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River and Marine Water Quality in Hong Kong in 2008

Introduction

The Environmental Protection Department (EPD) conducts long-term monitoring of river and marine water quality and publishes the annual reports in the following year. The 2008 river and marine water quality reports are now available for public's viewing at the EPD's website (http://www.epd.gov.hk)[1]. This paper summarizes the state of rivers and marine waters in Hong Kong in 2008 for Members' information.

River Water Quality

2. The overall water quality of Hong Kong rivers in 2008 continued to perform well. In terms of compliance with the statutory Water Quality Objectives (WQOs), the compliance rate in 2008 was at 87.5%, higher than 86% of 2007 and 76% in 1997. This was the result of the implementation of pollution abatement legislation and schemes, including the Water Pollution Control Ordinance, Livestock Waste Control Scheme and Sewerage Master Plans.

3. A similar trend was observed in the Water Quality Index (WQI) grading, which reflected the general health of the rivers. In 2008, 82% of river monitoring stations were maintained at the gradings of "Excellent" or "Good" and half of these stations were graded "Excellent". The majority of the river stations in Lantau Island, Eastern New Territories, Southwestern New Territories and Kowloon were in these categories. The number of river stations in the

[1] EPD ceased producing CD-ROMs since 2007 and only web-based versions of the reports will be available from now on.

territory that remained 'Bad' or 'Very Bad' also decreased from 14% in 2006 to 6% in 2008. These watercourses were mostly found in the Northwestern New Territories. Early signs of water quality improvement were noted in this area and could be attributed to the effects of farm closures under the Voluntary Surrender of Poultry and Pig Farm Licence Scheme which saw a large number of farms closed towards the latter part of 2007. In spite of this, 25 out of the 82 monitoring stations still contain high levels of *E. coli* (over 10,000 cfu/100mL) due to pollution from the remaining livestock farms and unsewered villages.

4. The Shing Mun River is included in the report as an example to illustrate the improvement of the water quality brought about by various Government's efforts over the past 20 years. Through the sewerage programme and vigorous legislative control, the *E. coli* content was reduced by 90% from 1990 to 2008.

Marine Water Quality

5. In 2008, the marine water quality in Hong Kong achieved an 81% compliance rate with the WQOs[2], slightly higher than that in 2007 (80%). While the compliance with the dissolved oxygen (DO) objective increased from 72% in 2007 to 82% in 2008, the compliance with the total inorganic nitrogen (TIN) objective decreased from 67% to 57%.

6. The increases in TIN levels at some stations located in the Victoria Harbour could be related to the surface runoff under unusually heavy rainfalls observed during June and July 2008, resulting in higher non-compliance rates. The heavy rain in 2008 also contributed to higher non-compliance rates at stations located in the northwestern and southern sides of Hong Kong, which were also influenced by the Pearl River Estuary. According to the report of the Hong Kong Observatory, the monthly rainfall total of 1,346.1 mm in June 2008 was a record high since 1884.

[2] The WQO compliance rate is calculated based on the combined individual compliance rates of all stations in the territory for the four important marine Water Quality Objectives, namely Dissolved Oxygen, Total Inorganic Nitrogen, Unionized Ammonia and *E. coli* bacteria.

7. Except for the nitrogen levels, the water quality in the Victoria Harbour Water Control Zone (WCZ) continued to improve notably with a decrease in the levels of *E. coli* and an increase in the level of DO, particularly on the eastern side. These improvements were largely due to the implementation of the Harbour Area Treatment Scheme (HATS) Stage 1. The *E. coli* bacterial levels in the central and western harbour remained high but this problem should be alleviated after the implementation of the advanced disinfection facilities, which provide disinfection treatment of the effluents from the Stonecutters Island Sewage Treatment Works starting at the end of 2009.

8. Apparently not affected by the record-high rainfall, the Eastern Buffer, Junk Bay, Port Shelter and Mirs Bay WCZs fully complied with the WQOs in 2008. In the semi-enclosed Tolo Harbour, the overall WQO compliance rate maintained at 64% in 2008 while long term decreasing trends in two pollution related parameters (nutrient and *E. coli* bacteria) were observed.

9. The Deep Bay WCZ continued to have the lowest water quality in the territory, with an overall WQO compliance rate of 40% in 2008 compared with 27% in 2007. The improvement was due to the fact that two outer bay stations met the DO objective in 2008.

10. In 2008, a total of 15 red tide incidents were reported in the territory, largely similar to the 13 cases reported in 2007. There was no record of any red tide-related fish kill during 2008.

Conclusions

11. In 2008, the river water quality in Hong Kong continued to perform well with 82% of the monitoring stations achieving a “Good” or “Excellent” WQI grading. However, the major rivers in the Northwestern New Territories contain high levels of *E. coli* due to pollution from the remaining livestock farms and unsewered villages. Continued efforts to address the sewage discharge from unsewered areas are needed.

12. For marine waters, the overall WQO compliance rate was 81% in 2008. The record-high rainfalls observed during June and July 2008 had brought about a decrease in the rate of compliance with the TIN objective. In the Victoria Harbour WCZ, the water quality improvements resulting from the implementation of the HATS Stage 1 since 2002 were generally sustained. The central and western Victoria Harbour continued to have high *E. coli* bacterial counts but the problem should be alleviated when the effluents from the Stonecutters Island Sewage Treatment Works undergo disinfection treatment starting at the end of 2009.

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