

For information**Legislative Council
Panel on Environmental Affairs****Protection of the Marine Environment****Purpose**

The purpose of this paper is to inform members about how our marine environment is protected for the purpose of achieving the intended beneficial uses, and sustained viability of the ecosystem.

Existing Conditions of HK's Marine Environment

2. Hong Kong's marine waters cover an area of 1,651 km². With a population of 6.9 million¹, Hong Kong relies heavily on its coastal environment for a variety of beneficial uses, including amenities, mariculture, fisheries, cooling, flushing, transport, effluent discharge, sand borrowing and mud disposal. Hong Kong also has a rich array of marine life ranging from microscopic plankton and corals to dolphins and porpoises. Marine fauna of ecological interest include marine mammals (such as the Chinese White Dolphin and finless porpoise), coral reef fish, hard and soft corals, green turtles and horseshoe crabs. Recent studies have confirmed that there are 84 species of hard corals and over 300 reef-associated fish species in Hong Kong waters, which compares favorably with other places as reflected in the report of the global reef check. Annexes 1 and 2 respectively illustrate the distributions of marine life and human uses of our waters.

3. In general, waters with more sensitive uses, including sanctuaries for important species such as the Chinese White Dolphin, mariculture areas and bathing beaches, require higher levels of protection, while water bodies with less sensitive uses such as navigation require relatively lower levels of protection. Sensitive water bodies are mostly found in the Eastern Waters, Deep Bay, and Southern Waters.

Measures taken by the Administration to protect the Marine Environment

4. To protect our marine waters, we have established Water Quality Objectives² (WQOs). The aim is to achieve and maintain the WQOs by implementing various measures, including development planning, controlling pollution sources, expanding sewage collection systems, improving sewage treatment facilities, implementing extensive monitoring plans to track water quality trends (which helps direct action to priority areas), and collaborating with authorities in Guangdong to protect shared water bodies. More details of these measures are provided in the paragraphs below.

¹ Year 2005 figure.

² The WQOs are a set of benchmarks that help to indicate the environmental health of a marine water body. Details of the WQOs are shown in the "Annual Marine Water Quality Reports" at our website at <http://www.epd.gov.hk>.

5. Apart from pollution control, we have also taken proactive action in protecting our marine environment and conserving important ecological habitats and species. Four marine parks and one marine reserve have been designated to protect water areas of high ecological value including habitats for the Chinese White Dolphin, corals, sea grass and a variety of other valuable marine species. All these areas are being actively managed by the Agriculture, Fisheries and Conservation Department for the purpose of nature conservation, recreation and education. We are also implementing various conservation programmes to protect species such as the Chinese White Dolphin, corals and the green turtle. Ecological studies and surveys are also being conducted to collect information about important species and habitats with a view to drawing up practical conservation programmes.

I. Development Planning

6. Under the Environmental Impact Assessment Ordinance (EIAO), all strategic and local developments with potential impact on water quality and aquatic life require impact assessment at the planning stage, with specific requirements for environmental monitoring and audit of marine and coastal works. Only projects meeting the EIAO requirements will be granted permits for construction and operation. In granting the permits, the authority will consult the Advisory Committee on the Environment and the community.

II. Controlling Pollution Sources

7. We have four main ordinances to prevent water pollution. They are targeted at different pollution sources, or pollution-generating activities. These ordinances are the Buildings Ordinance³, the Water Pollution Control Ordinance⁴, the Waste Disposal Ordinance⁵, and the Dumping at Sea Ordinance⁶. Most wastewaters are controlled under the Buildings Ordinance and the Water Pollution Control Ordinance while chemical waste and livestock waste are controlled through regulations made under the Waste Disposal Ordinance.

III. Provision of Sewage Infrastructure

8. In 1989, over 50% of the total sewage produced locally was discharged directly into the environmental waters without treatment, and less than a quarter of the sewage collected received suitable treatment. Since 1991, we have spent \$22 billion on sewage infrastructure and will spend a further \$5 billion on non-HATS sewage infrastructure in the coming years. Through these programmes, over 93% of our population is now served by public sewers and about 70% of the sewage collected is now receiving chemically-enhanced primary (CEPT) or higher level treatment. More details of this sewage infrastructure are described below.

³ The Buildings Ordinance imposes a duty on property owners who should properly maintain their own sewers to avoid incidental discharge of untreated sewage to the environment.

⁴ The Water Pollution Control Ordinance regulates discharges through licenses.

⁵ The Waste Disposal Ordinance provides cradle-to-grave control of chemical wastes from their production through transportation to disposal. It also controls discharges from livestock farms and limits livestock farming to designated areas.

⁶ The Dumping At Sea Ordinance regulates marine disposal of wastes (e.g. dredged mud) through permits.

IIIa. Harbour Area Treatment Scheme (HATS)

9. When fully completed HATS will provide an integrated infrastructure that collects and treats sewage from both sides of Victoria Harbour in an efficient, effective and environmentally sustainable manner.

10. HATS Stage 1 was commissioned at the end of 2001. Through a 23.6 km long deep tunnel system, it now collects about 1.4 million m³/d of sewage (or 75% of the total from the whole HATS catchment) from Tseung Kwan O, urban Kowloon, Kwai Ching, Chai Wan and Shau Kei Wan for CEPT treatment at the Stonecutters Island Sewage Treatment Works (SCISTW). The effluent is discharged into the western harbour. The whole system cost \$8.2 billion to build.

11. The rest of HATS (Stage 2) is being implemented in two phases. In the first phase (Stage 2A), sewage from the northern and western parts of Hong Kong Island will be conveyed by deep tunnels to the expanded SCISTW for CEPT treatment and disinfection with the Stage 1 sewage. This is targeted for completion in 2013/14. Part of the Stage 2A disinfection facility is proposed to be brought forward for commissioning in 2009, in order to provide early improvement to water quality in the Western Harbour and at the Tsuen Wan beaches. The second phase (Stage 2B) will provide biological treatment. The implementation timetable for this phase will be reviewed in 2010/11. The Stage 2 works require the community's acceptance of the polluter-pays principle that the operating costs should be fully recovered through sewage charges.

IIIb. Other Sewage Infrastructure

12. In the early 90's, the Government formulated 16 Sewerage Master Plans (SMPs) to identify sewage infrastructure needs for meeting the population demand and improving the water quality in local coastal waters. These SMPs are being implemented in phases, and reviewed appropriately to address potential population growth and new development needs at the regional level.

IIIc. Other Major Pollution Abatement Infrastructure

13. Apart from sewage infrastructure, we have built the Chemical Waste Treatment Centre in 1993 at a capital cost of \$1.3 billion. The facility has since then received some 720,000 tonnes of chemical wastes, effectively preventing the waste from entering into our sewerage systems and marine waters.

IV. Monitoring

14. To assess the health of the marine environment, detect long-term water quality changes, and measure WQO compliance, we have implemented a comprehensive marine monitoring plan since 1986. The Marine Water Quality Report, which summarizes the monitoring data and reports any significant short- or long-term changes in water quality, is

issued annually. Recent annual reports are available from our website at <http://www.epd.gov.hk/epd/>.

15. To complement existing water monitoring which mainly focuses on traditional physical and chemical parameters, we have implemented a toxic substances monitoring programme and a biological indicator monitoring programme since 2004. The toxic substances programme aims to monitor the levels of toxic chemical pollutants, e.g. dioxins/furans, pesticides, other trace organics and heavy metals in the marine environment. The results so far show that while levels of toxic metals can be quite high in some areas, the dioxin level in the Hong Kong marine environment is generally low. The biological indicator monitoring programme mainly tracks the effects of pollution on marine organisms.

V. Trans-boundary Cooperation

16. We are liaising with the Guangdong authorities to control pollution of shared water bodies. Since the late 1990's, we have worked with the Shenzhen Environmental Protection Bureau (EPB) to draw up plans and take joint actions for the protection of Deep Bay and Mirs Bay. We are also collaborating with the Guangdong EPB to develop a water quality model for the Pearl River Estuary.

17. Apart from cooperation with the Mainland, we are also implementing the Stockholm Convention on Persistent Organic Pollutants following the Mainland's ratification of the Convention in 2004. The pollutants will be prevented from entering into the marine waters as discharges and chemical wastes.

Achievements and Areas for Improvement

18. Despite the 21% growth in population since 1991, marine water quality has gradually improved and achieved an overall WQO compliance rate of about 87% in the last three years. There have been notable improvements in terms of a long-term decrease in nutrients (which in excess would induce red tides) and ammonia (which is toxic to marine life) in sensitive waters such as Port Shelter and Tolo Harbour. The commissioning of HATS Stage 1 has brought about notable improvement in water quality in Victoria Harbour, with dissolved oxygen increasing by 10%, and ammonia, nitrogen and phosphorus decreasing by 13%, 14%, and 27% respectively. The number of beaches with a "Good" ranking has increased drastically from 9 in 1986 to 23 in 2005. Annex 3 shows the changes in nitrogen levels in Tolo Harbour and Port Shelter, and the annual beach rankings from 1986 to 2005.

19. Despite the good progress, much is left to be done to pursue the long-term goal of adequately protecting all our marine waters. Monitoring data indicates that several areas remain unsatisfactory and far from full compliance with the WQOs. These include the semi-enclosed Deep Bay with naturally poor flushing capacity, the Western and Southern Waters which are under the influence of nutrient-rich Pearl River flow, and beaches susceptible to pollution from unsewered villages located in the beach hinterland. All these areas warrant our continuous effort in bringing about further improvements.

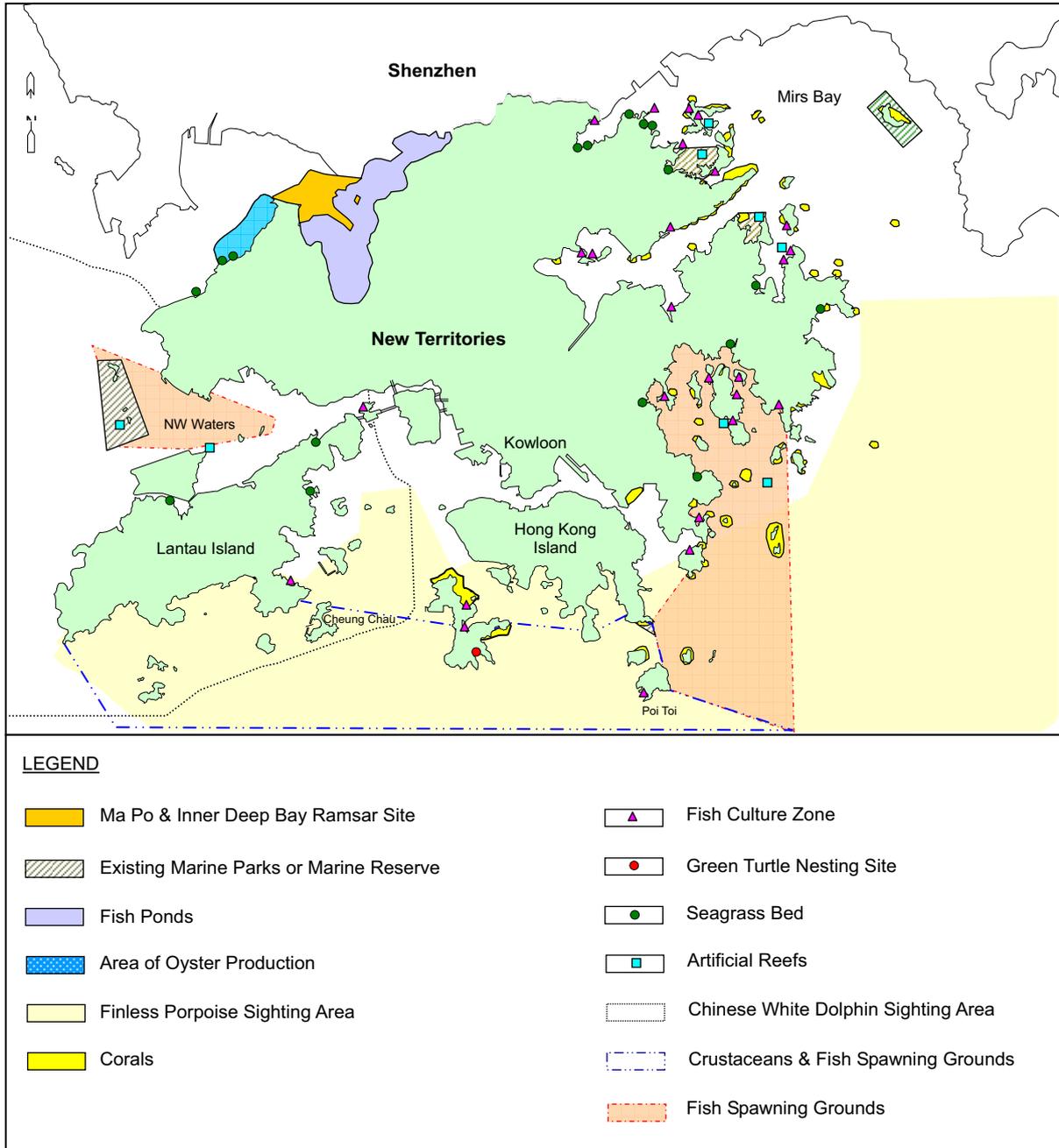
20. In the area of marine conservation, four marine parks and one marine reserve have been designated covering a total area of about 2430 hectares. Important marine habitats and ecological systems were brought under active management and protection. These include important habitats for the Chinese White Dolphin, coral communities, and spawning and nursery grounds of fish species. Marine parks and a marine reserve also provide opportunities for scientific studies and educational activities.

Way ahead

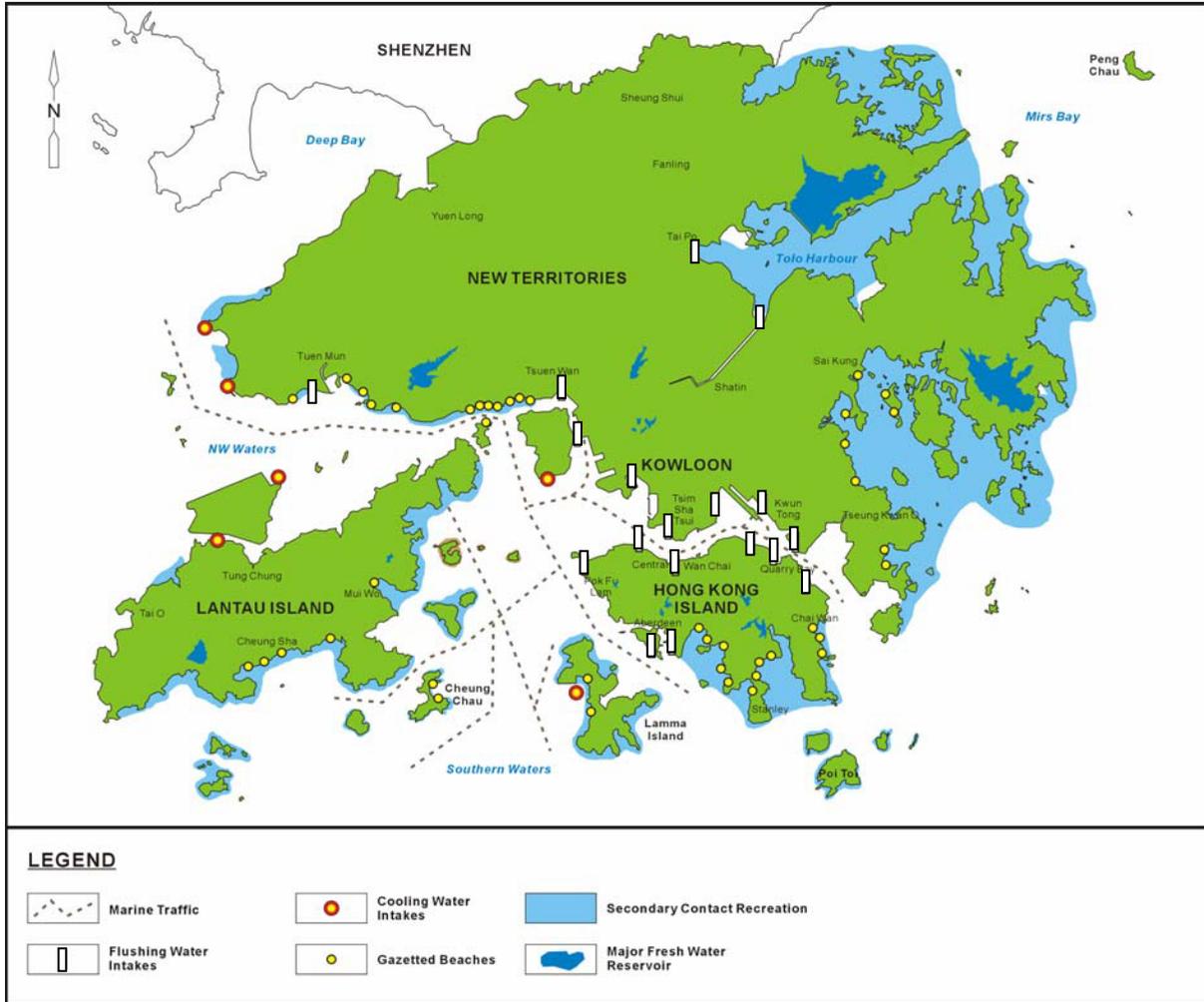
21. Hong Kong's population could reach 7.6 million by 2016 and this could potentially generate an additional pollution load of about 70 tonnes of BOD and other pollutants in sewage each day. To cope with the potential challenge, the SMPs will be kept constantly under review. We also plan to continue our work aimed at extending the sewerage system to unsewered areas and at upgrading sewage infrastructure to meet the latest development needs and environmental standards.

22. As stated in paragraph 11 of this paper, we are implementing HATS Stage 2, with a view to ultimately providing biological treatment plus disinfection for sewage from both sides of the harbour. The Stage 2 works are subject to the community's acceptance of the polluter-pays principle that the full operating costs should be recovered through sewage charges.

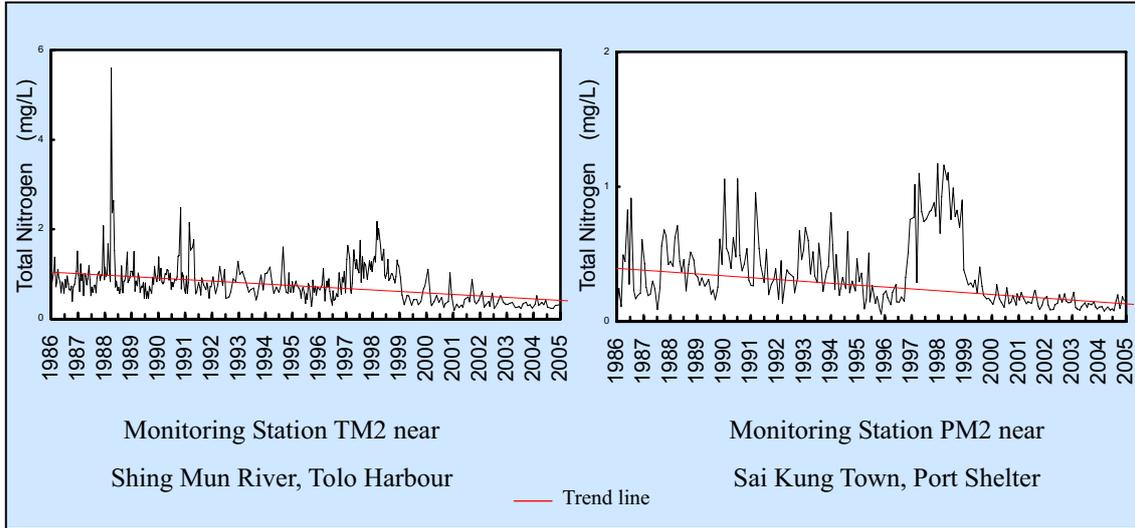
Sensitive Natural Resources in Marine Waters of Hong Kong



Human Uses of Marine Waters of Hong Kong



**Marine Water Quality Trends in Tolo Harbour and Port Shelter
(1986 to 2005)**



Annual Beach Ranking (1986 to 2005)

