

# Pink water at Sentosa Cove caused by heavy rainfall



Left: The pink-purple colour of the Sentosa South Cove waterway as seen last Thursday. Right: A photo taken yesterday which shows the lock gate separating the open sea (left) and the waterway that runs through Sentosa South Cove. ST PHOTOS: ALPHONSUS CHERN, MARK CHEONG

## Altered water conditions likely led to algal bloom that induced colour change: SDC, NEA

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Investigations into the fish die-off and pinkish-purple colour of the Sentosa South Cove waterway earlier this month have found that they were caused by the heavy and persistent rainfall in recent weeks that altered water conditions.

Water samples tested had low levels of salinity and dissolved oxygen, which may have led to the dead fish sighted in the waterway banks from Jan 6 to 9, said the Sentosa Development Corporation (SDC) and National Environment

Agency (NEA) yesterday.

The algal bloom that changed the colour of the waters was likely triggered by a high nutrient level and organic content in the water, NEA added.

Sentosa Cove residents first noticed a foul, sewage-like smell from the waterway on Jan 5. This was followed by the fish kill and the waters turning shades of plum from Jan 12.

SDC and NEA, together with Sentosa Cove Resort Management (SCRM), studied water samples collected between Jan 6 and 13.

The National University of Singapore's Tropical Marine Science In-

stitute (TMSI), which collaborated with SDC and SCRM to carry out the investigations, found high amounts of pico-cyanobacteria – a form of algae – in the water samples.

The colour of the bloom depends on the species of the algae form and their pigment composition, and the algal bloom could have occurred even before the visible change in the colour of the waters, said the SDC-NEA statement.

In line with what experts told *The Straits Times* in earlier reports, TMSI's evaluation suggests that the fish kill could also be due to the low level of oxygen caused by the cyanobacteria's respiration or decomposition, or suffocation due to gill clogging.

The SDC-NEA statement added another possible cause – irritation

caused by the algal bloom.

The unpleasant odour of the waters was likely due to decomposing fish, said the statement.

One Sentosa Cove resident, drama educator Thi Lien Margailan, who is in her 40s, said that while there are no dead fish along the waterway, the smell still lingers in the area.

Ms Thi Lien, who runs environmental-interest group *The Heron of the Green Barrels* on Facebook, said residents in the area were concerned about how the algal bloom affects the waterway.

"The water has yet to go back to normal and is now a muddy brown colour. As I live on a higher floor, the smell was not so unbearable, but I know residents living by the waterway will be affected if this happens again," she said.

TMSI senior research fellow Sandric Leong said heavy and regular rainfall causes the salinity of sea-surface water to decrease, and may also cause high-nutrient run-off from land into the waterway. Rainwater, he added, was also a source of nutrients.

Some observers had speculated that run-off from nearby golf courses had caused the algal bloom.

In response to queries, a spokesman for SDC said: "As part of irrigation design, surface run-off from the Sentosa Golf Club's courses does not drain into the South Cove waterway.

"The lakes and fishes at the courses have also remained unaffected."

Dr Leong said the algal bloom is a complex phenomenon caused by multiple factors such as light, nutri-

ents and water movements.

The cyanobacteria's adaptability to sudden changes in environmental conditions like the recent continuous rainfall enables it to out-compete other phytoplankton or algae, he added.

"Due to rainfall, the light condition was low – cyanobacteria could grow better in low light level when compared with others," he said.

Dr Leong noted that algal blooms are a natural phenomenon that cannot be stopped or cleared away.

He added: "The seawater and algal species need to be monitored regularly in order to minimise impact. It could happen again, when the right species is present with the optimal conditions for bloom formation."

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