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THE INFLUENCE OF THE RED TIDE PHENOMENON ON HUMAN HEALTH AND WELFARE

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A phenomenon known as "red tide" describes a natural occurrence in which a high concentration or bloom of particular forms of marine algae in coastal or marine waters. Image 1 shows the discovery of red tide algae in coastal waters around Kota Kinabalu and Tuaran. Although the phrase "red tide" refers to a reddish-brown staining of the water, it can also appear as brown, green, or even blue tides depending on the type of algae involved. Red tide is primarily caused by specific algae, such as dinoflagellates and diatoms, growing quickly in favourable climatic conditions. Among the many factors contributing to red tides is nutrient enrichment. The overabundance of nutrients in the water, such as phosphate and nitrogen, might encourage the growth of algae. Numerous sources, including sewage discharge, agricultural runoff as shown in Image 2, and natural phenomena like upwelling, can provide these nutrients. Besides that, plenty of harmful algal species favour warm water conditions. Red tides can emerge as a result of



Image 1: Red tide algae in coastal waters around Kota Kinabalu and Tuaran (Source: The Borneo Post, 2023)



Image 2: Nutrient-filled water, called runoff that flows into lakes and oceans causes red tides (Source: CBS News, 2023)

their growth and reproduction being facilitated by warmer temperatures. Moreover, calm or sluggish water is frequently linked to red tides. The algae can stay concentrated in one place and proliferate quickly when the water is not moved by wind or currents. Red tide severity and frequency can vary due to climate change. Changes in ocean chemistry, modified rainfall patterns, and higher sea temperatures can all effect on how dangerous algal blooms behave. As a result, the algae multiply aggressively during a red tide, creating a dense population or bloom. A high level of algae can cause the water to turn to a particular shade as it grows. The fact that some species of algae produce toxins is one of the primary causes of red tide. Depending on the sensitivity and exposure level of the marine organisms, these poisons can be dangerous and even fatal. The health of humans may be impacted by the toxins as well. The toxins can be aerosolized and travel by winds, causing respiratory respiratory problems such as coughing, sneezing, throat irritation, and difficulty breathing, particularly in those who currently suffer from a respiratory illness like asthma. Additionally, this phenomenon may cause human poisoning from shellfish. This is due to the fact that red tide algae produce toxic poisons that can retain in filter-feeding shellfish like clams, mussels, and oysters. Consumption of these shellfish can result in Amnesic shellfish poisoning (ASP),

neurotoxic shellfish poisoning (NSP), and diarrhetic shellfish poisoning (DSP), among other forms of shellfish poisoning (Vermes, 2019). In severe cases, symptoms can result in paralysis or even death. Other symptoms might include tingling or numbness in the lips or extremities, vomiting, diarrhoea, and nausea. Apart from that, humans may get skin and eye irritation due to the toxic algae. Direct contact with red tide-contaminated water can result in infection and cause rash, redness, and skin irritation. Additionally, if the water gets in the eyes, it can

endanger or even kill marine life and cause large fish deaths as shown in Image 3 which occurs in Florida's beach. For coastal communities that depend on healthy fisheries and the fishing industry, this phenomenon will bring a negative economic impact. Even so, red tide is a natural occurrence that cannot be completely stopped or avoided. So, people should take precautions by avoiding contact with affected water, such as avoiding swimming, snorkelling, or participating in other water sports in red tide-affected locations.



Image 3: Thousands of dead fish float during red tide blooms in the Boca Ciega Bay, Florida (Source: Azhar, 2022)

cause redness, irritation, and itching. Further, the phenomena brought on by toxic algae may result in fish kills and have an adverse economic impact. The chemicals released by the algal blooms have the potential to reduce the amount of oxygen in the water, resulting in hypoxic or anoxic conditions that may

Image 4 shows a surfer having contact with the affected water which could lead to infection of the toxic from the red tide algae. Other than that, consumer must follow seafood consumption advisories and avoid eating shellfish harvested from impacted areas unless authorities have tested and approved it. Additionally, avoid



Image 4: A surfer rides a wave showing red tide (Source: Pierson, 2018)

being upwind when near an area that is experiencing a red tide in order to reduce potential exposure to airborne pollutants. In conclusion, the red tide natural phenomena have a consequence on both marine ecosystems and human health and well-being. However, the amount and severity of red tides are determined by a range of environmental factors. It is crucial to remember that the exact causes and triggers of red tides might change based on the area and the type of algae present. Red tide's effects on human health and the marine ecology can be more effectively managed by being aware of the risks, exercising caution, and supporting initiatives to preserve water quality. Although discoloured water does not always indicate

danger, it is advisable to stay on the side of caution and avoid locations that are obviously affected. Therefore, in order to reduce potential health risks to people in impacted areas, it is crucial that local authorities and health organizations keep an eye on red tide incidents and issue warnings about them. For the purpose of regulating fisheries, determining potential health hazards to humans, and putting mitigation measures into action, red tide outbreaks must be closely monitored and early detected. To reduce exposure and safeguard both humans and marine life, this involves routinely checking the quality of the water, testing shellfish, and releasing public health advisories. However, not every algal bloom is harmful.

Certain times they just serve as a food supply for specific kinds of marine life and are a component of the ocean's natural cycle. In accordance with the goals of Sustainable Development Goal 3 (SDG 3) to ensure healthy lives and promote well-being for all at all ages, environmental preservation must be given top priority in order to prevent the spread of harmful diseases.

References

