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***For information***

# Interim Report on River and Marine Water Quality in Hong Kong in 2005

## Introduction

This paper provides a preliminary assessment and a summary of the water quality data from representative river and marine monitoring stations in Hong Kong in 2005. A full account of the river and marine water quality will be available on the Environmental Protection Department's website (http://www.epd.gov.hk) at the end of 2006.

## River Water Quality

2. In 2005, 81% of the river monitoring stations attained a Water Quality Index (WQI) grading of "Excellent" or "Good", the highest since the mid 1980s (**Figure 1**). Five percent of the monitoring stations were graded as "Fair" and 14% of the stations were graded as "Bad" or "Very Bad". Overall, there has been a slight improvement of river water quality in 2005 as compared with that in the two previous years.

3. Of the twelve major rivers monitored, seven of them (i.e. Mui Wo River in Lantau Island; Shing Mun Main Channel, Lam Tsuen River and Tai Po River in the Tolo Harbour catchment; Ho Chung River in Sai Kung; and Tuen Mun River and Sam Dip Tam Stream in the Southwestern New Territories) attained a "Good" or "Excellent" water quality at the most downstream monitoring stations (**Figure 2**). Among the five rivers in the Northwestern New Territories, only River Beas was graded as "Fair" while the others (i.e. Yuen Long Creek, Kam Tin River, River Indus and River Ganges) were graded either "Bad or "Very Bad". The annual geometric mean *E. coli* bacterial counts of the rivers ranged from 420 cfu/100mL in Mui Wo River to the very high level of 1,900,000 cfu/100mL in Yuen Long Creek (**Figure 3a to 3c**).

4. With the implementation of environmental legislation and sewerage works in the last two decades, the water quality of Hong Kong's rivers has shown steady improvement. However, the river water quality in the Northwestern New Territories was still unsatisfactory due to effluents from unsewered villages and livestock farms. Pollution from these sources should be reduced as livestock farmers join the Government's Voluntary Surrender of Poultry Farm and Pig Farm Licence Schemes currently being implemented, and as more villages in the river catchments are connected to public sewers.

**Marine Water Quality**

5. In 2005, the overall compliance with the marine Water Quality Objectives (WQOs) was 85%, slightly lower than the record high level of 87% in 2002 to 2004 (**Figure 4**). A map of the locations of the representative monitoring stations in the ten Water Control Zones is shown in **Figure 5**, and a summary of the water quality data is shown in **Figures 6a to 6j**. In 2005, a reduction in the compliance with the WQO for total inorganic nitrogen (TIN) was observed due to a general increase of inorganic nitrogen, and this contributed to the lower overall WQO compliance. The increase in inorganic nitrogen was most pronounced during the summer rainy season and in the southwestern waters where the impact of the Pearl River flow was high. 2005 was the third wettest year on record with a total rainfall of 3214.5 mm, 45% above the normal level.

6. The water quality of Port Shelter and Mirs Bay continued to be excellent, with low levels of *E. coli* bacteria and nutrients, and high dissolved oxygen (DO) content. On the other hand, the water quality in Inner Deep Bay remained poor, with low DO and elevated nutrient levels, indicating the persisting pollution problems in Deep Bay.

7. In Victoria Harbour, the water quality improvements as a result of the implementation of the Harbour Area Treatment Scheme (HATS) Stage 1 were sustained in 2005. The increase of DO and decrease of nitrogen and other pollutants particularly in the eastern part of the harbour persisted. Although eastern Victoria Harbour has experienced a reduction in *E. coli* bacteria, the levels in the central and western parts of the harbour, including the Tsuen Wan coastal areas, remained high.

8. **Figure 7** shows the number of red tides occurring in Hong Kong waters from 1980 to 2005. In 2005, there was a total of 41 red tides in the territory, slightly higher than that reported in 2004 (i.e. 34 incidents). There was no record of any red tide-related fish kill during the year.

**Conclusions**

9. In 2005, 81% of the river monitoring stations attained a “Good” or “Excellent” WQI grading, the highest since the mid 1980s. However, most of the major rivers in the Northwestern New Territories were ranked “Bad” or “Very Bad” with very high *E. coli* bacterial content. This was mainly due to pollution from unsewered villages and livestock farms in the catchment.

10. The overall compliance with the marine WQOs in 2005 was 85%, slightly lower than the record level of 87% in 2002 to 2004. This was largely attributed to the increased inorganic nitrogen levels relating to higher rainfall in the summer months. While the water quality in the eastern waters continued to be excellent, the Inner Deep Bay remained poor. The improvements particularly in the eastern part of Victoria Harbour as a result of HATS Stage 1 were sustained; whereas the central and western harbour, including the Tsuen Wan coastal areas, continued to have high *E. coli* bacterial counts.

**Environmental Protection Department**
**June 2006**

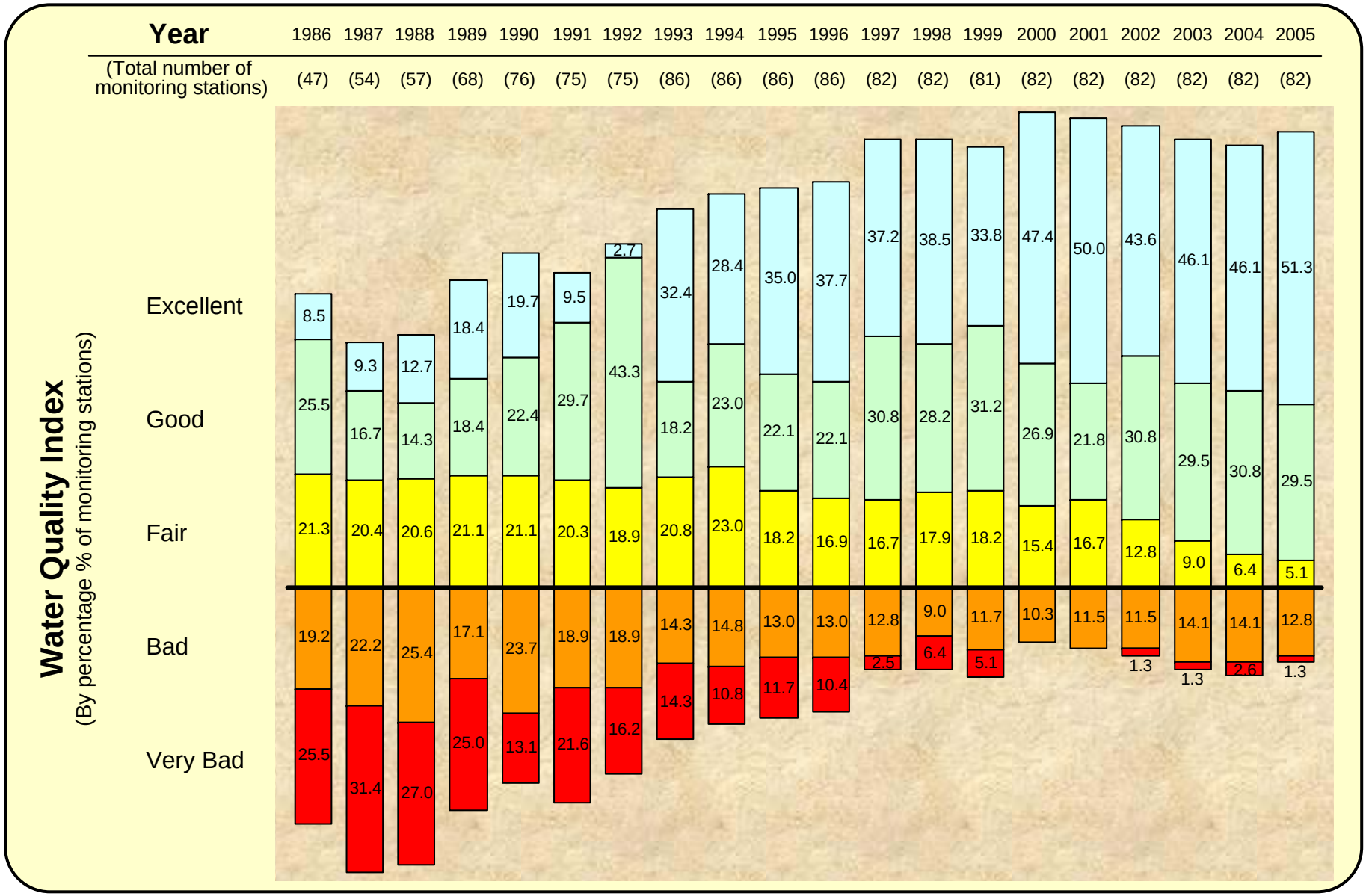



**Figure 1 Long-term water quality trend of Hong Kong's inland watercourses, 1986 - 2005**

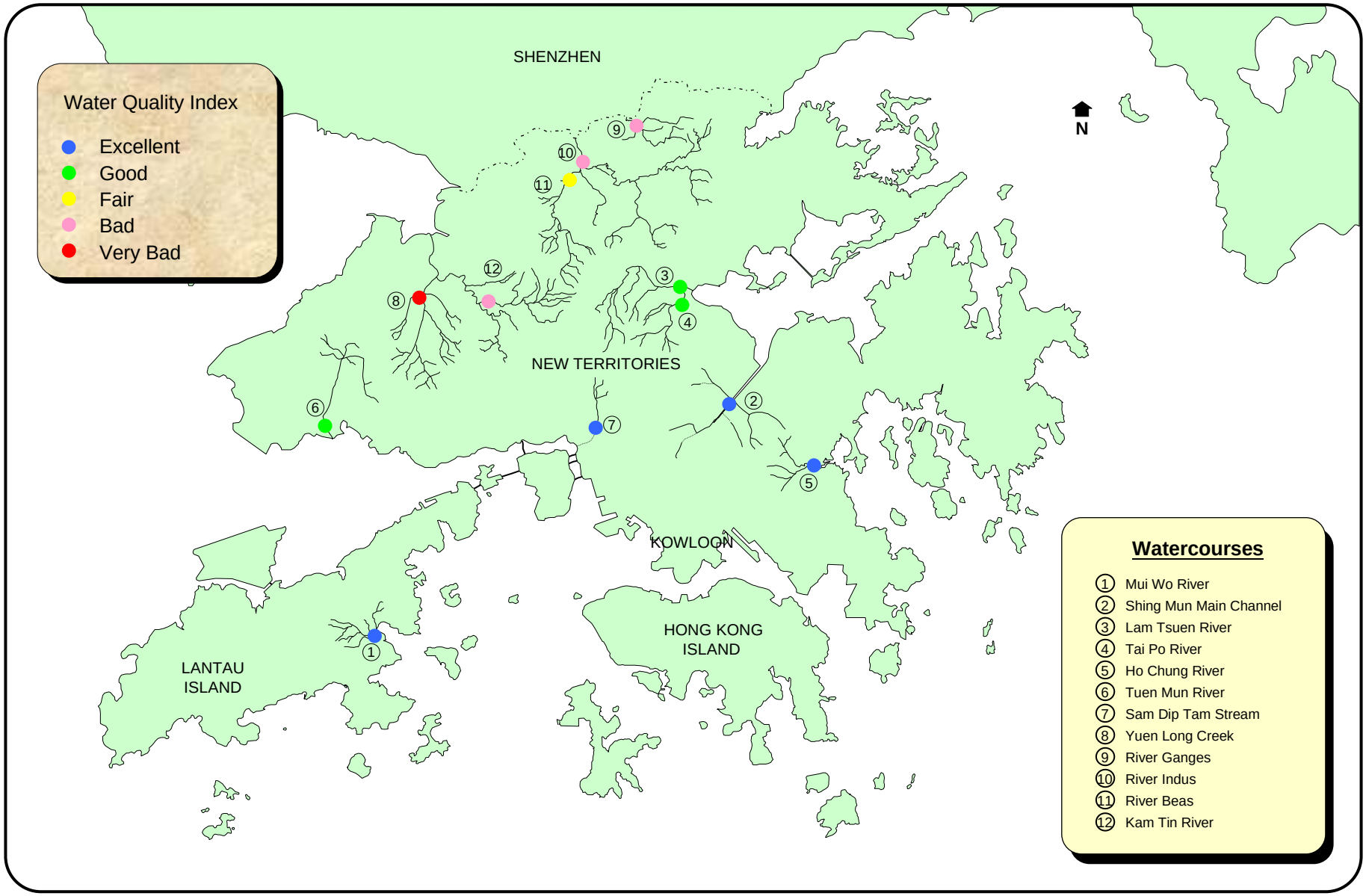



**Figure 2** **The Water Quality Index grading and location of the most downstream monitoring stations of 12 major inland watercourses in Hong Kong in 2005**

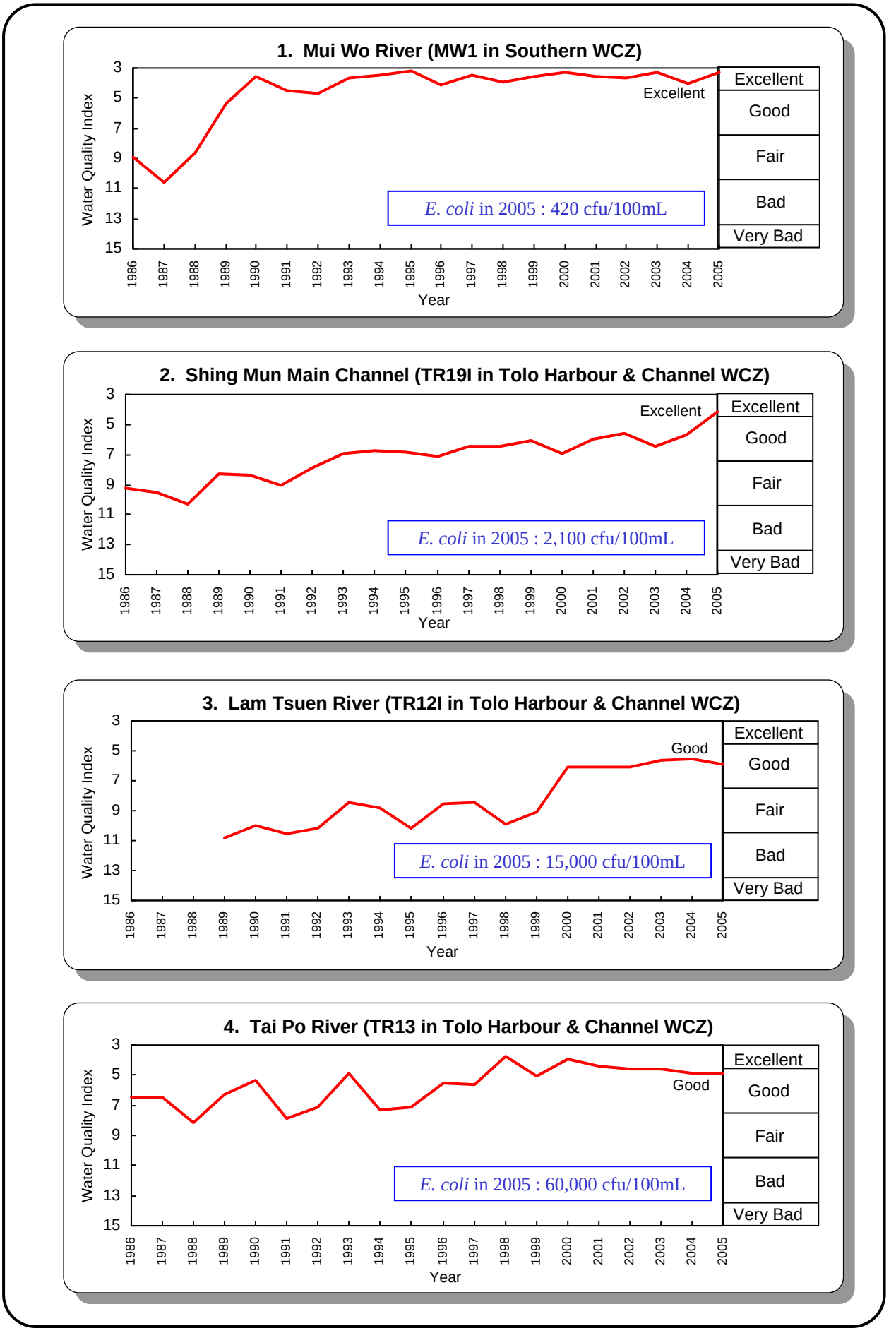



**Figure 3-a: Water Quality Index (WQI) & *E. coli* levels of the major rivers in Hong Kong**

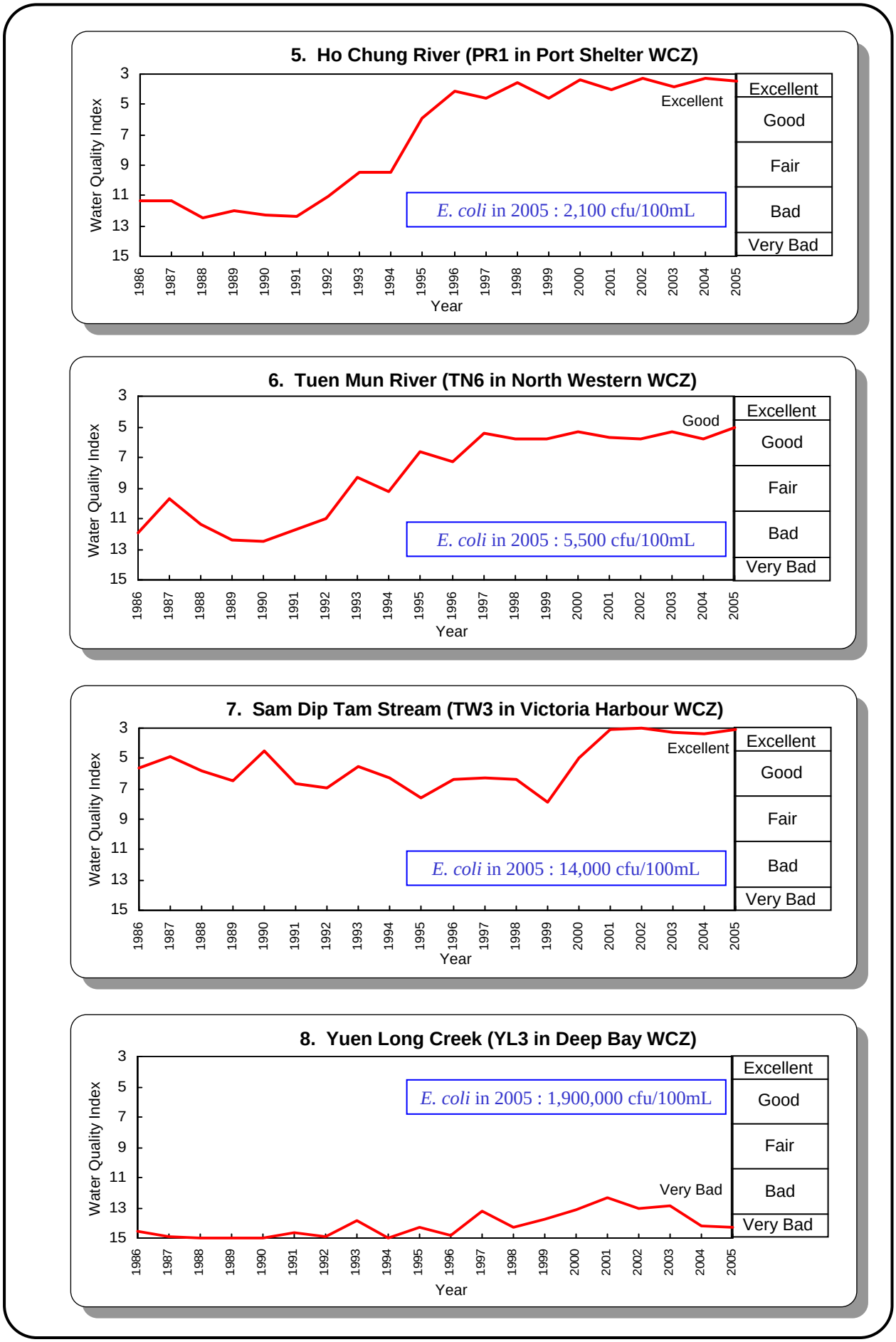



**Figure 3-b: Water Quality Index (WQI) & *E. coli* levels of the major rivers in Hong Kong**

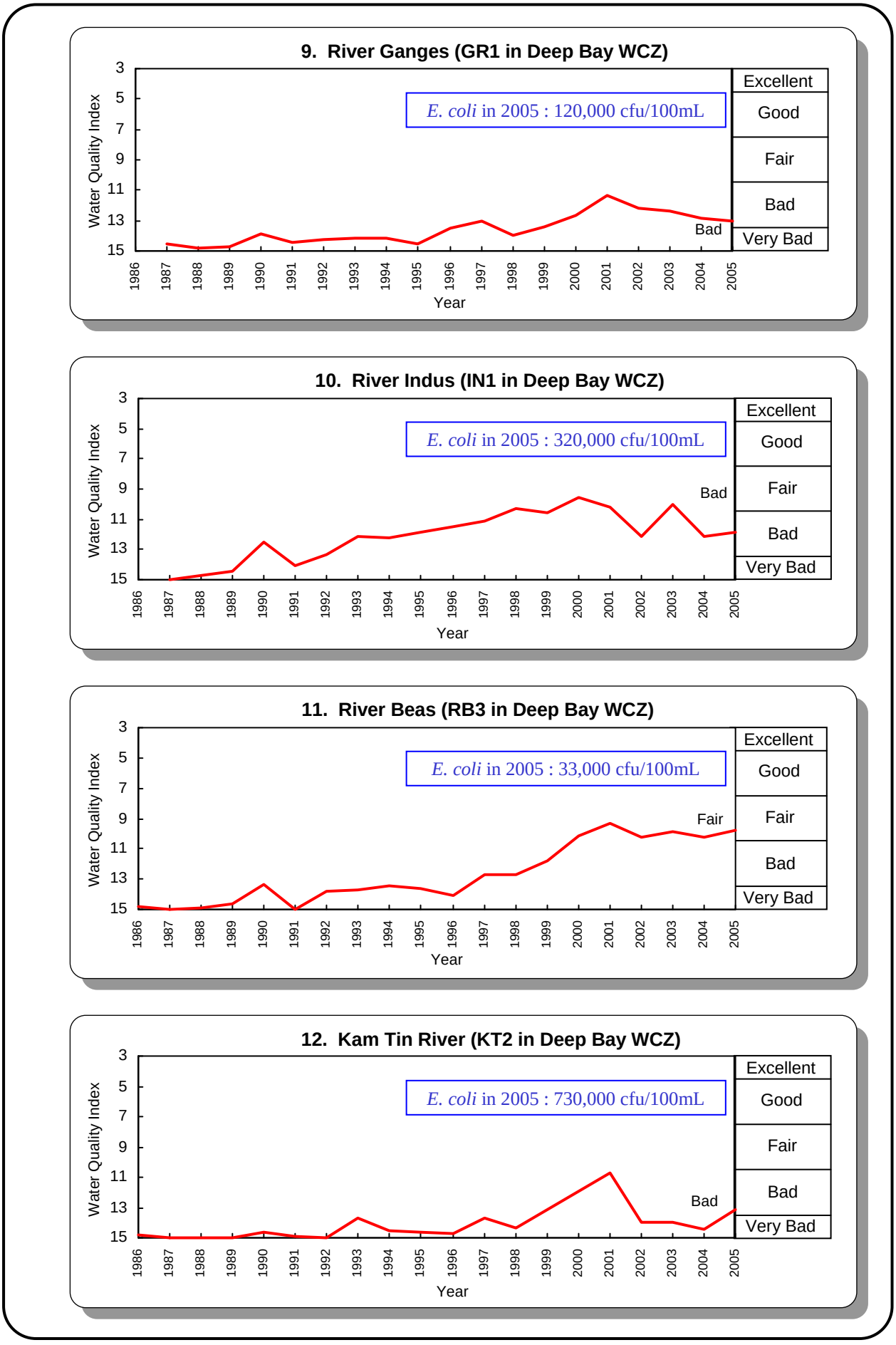



**Figure 3-c: Water Quality Index (WQI) & *E. coli* levels of the major rivers in Hong Kong**

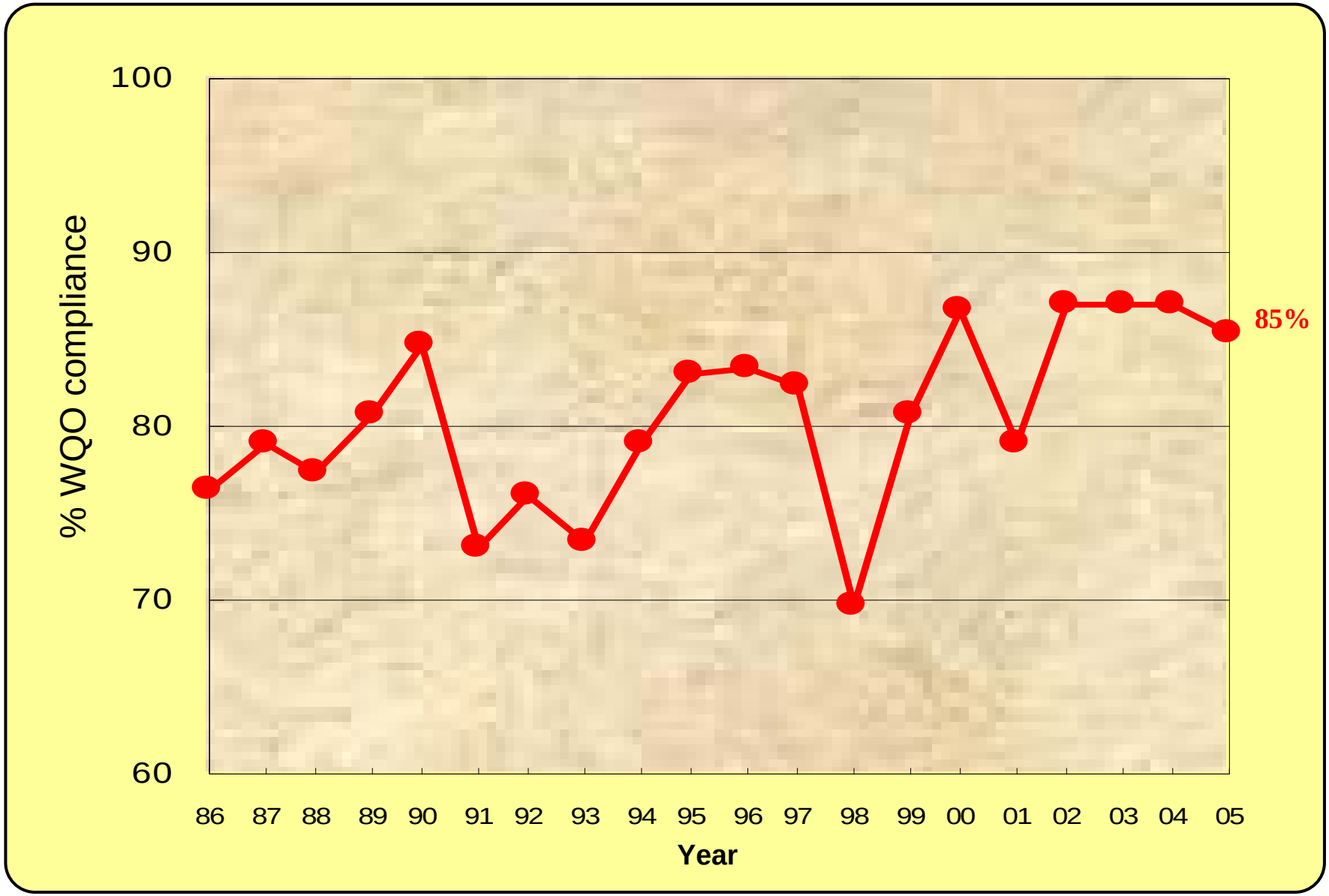



**Figure 4 Overall compliance with marine Water Quality Objectives in Hong Kong, 1986 - 2005**

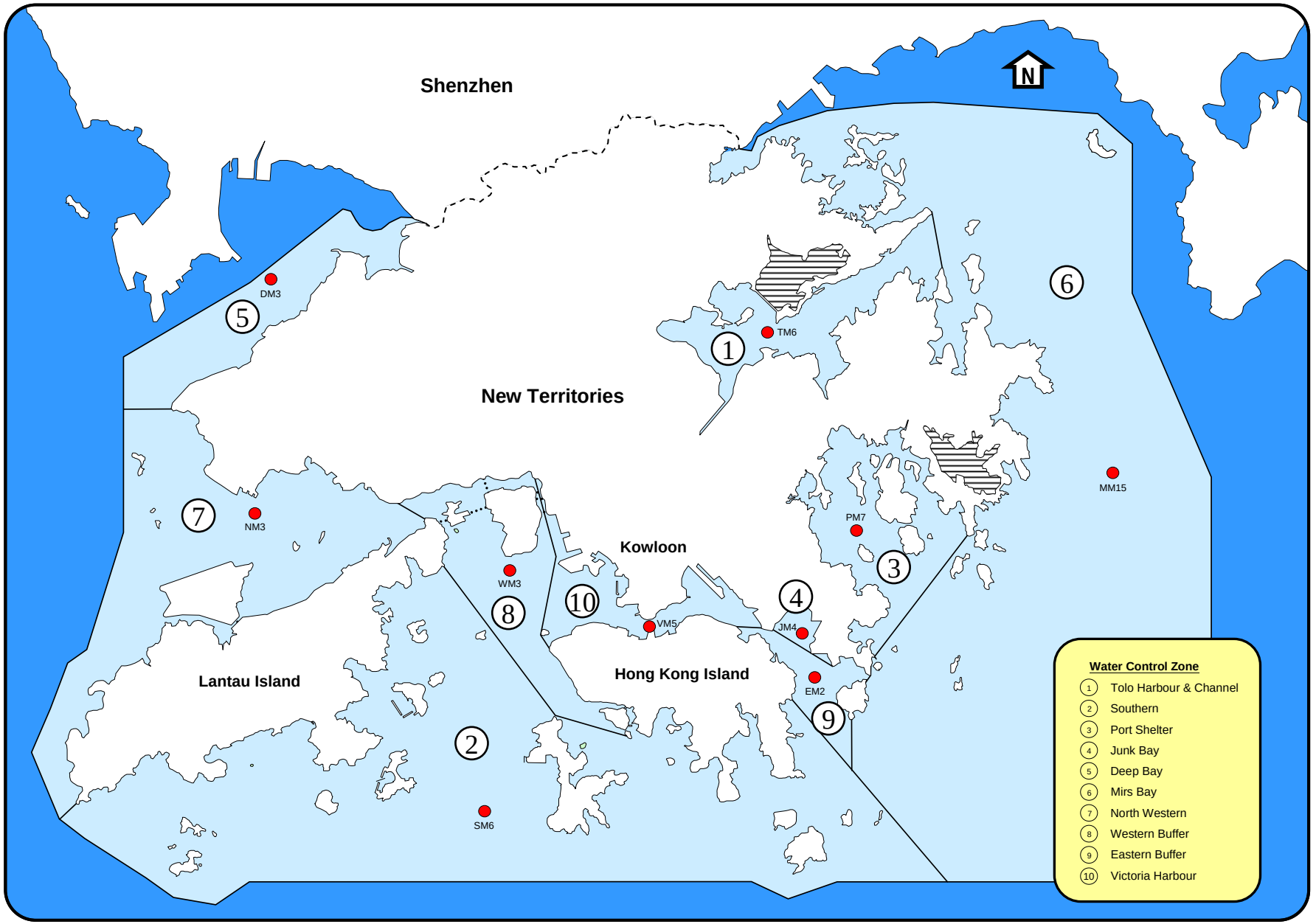



**Figure 5 Selected marine water quality monitoring stations in 10 Water Control Zones**

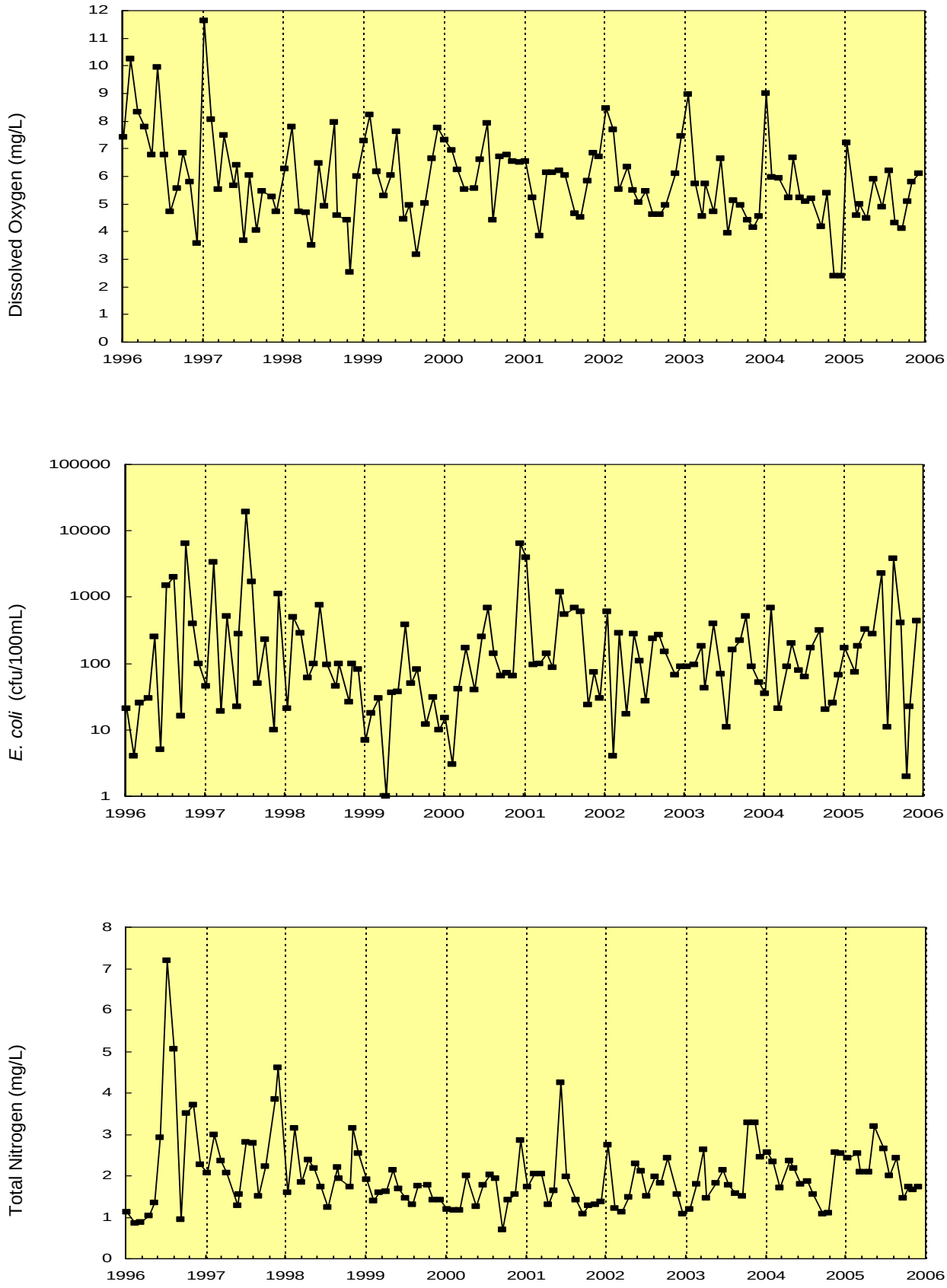



**Figure 6-a: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at DM3 in the Deep Bay WCZ**

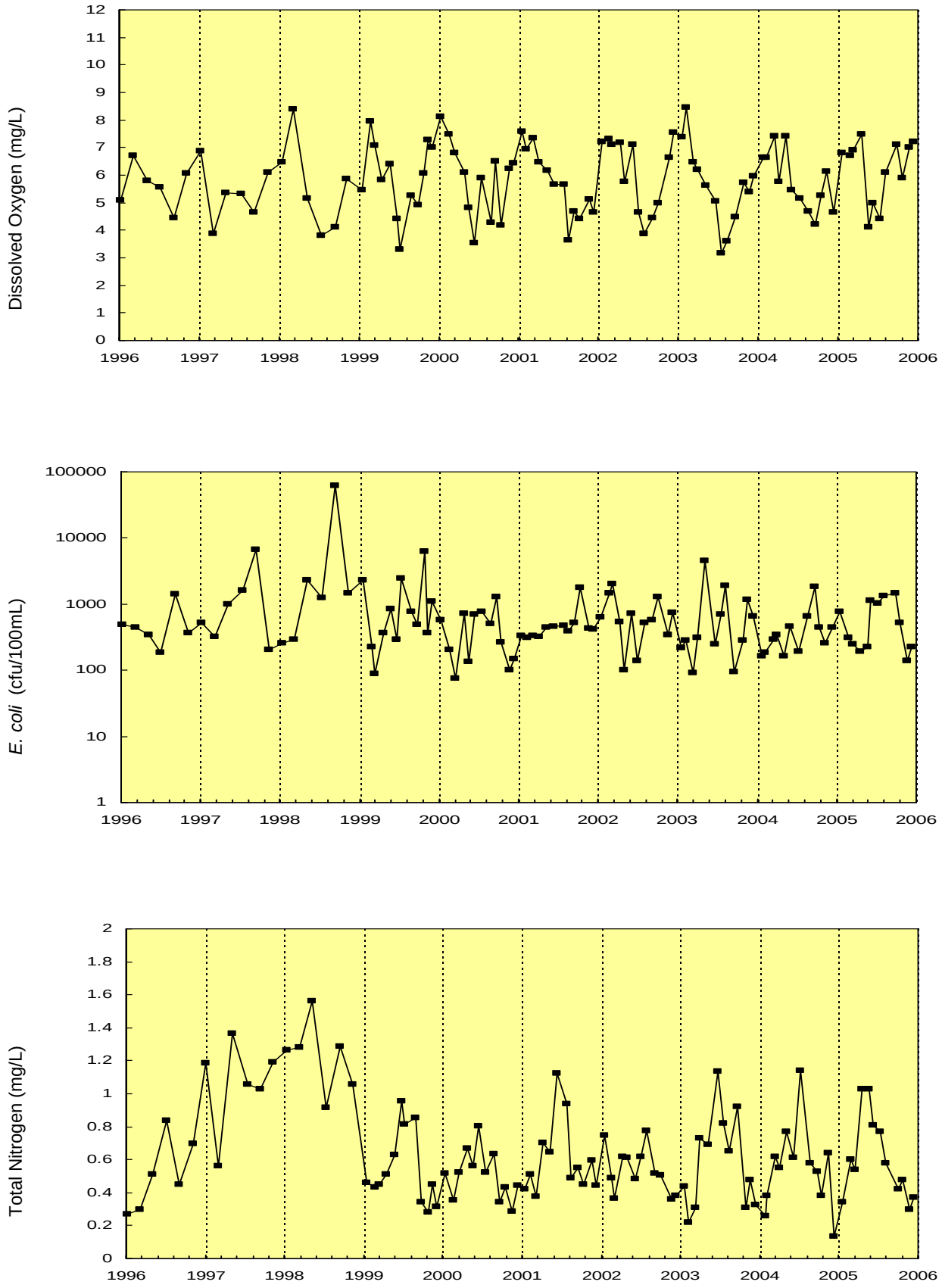



**Figure 6-b: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at NM3 in the North Western WCZ**

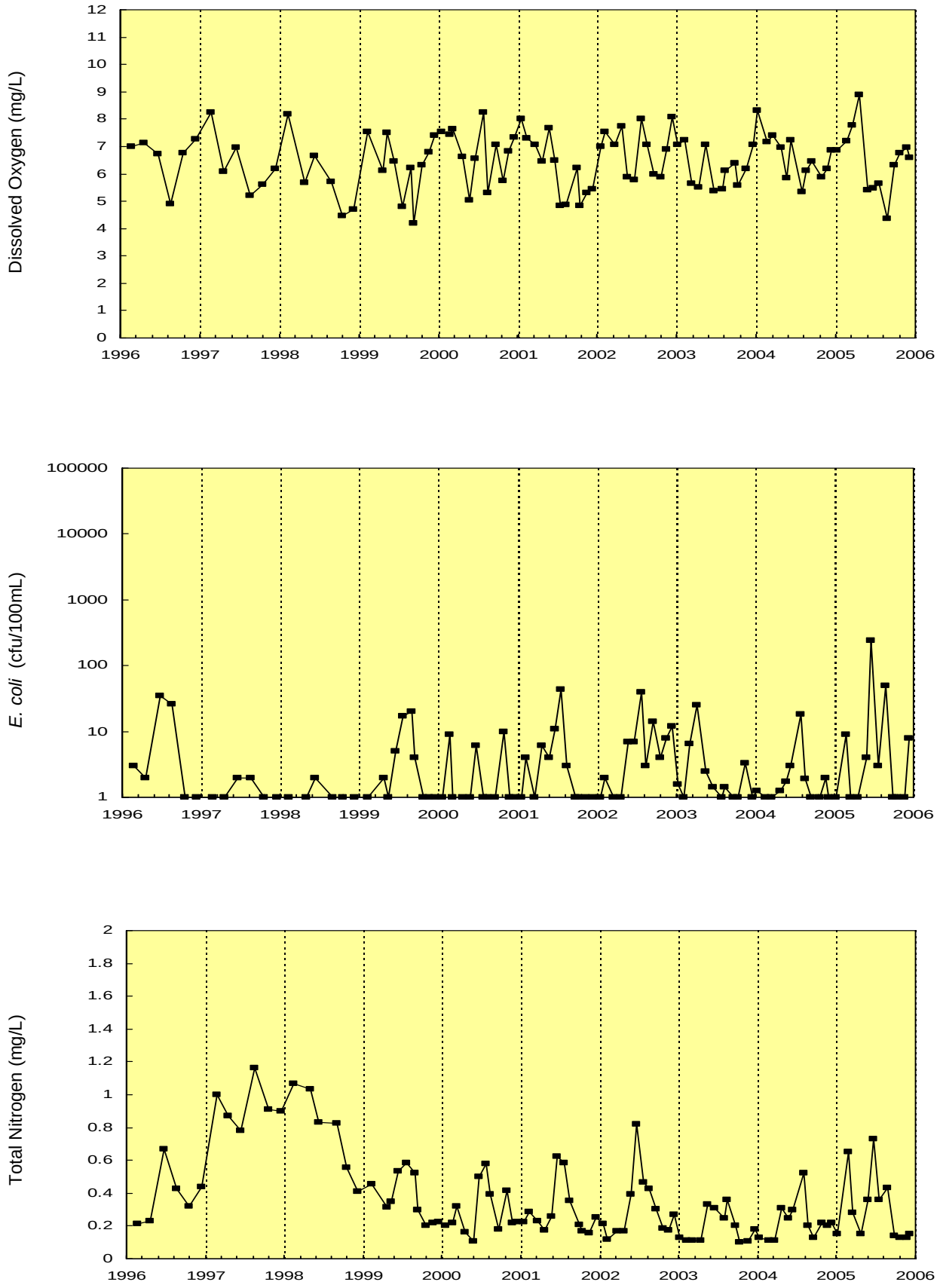



**Figure 6-c: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at SM6 in the Southern WCZ**

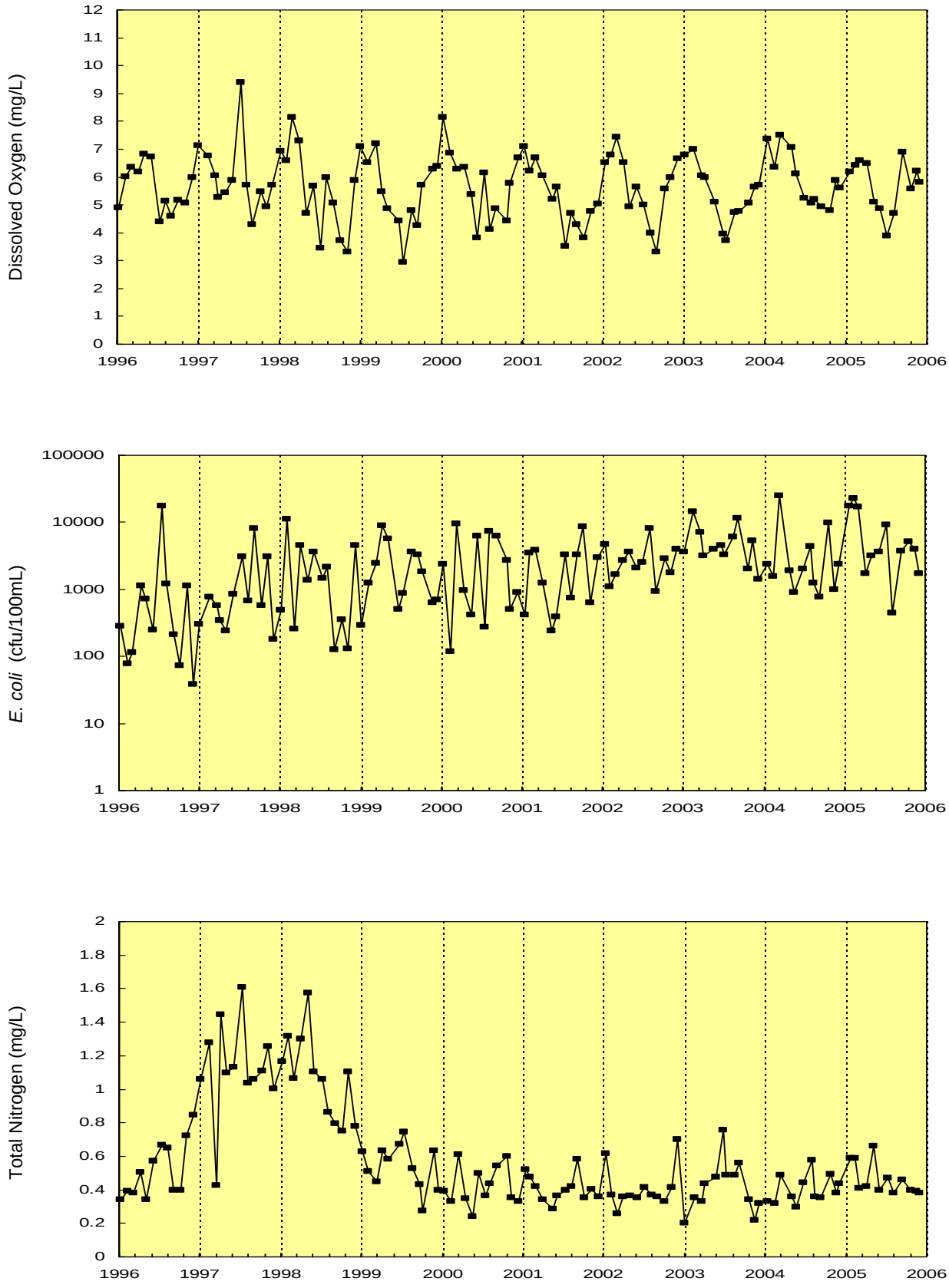



**Figure 6-d: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at WM3 in the Western Buffer WCZ**

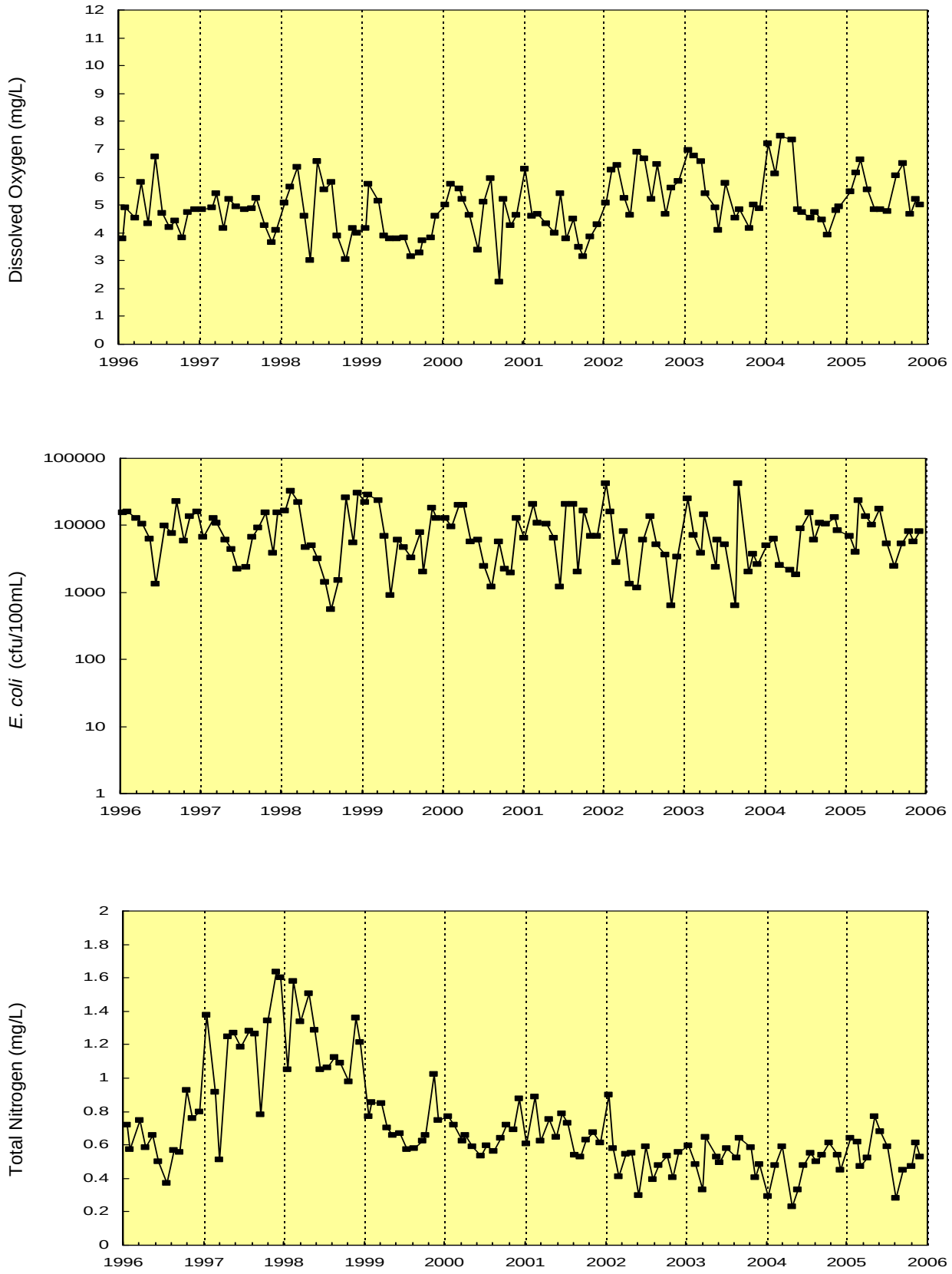



**Figure 6-e: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at VM5 in the Victoria Harbour WCZ**

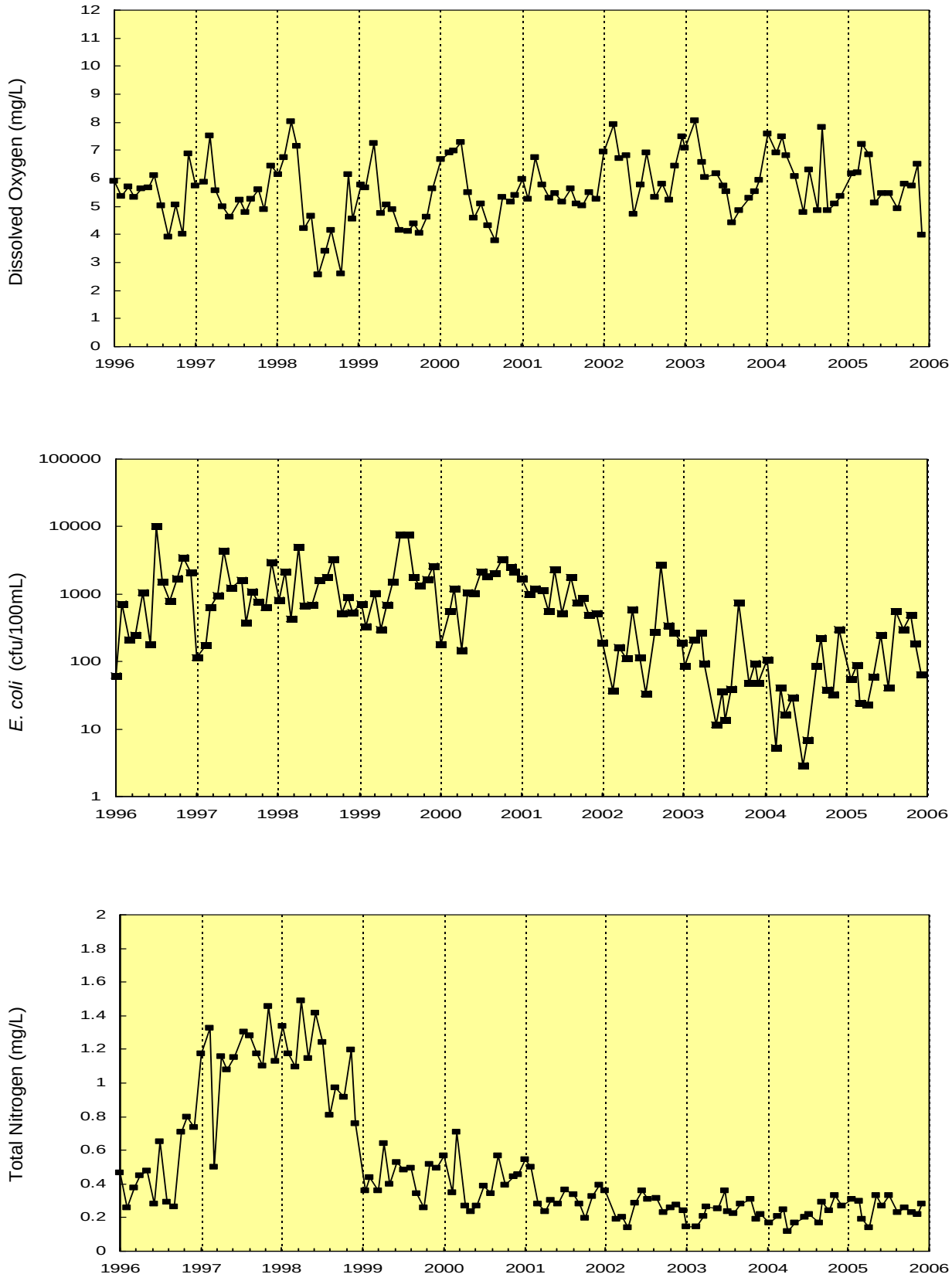
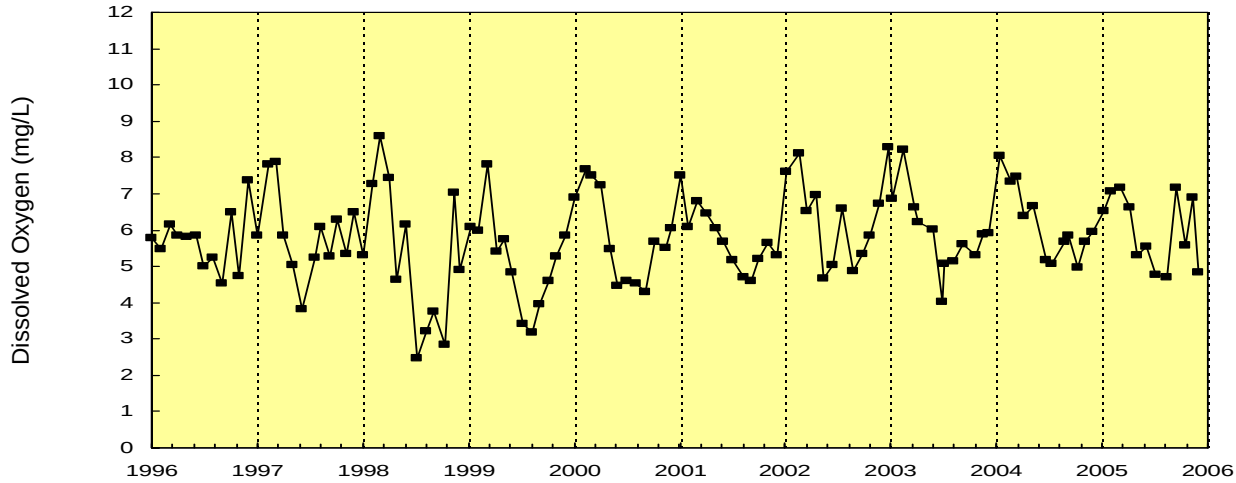
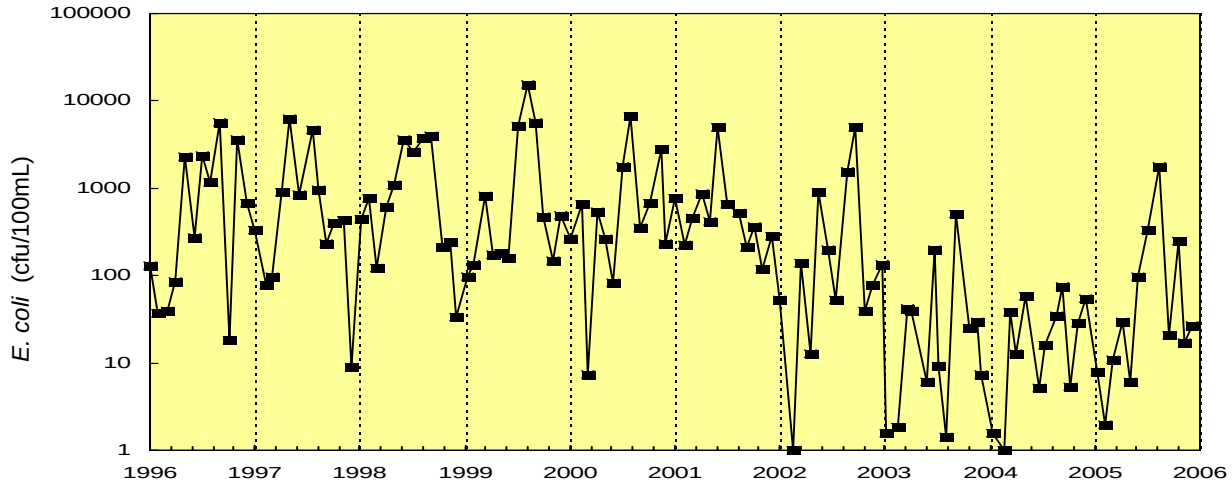



**Figure 6-f: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at JM4 in the Junk Bay WCZ**



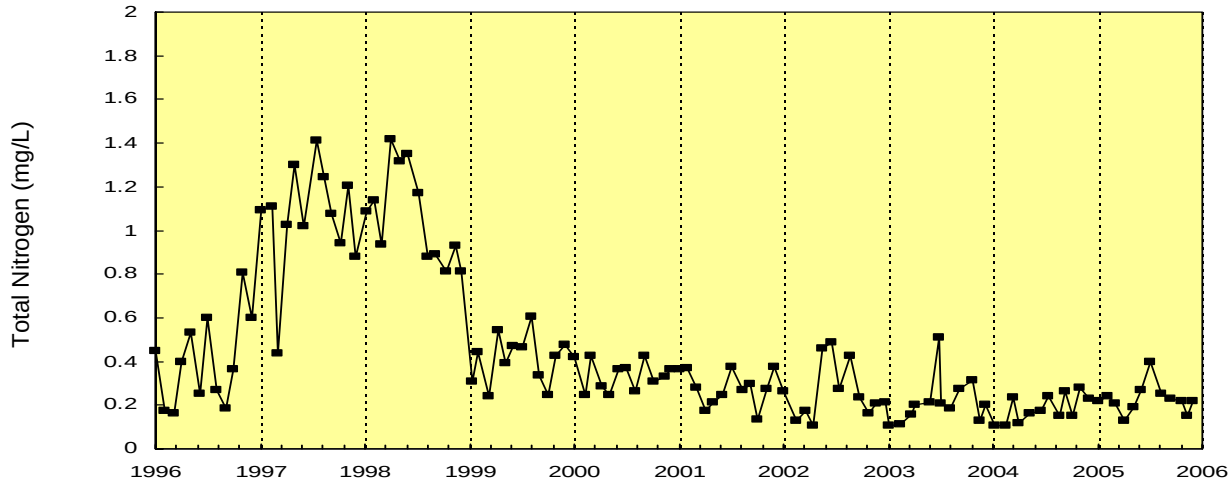




**Figure 6-g: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at EM2 in the Eastern Buffer WCZ**

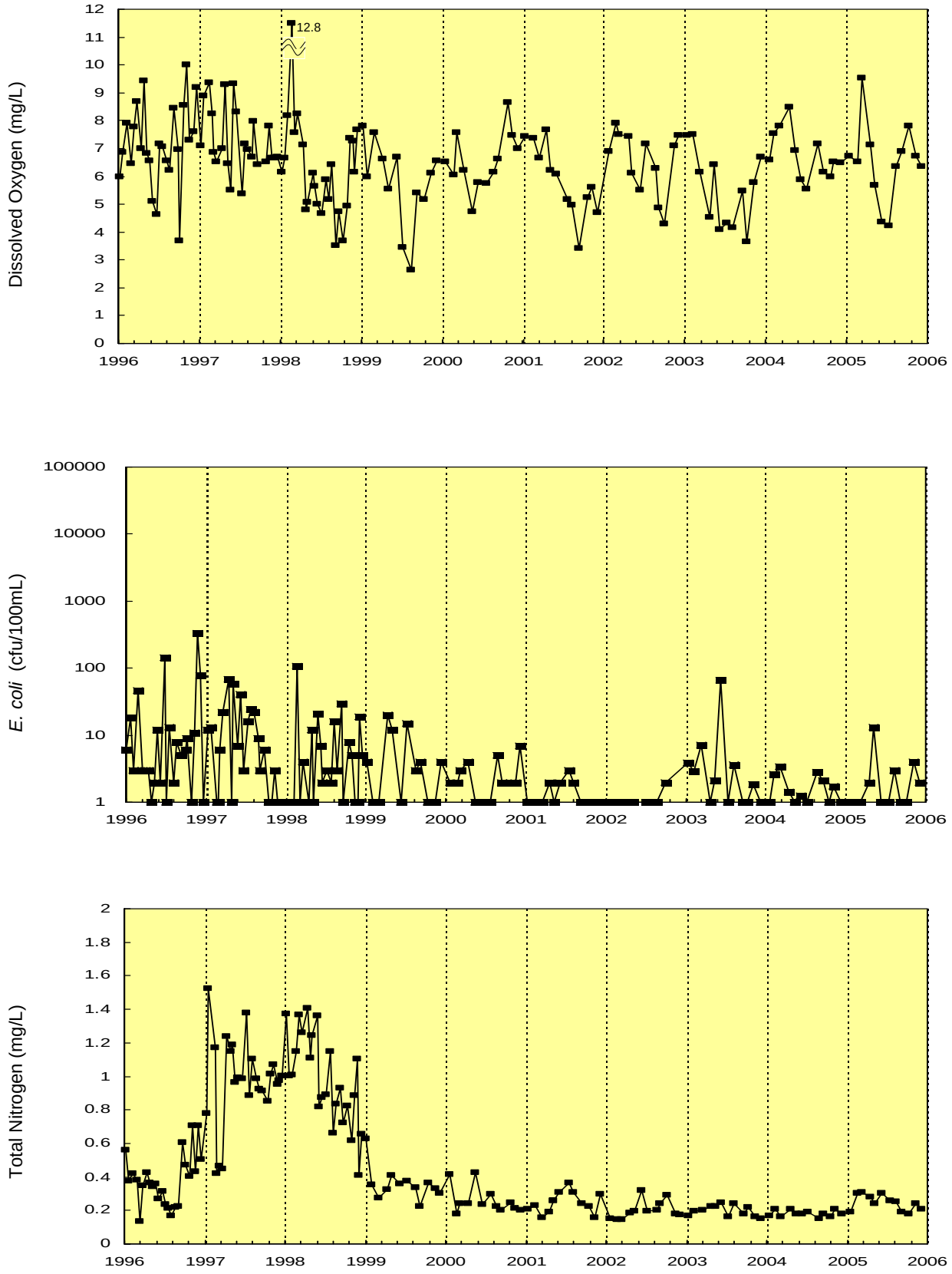



**Figure 6-h: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at TM6 in the Tolo Harbour WCZ**

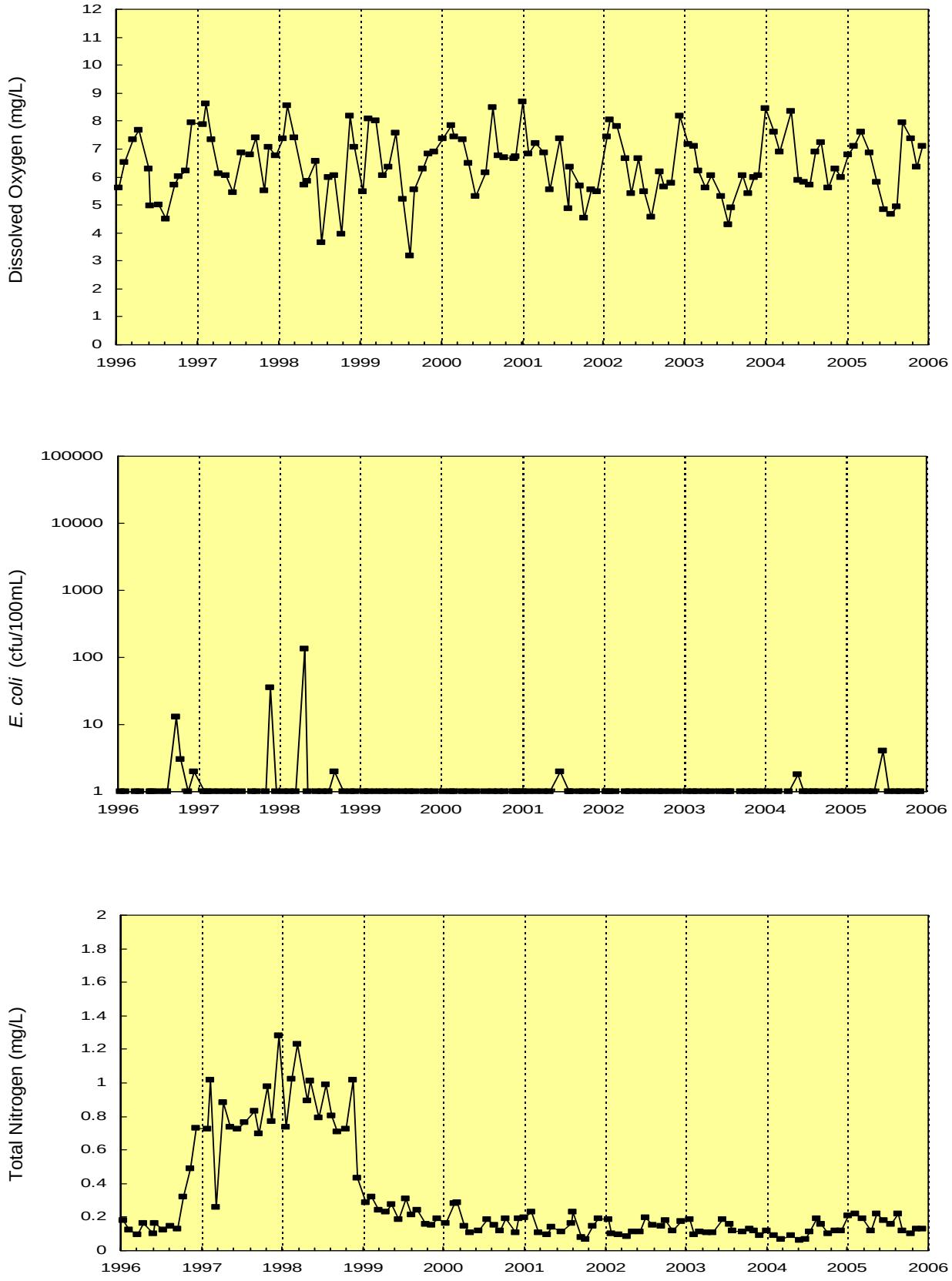



**Figure 6-i: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at PM7 in the Port Shelter WCZ**

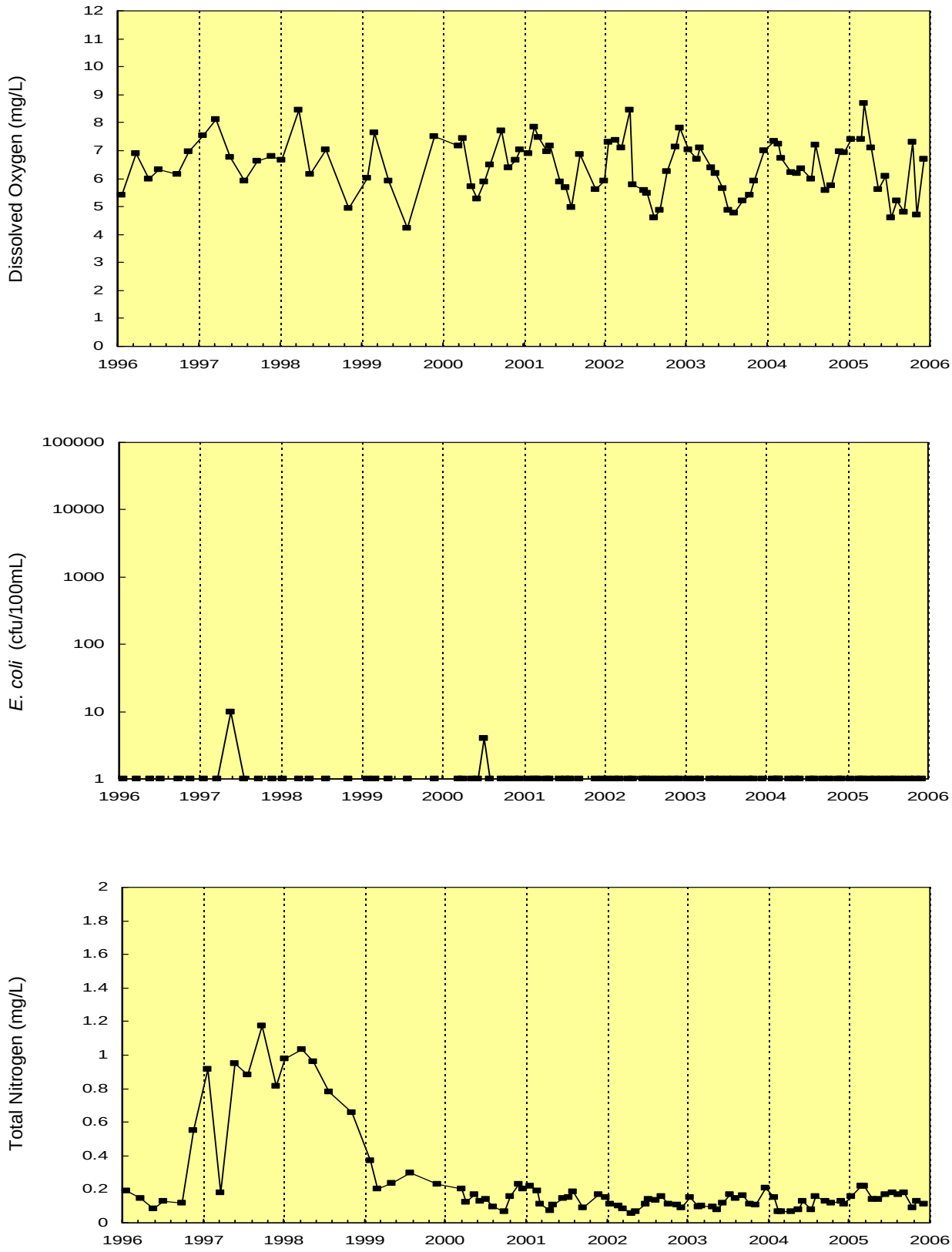



**Figure 6-j: Depth-averaged dissolved oxygen, *E. coli* and total nitrogen levels at MM15 in the Mirs Bay WCZ**

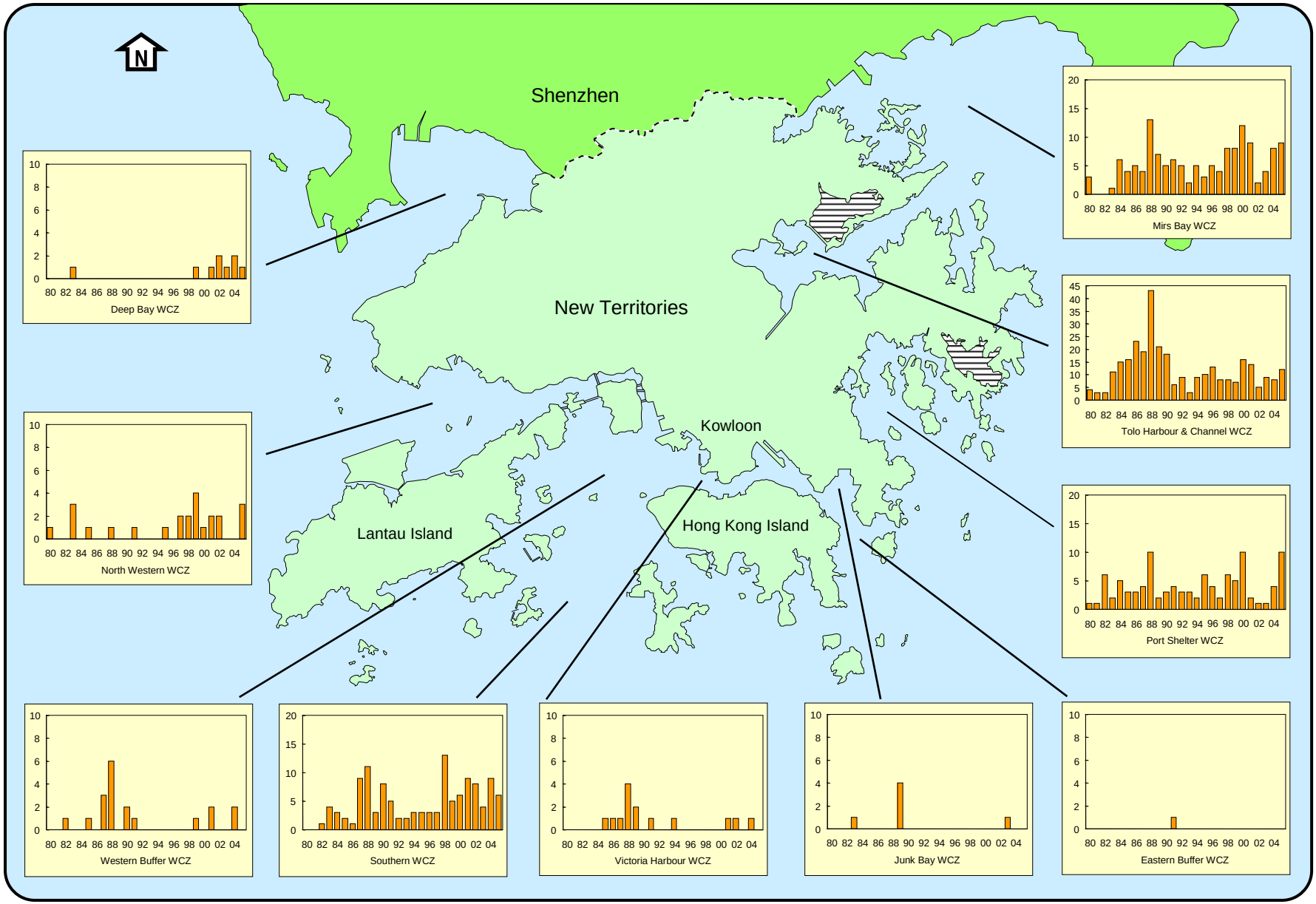



Figure 7 Frequency of red tides in 10 Water Control Zones in Hong Kong, 1980 - 2005

Source: Agriculture, Fisheries and Conservation Department and Environmental Protection Department