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(ACE Paper 5/96)
for information

MARINE AND INLAND WATER QUALITY IN HONG KONG FOR 1994 **AND BEACH WATER QUALITY FOR 1995**

INTRODUCTION

The purpose of this paper is to brief members on the status of Hong Kong's environmental waters including inland and coastal waters (status in 1994), and beach waters (status in 1995).

BACKGROUND

2. Comprehensive reports of the quality of our coastal waters, streams and beach waters are produced each year. These serve several purposes, the main ones being:

- (i) to allow the Director of Environmental Protection to track compliance with water quality objectives and thus assess the effectiveness of existing pollution control programmes;
- (ii) to elucidate the relationship between pollution loads and water quality, and thus provide the basis for better planning for environmental protection;
- (iii) to provide sufficient information to the beach management authorities to help to decide whether gazetted beaches should be re-opened or closed for swimming purpose and whether certain non-gazetted beaches should be gazetted.
- (iv) to provide a source of reference and an educational tool for academics and others who have a professional interest in the quality of our waters; and
- (v) to inform the public of the state of our environment and to provide up-to-date information to beach-goers on the latest water quality at beaches and the associated health risk of swimming at them.

3. For our inland and coastal waters, the nature of these objectives precludes simple summaries of water quality. A large body of data has to be collected and analysed in order to provide meaningful information. Much effort is put into compiling information on reductions in polluting loads, so that improvements in water quality can be linked with pollution control efforts. All this takes time and, for data analysis, cannot begin until chemical analyses are complete. This, coupled with the time allowed for preparation of graphics and printing means that there will always be a delay of a year or so between the end of the year reported upon and the issuance of the report. The marine and river water quality reports for 1994 are now ready and are distributed with this paper.

4. As for the bathing beaches, water quality data are processed and presented as tables, charts and trend lines in the beach water quality report for 1995, a copy of which is distributed with this paper.

Marine Waters

5. A comprehensive monitoring programme on marine water quality was initiated in 1986. In 1994, the number of sampling stations at which the quality of seawater and bottom sediments was monitored was 104 and 66 respectively. These include sampling stations located within 15 typhoon shelters which were also monitored. At each sampling station, a range of physical, chemical and biological parameters are measured. The marine report reviews the seawater and bottom sediment quality for 1994 and gives the compliance with the key water quality objectives in the ten gazetted water control zones in existence in 1994.

Inland Waters

6. A great number of streams, rivers and open nullahs exist in Hong Kong and of these, 38 watercourses or nullahs were monitored in 1994 by taking samples at 86 sampling stations. The status of the rivers is assessed by using a Water Quality Index which reflects the extent of organic, but not microbiological, pollution in the rivers. Using this system, rivers are classified as excellent, good, fair, bad and very bad.

Bathing Beach Waters

7. The bacteriological water quality of 43 gazetted beaches and 13 non-gazetted beaches in the territory is monitored under the department's beach water quality monitoring programme. The status of the beaches is assessed through a grading system which links pollution level with swimming-associated health risks. According to the system, beaches are graded as "good", "fair", "poor" or "very poor" and those in the rank of "good" and "fair" can achieve the relevant water quality objective. The annual ranks of the gazetted and non-gazetted beaches are recorded in the bathing beach report. The report also shows the bacteriological water quality trends of all the bathing beaches, and highlights the sources of pollution of beaches in various districts and the remedial actions required.

STATUS OF HONG KONG WATERS

Marine Waters

8. Marine water quality in Hong Kong in 1994 generally showed no significant improvement over 1993. High faecal coliform counts, turbidity and suspended solids, excessive nutrient level and low dissolved oxygen concentration were still recorded in some marine areas. Compliance with water quality objectives was mixed. The main areas of non-compliance were inner Deep Bay, Victoria Harbour and parts of Tolo Harbour (Figure 1).

9. In 1994, there were 20 incidents of red tides reported, 10 more than in 1993. The bottom sediment of Hong Kong, much of it anoxic and contaminated with heavy metals and organic pollutants, also changed little in 1994. A detailed analysis of the data available for Tolo Harbour included in the 1994 report indicated that the composition of the populations of microscopic algae has shifted in recent years in parallel with a decrease in chlorophyll-*a* levels in the inner harbour since the implementation of the Tolo Harbour Action Plan.

10. A significant event, involving the massive die-off of bottom-living organisms, was observed in Mirs Bay in July 1994. This was caused by the intrusion in-shore of a dense bottom layer of water with a very low dissolved oxygen content, a rare natural phenomenon.

Inland Waters

11. In contrast to marine waters, inland water quality in 1994 continued the improving trend observed since 1987. More sampling stations than ever before had a water quality grading of 'fair' or above in terms of the Water Quality Index (Figure 2). Sampling stations with 'bad' or 'very bad' water quality amounted to only 25.6% of the total number of stations monitored, a very clear improvement over 1987 when 53.6% of all stations were in these two undesirable categories.

12. It is encouraging to note that the number of rivers exhibiting full compliance with the stipulated water quality objectives increased from 2 in 1993 to 4 in 1994 while most other watercourses also showed high levels of compliance (Figure 3). This is clearly a function of our success in reducing the polluting inputs to Hong Kong's aquatic environment. Since the application of controls, we estimate we have reduced these by at least some 81,000 Kg BOD/day, equivalent to the waste from 1,450,000 people. However, a number of rivers in the northwest, notably the Kam Tin River and Yuen Long Creek, remain highly polluted, principally with livestock waste, and show very poor compliance with the water quality objectives.

Bathing Beach Waters

13. In the 1995 bathing season, there were 16 gazetted beaches ranked "good", 10 "fair", 13 "poor" and 4 "very poor". The number of beaches in different ranks over the past eight years is shown in Figure 4. The general momentum towards improvement in bacteriological beach water quality, built up in 1980's, has stopped and there is now clear evidence of a deteriorating trend.

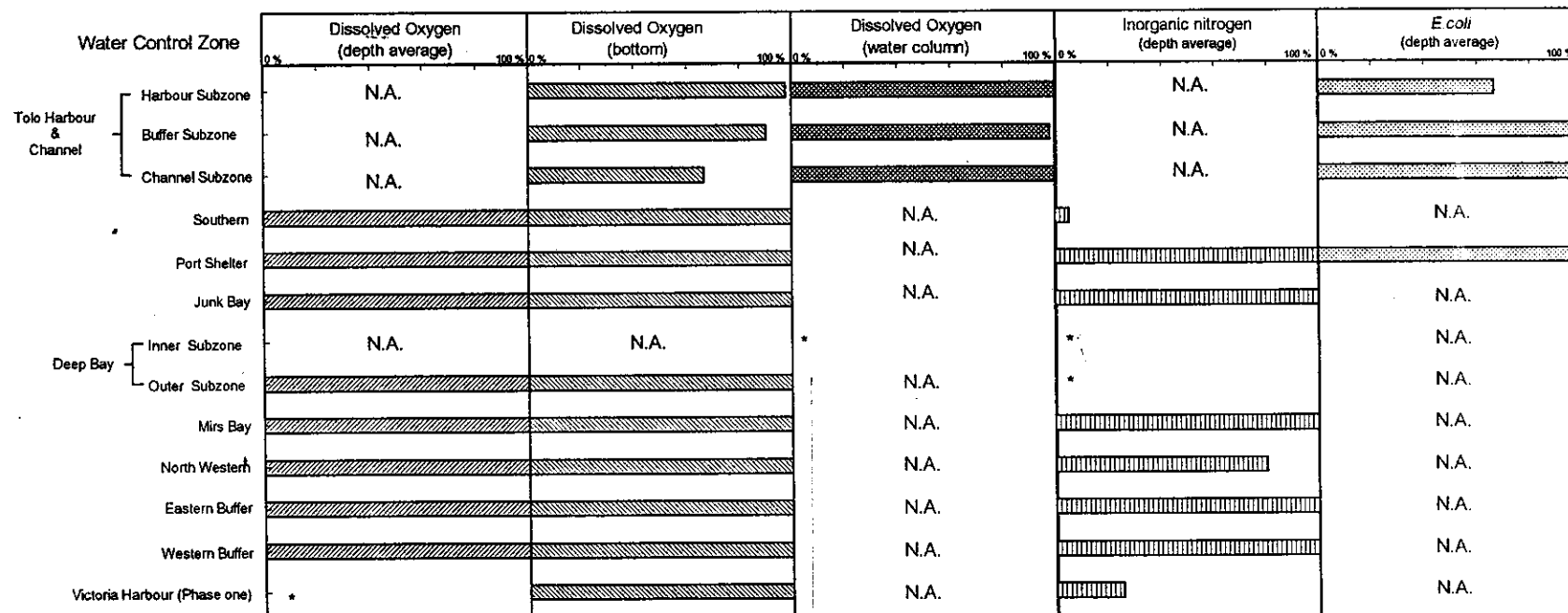
14. Bacteriological water quality at Butterfly, Castle Peak, Kadoorie, Old Cafeteria, New Cafeteria, Golden, Gemini, Hoi Mei Wan, Casam and Lido beaches was consistently "poor" during 1995. Water quality at Silvermine Bay, Silverstrand and Cheung Sha Lower beaches moved down from "fair" to "poor" while that at Approach and Ting Kau moved down from "poor" to "very poor". Water quality at Anglers and Rocky Bay beaches remained "very poor" in 1995. All these seventeen beaches failed to meet the bacteriological water quality objective for bathing beaches.

CONCLUSIONS

15. For marine waters, there was no significant improvement in water quality in 1994 due to the lack of major advances in the provision of treatment for the various discharges. Real long term improvement will only be seen upon completion of the first stage of the strategic sewage disposal scheme. More heartening, however, is the river water quality which continues to show progressive improvement from year to year. Two more rivers were found to show full compliance with the stipulated water quality objectives in 1994, bringing the total to four. Continued improvement in river water quality is anticipated with increased provision of sewers to unsewered areas, enforcement of the Water Pollution Control Ordinance, and implementation of the revised livestock waste control scheme.

16. Starting from 1990, a trend of gradual but steady deterioration in general beach water quality has set in as polluting flows have built up. This situation is particularly severe along the Tsuen Wan to Tuen Mun coastline. This gradual deteriorating trend will be reversed when the various sewerage improvement schemes, particularly in the Tuen Mun and Tsuen Wan areas, are completed by the end of this decade and local domestic discharges are connected to the sewerage system.

Environmental Protection Department
February 1996



* The absence of a bar indicates 0% compliance

N.A. = not applicable

- Note:
1. For Tolo Harbour and Channel Water Control Zone, water column dissolved oxygen means dissolved oxygen level at any point two metres above the bottom in the water column.
 2. For Inner Marine Subzone of Deep Bay Water Control Zone, water column dissolved oxygen means dissolved oxygen level at one metre below surface.

Figure 1 Level of compliance with key marine water quality objectives for the water control zones in 1994

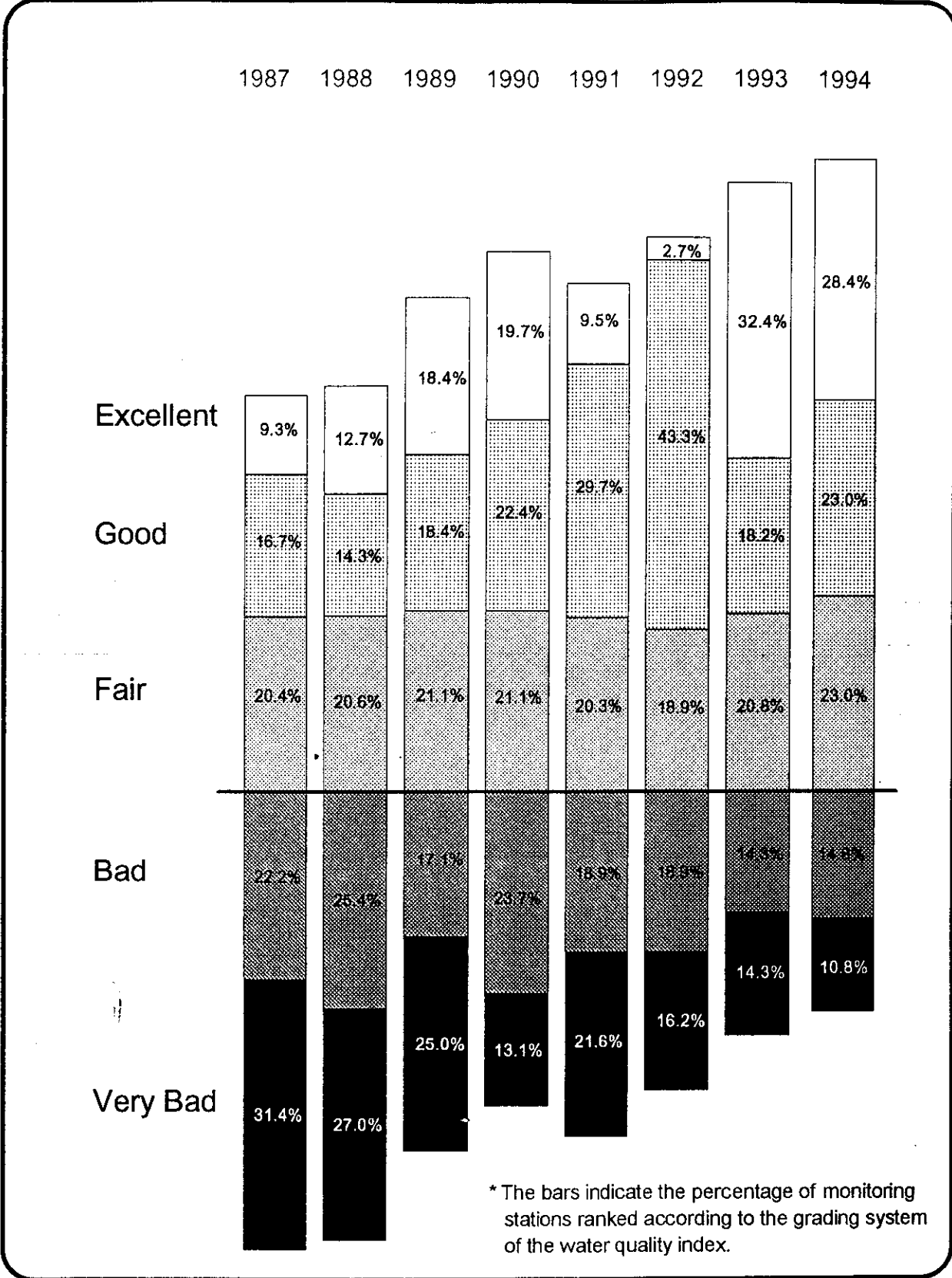
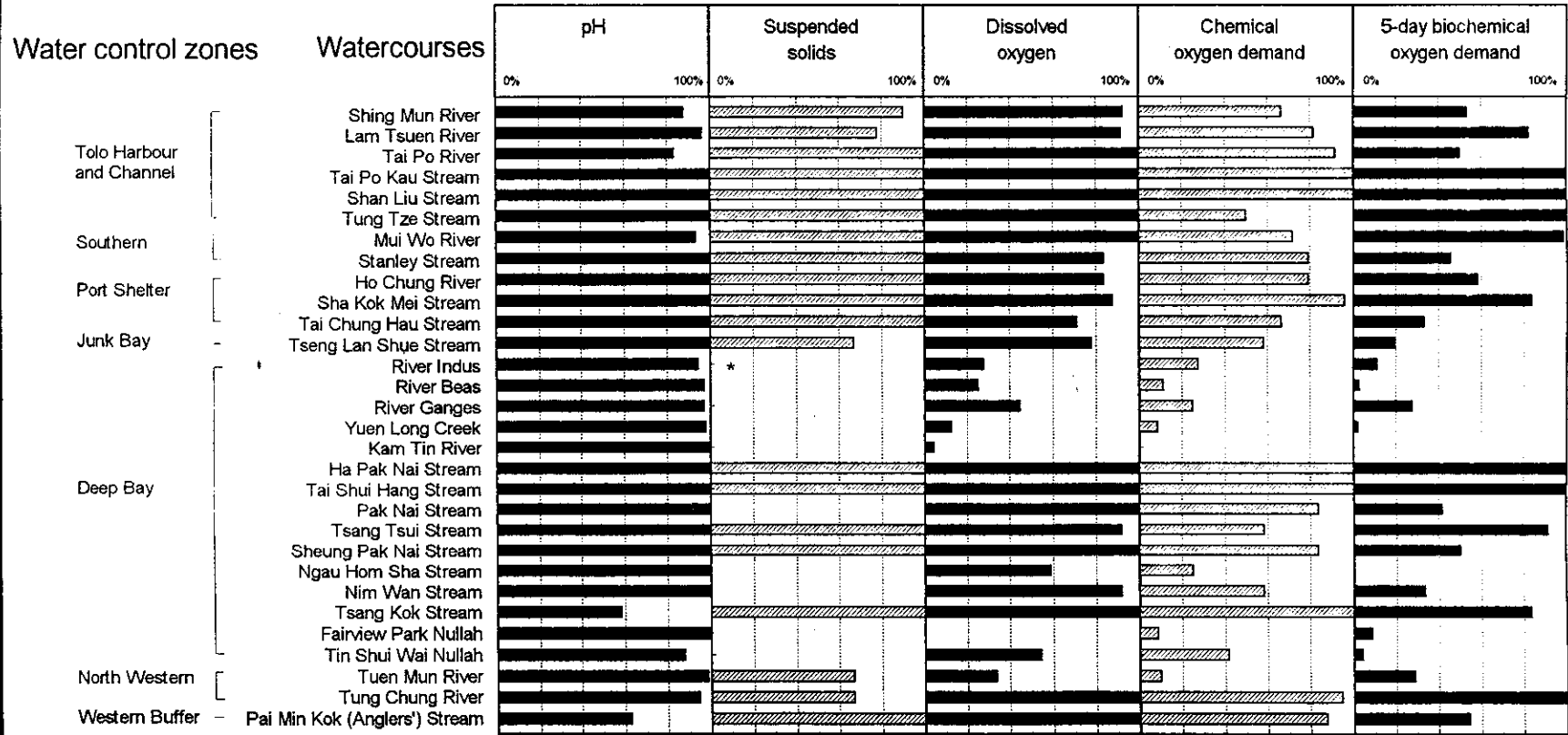
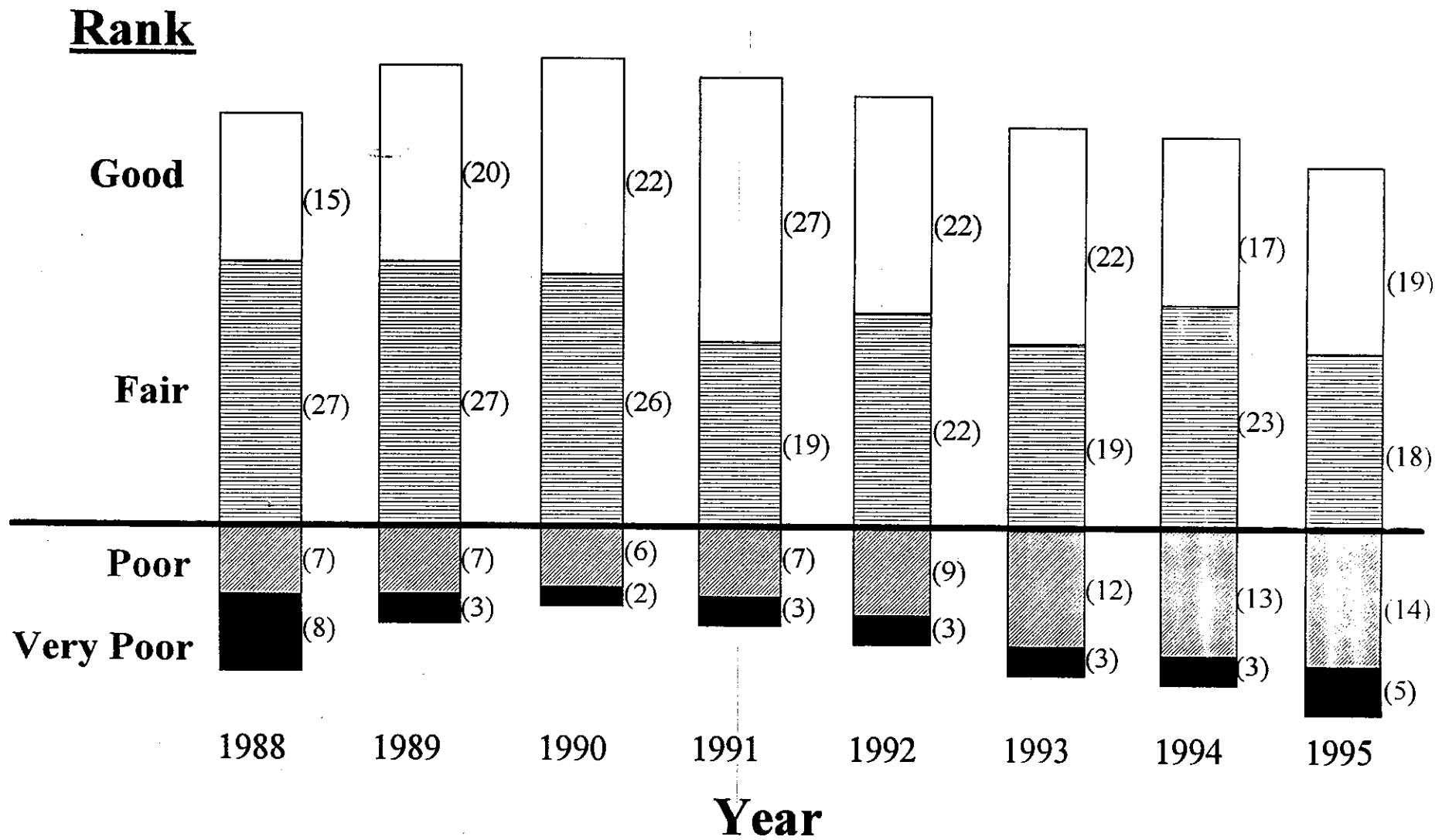


Figure 2 Trends of water quality in watercourses from 1987 to 1994



* The absence of a bar indicates 0% compliance

Figure 3 Percentage compliance of watercourses with water quality objectives in 1994



Legend : Figure in brackets indicates number of beaches

Figure 4 Ranks of Hong Kong beaches (both gazetted and non-gazetted) in the past eight years