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ACE Paper 15/2025
For information by circulation

Recent Progress on Water Quality Improvement and Management in Hong Kong

PURPOSE

The Environmental Protection Department (EPD) regularly monitors water quality at gazetted beaches, marine waters and rivers, and publishes annual findings about water quality. The EPD released its beach water quality report in April 2025, and the marine and river water quality reports in August 2025. This paper provides an overview of recent progress in water quality improvement and management, highlighting key findings from these reports and updating members on the government's latest achievements.

KEY FINDINGS AND LATEST ACHIEVEMENTS

Enhancing Water Quality for 15th National Games Triathlon Competition and Cross Harbour Race

2. The EPD has been improving the water quality in Hong Kong. The 15th National Games triathlon competition was successfully held on 15 and 16 November 2025 at the Central Harbourfront Event Space and Victoria Harbour. The event showcased Hong Kong's scenic harbour and demonstrated the excellent water quality, which fully complied with the stringent standards specified for the triathlon competition. The Cross Harbour Race 2025 also proceeded smoothly on 22 November 2025, attracting a record-breaking participation of about 4 000 swimmers. The successful organisation of these national and international mega water sports events in Victoria Harbour underscores the effectiveness of the government's sustained efforts in water quality improvement and management.

3. In preparation for these iconic water sports events, a cross-departmental government task force commenced planning work a year in advance of the official competitions. To ensure effective implementation of improvement measures, the EPD proactively deployed advanced smart technologies, including a new-generation 3D hydrodynamic and water quality model integrated with the up-to-date meteorological data, to analyse and predict the water quality and hydrological conditions of Victoria Harbour during the race events. A series of measures were implemented, including enhanced water quality monitoring, comprehensive pollution source investigations in the catchment areas, prompt rectification of ageing public sewers and sewer misconnections, various sewage interception and odour mitigation measures along the harbourfront, and enhanced harbour cleanup operations.

National "Beautiful Bays" Recognition

4. The "Beautiful Bays" (美麗海灣) initiative is a key national programme that promotes marine ecological environment protection and forms an integral part of building a "Beautiful China" as advocated in the national 14th Five-Year Plan. The Ministry of Ecology and Environment has recently announced the fourth batch of national "Beautiful Bays", with Hong Kong's Mirs Bay selected as an Outstanding Example of Beautiful Bays. This marks the first time the Hong Kong Special Administrative Region (HKSAR) has received such recognition, highlighting the HKSAR Government's efforts in marine ecological conservation. It also signifies a significant achievement in jointly building the Greater Bay Area into an international first-class beautiful bay area, in line with the 2025 Policy Address.

5. The HKSAR Government has been actively strengthening regional cooperation with the Guangdong Provincial Government and Shenzhen Municipal Government, deepening exchanges on marine environment management in Mirs Bay. This collaboration promotes information sharing and emergency response coordination mechanisms, jointly enhancing overall ecological governance standards. We will also share the experience in promoting the development of "Beautiful Bays" with coastal cities in the Chinese Mainland. The HKSAR Government will continue to enhance the quality of the marine ecological environment including promoting the prevention and control of coastal pollution, coordinated ecological protection, and shoreline remediation.

Developed the Phytoplankton Community Integrity Index (PCII)

6. In line with international practices and the latest scientific developments, the EPD has developed a biological indicator, namely the Phytoplankton Community Integrity Index (PCII) in recent years. The PCII provides an objective and scientific means for assessing coastal eutrophication by analysing the impact of nutrient levels on phytoplankton communities in coastal ecosystems. It supplements traditional

nutrient-based water quality parameters with key indicators of ecological or biological responses, thereby enhancing the assessment of eutrophication risks in coastal and estuarine waters. The development and applications of the PCII, together with the associated study findings, were reviewed by academic scholars and published in an international scientific journal in February 2024[1]. The EPD has adopted the PCII to assess the eutrophication status of marine waters, with detailed results presented in the 2024 marine water quality report.

7. The EPD has also actively organised a series of exchanges with the government officials and experts from the Chinese Mainland through expert working groups, forums, lectures and technical seminars to introduce and promote the development and applications of the PCII. In early November 2025, the EPD hosted an International Conference and Workshop on the PCII[2] to strengthen exchanges and collaboration among government officials, professional bodies and experts from Hong Kong, the Chinese Mainland and overseas. These efforts have further deepened co-operation between the HKSAR and the Chinese Mainland in promoting marine ecological environment protection and conservation.

BEACH, MARINE, AND RIVER WATER QUALITY IN 2024

Beach Water Quality

8. During bathing season from March to October, the EPD conducts water quality monitoring at all 42 gazetted beaches at least three times per month, with sampling intervals ranging from 3 to 14 days. Beach water quality is assessed using a ranking system, under which the beaches are rated “Good”, “Fair”, “Poor” or “Very Poor” based on the *E. coli* level, reflecting the level of swimming-associated health risks. Beaches rated “Good” or “Fair” comply with the bacteriological Water Quality Objective (WQO) for bathing waters.

9. In 2024, all 42 gazetted beaches continued to fully comply with the bacteriological WQO, with 23 beaches (55%) rated as “Good” and 19 beaches (45%) rated as “Fair” (see **Figures 1** and **2** in **Annex**). No beaches were rated as "Poor" or "Very Poor", marking 15 consecutive years of full compliance with the bacteriological WQO since 2010.

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[1] Mak, Y.L., Tett, P., Yung, Y.K., Sun, W.C., Tsang, H.L., Chan, C.T., Liu, H., Chiu, W.L., Leung, K.F., Yang, R. and Chui, H.K. (2024) Phytoplankton community integrity index (PCII) – A potential supplementary tool for evaluating nutrient enrichment status of Hong Kong marine waters. *Marine Pollution Bulletin, 199*, 115964.

[2] https://www.info.gov.hk/gia/general/202511/04/P2025110400300.htm

10. The number of beaches rated as "Good" in 2024 decreased slightly from 26 to 23 compared with 2023 (see **Figure 3** in **Annex**). This was attributed to the unstable weather conditions during the first half of 2024, when heavy rainstorms possibly washed off pollutants from beach hinterlands into coastal waters, resulting in a short-term increase in *E. coli* levels.

11. The progressive improvement in beach water quality over the past three decades, reflected by an increase in the bacteriological WQO compliance rate from 74% in 1986 to a steady 100% since 2010 (see **Figure 3** in **Annex**), has been driven primarily by the Government's continuous implementation of various pollution control and environmental improvement measures. These include the enforcement of the Water Pollution Control Ordinance (WPCO) and the Waste Disposal Ordinance (WDO), the extension of sewerage networks to beach hinterlands, the implementation of the Harbour Area Treatment Scheme (HATS), and the upgrading of sewage treatment facilities.

12. To keep the public informed of potential water quality deterioration arising from hydrometeorological conditions (e.g. heavy rainstorms), the EPD launched the Beach Water Quality Forecast System in 2023 to provide daily water quality forecasts for all gazetted beaches open for swimming in Hong Kong. The latest beach water quality forecast and grading information are available on the EPD's beach thematic webpage at www.epd.gov.hk/epd/beach.

Marine Water Quality

13. The EPD monitors marine water quality at 76 stations in open waters of the ten Water Control Zones (WCZs) in Hong Kong on a monthly basis. Marine water quality is assessed using the overall marine WQO compliance rate, which takes into account the average compliance rate across all stations for four key parameters: dissolved oxygen (DO), total inorganic nitrogen (TIN), unionised ammonia nitrogen (NH_3-N) and *E. coli* bacteria.

14. In 2024, Hong Kong's marine waters achieved an overall WQO compliance rate of 88%, continuing the improving trend from about 80% in 2014 (see **Figure 4** in **Annex**). Among the key parameters, NH_3-N and *E. coli* maintained 100% compliance across applicable WCZs. The compliance rate for DO was 99%, while that for TIN was 61%, mainly due to the high background level in the Pearl River Estuary resulting from seasonal estuarine discharges.

15. The water quality of Victoria Harbour continued to improve notably with the staged implementation of the HATS (see **Figure 5** in **Annex**). Compared with pre-HATS levels (1997-2001), levels of *E. coli*, NH_3-N and TIN in 2024 were reduced by approximately 91%, 54%, and 17% respectively. The average WQO compliance rate of Victoria Harbour has exceeded 90% in recent years. Through interdepartmental efforts to investigate pollution sources and rectify ageing sewers and misconnections, the pollution load at previously highly polluted stormwater outfalls along the harbour, including Tsuen Wan, Sham Shui Po and Kowloon City, was reduced by about 87% by end-2024, exceeding the 2022 Policy Address key performance indicator of halving pollution load at seriously polluted outfalls on both sides of Victoria Harbour by end-2024.

16. Among the ten WCZs, five — Mirs Bay, Port Shelter, Eastern Buffer, Junk Bay and Western Buffer — fully met WQOs in 2024. Victoria Harbour achieved 97% compliance, while Tolo Harbour and Channel achieved 93%. The remaining three WCZs — North Western (72%), Southern (69%) and Deep Bay (67%) — were within the normal range of fluctuations observed in recent years.

17. The lower compliance in North Western, Southern and Deep Bay WCZs was mainly attributed to the high background levels of TIN resulting from seasonal estuarine discharges. With the progressive implementation of pollution control measures by the governments of Hong Kong and Shenzhen, the water quality of Deep Bay has improved significantly with the overall WQO compliance rate rising from an average of 47% during 2009-2018 to 67% in 2024. Ongoing pollution control measures, including sewerage extensions and upgrading works, will further reduce pollution loads and sustain the notable improvement in water quality.

18. The PCII aims to monitor and gauge the change and trend of the abundance of two major phytoplankton lifeforms, namely diatoms and dinoflagellates. A five-tiered grading system was established to describe the ecological status of phytoplankton communities. A PCII value of 0.6 or above, which is equivalent to "Good" or "High", is set as the Biological Water Quality Criterion target[3] of acceptable disturbance to the phytoplankton communities in all WCZs of Hong Kong. In 2024, the PCII at WCZs met the biological target, showing no signs of eutrophication or nutrient enrichment impacts on phytoplankton communities. In 2024, 11 red tide incidents were recorded in Hong Kong waters, compared with an average of 10 incidents per year during 2019-2023 (see **Figure 6** in **Annex**). These

[3] The Biological Water Quality Criterion target is set based on a previous local study as well as the latest international practices including European Union Water Framework Directive (EU WFD) and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention).

incidents were caused by five phytoplankton species and most of them were non-harmful. No red tide-related fish kills were reported.

River Water Quality

19. The EPD's river monitoring programme covers 82 stations across 30 watercourses. Compliance with the WQOs at individual stations within various WCZs is assessed based on five key parameters: pH, suspended solids (SS), DO, 5-day biochemical oxygen demand (BOD_5) and chemical oxygen demand (COD). The EPD also applies a Water Quality Index (WQI) to indicate the overall river health. The WQI rates river water quality as "Excellent", "Good", "Fair", "Bad" and "Very Bad" based on DO, BOD_5 and ammonia nitrogen (NH_4-N) levels.

20. Hong Kong's rivers continued to perform satisfactorily in 2024. The WQO compliance rate reached 87%, up from 48% in 1987 (see **Figure 7** in **Annex**). For WQI gradings, 78% of stations were rated "Excellent" or "Good" in 2024, compared with 26% in 1987. The most pristine watercourses are found primarily in Lantau Island, the Eastern and Southwestern New Territories and Kowloon. The consistently high WQO compliance and favourable WQI gradings are attributed to the pollution control measures implemented under WPCO and WDO, together with the sewerage extensions to villages carried out under the Sewerage Master Plans. These improvements have been achieved despite the population of New Territories doubling over the past three decades.

21. Rivers in the western New Territories have shown slower improvements, affected by run-off from unsewered villages, misconnections in older districts, and illegal discharges from livestock farms. For example, about 50% of the stations along Yuen Long Nullah and Kam Tin River recorded WQI gradings between "Fair" and "Very Bad" in 2024. The Government will continue to step up law enforcement against illegal discharges in these areas and enhance sewerage infrastructure by upgrading sewage treatment facilities, extending sewerage networks, and installing dry weather flow interceptors to further improve the water quality.

WAY FORWARD

22. Looking ahead, we will further strengthen regional collaboration and Hong Kong's water quality management capability. We will focus on tackling pollution issues in the nearshore waters of Victoria Harbour and in pollution-prone rivers across the New Territories. By leveraging smart technologies, we will enhance the identification and rectification of sewer misconnections to further improve the environmental conditions of the harbourfront, thereby facilitating the safe

organisation of water sports and recreational activities in our world-class harbour and adjacent waters. These initiatives will greatly enhance the quality of life for citizens in Hong Kong by creating a better living environment.

Environmental Protection Department
December 2025

Figure 1 Annual ranking of gazetted beaches in 2024

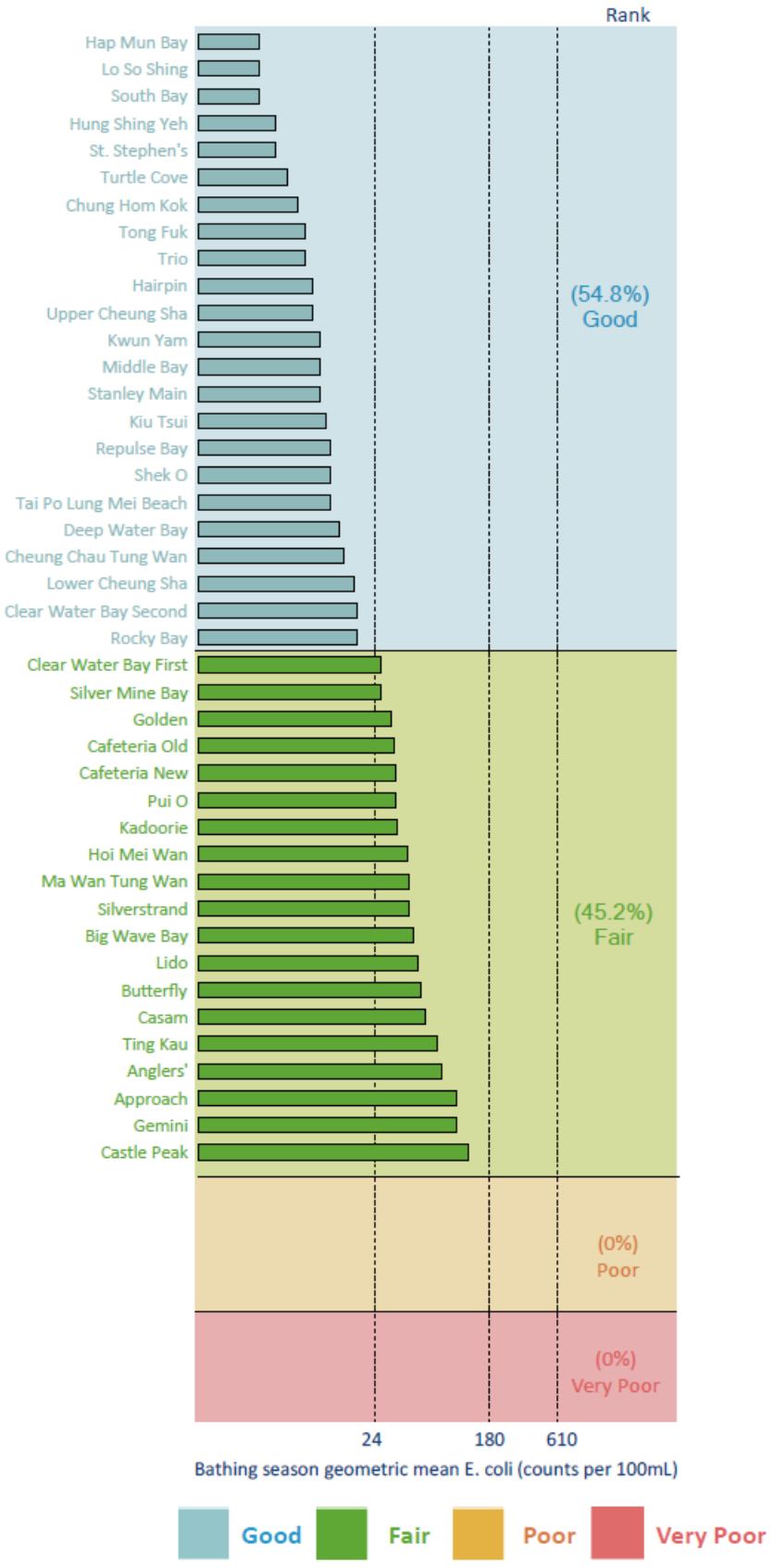

Figure 2 Distribution of gazetted beaches and their annual ranking in 2024

Tuen Mun District

1. Butterfly
2. Castle Peak
3. Kadoorie
4. Cafeteria Old
5. Cafeteria New
6. Golden

Tsuen Wan District

7. Ma Wan Tung Wan
8. Anglers'
9. Gemini *
10. Hoi Mei Wan
11. Casam
12. Lido
13. Ting Kau
14. Approach

Islands District

15. Silver Mine Bay
16. Pui O
17. Lower Cheung Sha
18. Upper Cheung Sha
19. Tong Fuk
20. Cheung Chau Tung Wan
21. Kwun Yam
22. Hung Shing Yeh
23. Lo So Shing

Tai Po District

24. Tai Po Lung Mei

Sai Kung District

25. Kiu Tsui
26. Hap Mun Bay
27. Trio
28. Silverstrand
29. Clear Water Bay First
30. Clear Water Bay Second

Southern District

31. Deep Water Bay
32. Repulse Bay
33. Middle Bay
34. South Bay
35. Chung Hom Kok
36. St. Stephen's
37. Stanley Main
38. Hairpin *
39. Turtle Cove
40. Shek O
41. Rocky Bay *
42. Big Wave Bay

* Beaches not open for swimming (no lifeguard service provided by Leisure and Cultural Services Department)

Figure 3 Annual ranking of gazetted beaches from 1986 to 2024

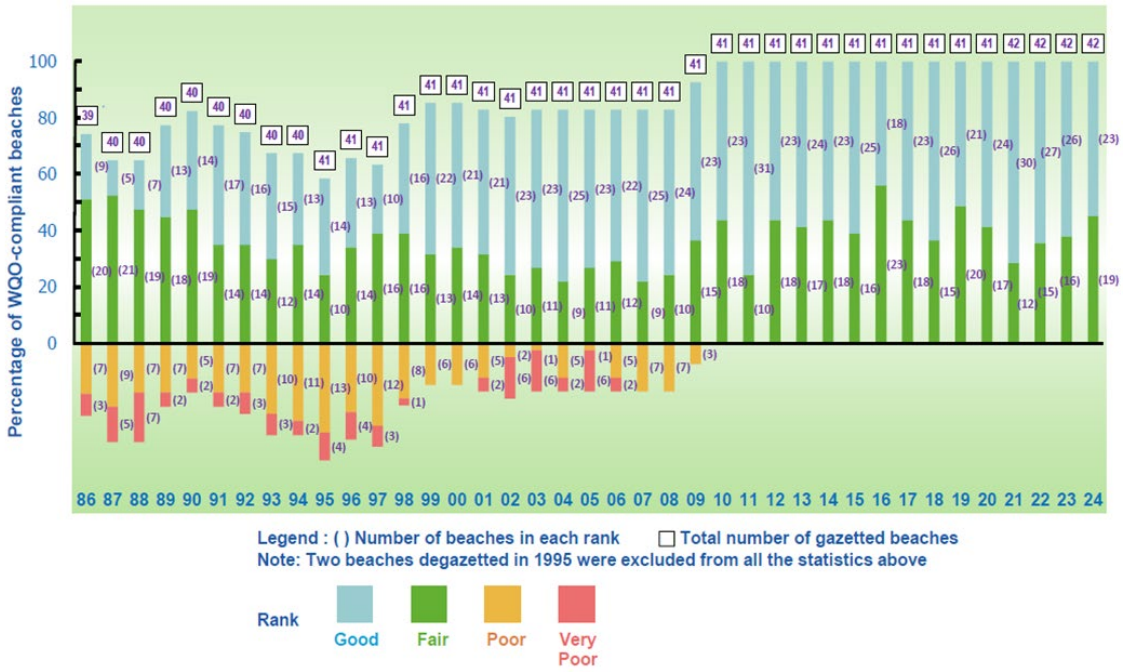

Figure 4 Overall marine WQO compliance rates of Hong Kong, 1986-2024

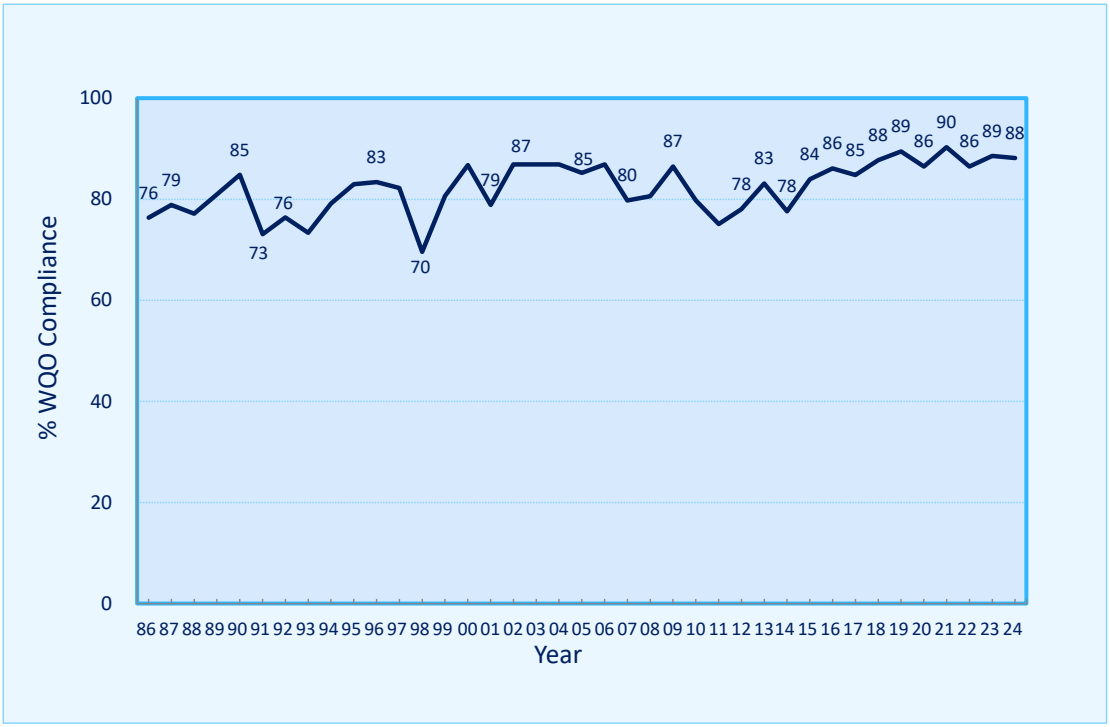

Figure 5 Water quality improvement in Victoria Harbour since the implementation of Harbour Area Treatment Scheme (HATS)

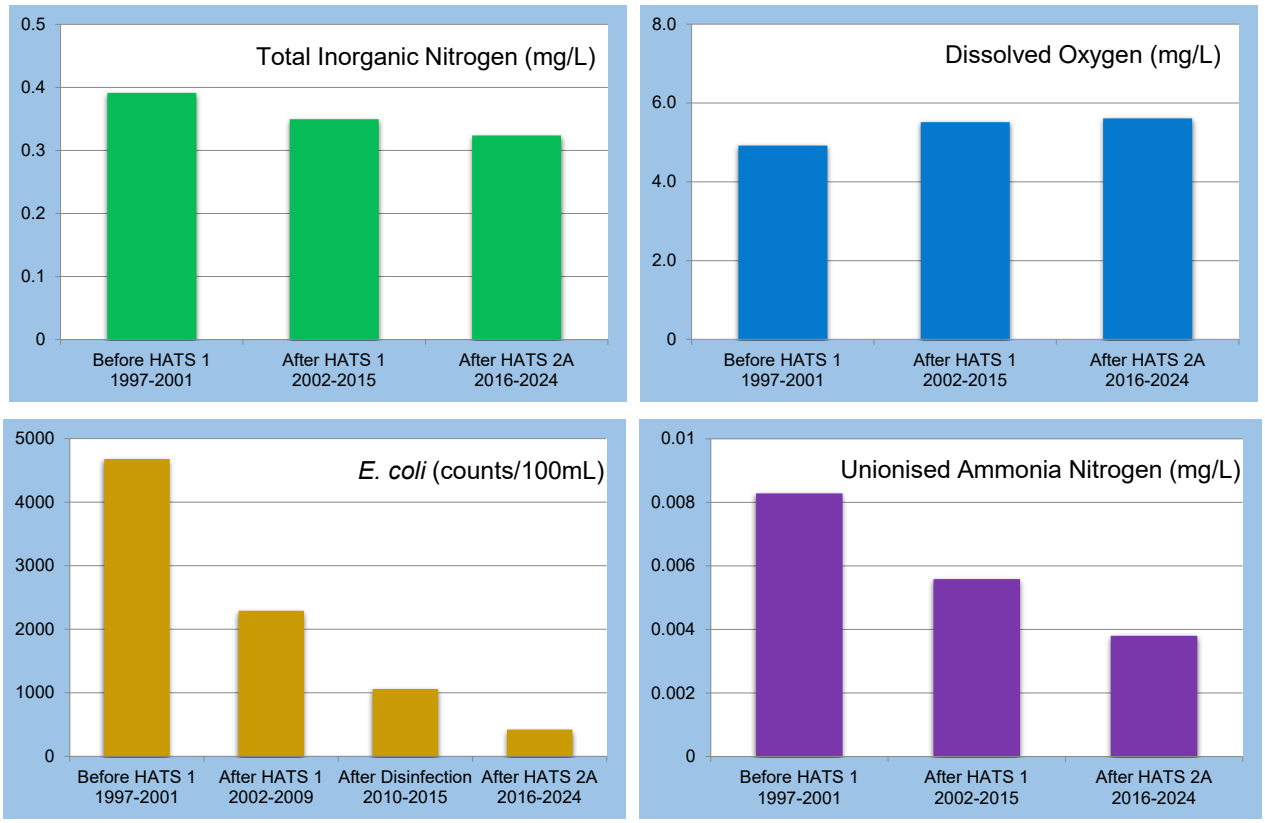

Figure 6 Occurrence of red tides in Hong Kong waters, 2000-2024

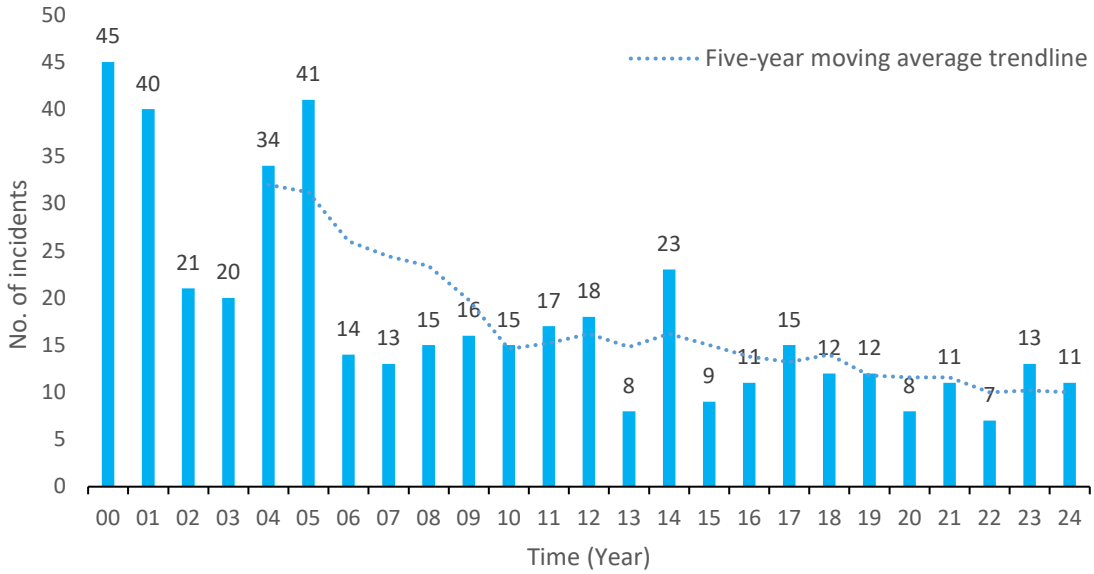

Figure 7 Overall river WQO compliance rates of Hong Kong, 1987-2024