






CHINA COMMUNICATIONS CONSTRUCTION COMPANY
MOMBASA PORT BERTH 19B AND ASSOCIATED INFRASTRUCTURE PROJECT



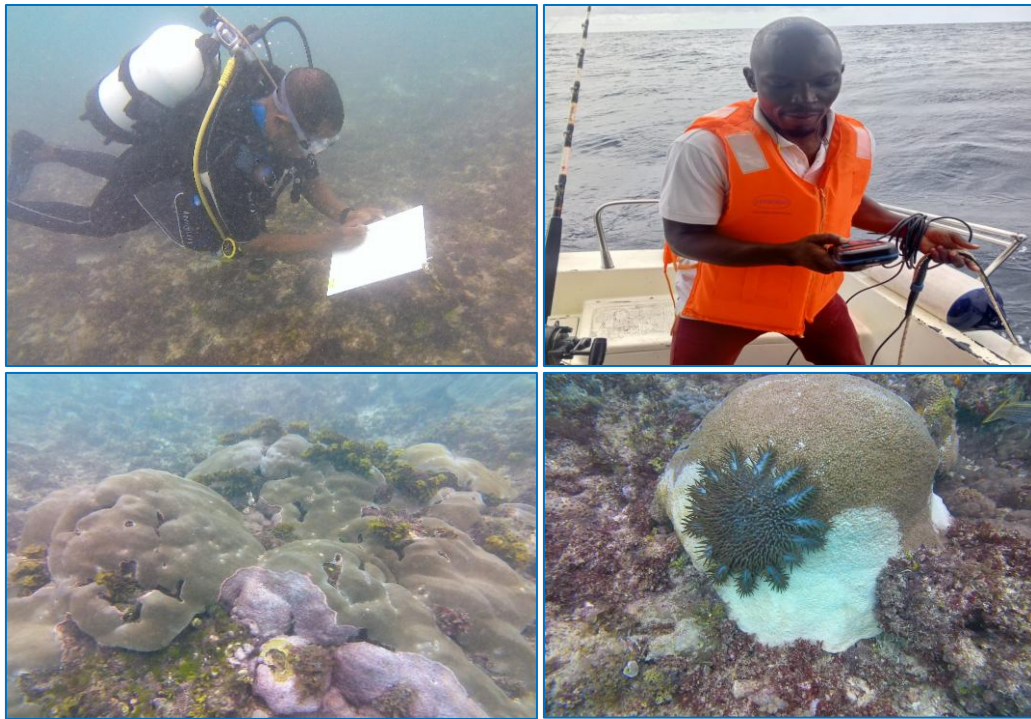
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| PROPOSED CONSTRUCTION OF BERTH 19B AND ASSOCIATED INFRASTRUCTURE (KPA/004/2024-25/PDM) | DOCUMENT NO. CCCC/19B/HSE/09 |
| 1st Monthly Environmental Monitoring Report 20th July – 19th August 2025 | REV. A01 |

1st Monthly Environmental Monitoring Report (20th July – 19th August 2025)

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| A01 | 2.Sep.2025 | for Approval |  Simon Nzuki |  David Leo |  YU FUJIA |
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Environmental Management and Monitoring Plan for Civil and Construction Works at Mombasa Port Berth 19B and Associated Infrastructure



1st Monthly Environmental Monitoring Report

July/August 2025

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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 first monthly report covering the period between 20th July – 19th August 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 20th July – 19th August 2021 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.

3 Biological monitoring

Biological communities monitoring was carried out on 2nd – 3rd August and 16th – 17th August 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 20th July – 19th August 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. There was significant change in the parameters reported at inshore monitoring stations with a maximum record of turbidity (88.03 NTU) on the sixth day of monitoring, exceeding the EMMP threshold value (Figure 1). Offshore monitoring stations reported insignificant change in parameters and the records are within the EMMP threshold value. The results are within the EMMP threshold values except for the sixth day inshore turbidity record (Figure 1 and 2).

Table 1: Summary of the inshore (MS 1-3) monthly (20th July – 19th August 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, July/August 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 | 6.03 | 5.32 | >4 mg/l | |
| Turbidity | 14.49 | 6.02 | +60 NTU | |
| Total Suspended Solids | 19.81 | 16.13 | +60 mg/l | |
| Chemical Oxygen Demand | 13.73 | 10.46 | 50 mg/l | |
| Perspective Degree | 0.38 | 0.33 | - | |

Table 2: Summary of the offshore (MS 4-8) monthly (20th July – 19th August 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, July/August 2025).

| Parameters | Average Value | Baseline Value | EMMP Threshold Value | Comments |
|------------------------|---------------|----------------|----------------------|---|
| pH | 8.01 | 8.10 | 6.6-8.8 | All results are within the EMMP threshold value |
| Dissolved Oxygen | 7.01 | 6.77 | >4 mg/l | |
| Turbidity | 0 | 0 | +60 NTU | |
| Total Suspended Solids | 8.53 | 9.06 | +60 mg/l | |
| Chemical Oxygen Demand | 10.01 | 8.28 | 50 mg/l | |
| Perspective Degree | 8.00 | 8.00 | - | |

Table 3: Detailed baseline water quality monitoring results for inshore and offshore monitoring stations across the water column (Source: Lahvens (K) Limited, July/August 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 | 12.88 | 6.16 | 0.33 | 15.38 | 18.32 |
| | 3 | 7.96 | 14.13 | 6.04 | | 17.34 | 17.55 |
| | 8 | 7.97 | 14.45 | 5.85 | | 15.98 | 17.90 |
| MS2 | 0.5 | 7.98 | 14.03 | 6.18 | 0.35 | 20.99 | 15.29 |
| | 3 | 7.98 | 13.10 | 6.05 | | 23.84 | 12.69 |
| | 8 | 7.99 | 12.68 | 5.95 | | 23.72 | 12.25 |
| MS3 | 0.5 | 7.97 | 13.83 | 6.19 | 0.45 | 19.75 | 12.85 |
| | 3 | 7.98 | 14.38 | 5.94 | | 21.04 | 11.68 |
| | 8 | 7.99 | 14.15 | 5.95 | | 20.29 | 11.87 |
| Offshore monitoring stations | | | | | | | |
| MS4 | 0.5 | 7.99 | 10.83 | 6.96 | 8.00 | 8.23 | 0.00 |
| | 3 | 7.99 | 10.90 | 6.96 | | 7.96 | 0.00 |
| | 8 | 7.99 | 11.05 | 6.97 | | 9.41 | 0.00 |
| MS5 | 0.5 | 8.01 | 9.93 | 6.96 | 8.00 | 7.31 | 0.00 |
| | 3 | 8.01 | 9.90 | 7.01 | | 9.02 | 0.00 |
| | 8 | 8.02 | 9.73 | 7.02 | | 9.18 | 0.00 |
| MS6 | 0.5 | 7.99 | 9.68 | 6.98 | 8.00 | 8.42 | 0.00 |
| | 3m | 8.02 | 9.05 | 7.01 | | 9.93 | 0.00 |
| | 8m | 8.02 | 9.08 | 7.03 | | 9.20 | 0.00 |
| MS7 | 0.5 | 8.01 | 9.63 | 7.01 | 8.00 | 8.66 | 0.00 |
| | 3 | 8.01 | 11.10 | 7.01 | | 8.84 | 0.00 |
| | 8 | 8.01 | 11.75 | 7.04 | | 8.17 | 0.00 |
| MS8 | 0.5 | 7.99 | 9.20 | 6.98 | 8.00 | 5.81 | 0.00 |
| | 3 | 8.00 | 9.48 | 7.04 | | 8.45 | 0.00 |
| | 8 | 8.02 | 8.83 | 7.09 | | 9.33 | 0.00 |

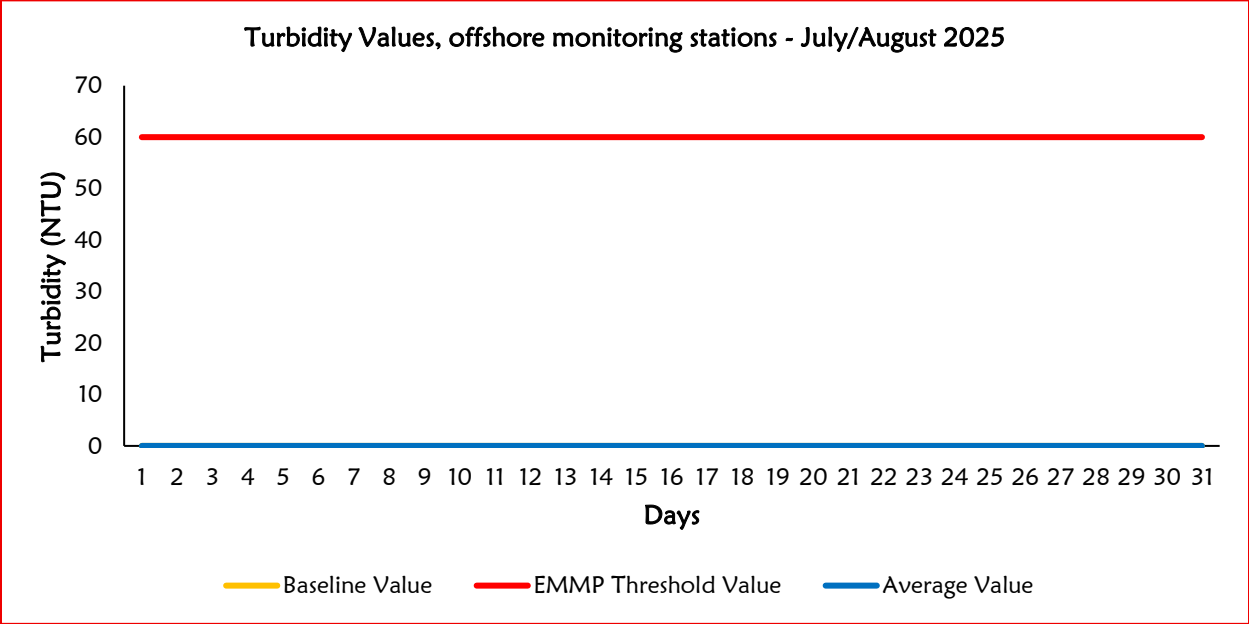
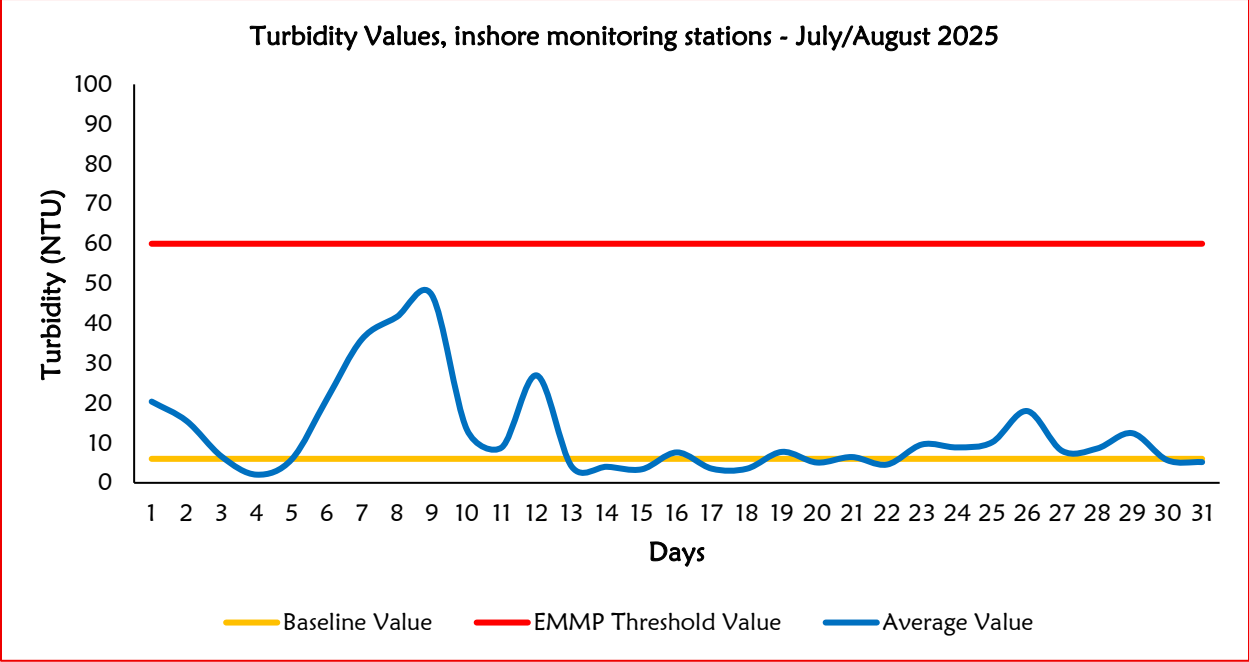


Figure 1: Turbidity values for onshore and offshore monitoring stations for the month of July/August 2025. The average value is the mean turbidity at -0.5m, -3.0m and -8.0m for the inshore and offshore monitoring stations (Data source: Lahvens Limited, July/August 2025).

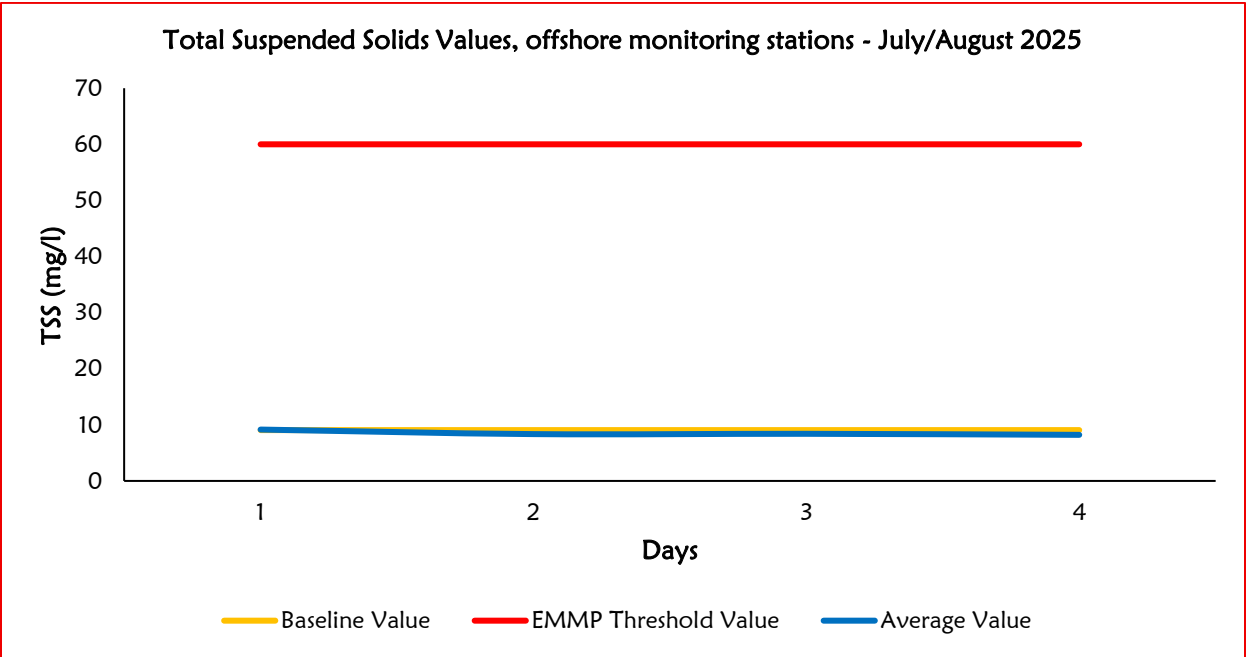
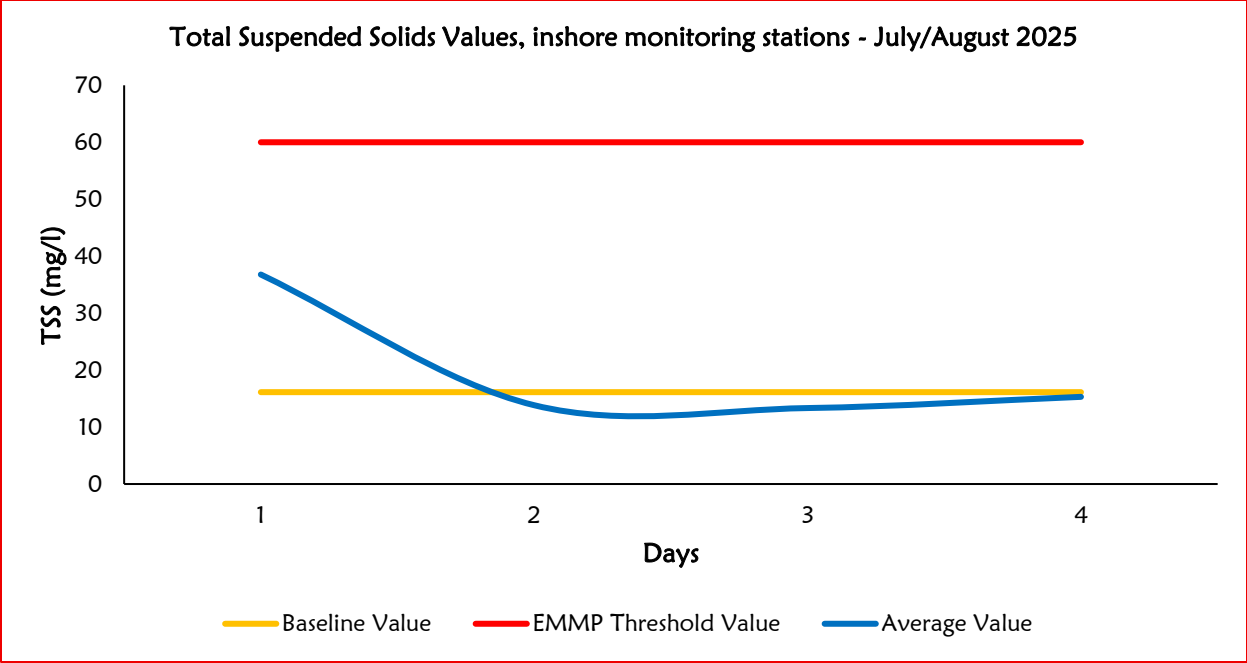


Figure 2: Total Suspended Solid values for inshore and offshore monitoring stations for the month of July/August 2025. The average value is the mean TSS at -0.5m, -3.0m and -8.0m for onshore and offshore monitoring stations (Data source: Lahvens Limited, July/August 2025).

5.2 Biological monitoring

The first monthly biological communities monitoring was undertaken on 2nd – 3rd August 2025 and 16th – 17th August 2025 targeting stations at Shelly Beach (MS4) area and Mombasa Marine Park and Reserve (MS8).

5.2.1 Biological monitoring between 2nd and 3rd August 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, sand, turf algae, crustose coralline algae, bare rock and rubbles were assessed using a point-intercept method to 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 × 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 (neap tide) between 8.00 am and 10.00 am at both sites to maximize sea conditions. The survey at Mombasa Marine Park and Reserve (MS8) was conducted at depths 9 – 14m. One transect was done along the 9m contour, another one at 12m contour while the third was done along 14m contour. Shelly Beach (MS4) survey was conducted at 6 – 12m depth as well, with the 3 contour transects running along 6m, 9m and 12m depth. Visibility was estimated at 10m at Mombasa Marine Park and Reserve and 12m at Shelly Beach. Total dive time was 52 minutes at Mombasa Marine Park and Reserve and 61 minutes at Shelly Beach.

5.2.1.1 Benthic substrate

Hard coral (30.0% ± 5.0), soft coral (22.5% ± 2.5) and macro algae (17.5% ± 7.5) were the dominant substrate type at Mombasa Marine Park and Reserve (MS8), while macro algae (41.7% ± 3.4), sand (22.5% ± 2.5) dominated Shelly Beach (MS4) in percentage cover. Hard and soft coral at Shelly Beach (MS4) was low with a percentage cover of 8.3% ± 1.7 and 7.5% ± 2.5 respectively (Figure 3). Turf algae are early colonisers of degraded substrate previously with soft or hard corals and maybe indicative of changing dominance of the desirable soft and hard corals states. However, no recent mortality was observed on this survey that would have suggested recent disturbances. No coral bleaching incidence was observed at either site, this may be attributed to the low sea surface temperature being experienced during SEM season. August usually records the lowest temperature (Average of 24.1°C). Only Eight (8) genera of corals were recorded at both Mombasa Marine Park and Reserve and Shelly Beach area.

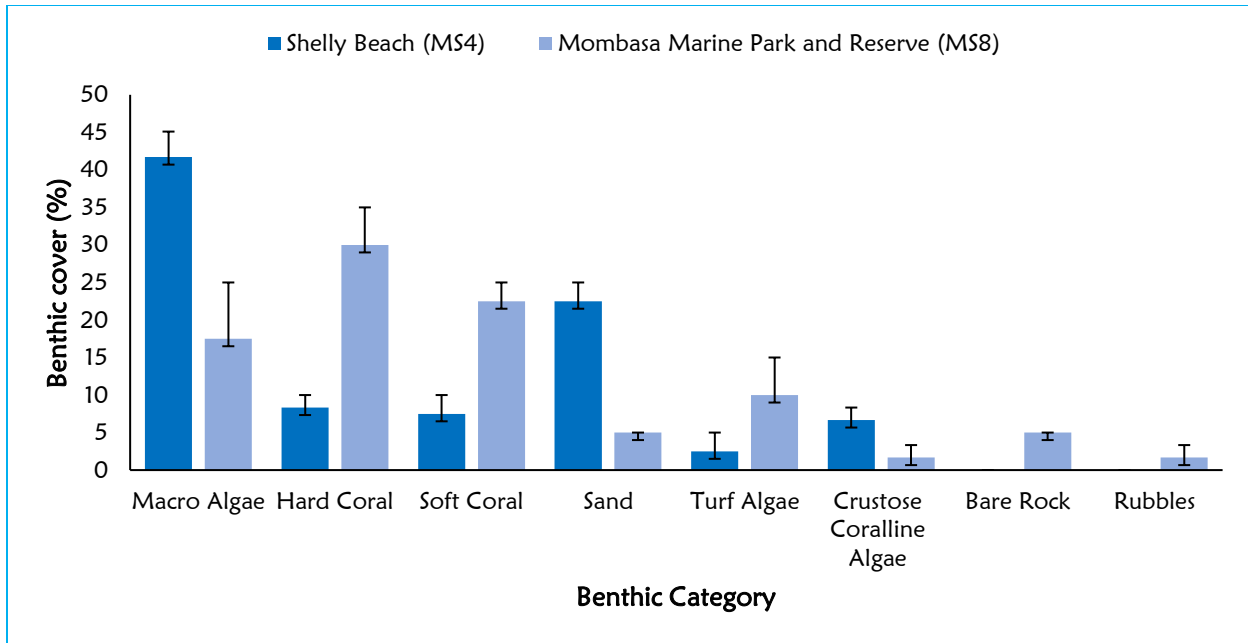


Figure 3: Benthic substrate characteristics at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)



Figure 4: Hard and soft coral at Mombasa Marine Park and Reserve (MS8) (left) and Shelly Beach (MS4) (right) (Source: Envasses, August 2025)

5.2.1.2 Fish abundance

A total of 27 species were recorded from both Mombasa Marine Park and Reserve (26 species) and Shelly Beach (19 species). Mombasa Marine Park and Reserve (MS8) recorded high fish density (45.0 ± 5.0 indiv. / 250m^2) while Shelly Beach (MS4) recorded very low fish density of 9.0 ± 0.5 indiv. / 250m^2 as maximum density. A total of 13 fish families were recorded from both Mombasa Marine Park and Reserve (11 fish families) and Shelly Beach (10 fish families). Pomacentridae (45.0 ± 5.0 indiv. / 250m^2) and Lutjanidae (23.3 ± 7.3 indiv. / 250m^2) were the most abundant families at Mombasa Marine Park and Reserve (MS8), while Shelly Beach (MS4) was dominated by Acanthuridae (9.0 ± 4.0 indiv. / 250m^2). Three common indicators of reef health such as Acanthuridae and Scaridae fish families were present at both monitoring stations, while Chaetodontidae was only present at Shelly Beach (MS4), at relatively low densities (Figure 5).

Both Mombasa Marine Park and Reserve (MS8) and Shelly Beach (MS4) recorded low densities of planktivorous family, Acanthuridae, 10.5 ± 0.5 indiv. /250m² and 9.0 ± 4.0 indiv. /250m² respectively (Figure 5).

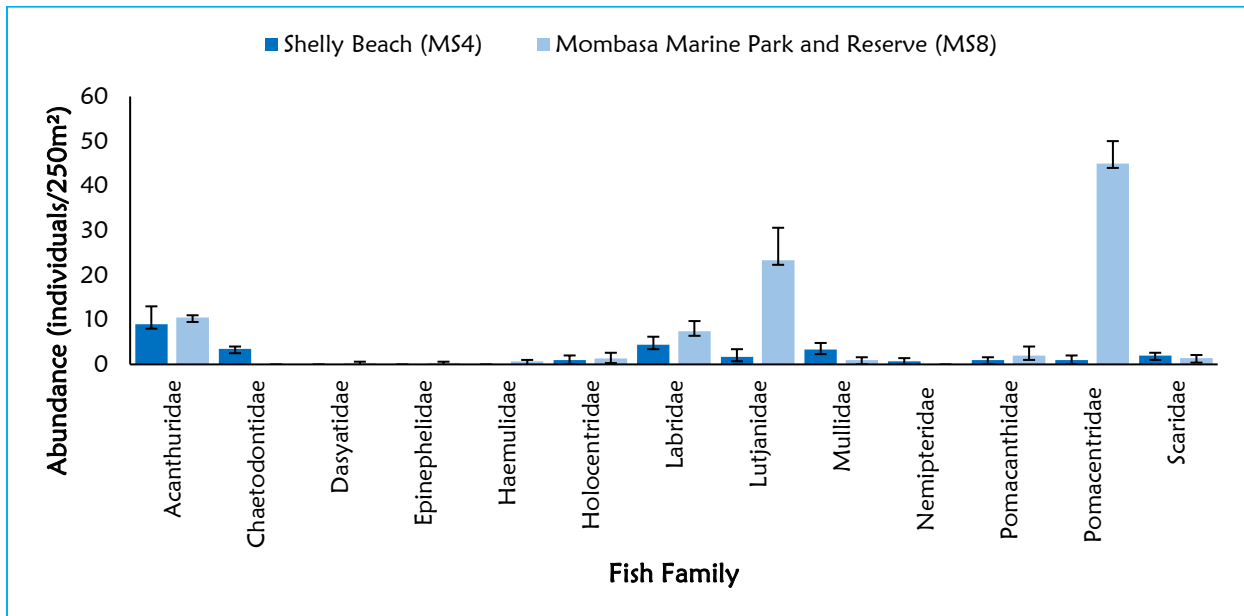


Figure 5: Fish species density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)



Figure 6: Pomacentridae (*Dascyllus trimaculatus*) at Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)

5.2.1.3 Invertebrate species

Six invertebrates' taxa were observed at both Mombasa Marine Park and Reserve (3 taxa) and Shelly Beach (6 taxa). Echinometridae dominated both Mombasa Marine Park and Reserve (11.0

± 0.5 indiv. /250m²) and Shelly Beach (5.0 ± 1.2 indiv. /250m²) (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.

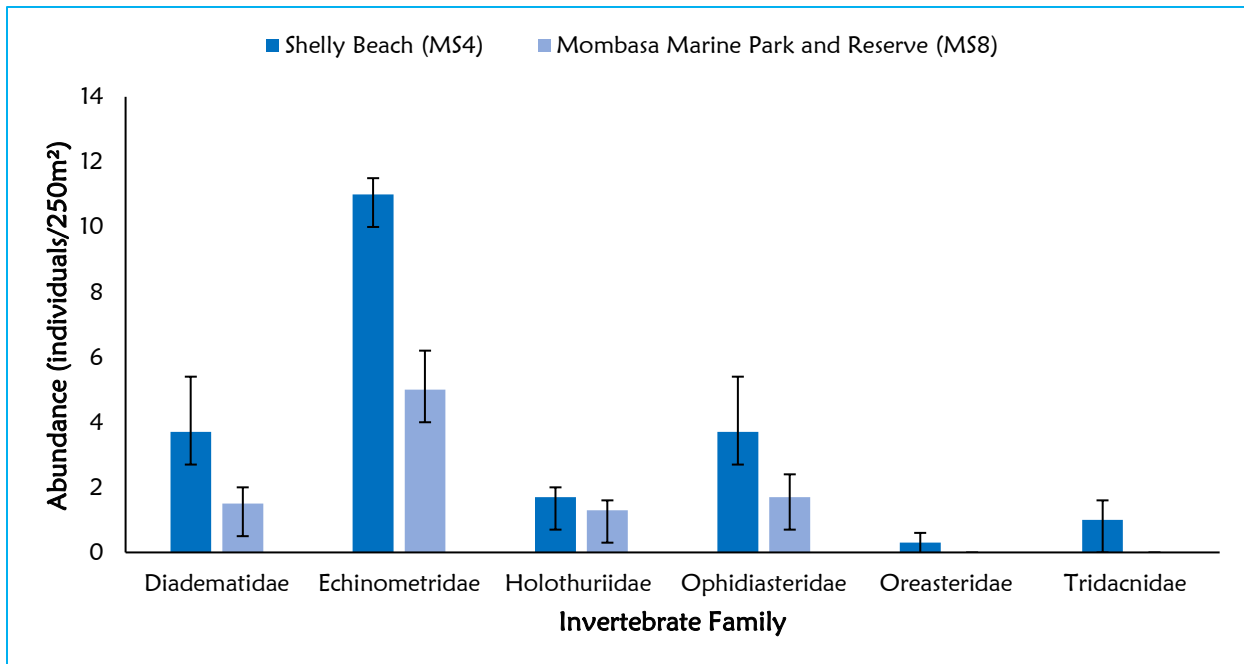


Figure 7: : Invertebrates density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)



Figure 8: Ophiasteridae (*Linckia multifora*) in Mombasa Marine Park and Reserve (left) and Shelly Beach (right) (Source: Envasses, August 2025)

5.2.1.4 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).

5.2.2 Biological monitoring between 16th and 17th August 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, soft coral, hard coral, turf algae, halimeda, crustose coralline algae, sand and rubbles were assessed using a point-intercept method to 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 × 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 (neap tide) between 8.00 am and 10.00 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 56 minutes at Mombasa Marine Park and Reserve and 62 minutes at Shelly Beach.

5.2.2.1 Benthic substrate

Soft coral (38.3% ± 4.4), macro algae (21.7% ± 1.7) and hard coral (18.3% ± 1.7) were the dominant substrate type at Mombasa Marine Park and Reserve (MS8), while macro algae (51.7% ± 4.4) and soft coral (11.7% ± 1.7) dominated Shelly Beach (MS4) in percentage cover. Hard coral at Shelly Beach (MS4) was low with a percentage cover of 8.3% ± 1.7 (Figure 9). Turf algae are early colonisers of degraded substrate previously with soft or hard corals and maybe indicative of changing dominance of the desirable soft and hard corals states. However, no recent mortality was observed on this survey that would have suggested recent disturbances. No coral bleaching incidence was observed at either site except for coral predation by Crown-of-thorns starfish (*Acanthaster mauritiensis*) in Shelly Beach area (Figure 11), this may be attributed to the low sea surface temperature being experienced during SEM season. August usually records the lowest temperature (Average of 24.1°C). There was less TSS in water column. Only Eight (8) genera of corals were recorded at both Mombasa Marine Park and Reserve and Shelly Beach area.

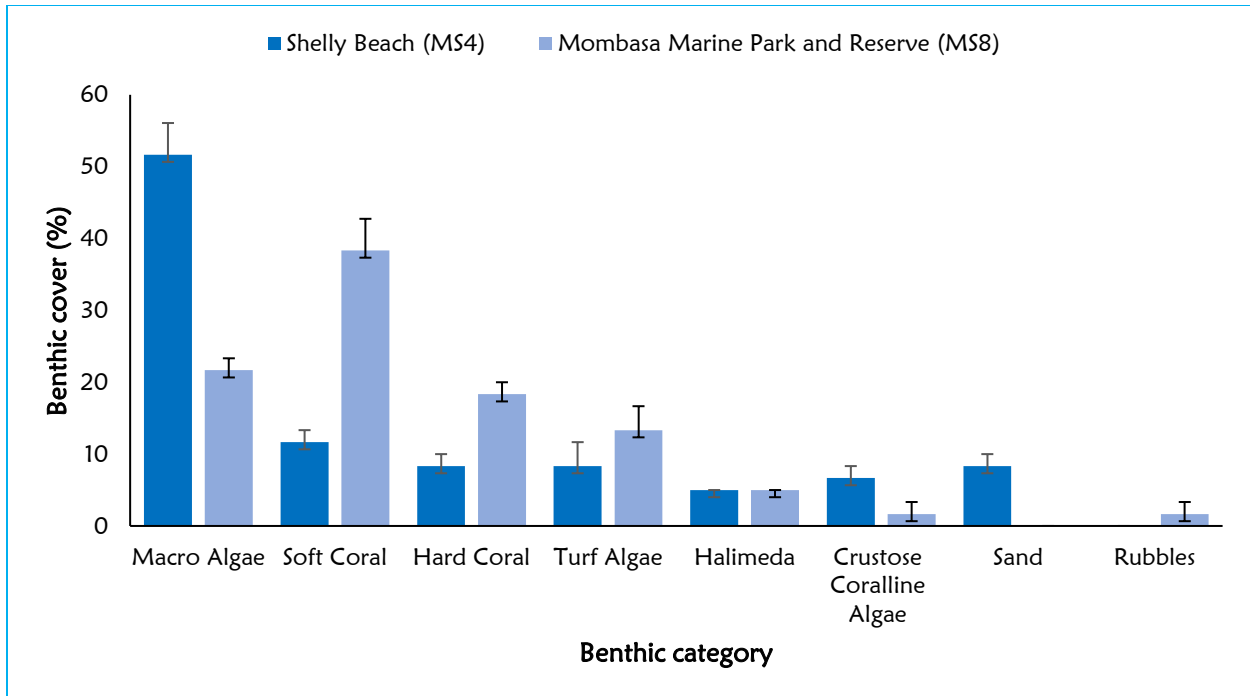


Figure 9: Benthic substrate characteristics at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)



Figure 10: Soft coral (left) at Mombasa Marine Park and Reserve (MS8) and hard corals (right) at Shelly Beach (MS4) (Source: Envasses, August 2025)



Figure 11: Crown-of-thorns starfish (*Acanthaster mauritiensis*) predating on corals at Shelly Beach (MS4) (Source: Envassess, August 2025)

5.2.2.2 Fish abundance

A total of 35 species were recorded from both Mombasa Marine Park and Reserve (29 species) and Shelly Beach (16 species). Mombasa Marine Park and Reserve (MS8) recorded very high fish density (56.7 ± 29.6 indiv. / 250m^2) while Shelly beach recorded very low fish density of 7.0 ± 1.0 indiv. / 250m^2 as maximum density. A total of 14 fish families were recorded from both Mombasa Marine Park and Reserve (13 fish families) and Shelly Beach (10 fish families). Caesionidae (30 ± 30 indiv. / 250m^2), Lutjanidae (56.7 ± 29.6 indiv. / 250m^2) and Pomacentridae (53.3 ± 29.1 indiv. / 250m^2) were the most abundant families at Mombasa Marine Park and Reserve while Shelly beach was dominated by Acanthuridae (7.0 ± 1.0 indiv. / 250m^2) and Pomacentridae (6.7 ± 6.7 indiv. / 250m^2). 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 (Figure 12).

Mombasa Marine Park and Reserve (MS8) recorded high and low densities of both planktivorous families, Caesionidae (30 ± 30 indiv. / 250m^2) and Acanthuridae (7.4 ± 2.2 indiv. / 250m^2) respectively. However, Shelly Beach (MS4) recorded low density of Acanthuridae (7.0 ± 1.0 indiv. / 250m^2) (Figure 12).

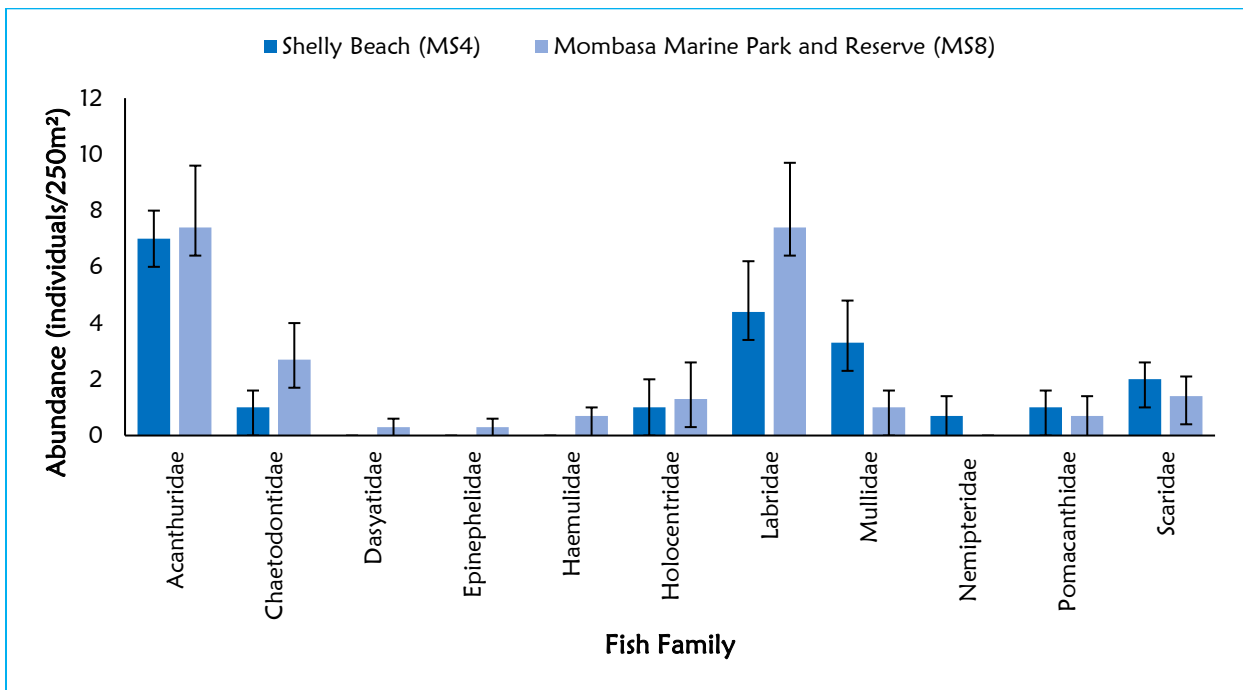
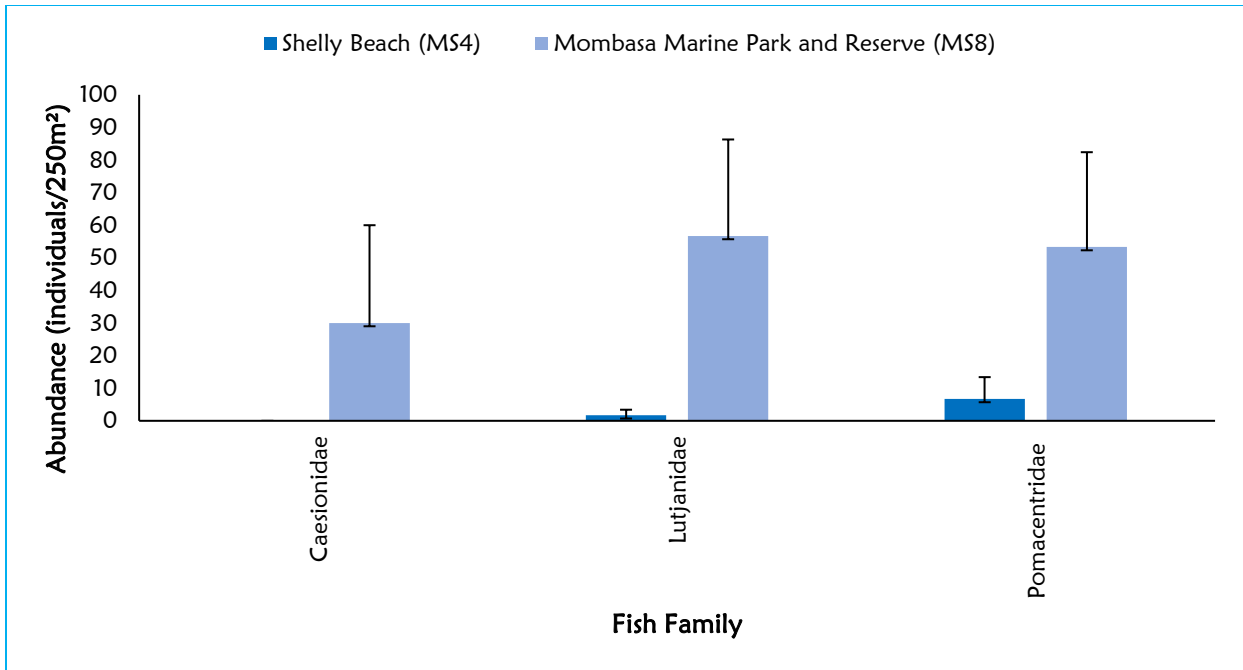


Figure 12: Fish species density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)

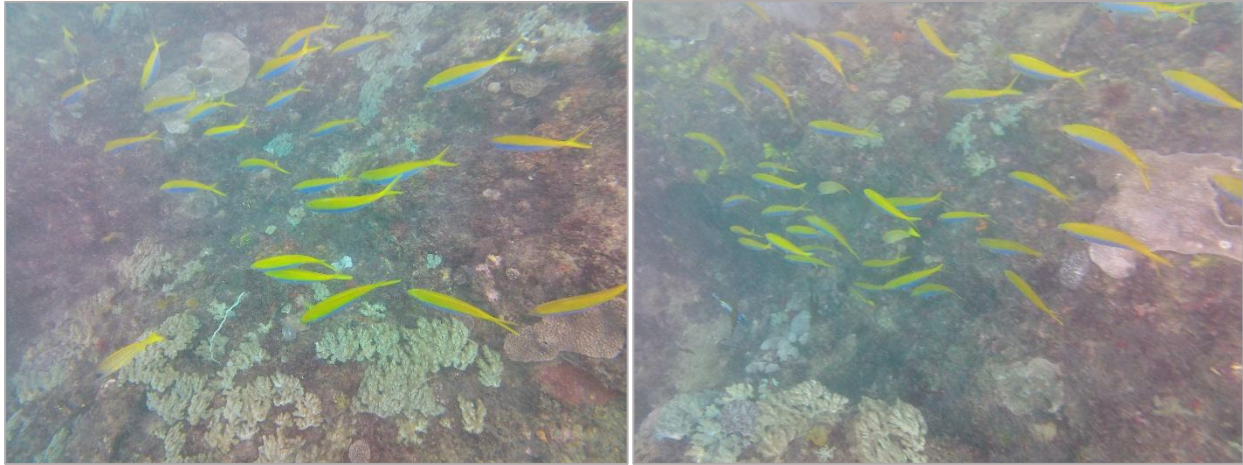


Figure 13: Caesionidae (Fusilier) shoals at Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)

5.2.2.3 Invertebrate species

Six invertebrates' taxa were observed at both Mombasa Marine Park and Reserve (3 taxa) and Shelly Beach (6 taxa). Echinometridae dominated both Mombasa Marine Park and Reserve (20.0 ± 10.0 indiv. /250m²) and Shelly Beach (6.3 ± 1.9 indiv. /250m²) (Figure 14). 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.

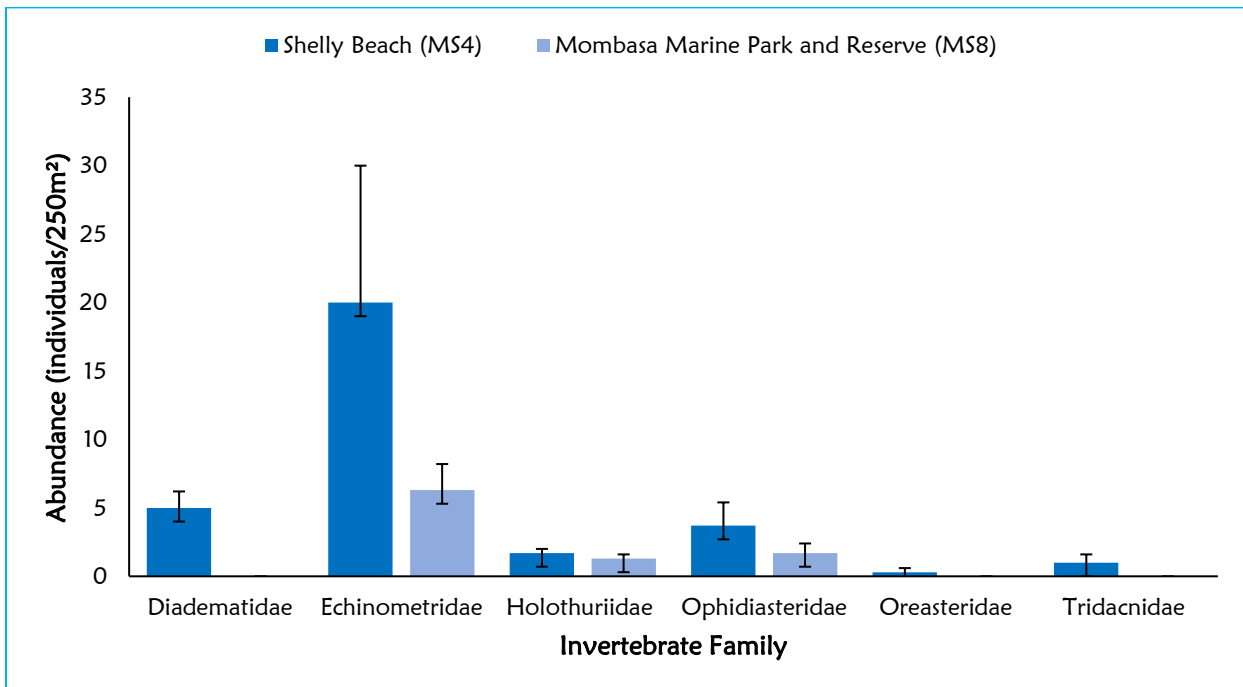


Figure 14: Invertebrates density at Shelly Beach (MS4) and Mombasa Marine Park and Reserve (MS8) (Source: Envasses, August 2025)



Figure 15: Ophidiasteridae (Blue Sea Star) (left) in Mombasa Marine Park and Reserve and Echinometridae (Burrowing Fine Spine Urchin) (right) in Shelly Beach (Source: Envasses, August 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).

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 results recorded increased diversity and density in both benthic, fish and invertebrates' species. Notably, a record of endangered invertebrate species, Holothuriidae (Black Sea cucumber) was made, indicating the rich diversity and importance of implementing environmental mitigation measures throughout the project cycle.