

Supported by J.P. Morgan,
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COASTAL BIODIVERSITY OF CHIMBAI BEACH, BANDRA (WEST), MUMBAI

This unique field guide on marine life covers species of flora and fauna found in Chimbai.



Purple Climber Crab



Gymnothorax reticularis

ABOUT CHIMBAI BEACH

Chimbai is a 400-year-old small fishing village located between Bandstand and Carter road in Bandra. It is inhabited by the fishing communities who have been using the beach for their occupational needs like anchoring boats, weaving and drying fishing nets, shell, crab and worm collection. The beach has been plagued by rampant dumping of garbage, debris and open defecation which made it unpopular as Mumbai's dirtiest beach in 2017.

There have been several initiatives by groups and celebrities who did periodic clean-up drives. The local municipal authorities also clean the beach on a regular basis, yet due to the C-shaped shoreline, the tides invariably bring in a large amount of plastic waste which could be seen littered on the beach during low tide. It certainly needed more than clean-up drives, that is when in 2019, United Way Mumbai stepped in to rejuvenate Chimbai Beach. Under its community impact initiative "Clean Shores Mumbai", United Way Mumbai with support from J.P. Morgan launched "Mission Blue". It's a two-year-long project involving systematic and regular clean-up and waste management services at the beach, community awareness activities, and bio-diversity assessment i.e. measuring micro-plastics, crab holes, documentation of marine life, etc.



WHAT IS UNIQUE ABOUT CHIMBAI BEACH?

- A unique combination of sandy and rocky shore that is edged by mangroves. This means it supports both sand loving and rock-loving marine life.
- One km stretch of beach sandwiched between two glamorous tourist attractions; Joggers' Park and Band Stand. This signifies the potential of Chimbai to become a tourist spot.
- Beach stretch towards the sea is the inter-tidal zone which gets exposed during low tides. It includes very dry, moist and water-logged sections.
- Intermittent rocky pools are where maximum marine life could be observed.
- Boasts a marine diversity of almost 115 species from 14 groups which are almost double compared to cleaner beaches of Mumbai.
- The only beach where the marine species were studied as bioindicators. The results indicate the beach is marred with heavy metal & sewage pollution.



ABOUT THIS FIELD GUIDE

Field guides are true treasures for those curious to know about the nature around us! This field guide displays, pictures of the amazing marine biodiversity found at Chimbai Beach. The purpose of this field guide is to help the reader to identify different diversity found at the beach and to develop an interest in marine conservation. This field guide contains a common name, scientific name, habitat and special features.

SYMBOL KEY:



Size of the organism



Rocky



Sandy



Mixed



Mangroves



Endangered Status

HOW TO USE THIS GUIDE ONCE YOU SPOT AN ORGANISM?

Look for field marks and other clues.

Watch it a little longer, especially if it's an unfamiliar species.

Try to determine what type of organism it is: Flora, Fauna, etc.

THEN reach for the field guide and find the matching species.

It is always better to study the guide before a shore walk or visiting the beach.

MARINE FLORA / समुद्र शैवाल



Brown Algae (*Chnoospora minima*)  | **20-25 cm**


- Exist in a wide range of sizes and forms, tiny, feathery tufts to long bands
- Brown colouration due to the pigment fucoxanthin
- Holdfast serves as an anchor and prevents the alga from being carried away by the currents
- Some brown algal species, such as kelps, are used by humans as food



Green Seaweed (*Enteromorpha sp.*)  | **1 m**


- Threadlike, tubular, and branched algae
- Found washed up by the tide, turns white or grey when dried
- Some species are known to grow on live oysters, thrives in waters that are moderate to heavily polluted
- Used as a food source in some Asian and European countries



Sea Lettuce (*Ulva lactuca*)  | **25 cm**


- Flat, delicate, translucent green algae, resembles lettuce leaves, prolific in areas where nutrients are abundant especially chemical pollutants
- Large quantities if washed up to beaches decay and produce
- Harmful gases like methane
- Contains vitamin A and is used as food in some Asian countries



MARINE FAUNA - Cnidarians /दंशपट्टी



Blue Button (*Porpita porpita*)

| **5-7 cm**

- Free-floating carnivorous colonies
- Not a single organism but a colony of zooids, each performing specialized roles
- Both male and female reproductive systems are present in one individual
- Feeds on small marine animals like copepods, crabs, and juvenile fishes
- Stings usually can cause skin irritation
- Bioindicators of increased water temperatures and salinities



False Pillow Coral (*Pseudosiderastrea tayamai*)

| | **5-16 cm**

- Reef-building stony corals that live in colonies
- Found in shallow water attached to bare rocks and are uncommon and cryptic
- The colony is generally encrusting or smooth dome-shape, resulting in a neat pattern of polygons
- Their flesh is embedded with thousands of minute single-celled marine plants called zooxanthellae which accounts for their colour
- Feeds on plankton
- Affected by human activities



Oriental Sea Anemone (*Oulactis orientalis*)

| **5 cm**

- Predatory animal related to jellyfish and corals
- Stays anchored by a fleshy foot to rocks or digs into sand.
- Tentacles retract inside the body cavity or expand to catch passing prey
- Found in tidal pools and ocean depths
- Some live in association with hermit crabs or small fish for mutual benefit
- Tolerant of heavy metal pollution.



MARINE FAUNA - Sponges/स्पंज



Pink Sponge (*Haliclona sp.*)



- A primitive group of animals, with porous bodies
- Adult sponges remain attached to one spot while juveniles swim freely
- Lacks bodily systems, rely on maintaining a constant water flow through their canal system to obtain food, oxygen and to remove wastes
- Bodies are adapted for maximal efficiency of water flow through the central cavity
- Affected by oil pollution

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी



Mangrove Swimming Crab (*Thalamita crenata*)



- Colour varies from dark to olive green overall with bluish claw tips
- Seen in the mangrove environment and active during the day
- Feeds on crabs, shrimps, and shelled animals
- Known for its homing instincts which helps the crab to locate its home
- Edible but not commercially valuable as other swimming crabs
- Affected by warmer waters and loss of mangrove habitats



Porcelain Crab (*Petrolisthes boscii*)



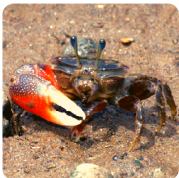
- Not a true crab as they have three pair of walking legs and has unusual long antennae
- Gets its common name for its ability to shed limbs if stressed, the lost limb grows back
- Feeds on algae or dead and decomposing matter
- Bioindicator of Chemical (organotins) pollution

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी



Purple Climber Crab (*Metopograpsus sp*) | **2-4 cm**

- Active at night, hides among crevices during the day
- Colours vary from purple, bluish to greenish, yellow, or grey
- Stout pincers, larger in males
- Long walking legs that are tipped with well-developed hooks, helps to cling tightly
- Feeds on algae, scraping with its pincers, which are scalloped on the inner edge



Ring-legged Fiddler Crab (*Austruca annulipes*) | **2-3 cm**

- Tiny crab with stalked eyes, seen in large groups
- The Male has one enlarged white claw which he waves to attract the females. This resembles a musician playing on his fiddle, thus the common name
- Feeds by scooping sand into their mouthparts and scraping detritus covering sand grains
- Affected by industrial and sewage pollution



Sally-light-foot Crab (*Grapsus albolineatus*) | **5-6 cm**

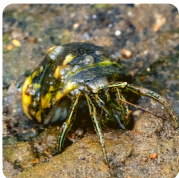
- Colourful crab, can climb steep rocks and remain hidden during low tide
- Feeds mainly by grazing on aquatic plants, algae, and detritus
- Active at night and seldom seen during daylight
- Not a commercially important species but is consumed locally
- Key species of the inter-tidal zone

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी



Stone Crab (*Epixanthus frontalis*)  | **3.5-4 cm** 

- Flattish crab is seen hiding among rocks or roots
- Front claws massive and unequal. Right claw larger, upper pincer is curved and toothed
- Smaller claws with a slender pincer, like a pair of forceps, hence, popularly known as Forcep Crabs
- Flural structure in the claw is used for the opening of snails and the pincers extract the exposed flesh
- Bioindicators of water salinity and sedimentation



Tawny Hermit Crab (*Clibanarius sp.*)  | **1-2 cm** 

- Not a true crab as it has a soft tubular body and lacks the hard shell
- Uses discarded shells of snail for protection
- Females of shore-dwelling crabs have to return to the sea to breed
- Feeds on plants, small animals, and scavenges on dead and decomposing matter
- Some species place the sea anemone on top of their shell for protection
- Bioindicators of chemical pollution and warmer waters



Common Prawn (*Palaemon serratus*)  | **11 cm** 

- Usually seen in groups, in crevices, and under stones
- Translucent with variable markings, long antennae, large head, and prominent eyes
- Feed on algae, smaller crustaceans, worms and are predated by fishes, birds
- Enters estuaries during the breeding season and can live up to 3-5 years
- Affected by higher temperatures and lower salinity levels



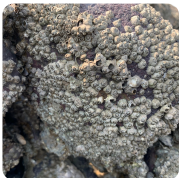
MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी



Snapping Shrimp (*Alpheus crassimanus*)



- A shrimp that is heard first and then seen
- Makes the incessant pops that you hear at low tide
- Forage outside their burrows more actively at night
- One pincer is greatly enlarged and produces a loud sound.
- The blast stuns prey, it is also used to warn off predators and intimidate rival snapping shrimps
- Acoustics used for determining marine health in coral reefs as their sounds change with changing marine environment



Striped Acorn Barnacle (*Amphibalanus amphitrite*)



- Shell is secreted by the soft-bodied animal. The lid remains closed during low tide
- The animal is fixed upside down inside the shell, thus feeds with help of its feet
- A fouling organism that grows on hard surfaces such as ships' hull, docks, and logs where they cause corrosion
- Bioindicator of sheltered marine habitats, and tolerates salinity variation
- Found washed up by the tide, turns white or grey when dried
- Some species are known to grow on live oysters thrive in waters that are moderate to heavily polluted
- Used as a food source in some Asian and European countries

MARINE FLATWORMS/ समुद्री चापटकृमि



Brown Flatworm (*Echinoplana sp.*)



- Free-living predatory marine worm with a flattened, roughly oval body and wavy margins
- Found under rocks and among rubbles
- Feeds during the night on shelled animals. Food is digested outside the body by the gut that is pushed out through the mouth (or) digestive juices are injected into the prey and the resulting liquefied meal is then sucked up
- Affected by heavy metal pollution



MARINE RINGED WORMS



Decorator Worm (*Diopatra sp.*)  | **6.3 cm**


- Gets its common name as it lives in a papery tube projecting out of the sand, decorated with sand and several small shell pieces on top
- Tubes usually lodged in the wet sand where they burrow more than a meter deep
- Some are scavengers while others are predators that ambush prey with large tentacles on their heads
- Bioindicator of polluted water. Brown colouration due to the pigment fucoxanthin
- Holdfast serves as an anchor and prevents the alga from being carried away by the currents
- Some brown algal species, such as kelps, are used by humans as food



Iridescent Fireworm (*Eurythoe sp.*)  | **10 cm**


- Belongs to a group of bristle worms having segmented bodies that are known to be predators, herbivores, filter feeders, scavengers, and parasites
- Each body segment has a pair of fleshy protrusions that bears many bristles used for movement
- Bright coloured may be iridescent or even luminescent
- Can digest their food outside their bodies with the help of an eversible gut.
- Some species are collected as fish bait locally
- Bioindicators of sewage pollution

MARINE FISH & REPTILES / मासे आणि सरपटणारे प्राणी



Blue Spotted Mudskipper (*Boleophthalmus boddarti*)  | **13.5-22 cm**


- Unique fish with the ability to walk, climb and breathe air
- Fins act like strut that helps in walking
- Lives in muddy burrows during high tide, eyes above the head
- Feeds during low tide on worms, insects, fishes, and small crabs
- Affected by heavy metal pollution

MARINE FISH & REPTILES / मासे आणि सरपटणारे प्राणी



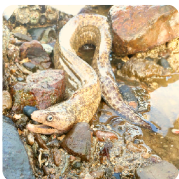
Crescent-banded Grunter (*Terapon jarbua*)  | **25 cm** 

- Also known as Target Perch for the concentric bands on its body
- Predatory species which feeds on smaller fishes, also act as cleaner fish by eating ectoparasites on larger fishes
- Tolerates a wide range of salinity (eurhaline) from seawater to freshwater, therefore seen in several habitats
- Communicate by producing sounds
- Important commercial species for aquarium trade while the larger ones are locally consumed by coastal communities



Indian Sand Whiting (*Sillago sihama*)  | **16.7 cm** 

- Highly-priced fish in coastal Maharashtra
- The body is variable, often being light tan, silvery yellow-brown, or sandy brown
- Adults bury themselves in the sand when disturbed
- Feeds on a variety of worms, crustaceans, and juveniles feed on plankton
- Regularly migrates between freshwater and the sea
- Under threat because of overfishing and environmental pollution



Moray Eel fish (*Gymnothorax reticularis*)  | **60 cm** 

- Predatory fish with a snake-like body
- Lives in the shallow water and burrows into sand, mud, or amongst rocks
- Powerful jaws with sharp teeth that help in catching slippery prey
- Juveniles are transparent and therefore known as glass eels
- The common name is derived from the Greek word- muraina, a kind of eel
- Some species have toxins in their body therefore not used as food while others such as Daggertooth Pike Conger are considered as a delicacy

MARINE FISH & REPTILES / मासे आणि सरपटणारे प्राणी



Threadfin Sea Catfish (*Arius sp.*) | | 20-25 cm

- Member of catfish group which gets its name for their prominent barbels, resembling a cat's whiskers
- Feeds on fishes, snails, crustaceans, algae, and detritus
- Some species are mouthbrooding. Males carry a small clutch of tiny eggs inside their mouths for about two months until the eggs hatch.
- Some species are highly regarded as a game and food fish



Beaked Sea Snake (*Hydrophis shcistosus*) | 90-140 cm

- Highly venomous sea snake usually caught as a bycatch in fishing nets
- Prominent downturned beak-like projection on the snout gives it the common name "Beaked"
- Tail flattened oar-like that helps in swimming
- Feeds exclusively on fish
- Active both during the day and at night
- They are able to dive up to 100 m and stay underwater up to 5 hours
- About 1.5 mg of its venom is estimated to be lethal and there is no antidote
- Threatened by bottom trawling and other bottom set gill nets



Common Octopus (*Octopus vulgaris*) | 25 cm

- The Common Octopus is a shelled animal with an internal shell
- It has eight arms which could be 1 m long, lined with suckers
- The Octopus uses the suckers to capture prey as well as travel
- The large head is actually its rest of its body having all body organs inside known as the mantle
- It hunts at dusk and feed on crabs and bivalves mainly
- The mouth, which is the underside of the head has a powerful beak that helps break open the shells
- It has the ability able to change colour to blend in with its surroundings

Molluscs/मृदुकाय प्राणी (Chiton/चिटॉन, Bivalves/ द्विदंडपी & Gastropods/ शंखवर्गीय)

CHITON



Chiton (*Ischnochiton* sp.)



1.6 cm



- Primitive marine molluscs
- Gets its name from the term khitōn, a Greek- meaning 'rock', or 'tunic'
- Firmly attaches to hard surfaces with their 'foot', making them almost immovable
- Mostly consume fine algae and other organisms
- Lives up to 40 years

BIVALVES



Forked Venus Clam (*Gafrarium divaricatum*)



4.2 cm



- Member of Venus clams which are circular, triangular, and rectangular
- White with a pattern of thin dark lines perpendicular to the shell edges
- Get their common name from the ribbed circular shells which spray out in two separate directions like a fork
- Colonize sandy areas with dense and large populations
- Filter feeders that strain the water with the help of their gills
- Bioindicators of heavy metal pollution



Hooded Rock Oyster (*Saccostrea cucullata*)



4-6 cm



- Commercially harvested edible oyster that is immobile (the lower valve is cemented to hard surfaces)
- Appearance and form variable; circular, oblong, or oval, with an irregular outline
- Filter feeder, pumping water through its gills and feeds on phytoplankton
- Fouling species that is found on rocks, harbor walls, pilings, groynes, and other underwater structures
- Bioindicators of heavy metal pollution and therefore used as natural biofilters in polluted areas

Molluscs/मृदुकाय प्राणी (Chiton/चिटॉन, Bivalves/ द्विद्वडपी & Gastropods/ शंखवर्गीय)

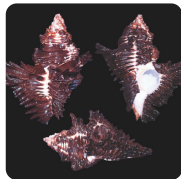
BIVALVES



Textile Clam (*Paratapes textilis*)  | **3.8 cm** 

- Commercially harvested clam that is used as food as well as in shell craft
- Shell elongated, thick, heavy, and moderately inflated, with rounded margins
- The outer shell surface is smooth, glossy, pale yellowish-white, with pale purple-grey inverted V-shaped markings
- Live on sandy bottoms at depths of up to 4 meter
- Filter feeder and has the potential to filter heavy metal pollutants

GASTROPODS



Adjuta or Burnt Murex (*Chicoreus brunneus*)  | **4.2 cm** 

- Predatory sea snail with beautiful structure and blackish to coffee brown colouration
- Large but well camouflaged, usually found on boulders, rocks, and hard surfaces as well as sandy areas
- Feed by drilling through clams and snails
- Breed in groups and egg capsules are attached to hard surfaces
- Some are collected for food and its shell used in shell craft
- In some places, populations have been greatly reduced due to over-collection



Arabian Cowrie (*Maurita arabica*)  | **10.5 cm** 

- Variable in colour from cream to light fawn dorsally, with shades of brown, the underside is cream to grey
- Shell markings of a dense and irregular pattern of thin longitudinal brown lines give an appearance similar to that of Arabic script, therefore the common name
- The shell of live animal is covered with fleshy extensions known as mantle which can be withdrawn into the shell when alarmed
- Collected for food and shell trade.

Molluscs/मृदुकाय प्राणी (Chiton/चिटॉन, Bivalves/ द्विदण्डपी & Gastropods/ शंखवर्गीय)

GASTROPODS



Button Shell (*Umbonium vestiarium*)  | 1 cm 

- Common along the entire Indian coast
- Shell, tiny, smooth, glossy with a wide range of colour variation
- Thousands come out near shallow pools during low tide for feeding
- The long mobile foot is used to burrow rapidly into wet loose fine sand
- Escape predators, by making a short, spiraling leap then quickly burying into the sand again
- Shell used for handicrafts
- Bioindicator of heavy metal pollution



Carinate Rock Shell (*Indothais lacera*)  | 3-5.7 cm 

- Predatory sea snail with beautiful shell
- Greyish brown medium-sized, ovate, shell
- Egg capsules are beautiful and large that is laid on the rocks or on dead shells
- Used as food
- Feed on clams and barnacles by drilling a hole into them
- Bioindicators of Chemical (organotins) pollution



Polished Nerite (*Nerita polita*)  | 3-3.5 cm 

- Largest nerite of the Indian coast
- Active during nocturnal low tide otherwise remain hidden in the sand
- Graze on algae that thrive on the rocks
- Used as food as well in shell art
- Lay their eggs in pools and among small stones
- When alarmed they retract into their shells and roll down the rocks like marbles
- Bioindicator of sewage pollution

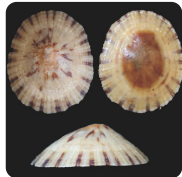
Molluscs/मृदुकाय प्राणी (Chiton/चिटॉन, Bivalves/ द्विद्वडपी & Gastropods/ शंखवर्गीय)

GASTROPODS



Radiate Top Shell or Banded Trochus (*Trochus radiatus*) | 30 cm

- Conical, thin, white shell with many reddish-brown longitudinal bands and flat base
- Feeds on brown and red algae
- Shells used in making buttons and art objects
- Bioindicator of heavy metal pollution (Copper, Cadmium)



Rayed Wheel Limpet (*Cellana radiata*) | 3-3.5 cm

- Common to the Indian coast
- Hat-like flattened, cone-shaped, small shell with the surface covered by coarse ribs and fine granules
- Grey-brown ground colour with olive bands
- Nocturnal. Feeds on green algae attached to rocks
- Some species return to the same spot on the rock known as a "home scar" just before the tide ebbs
- Used for the study of toxin accumulation



Spiral Babylon (*Babylonia spirata*) | 4-6 cm

- Shell colour and pattern variable, from plain brown to white with orange or brown spots
- Operculum (lid to the entrance) is thin and bears growth rings
- Prey on clams and other shelled animals
- Used as food, meat is valuable as it has high-quality protein
- Shell used as a decorative item and as keychains
- Potential species for aquaculture

Molluscs/मृदुकाय प्राणी (Chiton/चिटॉन, Bivalves/ द्विद्वडपी & Gastropods/ शंखवर्गीय)

GASTROPODS



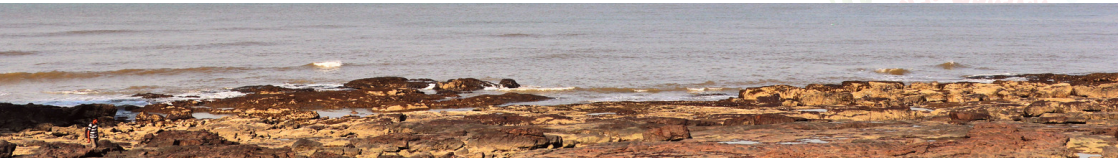
Telescope Snail (*Telescopium telescopium*)  | 8-15 cm 

- The largest member of Horn snails
- Conical shell strongly reminiscent of an ice-cream cone
- Velvety black body with a highly extensible proboscis
- Feeds on detritus and algae from the mud surface at low tide, using its proboscis
- Can stay out of water for a long time
- Used as food by locals



Turtle Cone (*Conus achatinus*)  |  | 3-3.5 cm 

- Carnivorous, the predatory and venomous snail, could be fatal to humans
- Hunt and eat marine worms or molluscs
- Paralyze prey by injecting venom through a hypodermic needle-like harpoon
- Once prey is digested, the cone snail will regurgitate any indigestible material, such as spines and scales
- Intricate color patterns have made them one of the most popular collectable shells.



COASTAL BIODIVERSITY OF CHIMBAI BEACH

THREATS TO MARINE LIFE AT CHIMBAI BEACH AND CALL TO ACTION

CHALLENGES FACED BY CHIMBAI BEACH



Encroachment activity and new developmental projects within the high tide zone



Bathing, urination and littering by some local residents or beach-goers



Lack of waste disposal facility, release of partly treated/untreated sewage & industrial effluents like oil, & heavy metals



Disposal of unauthorized garbage and plastic waste dumping



Overharvesting of the worms and shells, the reduced fish catch may put pressure on the marine environment



Almost 50% of the marine species found at Chimbai beach are pollution indicators



Lack of awareness among the local community

HOW YOU CAN HELP:



Practice responsible waste management and segregate your waste into dry and wet waste



Say NO to One-Time-Use Plastic



Reuse, recycle and reduce your waste



Participate in clean-up drives and marine awareness programmes



Be a citizen scientist, photograph and upload picture of marine life on iNaturalist portal



Volunteer for beach monitoring programmes and create awareness about Chimbai beach on your social media networks

COASTAL BIODIVERSITY OF CHIMBAI BEACH



Mission Blue

DOs AND DON'Ts WHILE AT THE BEACH



Always visit during low tide and be mindful of the hightide surge



Wear sports shoes and avoid walking on slippery rocks



Avoid sun exposure and wear a hat



Carry your own reusable bottle of drinking water



Avoid collecting any items from the beach like shells or rocks



Take photographs of the marine life and share it on [iNaturalist portal](#) and your social media



Don't litter and discourage others from littering at the beach

Mission Blue

In recognition of the urgent need for citizen awareness and sustained interventions to rejuvenate water bodies across the country, JP Morgan and United Way Mumbai intend to co-create and collaborate on Mission Blue Water. The project has been implemented across three cities – Mumbai, Bengaluru and Hyderabad. Chimbai Beach in Mumbai has been adopted under the Mission Blue Initiative of J P Morgan under Clean Shores Mumbai project to create a sustainable impact on the state of cleanliness at the beach and conserve biodiversity of the beach with local stakeholders and employee volunteer engagement.

COASTAL BIODIVERSITY OF CHIMBAI BEACH



Mission Blue



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