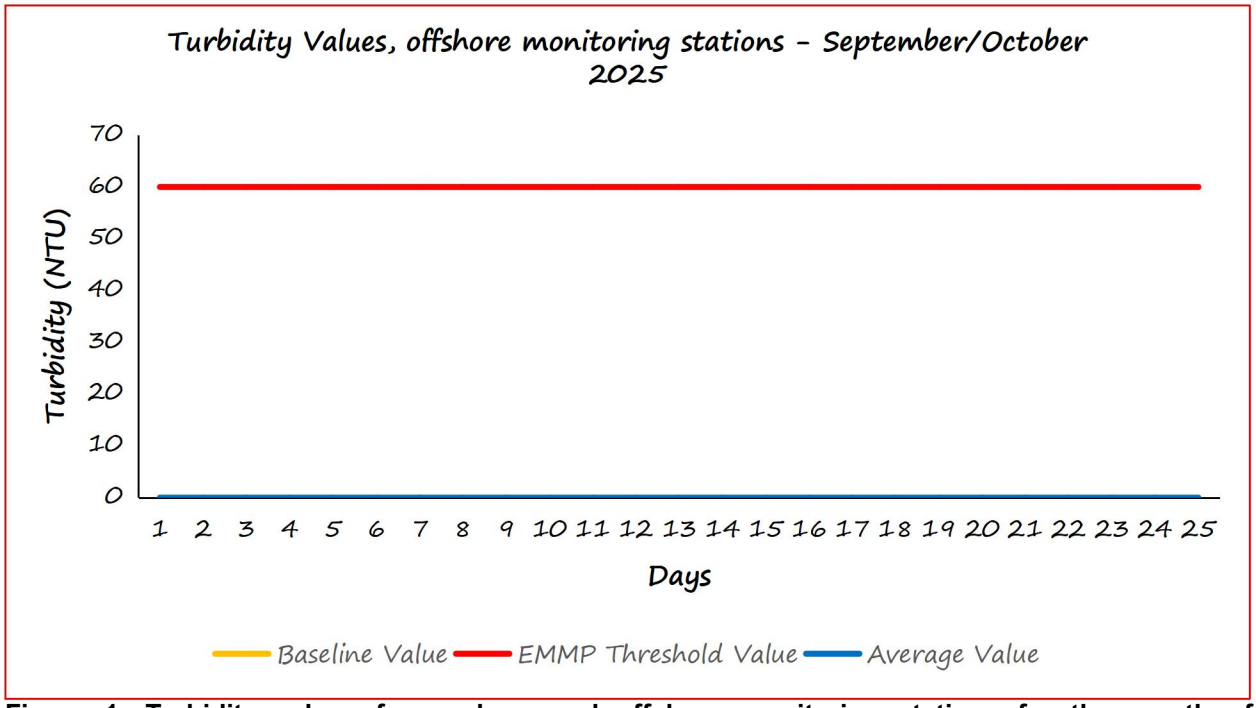


Figure 1: Turbidity values for onshore and offshore monitoring stations for the month of September/October 2025. The average value is the mean turbidity at -0.5m, -3.0m and -8.0m for the inshore and offshore monitoring stations (Data source: Lahvens Limited, September/October 2025).

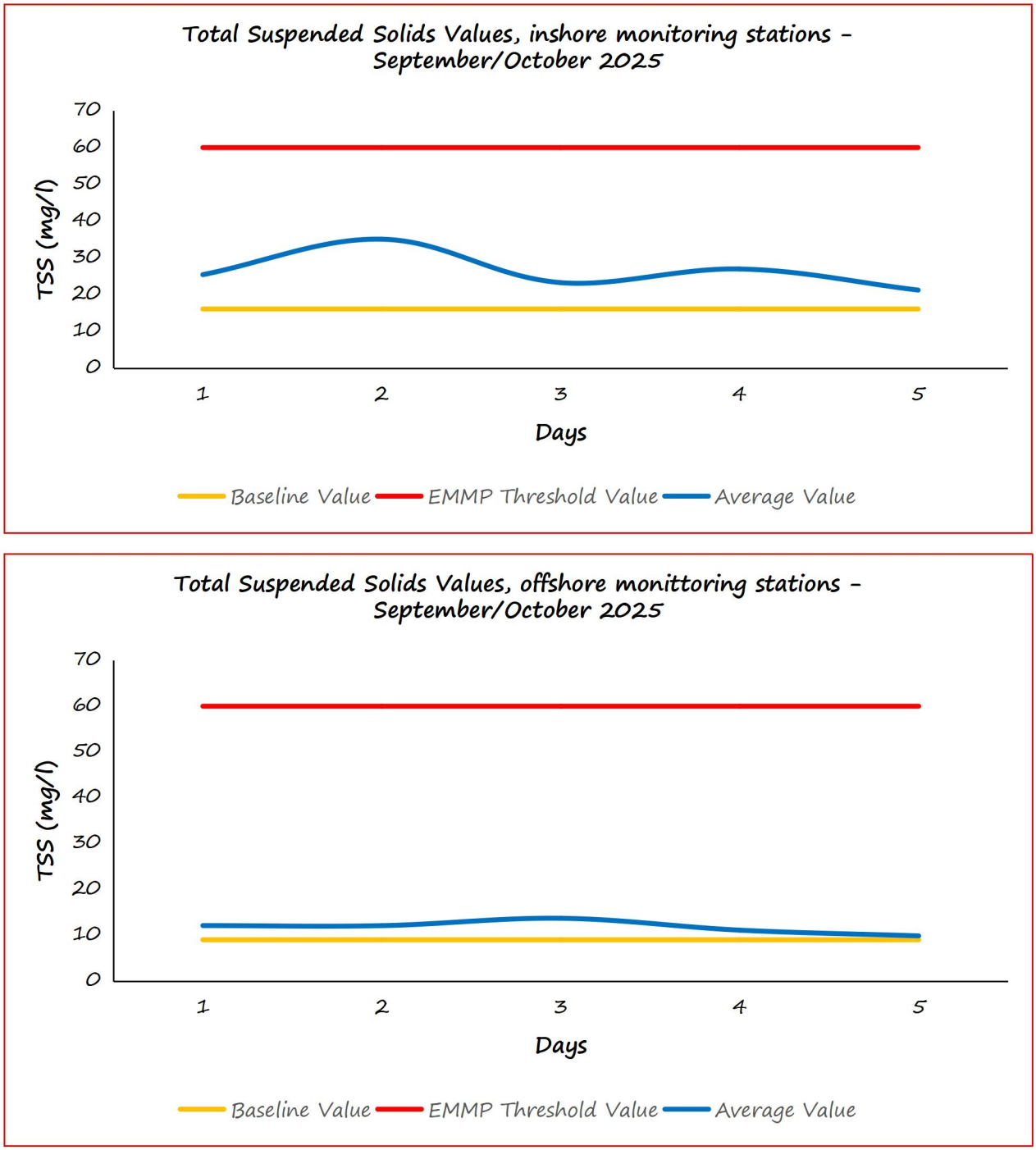


Figure 2: Total Suspended Solid values for inshore and offshore monitoring stations for the month of September/October 2025. The average value is the mean TSS at -0.5m, -3.0m and -8.0m for onshore and offshore monitoring stations (Data source: Lahvens Limited, September/October 2025).

5.2 Biological monitoring

The third monthly biological communities monitoring was undertaken on 27th – 28th September and 11th – 12th October 2025 targeting stations at Shelly Beach (MS4) area and Mombasa Marine Park and Reserve (MS8).

5.2.1 Biological monitoring between 27th and 28th September 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 7 major benthic categories; macro-algae, soft coral, hard coral, turf algae, halimeda, sand 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 – 15m. One transect was done along the 6m contour, another one at 11m contour while the third was done along 15m contour. Shelly Beach (MS4) survey was conducted at 8 – 12m depth as well, with the 3 contour transects running along 8m, 10m and 12m depth. Visibility was estimated at 11m at Mombasa Marine Park and Reserve and 15m at Shelly Beach. Total dive time was 78 minutes at Mombasa Marine Park and Reserve and 65 minutes at Shelly Beach.

5.2.1.1 Benthic substrate

Macro algae and soft corals were the dominant substrate types at both Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4), with macro algae recording 70.0% ± 2.9 (Mombasa Marine Park and Reserve (MS8)) and 33.3% ± 3.3 (Shelly Beach (MS4)), while soft corals accounted for 13.3% ± 3.3 and 21.7% ± 4.4 in Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) respectively. The pronounced dominance of macro algae in Mombasa Marine Park and Reserve (MS8) 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) (3.3% ± 1.7) and Shelly Beach (MS4) (8.3% ± 3.3), 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. Despite this observation, no recent coral mortality was recorded during the survey, indicating the absence of recent major disturbances. Furthermore, no coral bleaching incidents were observed at either site, a condition that may be attributed to the relatively low sea surface temperatures characteristic of the Southeast Monsoon (SEM) season. In total, eight coral genera were identified across both sites. Sand cover (3.3% ± 1.7) was only recorded at Shelly Beach (MS4) (Figure 3).

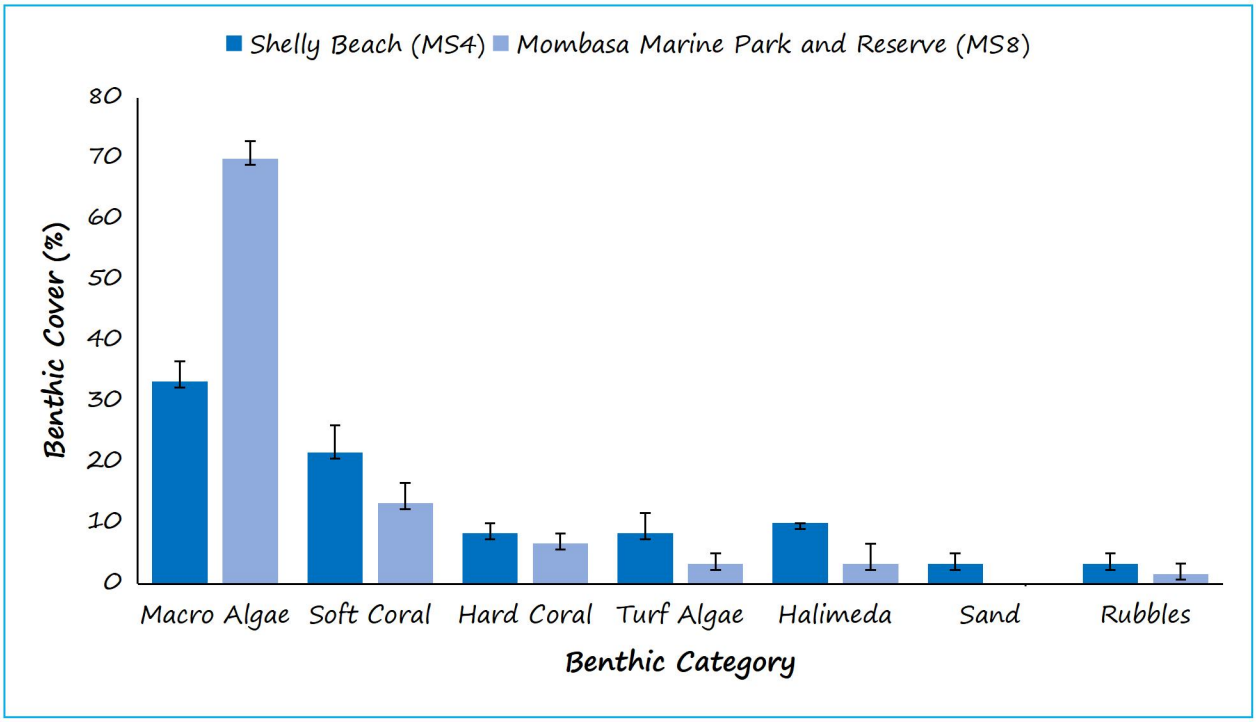
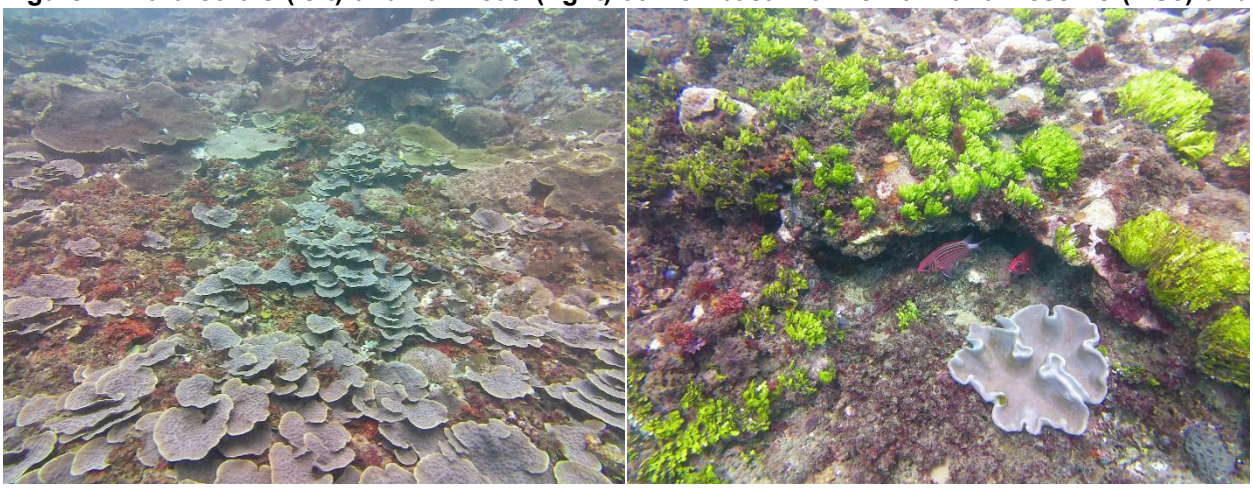


Figure 3: Benthic substrate characteristics at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, September 2025)

Figure 4: Hard corals (left) and halimeda (right) at Mombasa Marine Park and Reserve (MS8) and



Shelly Beach (MS4) respectively (Source: Envasses, September 2025)

5.2.1.2 Fish abundance

A total of 40 species were recorded from both Mombasa Marine Park and Reserve (20 species) and Shelly Beach (31 species). Shelly Beach (MS4) exhibited a relatively higher fish density (28.0 ± 9.3 indiv. /250m²), indicating a richer and more diverse fish assemblage compared to Mombasa Marine Park and Reserve (MS8) which recorded low fish density of 10.3 ± 8.4 indiv. /250m^2 as maximum density. A total of 16 fish families were recorded from both Mombasa Marine Park and Reserve (8 fish families) and Shelly Beach (16 fish families). Acanthuridae (10.3 ± 8.4 indiv. /250m²) and Pomacentridae (8.7 ± 8.7 indiv. /250m²) were the most abundant families at Mombasa Marine Park and Reserve (MS8) while in Shelly Beach (MS4), Pomacentridae (28.0 ± 9.3 indiv. /250m²) and Caesionidae (10.0 ± 10.0 indiv. /250m²) were the

most abundant. Three common indicators of reef health such as Acanthuridae and Chaetodontidae fish families were present at both monitoring stations, while Scaridae fish family was present only at Shelly Beach (MS4) in low densities. Both Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) recorded low densities of planktivorous family, Acanthuridae, 10.3 ± 8.4 indiv. /250m² and 4.3 ± 1.8 indiv. /250m² respectively (Figure 5).

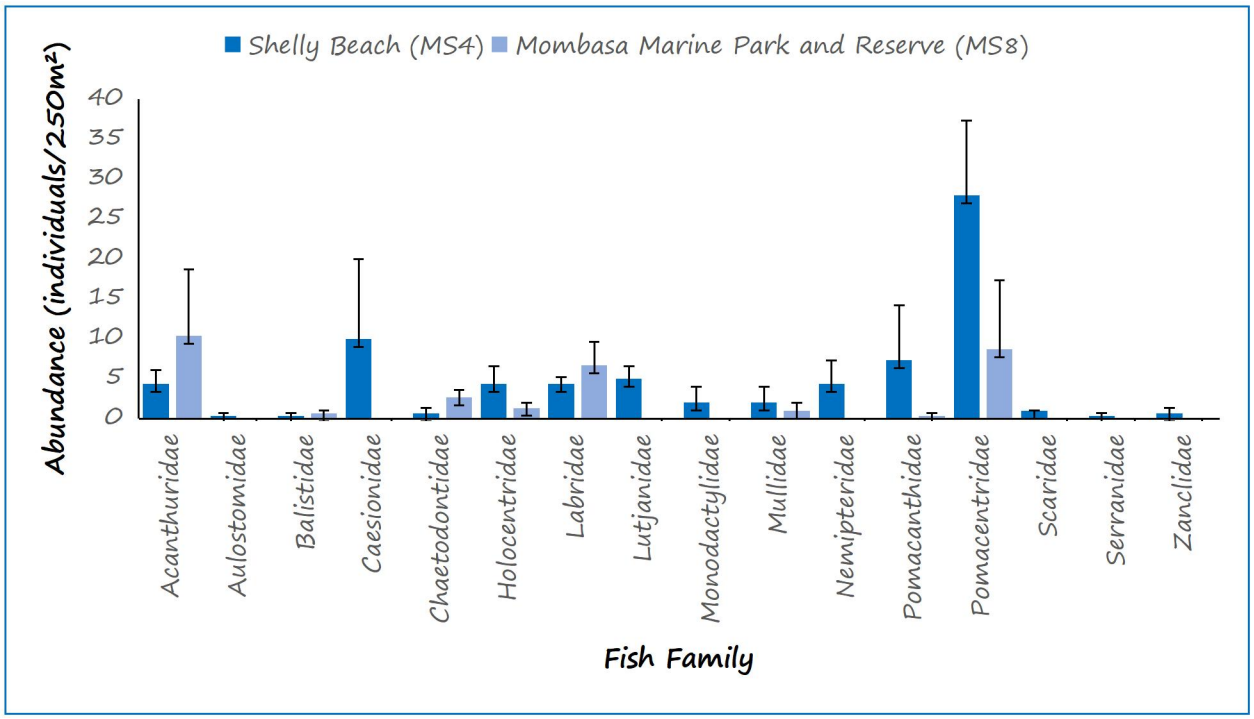


Figure 5: Fish species density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, September 2025)

Figure 6: Caesionidae (*Caesio xanthonota*) at Shelly Beach (MS4) (Source: Envasses, September 2025)

5.2.1.3 Invertebrate species

Seven invertebrates' taxa were observed at both Mombasa Marine Park and Reserve (4 taxa) and Shelly Beach (4 taxa). Ophidiasteridae dominated both Mombasa Marine Park and Reserve (0.7 ± 0.3 indiv. /250m²) and Shelly Beach (5.7 ± 1.5 indiv. /250m²). The Ophidiasteridae (*Linckia laevigata*) dominance generally signifies a healthy, well-functioning reef ecosystem with good water quality, sufficient food resources and minimal habitat disturbance. However, if their numbers rise dramatically alongside signs of predator decline, it could also hint at ecological imbalance or trophic simplification due to human impacts such as overfishing. Actiniidae (2.0 ± 2.0 indiv. /250m²), Diadematidae (1.3 ± 0.9 indiv. /250m²) and Echinometridae (1.7 ± 0.9 indiv. /250m²) were only recorded in Shelly Beach (MS4), while Mombasa Marine Park and Reserve (MS8) recorded Holothuriidae (0.7 ± 0.3 indiv. /250m²), Phyllidiidae and Strombidae (0.3 ± 0.3 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.

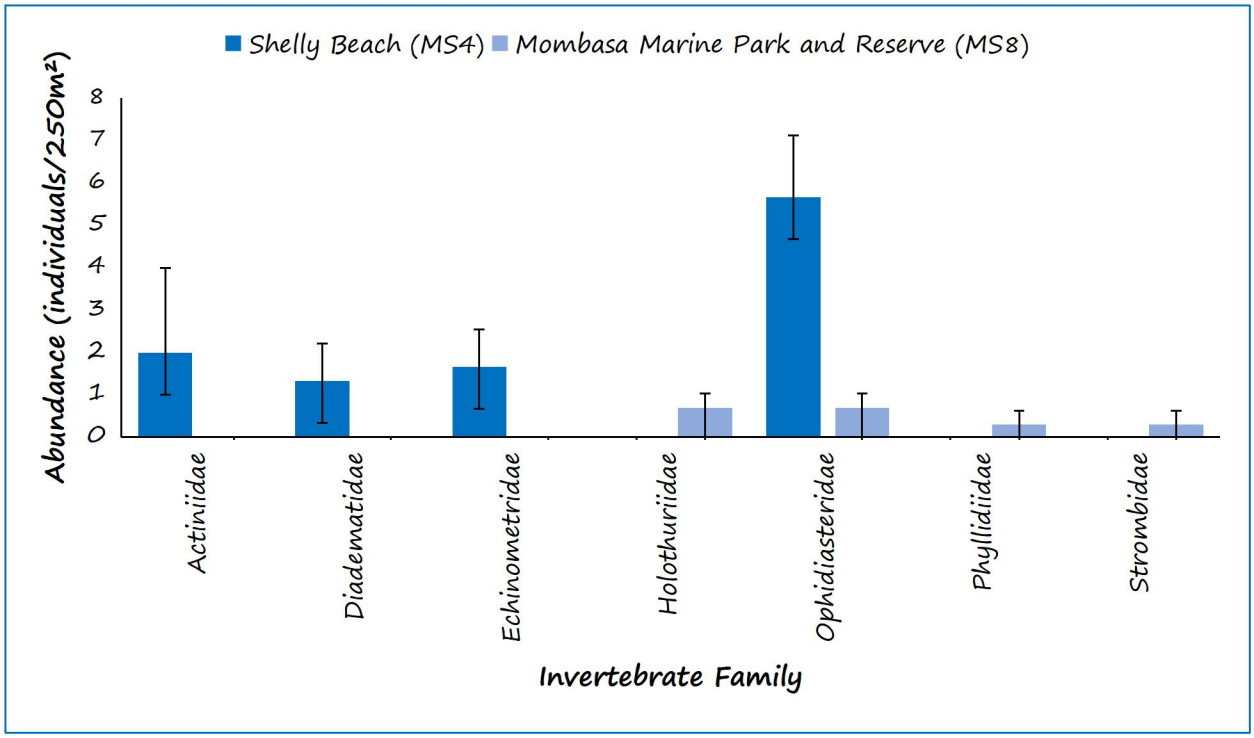


Figure 7: Invertebrates density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, September 2025)

Figure 8: Ophidiasteridae (*Linckia laevigata*) (left) and Sea anemone in Shelly Beach (Source: Envasses, September 2025)

5.2.1.4 Endangered species

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

5.2.2 Biological monitoring between 11th and 12th 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 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 7 major benthic categories; macro algae, soft coral, hard coral, sand, turf algae, crustose coralline algae, and halimeda 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 8 – 15m. One transect was done along the 8m contour, another one at 10m contour while the third was done along 15m contour. Shelly Beach (MS4) survey was conducted at 4 – 10m depth as well, with the 3 contour transects running along 4m, 7m and 10m depth. Visibility was estimated at 7m at Mombasa Marine Park and Reserve and 10m at Shelly Beach. Total dive time was 68 minutes at Mombasa Marine Park and Reserve and 71 minutes at Shelly Beach.

5.2.2.1 Benthic substrate

At Mombasa Marine Park and Reserve (MS8), soft corals were the dominant substrate type, accounting for 38.3% ± 4.4 of the total cover followed by macroalgae (23.3% ± 1.7). In contrast, at Shelly Beach (MS4), macroalgae exhibited the highest cover at 48.3% ± 1.7 followed by soft corals (11.7% ± 1.7). Hard coral percentage cover at both monitoring sites was relatively low with Mombasa Marine Park and Reserve (MS8) recording 13.3% ± 1.7 while Shelly Beach (MS4) recording 8.3% ± 1.7 cover percentages. The presence of turf algae at both sites, Mombasa Marine Park and Reserve (MS8) (13.3% ± 3.3) and Shelly Beach (MS4) (10.0% ± 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. Despite this observation, no recent coral mortality was recorded during the survey. 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).

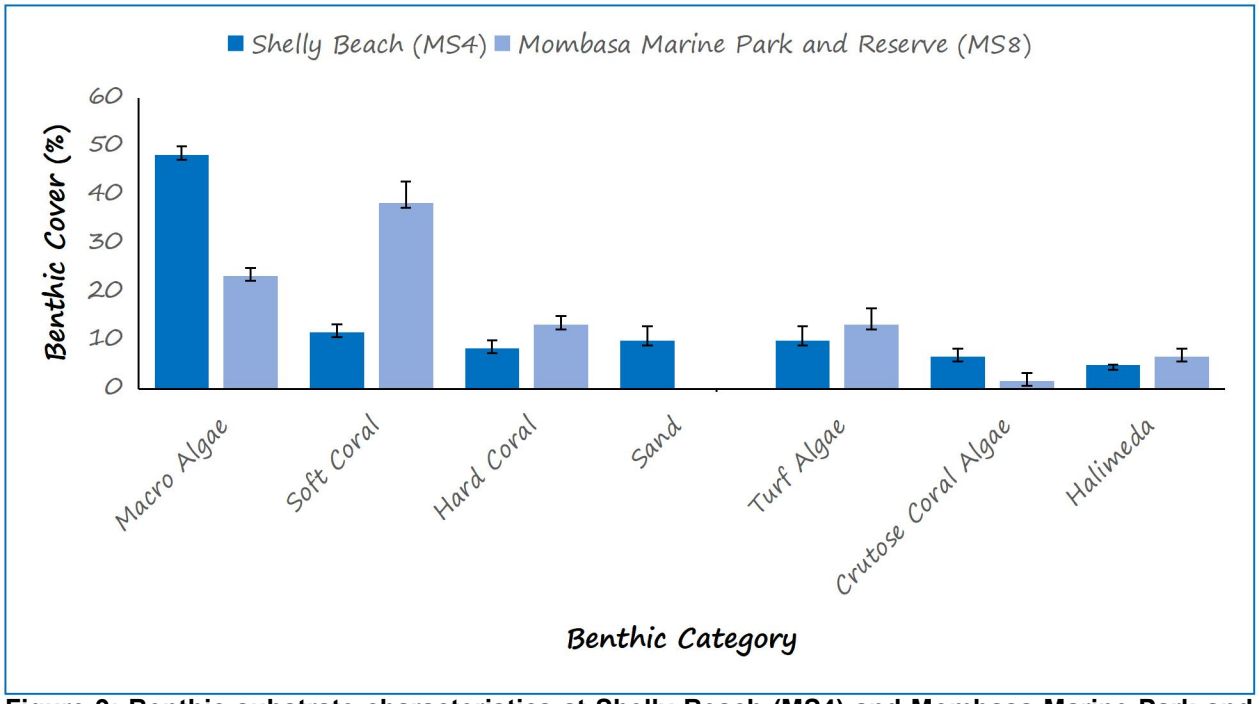


Figure 9: Benthic substrate characteristics at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

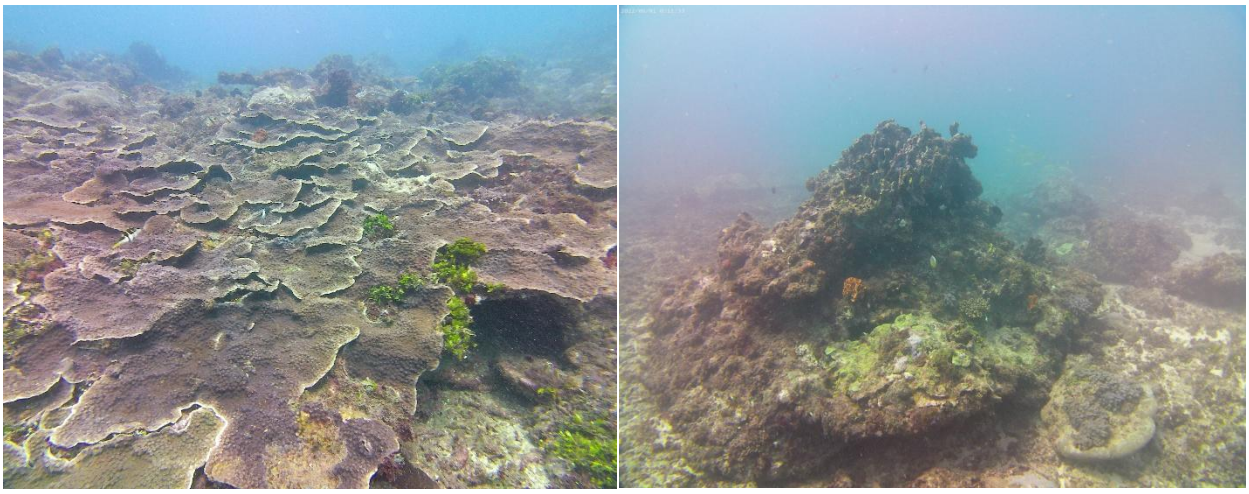


Figure 10: Coral cover at Mombasa Marine Park and Reserve (MS8) (left) and Shelly Beach (MS4) (right) (Source: Envasses, October 2025)

5.2.2.2 Fish abundance

A total of 36 species were recorded from both Mombasa Marine Park and Reserve (28 species) and Shelly Beach (19 species). Mombasa Marine Park and Reserve (MS8) recorded very high fish density (43.3± 23.3 indiv. / 250m²) while Shelly beach recorded relatively low fish density of 7.0 ± 1.0 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 (43.3 ± 23.3 indiv. /250m²), Lutjanidae (15.3 ± 4.8 indiv. /250m²) and Acanthuridae (9.0 ± 2.1 indiv. /250m²) were the most abundant families at Mombasa Marine Park and Reserve while Shelly beach was dominated by Acanthuridae (7.0 ± 1.0 indiv. /250m²),

Pomacentridae (6.7 ± 6.7 indiv. /250m²) and Labridae (6.7 ± 1.3 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; 9.0 ± 2.1 indiv. /250m² and 7.0 ± 1.0 indiv. /250m²) respectively (Figure 11).

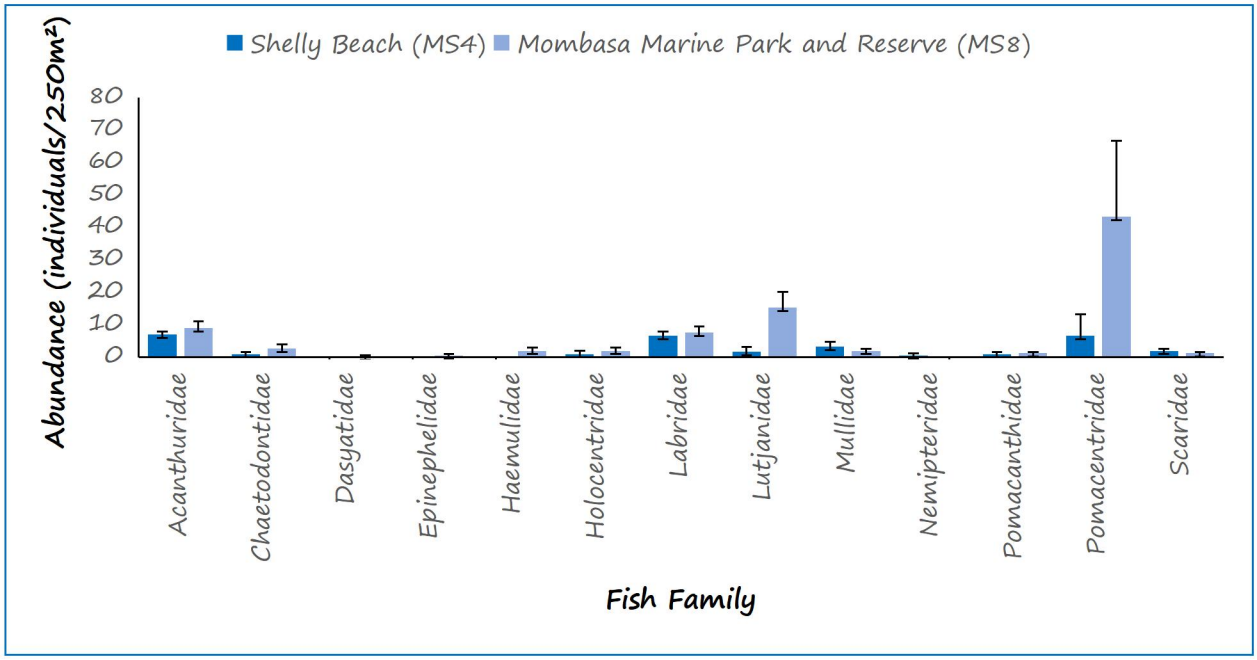


Figure 11: Fish species density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

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

5.2.2.3 Invertebrate species

Eight invertebrates' taxa were observed at both Mombasa Marine Park and Reserve (5 taxa) and Shelly Beach (6 taxa). Echinometridae dominated both Mombasa Marine Park and Reserve (5.7 ± 1.7 indiv. /250m²) and Shelly Beach (15.7 ± 2.6 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.

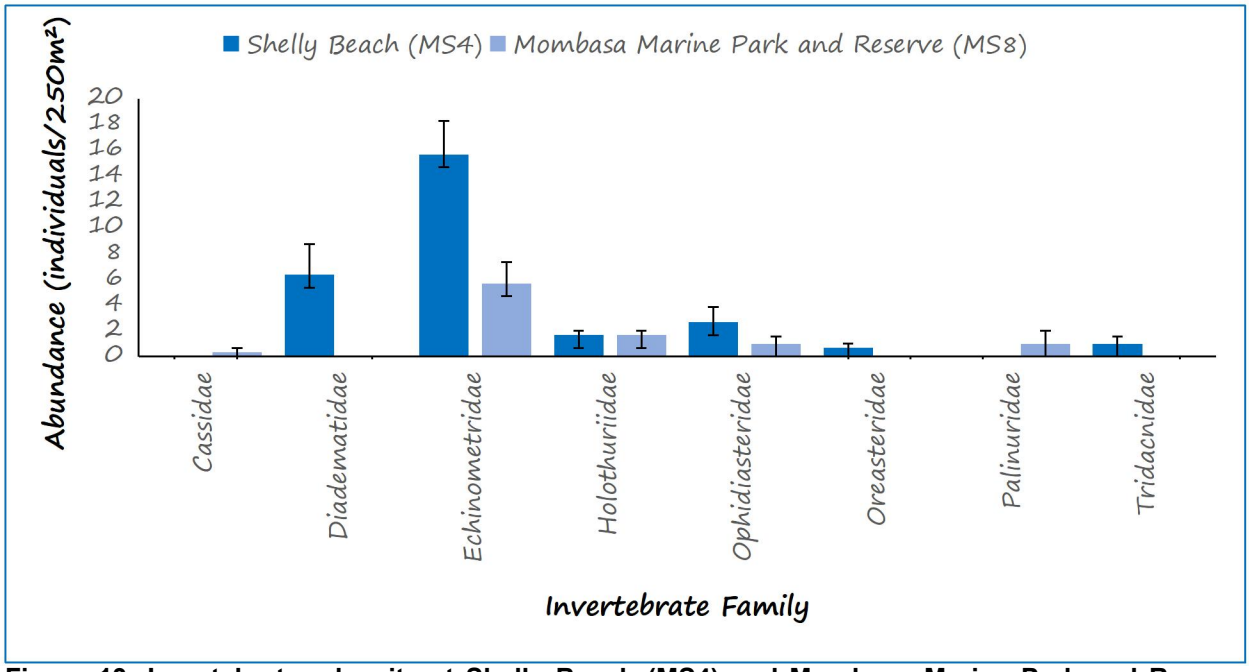


Figure 13: Invertebrates density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, October 2025)

Figure 14: Oreasteridae (*Culcita novaeguineae*) at Shelly Beach (MS4) (Source: Envasses, October 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 and biodiversity monitoring results respectively. Water quality parameters were all within the Environmental Monitoring Plan threshold values set for KPA Mombasa Port modernization projects. Biological monitoring revealed an increase in species diversity and density across benthic communities, fish and invertebrates. Notably, the presence of an endangered invertebrate species, the Black Sea Cucumber (Holothuriidae) was recorded, underscoring the rich biodiversity of the area and the importance of implementing environmental mitigation measures throughout the project cycle.