Clean Shores Mumbai | United Way Mumbai

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COASTAL BIODIVERSITY OF GREATER MUMBAI

This unique field guide on marine life covers 60 species of flora and fauna (5 flora and 55 animal species, which includes crabs, sea anemones, snails, fishes, reptiles and others) found on Greater Mumbai Coast.

Purple Climber Crab

Portuguese Man O' War

WHAT IS UNIQUE ABOUT GREATER MUMBAI SHORELINE?

Greater Mumbai encompasses Mumbai, Thane, Kalyan-Dombivali, Navi Mumbai, Ulhasnagar, Bhiwandi- Nizamapur, Vasai-Virar, Mira-Bhayandar and Panvel. The Arabian Sea touches only Mumbai, Thane, Navi Mumbai, Thane, Vasai Virar, and Mira Bhayendar. Along this stretch, there are several public beaches. Some of the most popular beaches are Uttan Beach, Gorai Beach, Manori Beach, Marve Beach, Aksa Beach, Dana Paani Beach, Erangal Beach, Silver Beach, Versova Beach, Madh Island Beach, Haji Ali, Juhu Beach, Dadar Chowpatty Beach, Vashi Mini seashore, Pirwadi, Kegav, Uran Nagav, Palm Beach Park, and Digha.

Our coasts are more economically significant. Mumbai Port Trust (MbPT), created in the 17th century, and Jawaharlal Nehru Port Trust (JNPT), founded in the 1970s, are the most prominent ports. These two ports handle 22% of India's 13 major ports' traffic. State's shoreline is 720 kilometres from Arabian Sea. Kolis, the traditional fishing community, also work here. Kolis lived in "Koliwadas," or "sea-facing dwellings." These villages usually have large fish markets at the entrance. Worli, Sion, Vasai, and Colaba Koliwadas are also prominent. These close-knit villages are solely known by the fish market at their entrance. The Kolis built harbours and coastlines when Bombay was simply seven islands. Kolis named islands such as Kolbhat (Colaba), Palva Bunder (Apollo Bunder), Dongri, Mazagaon, Naigaum, and Worli. Mumbai's name comes from the Kolis' Mumbadevi temple.

People used to think that our city coasts were empty and lifeless, but this idea has changed in recent years. Citizen-led groups have sprung up all over the city, with the goal of bringing attention to Mumbai's thriving coasts and marine life in order to get people interested in preserving and protecting them. Marine Life of Mumbai by the Coastal Conservation Foundation is one of these projects that has made progress in this area. They have recorded 557 marine species, and several remains unidentified. This means that there are lots of places to look for sea life in this big city.

WHAT IS INTERTIDAL ZONE?

The "intertidal zone" is the area along a shore between high and low tide. High tide, medium tide, and low tide are the three distinct zones of the intertidal zone. Because it only gets wet when the tide is high, the high tide zone is hotter and drier. At the same time, the middle tidal zone is wet and dry. The low tide zone, which always has some water, is only visible when the tide is low. This tide zone has the most diversity. Therefore, the inter-tidal zone is a harsh environment and many of the creatures that live on the coast have evolved to thrive in dry and wet conditions.

There are rocky, sandy, and mixed beaches in Greater Mumbai. Rocky shores are more diverse than sandy beaches because they provide more refuge for marine life. On rocky shores, you can find sea stars, snails, seaweed, algae, crabs, barnacles, and mussels. Additionally, tide pools form when seawater collects among the rocks, crevices or holes during low tide. Sea stars, shrimp, and fish that normally cannot survive in low tide conditions can thrive in these pools. On sandy beaches, you can find shells, clams, sand dollars, and a variety of burrowing worms. Now that you are aware that every shore is home to a marine species, you should exercise caution the next time you are at a beach.

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

Habitats

Rocky

Sandy

Mixed

Mangroves

Endangered Status

Season

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.

COASTAL BIODIVERSITY OF MUMBAI BEACHES

Size | Rocky | Sandy | Mixed | Mangroves | IUCN Red List | Flowering Season

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

- Thread-like, 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, causing their death due to dehydration
- Thrives in waters that are moderately to heavily polluted
- Used as a food source in some Asian and European countries

Grey Mangrove (Avicennia marina) | 2-5 m | May-Jul

- Intermediate mangrove tree that dominates the intertidal zone.
- Pioneer in colonizing newly formed mudflats.
- Tolerates shade and high salinity.
- Used as fodder, fuelwood, timber and medicine for ulcers & skin diseases.
- Host plant of Mangrove Moth.
- Pencil-like roots called pneumatophores.
- Edible fruits
- Highly resilient

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COASTAL BIODIVERSITY OF MUMBAI BEACHES

Size | Rocky | Sandy | Mixed | Mangroves | IUCN Red List | Flowering Season

MARINE FLORA / समुद्र शैवाल

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

Tooth Brush Tree (Salvadora persica)

3 m | Apr-January

- A mangrove associate tree, seen growing on the edges of mangrove forests towards the land end.
- Bark greyish, drooping, shining white branches. Leaves shiny green, thick and waxy
- Greenish yellow flowers.
- Used as natural toothbrushes. Seed oil used in soaps.
- Host plant of Small Salmon Arab butterfly.
- Fruit dark red small berries, sweet to taste and slightly narcotic. Ripe berries attract birds.

MARINE FAUNA - Cnidarians /दंशपुटी

Anjuna Anemone (Anthopleura anjunae)

2-5 cm

- Sea anemones benefit by living with clownfish, hermit crabs, small fish, and other creatures.
- They reproduce by releasing sperm and eggs through their mouths.
- Fertilized eggs become free-floating planula larvae that settle on the seafloor and become juvenile polyps.
- They also reproduce asexually by splitting into polyps.
- All sea anemones are threatened due to overexploitation for ornamental fish trade.

MARINE FAUNA - Cnidarians /दंशपुटी

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, crab, and juvenile fishes
- Stings usually can cause skin irritation
- Bioindicators of increased water temperatures and salinities

Banded Bead Anemone (*Anthopleura dixoniana*)

1-2 cm

- These little anemones are commonly seen on sandy and exposed rocks in clusters.
- It is a single polyp, not a colonial species, despite being found in large clusters.
- At low tide, it tucks its tentacles inside its body column to resemble a jelly bead, hence its name.
- Disappear in sand, leaving only tiny holes. These fragile critters are easy to miss and step on.

Striped Green Anemone (Diadumene lineata)

3.5 cm

- A little anemone with a smooth, cylindrical column in olive-green, greenish-brown, grey-green, or bright green.
- Some columns are stripe-less, but most have single or double orange, yellow, white, or grey vertical stripes.
- 25–100 tentacles are common.
- They can reproduce asexually by ripping in half vertically, forming two smaller anemones, or by pulling away from small sections of tissue.

MARINE FAUNA - Cnidarians /दंशपुटी

Pink-spotted bead anemone (Anthopleura buddemeieri)

1- 2 cm

- Small anemones found around the high water mark on smooth stones and rocks below a dense coastal forest.
- Solitary, rarely found together.
- Pale body with rows of pink dots. One tapering tentacle ring with pinkish tips.
- At low tide, tucks its tentacles into the body column like a pink jelly with tiny red dots.
- They feed on isopods and amphipods.

False Pillow Coral (Pseudosiderastrea tayamai)

5-16 cm

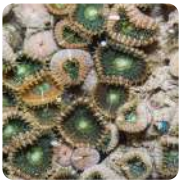
- Reef-building stony corals that lives in colonies
- Found in shallow water attached to bare rocks and are uncommon and cryptic
- Colony is generally encrusting or smooth dome-shape, resulting in neat pattern of polygons
- Their flesh is embedded with thousands of minute single-celled marine plants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

Flower Pot Coral (Goniopora sp)

30 cm

- Corals are marine invertebrates that attach themselves to rocky intertidal zones or the ocean floor.
- Colonial, lagoon dwelling stony coral
- Species found in lagoons and turbid water conditions
- They have several long polyps (either long or short) that appear like daisies.
- Each polyp has 24 mouth-wrapping stinging tentacles.

MARINE FAUNA - Cnidarians /दंशपुटी



Green Button Polyp (Palythoa mutuki)

1- 2 cm

- Also called as button coral, this zoanthid appears like a cluster of small brown anemones
- Typically seen among corals and seagrass beds.
- Polyps have a large mouth disc on a long, stout body column.
- Colonies usually measure up to 10-15 cm.
- They are linked by underground stems rather than a thick shared tissue called stolons.
- Broad zoanthids reproduce by budding.
- Some species of button polyps are known to be toxic.

Portuguese Man O' War (Physalia physalis)

30 cm

- A hydrozoan (not a true jellyfish) that floats. Lives in warm tropical and subtropical waters.
- Drifts along the surface (aided by the large float) blown by winds and carried by currents.
- It is made up of a colony of four different polyps; including a translucent float with a gas-filled bladder known as a (i) pneumatophore, (ii) tentacle-like dactylozooids, (iii) feeding zooids known as gastrozooids, and (iv) gamete-producing gonozooids.
- The tentacles contain stinging cells that aid in capturing prey. However, the sting can be excruciatingly unpleasant.
- Pneumatophore, the highest polyp that rises above the water and resembles an old warship in full sail, is whence it derives its popular name.

Violet Zoanthids (Zoanthus sansibaricus)

2.5 cm

- The encrusting anemone zoanthid is usually found in shallow water on exposed rocks and coral reef edges.
- Brightly coloured polyps that feel smooth as they do not incorporate sand into the tissues like Palythoa.
- Polyps live in groups called colonies and colonies can spread up to 1.5 Sq. m. in size.
- It can reproduce in three ways: as a male, as a female, or asexually.
- Using the moon's phases as a guide, breeding was seen around the middle of July.

MARINE FAUNA - Sponges/स्पंज

Pink Sponge *(Haliclona sp.)*

8-30 cm

- 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 bodies 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 Mud Crab (Scylla serrata)

25 to 28 cm

- Inhabits muddy bottoms, mangrove marshes, and river mouths in estuarine environments.
- It digs deep burrows.
- Migrates offshore (up to 50 km) to spawn.
- Feeds on snails and prawns.
- Adults remain buried at day, emerging at sunset and night to feed.
- Sold as sea-food.
- Mud crab harvesting is an important livelihood for coastal communities.

Mangrove Swimming Crab *(Thalamita crenata)*

5-7 cm

- Colour varies from dark to olive green overall with bluish claw tips
- Seen among mangroves 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

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी

Porcelain Crab *(Petrolisthes boscii)*

2-4 cm

- 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 plankton, algae or dead animals
- Bioindicator of Chemical (organotins) pollution

Purple Climber Crab *(Metopograpsus sp)*

2-4 cm

- Active at night, hides among crevices during 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
- 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 from sand grains
- Affected by industrial and sewage pollution

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी

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

- Colourful agile crab, climb steep rocks and remain hidden during low tide
- Able to survive out of the water for long hours
- 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 inter-tidal zone

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

- Flattish crab seen hiding among rocks or roots
- Front claws massive and unequal. Right claw larger, upper pincer is curved and toothed
- Smaller claws with slender pincer, like a pair of forceps, hence, popularly known as Forcep Crabs
- Curved tooth is used for the opening of snails and the pincers extract the exposed flesh
- Females have broader abdomen than males
- 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

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी

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 breeding season and can live upto 3-5 years
- Affected by higher temperatures and lower salinity levels

Indian White Prawn (Penaeus indicus) | 18.4-22.8 cm

- Inhabits mud or sandy bottom from 2- 90 m deep.
- Non-burrowing and active during day and night.
- Young shrimps migrate to estuaries, where they grow and return to the sea for breeding.
- Major commercial prawn species.

Snapping Shrimp *(Alpheus crassimanus)* | 3.8 cm

- A shrimp that is heard first than 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

MARINE CRABS & SHRIMP/ सागरी खेकडे आणि कोळंबी

Sea Slater (Ligia sp.) | 4cm

- A common intertidal woodlouse-like species.
- They are more connected to crabs than cockroaches.
- They are crustaceans like crabs and prawns, despite their "cockroach-like" behaviour!
- Look like insects but are isopods with seven legs, seven thoracic segments, and six abdominal segments.
- They consume debris.
- Shy creatures moving away from any disturbance and hide into crevices or underneath surfaces
- Large unisexual colonies of 50 individuals are common.
- Hunt and scavenge at night.

Striped Acorn Barnacle *(Amphibalanus amphitrite)* | 1.5 cm

- Shell is secreted by the soft-bodied animal. The lid remains closed during low tide
- Animal is fixed upside down inside the shell, thus feeds with help of its feet
- 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.)* | 3 cm

- Free-living predatory marine worm with a flattened, roughly oval body and wavy margins
- Found under rocks and among rubbles
- Feeds during night on shelled animals. Food is digested outside the body by the gut that is pushed out through 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 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 algae 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 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 but which also act as a cleaner fish eating ectoparasites from larger fishes
- Tolerates a wide range of salinity 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

Gold-spotted Grenadier Anchovy(Coilia dussumieri) | 17-20 cm.

- Small and slender fish, seen in coastal and estuarine zones
- Prefers total salinity in the water but can tolerate freshwater.
- Feeds on copepods, prawn and fish larvae, crustaceans, and other tiny animals.
- They are sold as seafood.

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

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

MARINE FISH & REPTILES / मासे आणि सरपटणारे प्राणी

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

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

MARINE FISH & REPTILES / मासे आणि सरपटणारे प्राणी

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 is actually it rest of its body having all body organs inside known as the mantle
- It hunts at dusk and feed or 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/ द्विझडपी & Gastropods/ शंखवर्गीय)

CHITON

Chiton (Ischnochiton sp.) | 1.6 cm

- Primitive marine molluscs
- Gets its name from the term khitōn, a Greek- meaning 'frock', 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

Blood Cockle (Tegillarca granosa) | 4-5 cm

- It is a thick-shelled, strongly ribbed clam with a white inner side.
- It prefers the intertidal zone, burrowing down into the sand or mud.
- It gets its name from the red haemoglobin in its body.
- It is a bottom filter feeder and feeds on organic detritus.

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

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

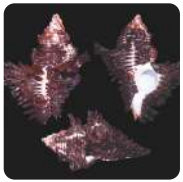
- Commercially harvested edible oyster that is immobile (the lower valve is cemented to hard surfaces)
- Appearance and form variable; circular, oblong, or oval, with an irregular outline
- Filter feeder, pumping water through its gills and feeds on phytoplankton
- Fouling species that is found on rocks,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

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

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

GASTROPODS



Adjusta 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.

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

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

GASTROPODS

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

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)

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

GASTROPODS

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

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

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

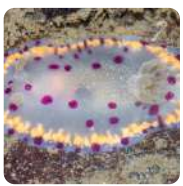
GASTROPODS

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.

Molluscs (Sea slugs)



Bombay Dorid (Goniobranchus bombayanus)

3 cm

- Sea slugs resemble land slugs found in shallow rock pools.
- They are soft-bodied slugs that shed their shells after they have completed their larval stage.
- They are known for their unusual colours and unique forms.
- They vary in size, colour, and shape. The majority are translucent.
- The brilliant colours of reef-dwelling species warn predators of their lethal stinging cells (nematocysts) and foul taste.
- They have radulas, which are small, sharp teeth and feed on jellyfish, bryozoans, sea anemones, plankton, and other sea slugs.
- On their heads, sea slugs have two sensory tentacles for smell, each with a small eye.
- Gills are feathery structures on the back of the animal.
- It was first described in Bombay, India

Hirase's Leaf Slug (Elysia hirasei)

3 cm

- They are sacoglossans, often called "slugs that drink the sap."
- They are seen grazing the floor of rock pools.
- The algal material makes the body almost see-through and gives it a greenish tint.
- It eats phytoplankton, and calcium carbonate is a part of its mineralized skeleton.
- They can do something called "kleptoplasty," a chemical process that lets them keep the chloroplasts from the algae they eat.

COASTAL BIODIVERSITY OF MUMBAI BEACHES

Size | Rocky | Sandy | Mixed | Mangroves | IUCN Red List | Flowering Season

Molluscs (Octopus, Squids & Cuttle Fish)

Indian Squid (Uroteuthis duvaucelii)

23-40 cm

- A torpedo-shaped animal has an internal shell, eight small arms, and two long tentacles with suckers.
- Their tentacles have spoon-shaped sucker discs. It helps the animal catch prey.
- They inhabit shallow water.
- It feeds on crabs, squids, and fish.
- They have unconventional defence techniques to escape danger quickly. They move using jet propulsion by forcing the water out of their bodies. Some change colour and release black ink to blind predators.

Common Octopus Octopus vulgaris

30-91 cm.

- They are commonly seen wedged under large rock beds during low tide.
- It is one of the most clever and studied octopuses.
- They can recognize faces, negotiate mazes, unscrew jars, and raid lobster traps.
- They have eight arms with several suckers and no internal shell.
- The Hunt at night. Crabs, crayfish, and bivalve molluscs are favoured, but the octopus consumes practically anything it can catch.
- It can change colour to blend in and jump on unsuspecting prey.
- Using its beak, it can break into the shells of shelled molluscs.

Echinoderms (Starfish, Brittle Stars)

Seven-armed Coral Star (Aquilonastra anomala)

2 cm.

- These small seastars can be found under rocks.
- They're often changing sizes, forms, and arm counts, constantly breaking up and growing again. Usually has seven short arms of various lengths.
- Because the rings' edges are deeply curled, it resembles a star.
- The top colours are speckled—no markings on the white bottom.
- They eat clams, oysters, arthropods, tiny fish, and gastropods. Some starfish eat algae and detritus.
- They reproduce sexually as well as asexually (Regeneration and cloning).
- The eggs develop into planktonic larvae, eventually becoming five-armed juveniles and young sea stars with short arms.

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Echinoderms (Starfish, Brittle Stars)

Little Six-arm Brittle Star (Ophiactis savignyi) | 1.63 cm

- Bottom-dwelling thrives in mangrove ecosystems, contaminated waterways, and sponges as a commensal. Six-armed adults are symmetrical. Their arms break readily, hence their name.
- It eats seafloor debris. It finds food with its arms, wraps it into a ball, and uses its tube feet to eat it.
- Individuals are males as well as females and can procreate sexually or asexually.
- Sexual reproduction involves releasing sperm and eggs into the sea and developing and settling planktonic larvae.
- Fragmentation asexually reproduces same-sex.

COASTAL BIODIVERSITY OF MUMBAI BEACHES

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THREATS TO MARINE LIFE AT CHIMBAI BEACH AND CALL TO ACTION

CHALLENGES FACED BY BEACHES IN MUMBAI

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

Rising sea levels due to climate change & ocean acidification due to pollution

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 MUMBAI BEACHES

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

About Clean Shores Mumbai

United Way Mumbai is a non-profit organization working since 2001 on various community development projects. Through the project Clean Shores Mumbai, United Way Mumbai strives to enhance the overall state of cleanliness and waste management at the shores of Mumbai through a public-private partnership and complement MCGM's cleanliness efforts. This project involves systematic and regular efforts for clean-up and waste management at the beach, community awareness activities, and biodiversity assessment, including measuring micro-plastics, crab holes, documentation of marine life, etc.

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HOW MANY SPECIES DID YOU SPOT USING THIS FIELD GUIDE?

Date	Name of the species spotted	Name of the species spotted	Name of the species spotted	Name of the species spotted	Name of the species spotted

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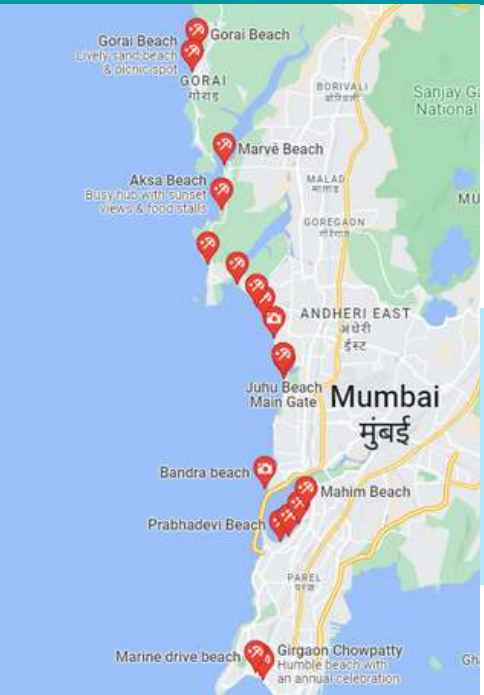

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