



Secret shores of Singapore

A handy guide for intertidal exploration



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Baler Snail



Acropora Coral



Phyllodesmium Nudibranch



Time and tide wait for no man!

The ideal tide level for intertidal walks is ≤ 0.2 m above chart datum, but exploration may still be possible at 0.4 m, depending on the site.

Check tidal predictions from MPA's yearly publication of the Singapore Tide Tables, but if you don't have a copy, you can [get a rough gauge from NEA's website](#).

Plan your trip and keep within 2 – 3 hours so that your exploration is not interrupted by the rising tide.



Orange-striped Hermit Crab



Pink Warty Sea Cucumber

What is the intertidal zone?

The intertidal zone is a unique ecosystem governed by the tides. At high tide this zone is submerged but at low tide it is exposed, allowing us to explore and observe many interesting life forms.

Life in the intertidal zone is not easy; algae, plants and animals must be able to tolerate immersion in saltwater and also be resistant to drying out under the sun. This gives rise to a multitude of fascinating adaptations and strange behaviours.

Despite extensive coastal development in urban Singapore, our intertidal areas are still full of life. These include sandy shores, mudflats, seagrass meadows, coral reefs, and even man-made structures such as seawalls and tidal canals.

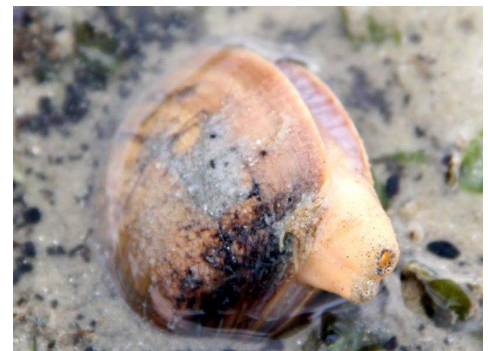
Indeed, Singapore's rich biodiversity tends to be hidden in plain sight; all we have to do is to visit our shores and take a closer look.

Are all our shores the same?

Our northern and southern shores have different environmental conditions. A number of rivers in Malaysia empty into the Straits of Johor, hence the waters of Singapore's northern shores are generally lower in salinity and have more sediment suspended in the water. Conversely, the waters of the southern shores are generally higher in salinity and clearer. Some algae, plants, and animals have environmental preferences; what you find on a sandy or muddy shore in the north may not be as abundant on a coral rubble shore in the south, and vice versa.

Top: Big brown maetra clams are often found on our northern shores. They have a short siphon and can use their foot to leap away from predators

Bottom: Ferocious reef crabs are often seen on our southern shores. Their red eyes are easily recognisable



Front page:

(Top) Kusu Island at dawn

(Bottom, left to right) Baler snail, *Acropora* coral, *Phyllodesmium nudibranch*

Know before you go

Planning your trip

- ✓ Check the tide tables for a suitable time to visit, when the tide is low.
- ✓ Watch out for the weather! Check weather apps regularly for lightning alerts.
- ✓ Note down emergency contacts.
- ✗ Do not explore the intertidal area alone.
- ✗ Do not go in big groups. Too much trampling can severely damage the ecosystem.



Packing list

- **Covered shoes** such as old sneakers, water booties or water shoes with decent grip
- **Long trousers** for good protection from stinging animals in the water and insect bites
- Loose-fitting **dri-fit clothes** that you don't mind getting a little dirty. **Long sleeves** are recommended for protection from the sun and insect bites
- **Hat or cap**, and **poncho or umbrella**
- **Torchlights** are useful for navigation and spotting marine life if you are exploring in the dark before or after daylight hours
- **Drinking water** and **snacks**, particularly if you are visiting the Southern Islands
- **Motion sickness pills** if required for the journey to the Southern Islands
- Sunscreen; if required, choose **reef-safe sunscreen**. These do not contain harmful substances that can harm marine life

On the shore

Safety first

- ✓ Wear covered shoes and watch where you step — there may be sharp rocks, broken glass, and animals with spines or sharp shells.
- ✓ Be careful of slippery rocks, especially those covered with algae.
- ✓ Avoid stepping into murky water or areas that you can't see.
- ✗ Don't touch anything unfamiliar, especially without an experienced guide — some animals can give you a nasty bite or sting.

(From left to right)

Hollow-cheeked stonefish have spines on their back which can inject venom into your foot! →

Textile cone snails may look unassuming, but they can inject deadly venom if picked up or disturbed. Look out for its colourful body and pointed shell and avoid touching cone-shaped shells! →



Avoid disturbing wildlife

- ✓ Tread carefully — the intertidal habitat is very fragile.
 - ✗ Do not handle animals unless trained to do so. Avoid poking, squeezing, or pick them up with tongs or chopsticks — this stresses them out!
 - ✗ Do not collect seashells because some animals use them as homes.
 - ✗ If you witness a predation event, do not attempt to save the prey. It is all part of nature!
- A very hairy hermit crab in its home — an empty seashell!

After the trip

Sharing your photos can help to raise awareness about the animals on our shores. Your sightings are also valuable to science! Contribute to our understanding of intertidal habitats by sharing your sightings on [BIOME](#).

Share your photos!

- ✓ Be patient; animals may re-emerge even if they're hiding!
- ✓ Photograph animals in their natural habitat; it is less stressful and records valuable behavioural information.
- ✗ Do not take 'trophy photos' of you or a friend handling the animals; this could endanger them or send the wrong message to others.
- ✗ Do not share specific locations of where you found the animals, as this could encourage poachers to visit the area.



Intertidal Habitats

A Rocky Shores

Rocky shores consist of solid rocks and boulders. The Labrador rocky shore is one of the last remaining natural rocky shores on mainland Singapore. This 300 m stretch of rocky shore and the surrounding Labrador Park was designated as a Nature Reserve in 2002. Some animals such as turban snails or climber crabs can be found attached to or crawling on the rocks. Others are often burrowed under rocks, such as bristleworms and thunder crabs.

- ➔ Usually active at night, the purple climber crab scrambles over rocks with the help of its long legs in search of algae to eat. In the day, its flat body allows it to hide in small crevices.



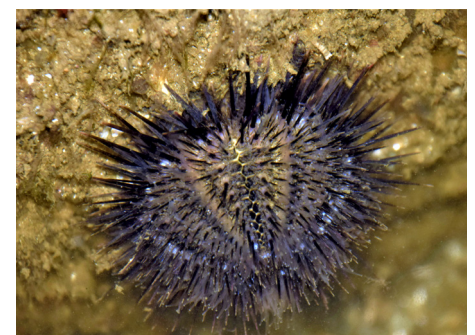
(Clockwise from top left)

Legend has it that if you get caught in the huge pincers of a thunder crab, only a clap of thunder will get it to release you. ➔

Nudibranchs (noo-dee-branks, rhymes with franks) can come in many vibrant colours. They 'smell' the water with two rhinopores at the front, while the feathery gills at the back help them breathe. ➔

Black sea urchins have prickly spines — do not touch them! ➔

The beautiful shells of cowries were once used as currency! ➔



B Sandy Shores

The sandy shores in Singapore look bare but are not devoid of life. You can find burrowing animals such as sand bubbler crabs and ghost crabs as well as other wildlife including sea stars, sand dollars and button snails on the beaches of Singapore. These crabs sift through the sand and feed on organic particles.

If you come across a patch of sand balls arranged in spiral patterns, you've entered sand bubbler crab territory. These crabs sift through the sand to find their food, leaving behind 'sand bubbles' around their burrow entrance. These crabs are shy and only about the size of your fingernail, so be quiet and patient when trying to spot them!



(From left to right)

Plain sand stars are common on our shores but often hide just beneath the sand surface. They have rows of tiny tube feet on their undersides to move around in search of prey.

It's not a pebble, it's an animal! To find buried sand dollars, just look for circular markings in the sand. Live animals have tiny soft spines on the underside that help them move; dead ones feel smooth and their skeletons are white in colour.



C Seagrass Meadows

Seagrasses are flowering plants that play important roles in the marine environment. They can grow on both muddy and sandy substrates. Apart from being a source of food for herbivores, seagrass meadows are nurseries for juvenile animals such as crabs, shrimps and fishes. The structural complexity of seagrasses makes seagrass meadows areas of rich marine biodiversity. There are a total of 12 species of seagrasses in Singapore, and their habitats can be found both on the northern and southern shores of the island. Animals associated with seagrass habitats include sea stars, sea horses, crabs, sea urchins, sea cucumbers and snails.

Horseshoe crabs existed even before the dinosaurs! Their tails are not venomous, nor are they used to sting. Instead, they use them as levers to flip themselves over when overturned.



Individual knobby sea stars have a unique pattern of nodules, like our fingerprints!

Peacock anemones have long and graceful tentacles.

Sea apple sea cucumbers are one of the most vibrant creatures on the shore. They can eject their guts to scare potential predators away. Please don't handle them as some species, like this one, are toxic!

Garlic bread sea cucumbers can be found in seagrass meadows. They move by using rows of tiny tube feet on their undersides.

D Coral Rubble

Coral rubble is made of broken-up skeletons of dead hard corals that have been washed up by the waves. While it may appear dead, it is actually full of life, providing a hard surface for algae to grow on and for animals to hold onto or take shelter from predators. The animals found here are very diverse, including sponges, sea fans, sea slugs, snails, flatworms, crabs, fishes, octopuses, sea anemones, sea cucumbers, and sea stars. Live hard and soft corals can also be found in this zone.

Blue-spotted fantail rays are beautiful, making them vulnerable to over-collection in the aquarium trade. Don't wade into murky water in case you step on one!



(From left to right)

- Sponges can come in vivid colours. They may look like non-living things or plants, but are in fact one of the earliest animal groups to evolve!
- Can eat or not? Red egg crabs may look fleshy, but these slow-moving crabs are poisonous. While you won't be able to enjoy this crab as a dish, you can, however, observe it under coral rubble.

Most soft coral feed on plankton and other small particles in the water column, which they catch with their tentacles. The algae they live with also makes food from sunlight.



Hard corals, like this boulder coral, produce an external skeleton by secreting calcium carbonate. This skeleton remains even after the animal dies, preserving a record of the environmental conditions of its lifetime. Scientists use corals to model our planet's past climate up to tens of thousands of years ago.



➤ Most feather stars have at least 10 arms, but some have up to 200! Their long arms are fragile and break easily, so please do not disturb them.

Not sure what you saw? Find out more!

- Submit your sightings to the [SGBioAtlas app](#) or [BIOME](#), where experts can identify your sightings!
- Use various online resources! Some of these include the [wild fact sheets](#) by WildSingapore, [Biodiversity of Singapore repository](#) by Lee Kong Chian Natural History Museum, and the [gallery](#) on the Reef Ecology Lab (NUS) website.
- Join Facebook groups such as "SG Seashore ID, can?" to ask other marine enthusiasts for help.