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River and Marine Water Quality in Hong Kong in 2009

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 2009 river and marine water quality reports are now available for public's reference at the EPD's website (http://www.epd.gov.hk).[1] This paper summarises the state of rivers and marine waters in Hong Kong in 2009 for Members' information.

RIVER WATER QUALITY

2. The overall water quality of Hong Kong rivers in 2009 continued to improve. In terms of compliance with the statutory Water Quality Objectives (WQOs), the compliance rate in 2009 was at 90%, higher than 88% of 2008 and 76% in 1997. This was the result of the implementation of pollution abatement legislation and schemes, including the Water Pollution Control Ordinance, Sewerage Master Plans and Livestock Waste Control Scheme.

3. A similar improving trend was observed in the Water Quality Index (WQI), which grades the general health of rivers. In 2009, 84% of river monitoring stations were graded at 'Excellent' or 'Good' and out of these, 56% of the stations were graded 'Excellent'. The majority of the monitoring stations in the Lantau Island,

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

Eastern New Territories, Southwestern New Territories and Kowloon were in these categories, indicating that the organic loading of their catchments was either low or steadily decreasing.

4. In spite of the improving trend, 33% of the 82 monitoring stations still contained high (over 10,000 cfu/100 mL) to very high (over 100,000 cfu/100 mL) levels of bacterial content, in term of *E. coli* reading. The stations with high *E. coli* levels are mostly located in the northwestern part of the New Territories (for example, Yuen Long Creek, Kam Tin River), and some in the North District (for example, River Indus, River Beas, River Ganges), and eastern New Territories (for example, Tai Po River).

5. For Shing Mun River, its bacterial content, in term of *E. coli* reading, was reduced by 95% from 1990 to 2009, largely as a result of the Government's continued efforts to improve the water quality through the implementation of sewerage programme and the enforcement of the Water Pollution Control Ordinance. In addition, the WQI of the Shing Mun River main channel improved from "Fair" in 1985 to "Excellent" grading in 2009. Such improvement allowed the rowing events of the 2009 East Asian Games to be conducted at Shing Mun River successfully.

MARINE WATER QUALITY

6. The overall WQOs compliance rate for 2009 was 87%, higher than that in 2007 (80%) and 2008 (81%), but generally similar to that in 2002-2006 (85% and above). The improvement of the overall compliance rate in 2009, as compared with 2008, was mainly due to the increase of compliance with the total inorganic nitrogen (TIN) objective from 57% to 72%. The compliance rate with the dissolved oxygen (DO) objective also increased from 82% to 86%, while the compliance with ammonia (NH_3) and *E. coli* objectives remained the same in the 2 years.

7. The compliance rates in respect of TIN objective in the Southern, North Western and Victoria Harbour Water Control Zones (WCZs) increased from 0%, 17% and 60% in 2008 to 19%, 83% and 100% in 2009 respectively. The North Western and Southern WCZs also saw their overall compliance rates to be increased from 61% and 65% in 2008 to 94% and 75% in 2009 respectively. The lower levels of TIN recorded in Hong Kong waters could be related to the drier weather in 2009 (as well as in Guangdong area), which resulted in less pollutants being washed into the marine

water via surface and storm water runoff. According to the Hong Kong Observatory's (HKO) weather report, the year 2009 was drier than usual and the annual rainfall was 8% less than normal.

8. In the Victoria Harbour WCZ, the 2009 compliance rate was 93%, which was the second highest rate recorded since the commissioning of the Harbour Area Treatment Scheme (HATS) Stage 1 in 2002. The increase of compliance was mainly due to the full compliance with TIN objective at all ten stations in the Victoria Harbour WCZ in 2009, as compared with full compliance at only six stations in 2008. While the *E. coli* levels in the central and western side of Victoria Harbour decreased by 38% in the period of 2006-2009, their levels remained higher as compared with the eastern side.

9. The compliance rates in Port Shelter and Mirs Bay in 2009 were 97% and 98% respectively, slightly lower than their usual rates (100%). The non-compliance with DO objective was due to the lower DO levels recorded at the sea bottom in July and August when the water column was thermally stratified. This phenomenon has been observed in the past to occur occasionally in areas where the water was calm and deep during the hot summer months.

10. The overall WQO compliance rate in Deep Bay maintained at 40% in 2009, the same as in 2008. The TIN levels in Inner Deep Bay were similar to those in 2008 but remained high compared with the WQO. The TIN levels in Outer Deep Bay have been largely stable since 2002.

11. Similar to 2008, a total of 16 red tide incidents were reported in the territory in 2009. There was no record of any red tide-related fish kill during 2009.

CONCLUSIONS

12. In 2009, the river water quality in Hong Kong continued to perform well with 84% of the monitoring stations achieving a "Good" or "Excellent" WQI grading. However, *E. coli* levels in excess of 10,000 cfu/100 ml are still found in 33% of the monitoring stations located mostly in the northwestern part of the New Territories, and some in the North District and eastern New Territories.

13. For marine waters, the overall WQO compliance rate in 2009 was 87%. This was mainly due to the increase of compliance with TIN objective from 57% in 2008 to 72% in 2009. The lower levels of TIN recorded in Hong Kong waters could be related to the drier weather in 2009 (as well as in Guangdong area), which likely resulted in less pollutant being discharged into the marine water via surface runoff. 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* levels, but the problem should be alleviated when the effluents from the Stonecutters Island Sewage Treatment Works undergo disinfection treatment starting in early 2010.

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