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Islandwide hunt planned for giant sea sponge

Search starts soon after a study found that the marine creature is at risk of disappearing again

Ang Qing

An islandwide hunt for a rare giant sea sponge in Singapore waters will start in the first quarter of 2023 to take stock of the critically endangered species.

This search for the sponge, known as the Neptune's Cup, follows a recent study which found that the marine creature, once thought to be extinct, is at risk of disappearing once again.

The sponge, which is shaped either like a goblet or a bowl, is under threat from hungry predators like turtles and pufferfish, and being too similar genetically.

National University of Singapore's Associate Professor Huang Danwei, who co-authored the study published in journal Scientific Reports in 2022, said: "The low genetic variation is problematic because it means that they would respond very similarly under environmental change.

"A single event such as a disease outbreak or worsening of sedimentation could wipe out the entire population."

These findings come as the sponge's habitat is set to shrink further with Singapore reclaiming more land.

Growing up to over 1m tall, the sea giant is prized by museums and collectors for its size. The species was first discovered here in 1819.

After the elusive sponge was believed to have been wiped out worldwide for more than a century, two individual sponges were found in Singapore in 2011 by marine scientists surveying waters off St John's Island.

To better monitor and protect the population, six of the seven living Neptune's Cups known to exist here were moved to Sisters' Islands Marine Park.

But the study, which tracked the size of these sponges from June to December 2020, has raised concerns that clustering the sponges in one location may make them a bigger magnet for their predators. One of the specimens died in 2022 and little remains of another.

Prof Huang said: "It's possible these two individuals were already stressed by some unknown environmental factor, and the severe predation exacerbated their tissue loss. We observed that the rest of the population did not decline significantly in size during the study. Since these sponges were situated in the same area, and we did not observe declines in the other individuals, the loss facing these two individuals may not have been easily averted."

A Neptune's Cup sponge being relocated from St John's Island to the Sisters' Islands Marine Park, as part of recovery efforts. ST FILE PHOTO

Recovery of the highly endangered sponges may require them to be transferred to aquariums and even cross-bred with other populations elsewhere, which are unfortunately rare in the region, he said.

National Parks Board's (NParks) director of the National Biodiversity Centre Karenne Tun, who co-authored the study, said the board plans to collaborate with divers and citizen scientists from the Friends of Marine Park community. From the first quarter of 2023, they will map out where the sponge cups are before making any changes to the species' conservation strategy.

This will help plug knowledge gaps of the species. Little is known about the sponge, she added.

She said: "NParks plans to leverage remote sea floor mapping to survey less accessible areas, and will explore piloting the use of autonomous underwater vehicles to systemically map out the distribution of this species."

Currently, NParks is aware of 12 sponges in Singapore, including the six individual ones relocated in the study – one from Pulau Semakau, one from the Sisters' Islands and four from Pulau Tekukor.

The health and size of the relocated individual sponges are checked quarterly, said Dr Tun, adding that while bite marks are regularly seen on the first sponge found in 2011, it has always healed and recovered. To date, the goblet-shaped sponge still retains its shape and has grown from about 30cm to over 1m tall.

Dr Tun, who was among the group which rediscovered the species in 2011, said bringing the sponges close together means when they release their larvae into the water, there is a better chance of cross-fertilisation.

"We know that they are reproducing because we've seen a juvenile measuring only a few centimetres tall," she said.

While moving the sponge cups to an aquarium might help the individual sponges, the trade-off would be reducing a food source for turtles, which are also critically endangered, she added.

Dr Tun said: "Our job is not to protect a single species, but to ensure the ecosystem can survive."

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In search of giant sea cups

The hunt is on for a rare giant sea sponge known as the Neptune's Cup (*Cliona patera*). The National Parks Board will be trawling through Singapore's coastal waters for it, starting in 2023. **Ang Qing** looks at how such sponges have been faring.

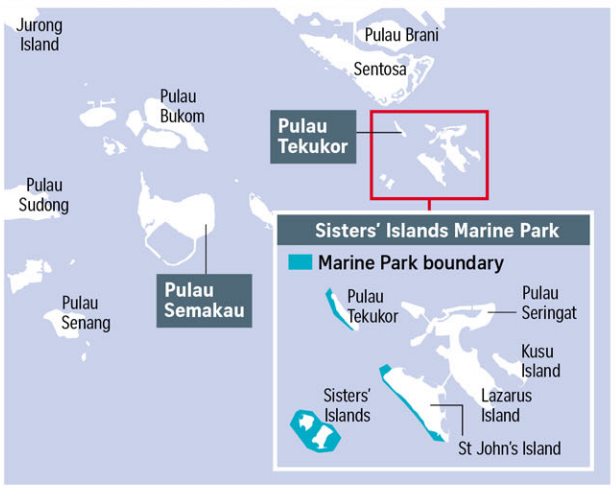
THE NEPTUNE'S CUP (*Cliona patera*)

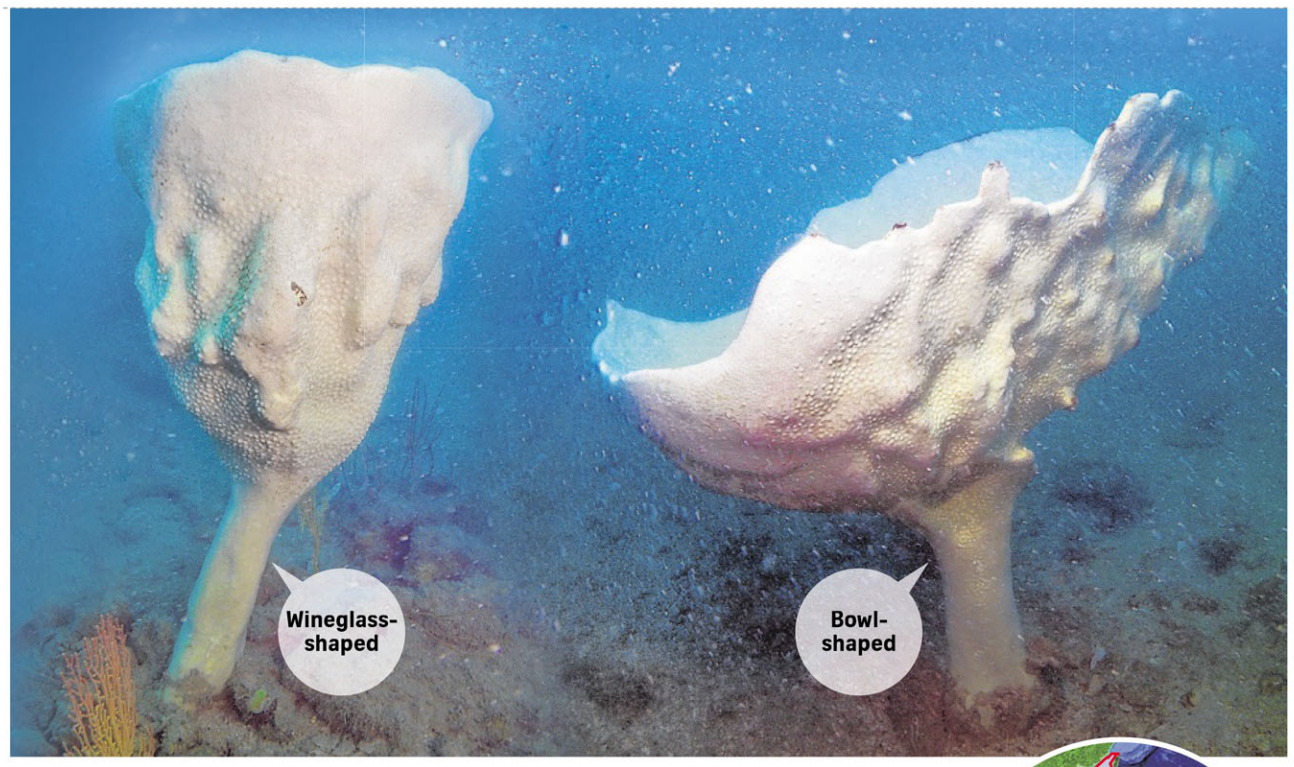
A brief history

- Discovered in 1819 and was once commonly found in Singapore waters.
- This giant of the sea floor was prized and harvested by museums and private collectors.
- For over a century, scientists believed the Neptune's Cup was extinct until 2011, when marine biologists stumbled upon two live specimens off St John's Island. More specimens were later spotted.
- They are displayed in museum collections worldwide. Records show that mature sponges were used as bathtubs for babies.

Right: A Neptune's Cup sponge specimen at the Leiden Museum, The Netherlands.

WHERE THEY HAVE BEEN SPOTTED IN SINGAPORE

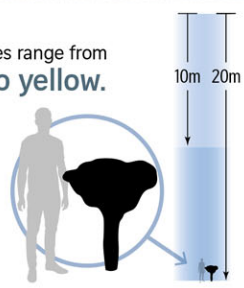




Appearance
Unlike other sponges in Singapore waters which are generally tough and rough, the cups feel **firm and leathery.** They anchor themselves to the sea floor with tree-like "roots".

Colour
Live sponges range from **white to yellow.**

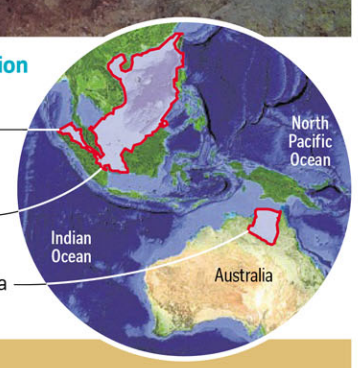
Size
Mature ones can measure **1m** in height and diameter.



Habitat
They can be found at depths of 10m to 20m in areas with **good water flow.**

Diet
They are **filter feeders** that extract nutrients from the surrounding water.

Distribution



THREATS TO THE GIANT SPONGE

Low genetic diversity
- Six out of seven known specimens in Singapore are genetically extremely similar.
- This low genetic variation is problematic because it means that they would respond similarly to environmental changes, said marine biologist Huang Danwei, who co-authored a study of the marine sponge.
- This means a single event such as a disease outbreak or worsening of sedimentation could wipe out the entire population.

Being too tasty
- Sponge sizes shrank by up to about 5 per cent every month between June and December 2020 due to severe predation.
- Bite marks suggest that predators such as pufferfish and turtles are the culprits.

Shrinking sea space
- The development of natural sea spaces has led to the destruction of these cups.
- Some were relocated to Sisters' Islands Marine Park to prevent their destruction.

Sources: NPARKS, KARENNE TUN, HUANG DANWEI PHOTOS: JEFFREY LOW, LIM SWEE CHENG, GOOGLE MAPS STRAITS TIMES GRAPHICS