

2006

Beach Water Quality in Hong Kong



環境保護署
香港特別行政區政府

Environmental Protection Department
The Government of the Hong Kong Special Administrative Region

Mission

To safeguard the health and welfare of the community and meet conservation goals by working to achieve and maintain the water quality objective for bathing beaches.



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Beach Water Quality in Hong Kong 2006

Introduction

The Environmental Protection Department (EPD) has implemented a comprehensive monitoring programme for bathing beaches in Hong Kong since 1986. The objective is to protect the public from possible health risks of swimming in polluted water. The background and details of the beach monitoring programme are available at the EPD's website (<http://www.epd.gov.hk>), and from the report [20 Years of Beach Water Quality Monitoring in Hong Kong](#) issued in May 2006 (also accessible through the website).



Repulse Bay Beach – an oasis of calm
in the busy city

In 2006, the EPD monitored 41 gazetted beaches and two non-gazetted beaches in Hong Kong. These beaches were monitored at least three times per month during the bathing season (March to October). Water samples were collected and tested for the bacteria *E. coli* at the EPD's Environmental Microbiology Laboratory. Other water quality parameters measured in the field and laboratory included: water temperature, dissolved oxygen, turbidity, pH and salinity.

Hong Kong's beaches are rated by a dual system: annual ranking and weekly grading based on the *E. coli* level in beach water, which indicates possible health risks associated with swimming. The annual ranking reflects the overall water quality of a beach in the entire bathing season, while the weekly grading denotes recent water quality of the beach. Under the system, beaches are grouped into “Good”, “Fair”, “Poor” and “Very Poor”, and those ranked as “Good” and “Fair” meet the Water Quality Objective (WQO) for bathing water.

Annual Beach Ranking in 2006

In 2006 the percentage of beaches complying with the WQO was 83%, the same as in the previous three years (2003 to 2005). Of the 41 gazetted beaches, 22 (or 54 %) were ranked as “Good”, 12 (29%) as “Fair”, five (12%) as “Poor” and two (5%) as “Very Poor”.



Big Wave Bay Beach – a paradise for wind-surfers



Beach Water Quality in Hong Kong 2006

The “Good” water quality beaches were mainly located in the Southern District (Hong Kong Island South), Sai Kung, and Outlying Islands. Ten out of the 12 beaches in the Southern District were ranked as “Good”, and only two (Big Wave Bay and Rocky Bay Beaches) as “Fair”. On the Outlying Islands, among the nine beaches monitored by the EPD, seven were ranked as “Good”, the rest (Cheung Chau Tung Wan and Silver Mine Bay Beaches) were “Fair”.



Stanley Main Beach – bathers enjoying the broad clean sand

Of the six beaches in Sai Kung, five were “Good”, and Silverstrand Beach was the only one ranked “Fair”; however, a steady decrease of *E. coli* level was observed at Silverstrand Beach in the last few years, indicating an improvement in water quality. Monitoring data show that all six beaches in Tuen Mun scored a “Fair” ranking in 2006. On the Tsuen Wan coast, seven beaches with “Poor” or “Very Poor” rankings were closed to swimmers due to poor water quality. Ma Wan Tung Wan Beach was the only beach open in the area and it was ranked as “Fair” in 2006. The Government is taking active measures to improve the water quality of Tsuen Wan beaches.

Two non-gazetted beaches were monitored by the EPD: Discovery Bay, a popular beach on Lantau Island, and Lung Mei, an artificial beach under planning in Tai Po. These two beaches were ranked “Good” and “Fair” respectively in 2006.

Overall, the beach water quality in 2006 was largely stable. Compared with 2005, the ranking of Cheung Chau Tung Wan Beach has changed marginally from “Good” to “Fair”, while Approach, Casam, Hoi Mei Wan and Lido Beaches in Tsuen Wan from “Very Poor” to “Poor”. The changes were generally within the normal range of water quality fluctuation of these beaches.

Weekly Beach Grading in 2006

The EPD issued gradings for the beaches when they were open to the public for swimming. These gradings were disseminated through [daily updated webpages](#), telephone hotline, beach noticeboards and weekly press releases.

The water quality of Sai Kung beaches was excellent. All six gazetted beaches maintained either “Good” or “Fair” gradings throughout the bathing season. Trio Beach was the best of all, achieving “Good”



Clear Water Bay First Beach
– a beach in picturesque landscape



Beach Water Quality in Hong Kong 2006

grading throughout the season. Beach gradings in the Southern District were also highly satisfactory. Nine out of the 10 beaches consistently achieved “Good” or “Fair” gradings, while Big Wave Bay Beach attained such gradings on over 80% of the sampling occasions. Tuen Mun beaches were mostly graded as “Fair”. The gradings of the only open beach in Tsuen Wan (Ma Wan Tung Wan Beach) were more variable, mostly fluctuating between “Fair” and “Poor”. The beaches on the Outlying Islands were ideal for swimming. Two out of the nine beaches, namely Lower Cheung Sha and Hung Shing Yeh Beaches, maintained a “Good” grading throughout the bathing season. Most of the other beaches maintained “Good” or “Fair” gradings, while Silver Mine Bay Beach attained such gradings in over 90% of the sampling occasions.



Hung Shing Yeh Beach achieved 100% “Good” grading in 2006

The number of “Grade 4” incidents has been reduced from 11 in 2005 to four in 2006. Whenever a “Grade 4” was issued, the beach would be closed to swimmers immediately and the EPD would undertake investigation and closely monitor the water quality. The decrease in “Grade 4” incidents in 2006 might be related to pollution reduction, as well as a lower amount of rainfall (2,440 mm in 2006 versus 3,180 mm in 2005) during the bathing season.

Beach water quality trend in the last 10 years (1997 to 2006)

The number of gazetted beaches complying with the WQO has increased from 26 out of 41 (63%) in 1997 to 34 (83%) in 2006. In the same period, the number of “Good” beaches has more than doubled from 10 (24%) to 22 (54%). Since 1999, the number of beaches complying with the WQO has been maintained at above 80%. The improvement over the past decade was attributed to strict enforcement of environmental legislation, extension of the sewerage network and enhanced sewage treatment facilities in the beach hinterlands. The advances made at Silver Mine Bay and Tuen Mun beaches were most noticeable.

Measures to improve Tsuen Wan Beaches

Seven gazetted beaches in Tsuen Wan remained closed in 2006 due to poor water quality. These were Anglers’, Approach, Casam, Gemini, Hoi Mei Wan, Lido and Ting Kau Beaches. Although a slight upgrade in the annual rankings of four beaches was observed in 2006, the water quality in the area was generally poor and highly variable. This was due to pollution in the unsewered hinterlands and high background bacterial levels in the marine water off the Tsuen Wan coast.



Beach Water Quality in Hong Kong 2006

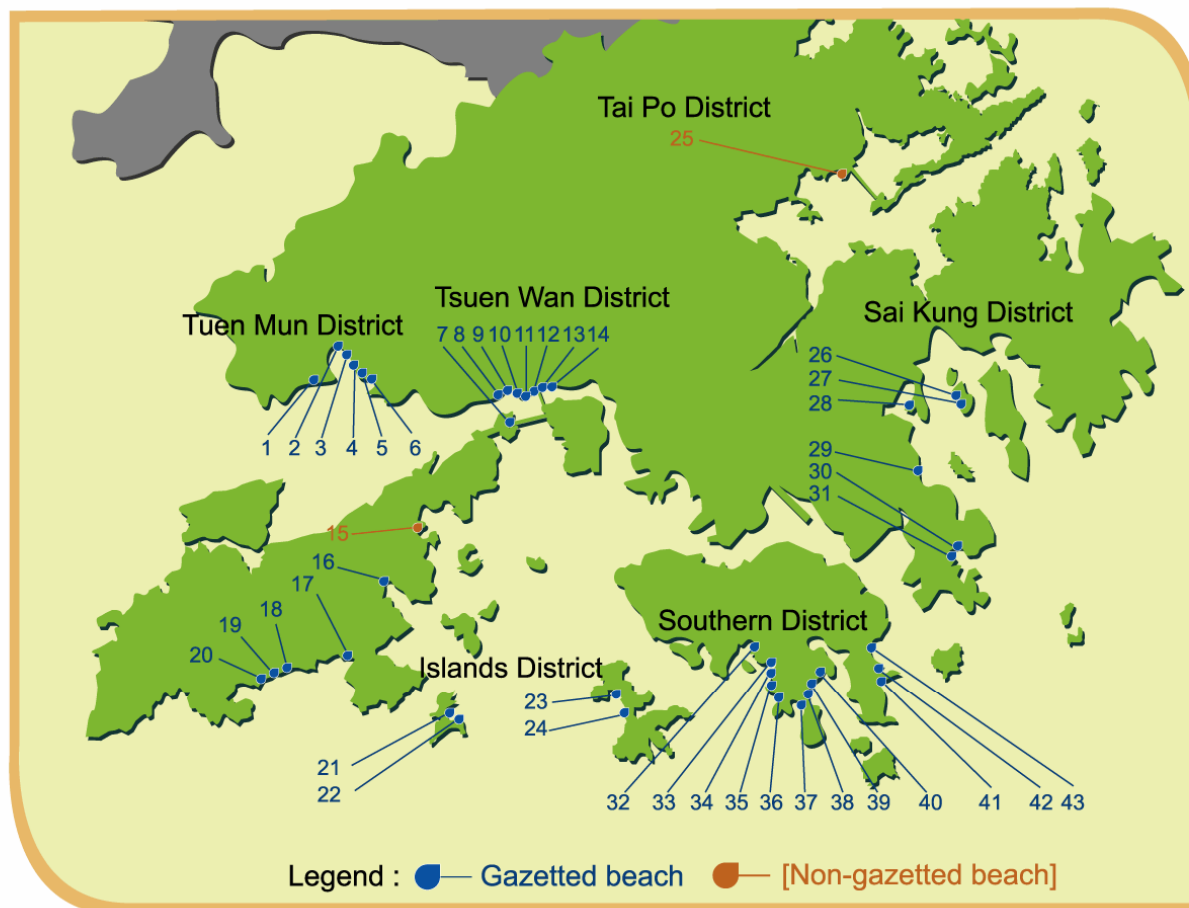
To improve the water quality of the Tsuen Wan beaches, the Government is working on the next stage of the Harbour Area Treatment Scheme (HATS Stage 2A), and plans to disinfect effluent from the Stonecutters Island Sewage Treatment Works by 2009, subject to the support of the community for full recovery of the operating cost through sewage charges. The extension of public sewers and connection of unsewered villages along Castle Peak Road (near the Tsuen Wan beaches) is on-going. With the proposed sewerage works and continued pollution control measures, the water quality of the Tsuen Wan beaches should improve substantially in the next few years. This would prepare the way for the re-opening of the beaches to the public for swimming.



Ma Wan Tung Wan Beach – the only open beach in Tsuen Wan District

The Monitoring Programme

Beaches monitored by the EPD



Tuen Mun District

1. Butterfly
2. Castle Peak
3. Kadoorie
4. Cafeteria Old
5. Cafeteria New
6. Golden

Tsuen Wan District

7. Ma Wan Tung Wan
8. Anglers'
9. Gemini
10. Hoi Mei Wan
11. Casam
12. Lido
13. Ting Kau
14. Approach

Islands District

15. [Discovery Bay]
16. Silver Mine Bay
17. Pui O
18. Lower Cheung Sha
19. Upper Cheung Sha
20. Tong Fuk
21. Cheung Chau Tung Wan
22. Kwun Yam
23. Hung Shing Yeh
24. Lo So Shing

Tai Po District

25. [Lung Mei]

Sai Kung District

26. Kiu Tsui
27. Hap Mun Bay
28. Trio
29. Silverstrand
30. Clear Water Bay First
31. Clear Water Bay Second

Southern District

32. Deep Water Bay
33. Repulse Bay
34. Middle Bay
35. South Bay
36. Chung Hom Kok
37. St. Stephen's
38. Stanley Main
39. Hairpin
40. Turtle Cove
41. Shek O
42. Rocky Bay
43. Big Wave Bay

Beach monitoring frequencies

Beach	Monitoring frequency per month	
	Bathing season*	Non-bathing season
Gazetted beaches open all year round**	at least 3 times	at least 3 times
Other gazetted beaches	at least 3 times	once
Non-gazetted beaches	at least 2 times	once

* March to October

** Clear Water Bay Second, Deep Water Bay, Golden and Silverstrand Beaches

Overview of various stages of the Beach Monitoring Programme

Water Sampling and Field Data Recording



Water sampling



On-site measurements

- Record beach conditions, dissolved oxygen and water temperature

Samples kept at 4°C and tested within 6 hours

Laboratory Testing

Bacteriological Analysis



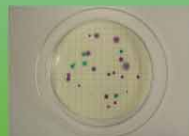
Membrane filtration

Water sample is filtered to retain bacteria on membrane



Incubation

Membranes are incubated with culture medium at 44.5°C in aerobic conditions for 18 - 24 hours



Counting of bacteria

Greenish blue colonies - *E. coli*

Physical Parameter Analysis



Measurement of pH, salinity and turbidity

Data Collation



Data processing

Calculating beach gradings and annual rankings



Information Dissemination



Hong Kong's annual beach ranking system

Rank	<i>E. coli</i> counts per 100 mL*	Minor illness rate** (Cases per 1,000 swimmers)	WQO Compliance
Good	≤24	Undetectable	Compliant
Fair	25-180	≤10	
Poor	181-610	11-15	Non-compliant
Very Poor	>610	>15	

* Geometric mean *E. coli* count calculated based on all data collected between March and October.

** Skin and gastrointestinal illnesses

Hong Kong's weekly beach grading system

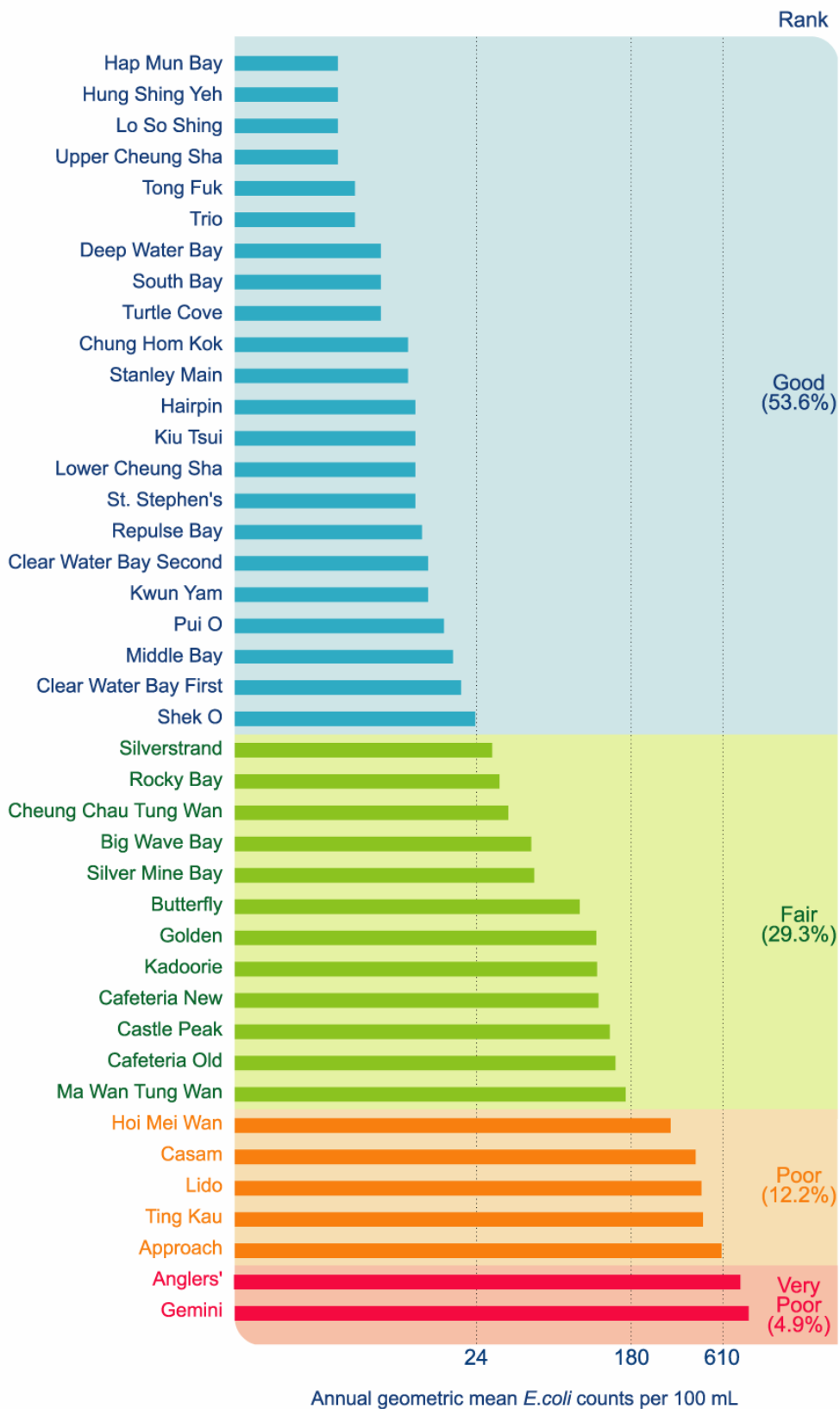
Grade	Beach water quality	<i>E. coli</i> counts per 100 mL*	Minor illness rate** (Cases per 1,000 swimmers)
1	Good	≤24	Undetectable
2	Fair	25-180	≤10
3	Poor	181-610	11-15
4	Very Poor	>610 or last reading >1,600	>15

* Unless otherwise indicated, the *E. coli* count represents the geometric mean of the 5 most recent sampling occasions.

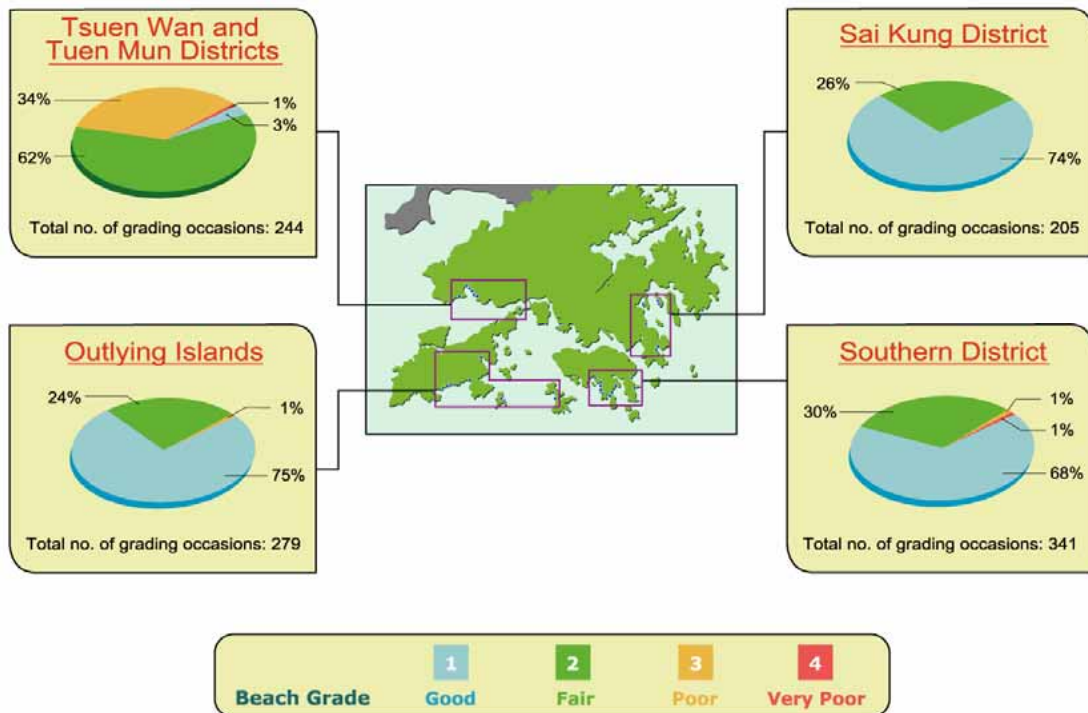
** Skin and gastrointestinal illnesses

The 2006 Findings

Hong Kong's gazetted beaches the 2006 annual ranking



Beach grading summary by district in 2006



Ranking and Grading Summary

Southern District beaches

Annual ranking



Annual Rank

Good

Fair

Poor

Very Poor

Weekly grading

Beach	Percentage of Weekly Gradings			
	Grade 1	Grade 2	Grade 3	Grade 4
Big Wave Bay	34 %	49 %	11 %	6 %
Chung Hom Kok	76 %	24 %	0 %	0 %
Deep Water Bay	79 %	21 %	0 %	0 %
Middle Bay	56 %	44 %	0 %	0 %
Repulse Bay	59 %	41 %	0 %	0 %
Shek O	47 %	53 %	0 %	0 %
South Bay	82 %	18 %	0 %	0 %
St. Stephen's	76 %	24 %	0 %	0 %
Stanley Main	85 %	15 %	0 %	0 %
Turtle Cove	85 %	15 %	0 %	0 %

Note: No gradings were issued for closed beaches.

Sai Kung beaches

Annual ranking



Annual Rank Good Fair Poor Very Poor

Weekly grading

Beach	Percentage of Weekly Gradings			
	Grade 1	Grade 2	Grade 3	Grade 4
Clear Water Bay First	59 %	41 %	0 %	0 %
Clear Water Bay Second	74 %	26 %	0 %	0 %
Hap Mun Bay	97 %	3 %	0 %	0 %
Kiu Tsui	82 %	18 %	0 %	0 %
Silverstrand	31 %	69 %	0 %	0 %
Trio	100 %	0 %	0 %	0 %

Tsuen Wan and Tuen Mun beaches

Annual ranking



Annual Rank

Good Fair Poor Very Poor

Weekly grading

District	Beach	Percentage of Weekly Gradings			
		Grade 1	Grade 2	Grade 3	Grade 4
Tsuen Wan	Ma Wan Tung Wan	0%	36%	61%	3%
Tuen Mun	Butterfly	6%	75%	19%	0%
	Cafeteria New	6%	66%	25%	3%
	Cafeteria Old	0%	60%	40%	0%
	Castle Peak	0%	69%	31%	0%
	Golden	9%	63%	28%	0%
	Kadoorie	0%	66%	34%	0%

Note: No gradings were issued for closed beaches.

Beaches on the Outlying Islands

Annual ranking



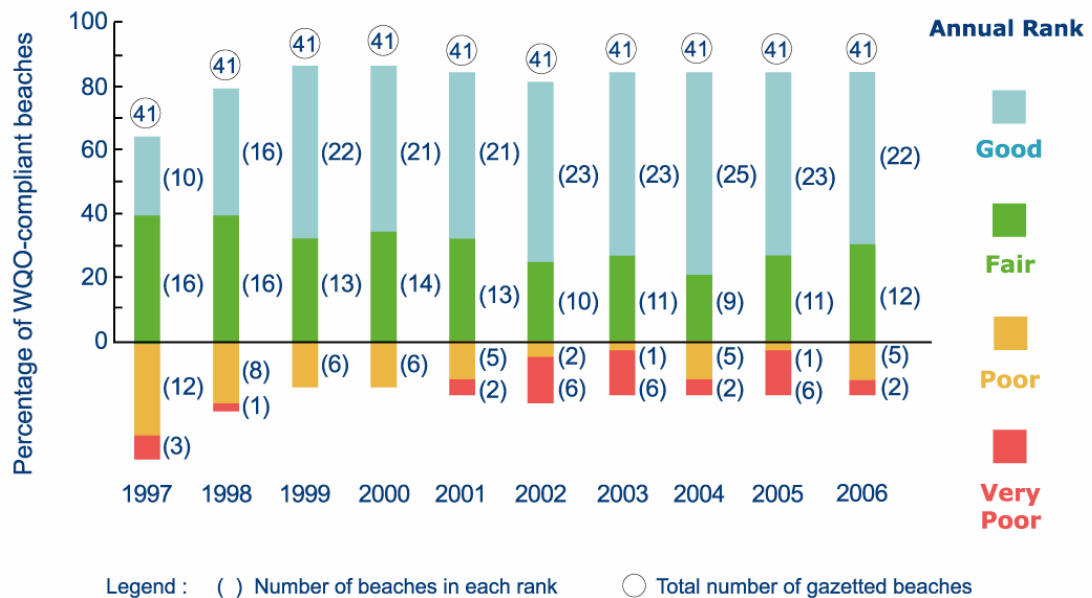
Annual Rank Good Fair Poor Very Poor

Weekly grading

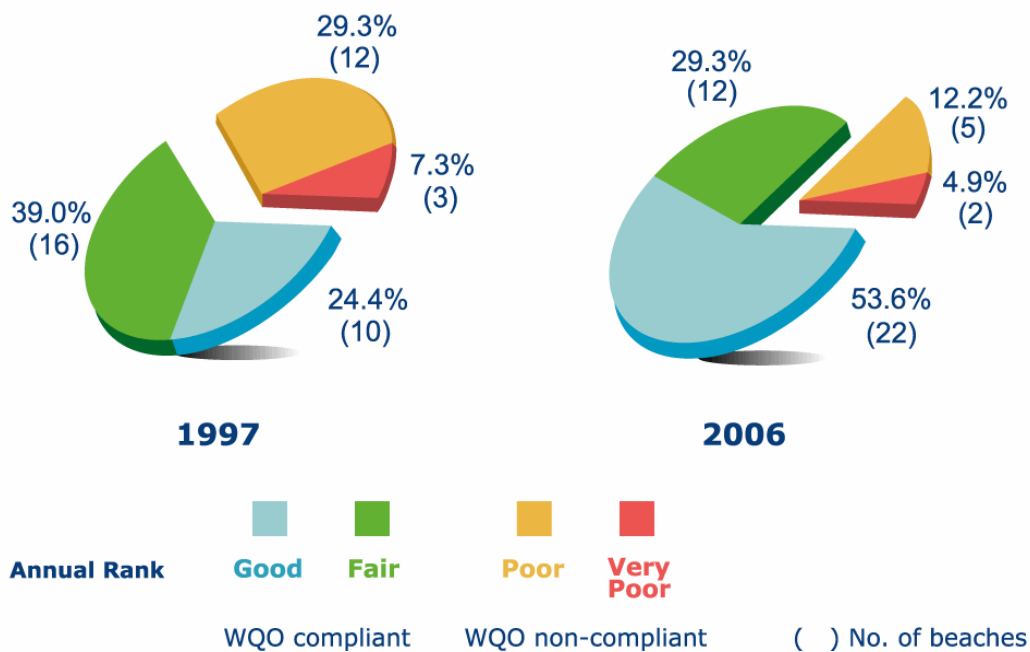
Beach	Percentage of Weekly Gradings			
	Grade 1	Grade 2	Grade 3	Grade 4
Cheung Chau Tung Wan	31 %	69 %	0 %	0 %
Hung Shing Yeh	100 %	0 %	0 %	0 %
Kwun Yam	77 %	23 %	0 %	0 %
Lo So Shing	96 %	4 %	0 %	0 %
Lower Cheung Sha	80 %	20 %	0 %	0 %
Pui O	77 %	23 %	0 %	0 %
Silver Mine Bay	20 %	71 %	9 %	0 %
Tong Fuk	97 %	3 %	0 %	0 %
Upper Cheung Sha	100 %	0 %	0 %	0 %

Ten Year Trend (1997 – 2006)

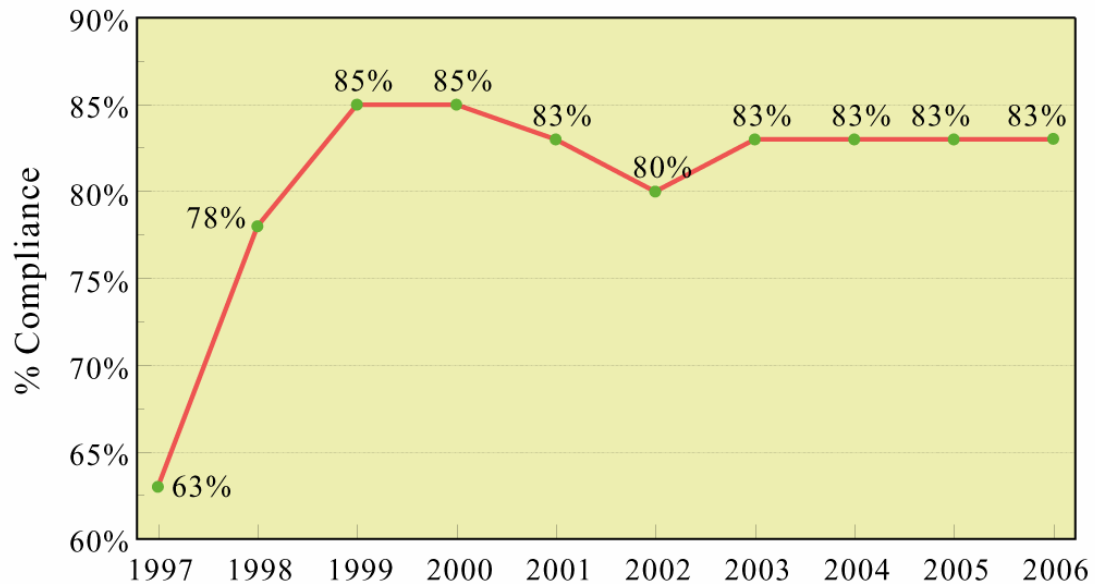
Annual beach ranking over the last 10 years



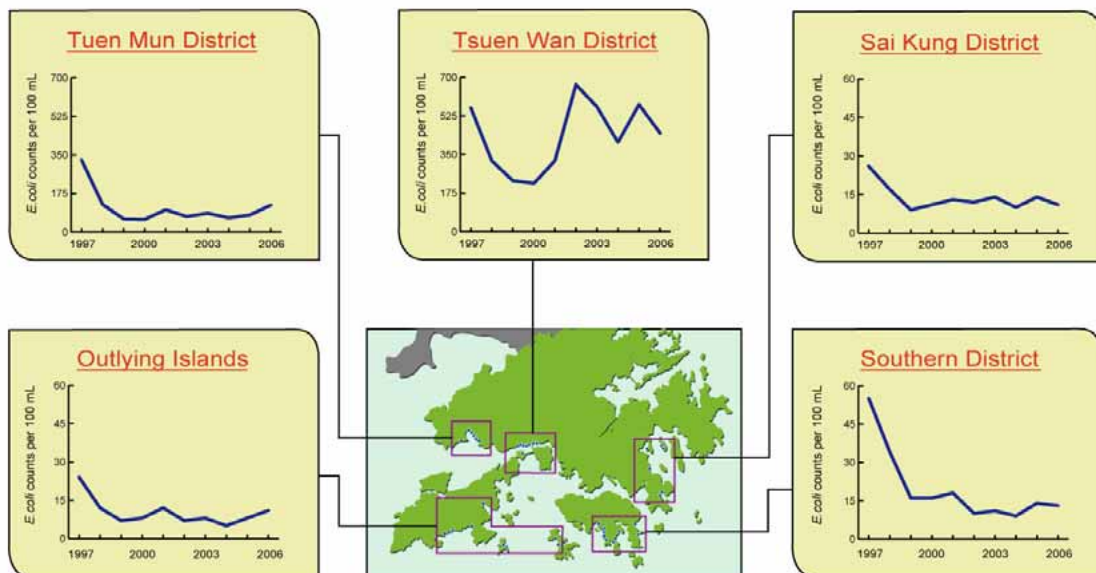
Annual beach ranking of 1997 and 2006 compared



Compliance with the Water Quality Objective at gazetted beaches, 1997 - 2006



Annual geometric mean *E. coli* levels by district, 1997 - 2006



Appendix A - Annual geometric mean *E. coli* levels over 10 years**Southern District****Annual geometric mean *E. coli* levels over 10 years**

Beach	<i>E.coli</i> counts per 100 mL									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Big Wave Bay	179	114	77	98	106	23	33	26	101	50
Chung Hom Kok	22	40	14	8	15	13	14	9	13	10
Deep Water Bay	55	46	14	16	18	9	9	7	8	7
Hairpin	44	72	17	18	10	6	7	7	13	11
Middle Bay	40	16	11	11	8	9	14	12	20	18
Repulse Bay	23	11	8	9	13	9	12	4	8	12
Rocky Bay	399	223	72	80	118	43	28	19	30	33
Shek O	102	70	32	29	31	13	11	16	19	24
South Bay	17	6	4	7	5	5	11	9	7	7
St. Stephen's	40	26	11	6	7	5	9	4	12	11
Stanley Main	72	24	13	12	9	8	6	5	7	10
Turtle Cove	40	14	12	11	15	8	4	5	8	7

Note: Figure in red indicates that the beach was closed in that year

Sai Kung District**Annual geometric mean *E. coli* levels over 10 years**

Beach	<i>E.coli</i> counts per 100 mL									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Clear Water Bay First	62	41	11	16	28	28	17	9	16	20
Clear Water Bay Second	66	44	12	26	22	14	21	10	19	13
Hap Mun Bay	3	2	2	2	1	2	4	3	4	4
Kiu Tsui	5	4	4	5	5	4	5	17	14	11
Silverstrand	148	99	32	61	100	133	97	74	67	30
Trio	30	21	17	10	12	6	10	2	6	5

Tsuen Wan District**Annual geometric mean *E. coli* levels over 10 years**

Beach	<i>E.coli</i> counts per 100 mL									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Anglers'	691	502	442	326	621	1,169	693	619	895	772
Approach	1,009	435	387	316	411	696	762	470	663	599
Casam	609	239	231	209	233	741	702	594	716	426
Gemini	458	399	350	258	323	1,155	875	1,102	1,042	853
Hoi Mei Wan	471	280	109	177	199	547	442	287	641	308
Lido	600	262	231	181	269	683	734	523	782	459
Ma Wan Tung Wan	110	92	51	39	133	201	159	101	132	171
Ting Kau	1,583	1,045	515	593	739	742	831	412	512	469

Note: Figure in red indicates that the beach was closed in that year

Tuen Mun District**Annual geometric mean *E. coli* levels over 10 years**

Beach	<i>E.coli</i> counts per 100 mL									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Butterfly	259	121	44	61	74	60	74	55	55	94
Cafeteria New	309	100	60	51	104	62	80	54	70	120
Cafeteria Old	435	138	58	57	125	74	76	61	81	150
Castle Peak	332	199	57	58	105	58	64	80	90	139
Golden	352	98	44	50	87	66	84	46	62	117
Kadoorie	290	130	109	68	120	114	160	98	117	118

Note: Figure in red indicates that the beach was closed in that year

Outlying Islands

Annual geometric mean *E. coli* levels over 10 years

Beach	<i>E.coli</i> counts per 100 mL									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cheung Chau Tung Wan	24	19	11	12	16	17	11	12	14	37
Hung Shing Yeh	5	3	3	5	6	2	5	4	4	4
Kwun Yam	32	21	6	10	11	9	7	5	10	13
Lo So Shing	3	2	4	2	5	2	3	2	3	4
Lower Cheung Sha	85	23	10	12	22	10	14	7	12	11
Pui O	36	16	10	10	17	10	15	9	10	16
Silver Mine Bay	481	123	39	50	67	42	50	14	34	52
Tong Fuk	14	10	4	5	6	4	3	4	5	5
Upper Cheung Sha	8	3	2	3	5	3	3	3	3	4

Appendix B – Beach visitor numbers, 2006

Southern District

Visitor numbers during the 2006 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Big Wave Bay	248	1,118	3,900	26,660	128,722
Chung Hom Kok	347	1,368	4,300	30,140	164,687
Deep Water Bay	1,230	4,979	39,000	141,200	593,730
Hairpin	89	517	900	9,340	55,230
Middle Bay	120	425	1,850	13,341	53,212
Repulse Bay	6,661	11,576	33,000	304,590	2,015,346
Rocky Bay	-	-	-	-	-
Shek O	789	4,574	33,000	124,400	488,510
South Bay	169	1,112	3,000	24,500	115,000
St. Stephen's	220	515	1,450	15,180	76,975
Stanley Main	558	3,088	17,500	63,480	334,140
Turtle Cove	88	268	750	6,113	35,630

Note: Information provided by the Leisure and Cultural Services Department

Sai Kung District

Visitor numbers during the 2006 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Clear Water Bay First	101	402	1,285	11,869	48,125
Clear Water Bay Second	2,398	8,823	38,000	279,700	1,088,764
Hap Mun Bay	377	2,816	16,450	79,453	282,613
Kiu Tsui	64	395	1,690	7,725	41,536
Silverstrand	150	796	4,500	18,680	87,144
Trio	325	712	3,100	35,476	109,816

Note: Information provided by the Leisure and Cultural Services Department

Tsuen Wan District**Visitor numbers during the 2006 bathing season**

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Anglers'	41	75	260	2,075	12,598
Approach	68	99	150	3,225	18,980
Casam	12	21	41	554	3,689
Gemini	3	7	14	171	1,068
Hoi Mei Wan	5	9	17	236	1,603
Lido	87	130	445	3,985	24,745
Ma Wan Tung Wan	244	1,332	5,093	30,402	144,585
Ting Kau	14	28	50	713	4,584

Note: Information provided by the Leisure and Cultural Services Department

Tuen Mun District**Visitor numbers during the 2006 bathing season**

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Butterfly	878	1,637	5,000	45,500	274,300
Cafeteria New	795	2,004	5,980	62,330	289,065
Cafeteria Old	538	1,737	4,820	38,720	225,330
Castle Peak	487	1,163	1,700	26,500	172,050
Golden	1,763	6,362	14,000	151,100	790,710
Kadoorie	515	736	1,600	25,800	143,390

Note: Information provided by the Leisure and Cultural Services Department

Outlying Islands

Visitor numbers during the 2006 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Cheung Chau Tung Wan	180	552	3,300	13,520	73,190
Hung Shing Yeh	149	519	1,090	12,820	65,280
Kwun Yam	120	351	750	9,240	47,400
Lo So Shing	46	135	550	2,970	18,280
Lower Cheung Sha	64	188	500	5,260	25,360
Pui O	81	285	850	7,270	35,850
Silver Mine Bay	125	281	2,500	8,435	42,760
Tong Fuk	89	199	720	7,160	30,400
Upper Cheung Sha	67	120	350	3,870	20,520

Note: Information provided by the Leisure and Cultural Services Department

Appendix C - Physicochemical water quality data of gazetted beaches, 2006

Southern District**Physicochemical water quality data of gazetted beaches, 2006**

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen	
					(mg/L)	(% Saturation)
Big Wave Bay	8.1 (7.9 - 8.4)	28.9 (14.3 - 32.9)	3.2 (1.3 - 7.4)	25.7 (17.7 - 30.2)	7.0 (5.6 - 8.5)	98 (85 - 117)
Chung Hom Kok	8.2 (7.9 - 8.5)	29.2 (20.8 - 33.0)	4.0 (1.3 - 8.3)	26.0 (18.4 - 30.4)	6.6 (5.0 - 8.8)	93 (75 - 122)
Deep Water Bay	8.1 (7.8 - 8.5)	28.9 (20.1 - 33.0)	7.1 (2.1 - 20.8)	26.3 (18.8 - 30.2)	6.5 (5.2 - 7.8)	93 (80 - 118)
Hairpin [Closed]	8.2 (8.0 - 8.7)	29.2 (19.1 - 33.1)	2.8 (1.0 - 9.3)	26.3 (18.2 - 31.0)	7.1 (6.0 - 9.7)	102 (84 - 140)
Middle Bay	8.2 (7.9 - 8.6)	29.1 (20.9 - 33.2)	4.7 (1.6 - 14.9)	26.1 (17.6 - 30.3)	6.5 (5.5 - 7.9)	93 (80 - 109)
Repulse Bay	8.2 (7.9 - 8.6)	29.3 (21.5 - 33.0)	4.1 (1.9 - 7.1)	25.9 (18.3 - 30.1)	6.7 (5.4 - 7.9)	94 (79 - 119)
Rocky Bay [Closed]	8.1 (7.9 - 8.3)	30.4 (23.7 - 33.0)	3.5 (1.0 - 9.4)	25.4 (17.8 - 30.8)	6.7 (4.5 - 9.9)	95 (60 - 140)
Shek O	8.1 (8.0 - 8.4)	30.3 (20.7 - 33.0)	4.2 (1.7 - 8.8)	26.0 (17.6 - 31.2)	6.9 (5.6 - 8.0)	95 (84 - 109)
South Bay	8.2 (7.9 - 8.7)	29.2 (21.0 - 33.0)	3.3 (1.3 - 10.7)	26.1 (18.0 - 30.2)	6.5 (4.8 - 8.5)	92 (74 - 121)
St. Stephen's	8.1 (7.9 - 8.6)	29.3 (20.7 - 33.1)	4.0 (1.4 - 14.1)	26.0 (17.9 - 30.4)	6.5 (5.4 - 8.2)	94 (81 - 122)
Stanley Main	8.2 (8.0 - 8.6)	29.0 (20.0 - 32.7)	4.0 (1.5 - 12.7)	26.5 (17.9 - 31.0)	7.1 (5.9 - 10.1)	101 (85 - 153)
Turtle Cove	8.2 (7.8 - 8.7)	28.9 (18.3 - 33.1)	5.3 (1.6 - 15.7)	26.4 (18.1 - 31.0)	6.8 (5.5 - 10.0)	98 (83 - 148)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

Note: Data presented are arithmetic means; figures in brackets are ranges.

Sai Kung District**Physicochemical water quality data of gazetted beaches, 2006**

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen	
					(mg/L)	(% Saturation)
Clear Water Bay First	8.2 (8.0 - 8.6)	29.6 (18.4 - 33.2)	5.6 (1.1 - 16.2)	26.3 (16.5 - 31.0)	6.8 (4.9 - 8.3)	96 (73 - 118)
Clear Water Bay Second	8.1 (8.0 - 8.3)	30.3 (21.8 - 33.5)	6.3 (1.3 - 29.1)	26.5 (16.2 - 31.1)	6.6 (4.8 - 8.3)	94 (73 - 120)
Hap Mun Bay	8.2 (8.0 - 8.4)	30.3 (24.7 - 33.6)	2.6 (0.4 - 8.6)	26.4 (16.8 - 31.6)	6.8 (5.5 - 8.2)	97 (80 - 106)
Kiu Tsui	8.2 (8.0 - 8.5)	30.0 (23.9 - 33.7)	2.8 (0.6 - 6.7)	26.4 (16.9 - 31.6)	6.9 (5.6 - 8.5)	98 (85 - 114)
Silverstrand	8.1 (8.0 - 8.4)	29.0 (20.2 - 32.6)	3.9 (0.8 - 13.5)	26.2 (16.8 - 31.5)	6.7 (4.6 - 8.2)	95 (69 - 116)
Trio	8.1 (7.9 - 8.4)	29.1 (19.1 - 33.5)	1.9 (0.8 - 6.6)	26.7 (16.8 - 32.5)	6.6 (5.2 - 8.4)	95 (76 - 106)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

Note: Data presented are arithmetic means; figures in brackets are ranges.

Tsuen Wan District**Physicochemical water quality data of gazetted beaches, 2006**

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Anglers' [Closed]	8.0 (7.8 - 8.6)	27.2 (12.0 - 32.0)	5.0 (2.6 - 12.3)	25.6 (18.3 - 29.9)	6.4 (4.7 - 8.8)	89 (69 - 130)
Approach [Closed]	8.0 (7.8 - 8.4)	26.3 (14.6 - 32.0)	4.9 (2.1 - 11.1)	25.4 (18.2 - 28.6)	6.3 (4.6 - 8.5)	89 (70 - 118)
Casam [Closed]	8.0 (7.8 - 8.4)	26.6 (15.6 - 31.9)	5.8 (2.2 - 19.4)	25.5 (18.8 - 30.0)	6.4 (5.1 - 7.5)	90 (72 - 101)
Gemini [Closed]	8.0 (7.8 - 8.5)	26.8 (12.7 - 31.9)	4.6 (1.5 - 8.6)	25.7 (18.3 - 29.7)	6.4 (5.3 - 8.8)	90 (70 - 120)
Hoi Mei Wan [Closed]	8.0 (7.8 - 8.3)	26.4 (15.1 - 32.0)	4.0 (1.4 - 7.9)	25.6 (18.5 - 28.9)	6.4 (5.0 - 8.3)	88 (71 - 108)
Lido [Closed]	8.0 (7.8 - 8.5)	26.7 (15.4 - 32.0)	5.3 (2.2 - 15.1)	25.7 (18.8 - 30.0)	6.5 (5.2 - 7.8)	89 (71 - 106)
Ma Wan Tung Wan	8.1 (7.8 - 8.6)	26.7 (17.1 - 31.8)	11.4 (2.7 - 46.8)	26.5 (17.7 - 31.5)	6.5 (5.7 - 10.0)	92 (67 - 150)
Ting Kau [Closed]	8.0 (7.8 - 8.3)	26.0 (14.5 - 31.9)	4.8 (1.6 - 10.5)	25.7 (18.5 - 29.0)	6.6 (5.3 - 9.2)	90 (77 - 117)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

Note: Data presented are arithmetic means; figures in brackets are ranges.

Tuen Mun District**Physicochemical water quality data of gazetted beaches, 2006**

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Butterfly	8.0 (7.8 - 8.5)	22.9 (6.2 - 31.5)	8.8 (3.6 - 29.3)	26.3 (17.8 - 31.0)	6.5 (5.1 - 7.8)	90 (61 - 103)
Cafeteria New	8.0 (7.8 - 8.5)	22.4 (7.1 - 31.2)	11.5 (5.1 - 22.6)	26.0 (17.0 - 30.5)	6.7 (5.3 - 8.0)	92 (73 - 108)
Cafeteria Old	8.0 (7.8 - 8.5)	22.4 (7.0 - 31.2)	8.6 (3.7 - 15.6)	26.0 (17.0 - 30.3)	6.5 (5.2 - 7.8)	90 (73 - 105)
Castle Peak	8.0 (7.8 - 8.8)	22.5 (7.4 - 31.5)	6.4 (2.2 - 16.3)	26.4 (17.5 - 30.8)	6.7 (5.0 - 12.3)	94 (63 - 175)
Golden	8.0 (7.8 - 8.5)	22.4 (7.1 - 31.3)	13.2 (4.6 - 31.2)	26.0 (17.0 - 30.3)	6.8 (5.8 - 7.9)	93 (75 - 107)
Kadoorie	8.0 (7.8 - 8.6)	22.6 (7.2 - 31.3)	8.4 (2.3 - 28.8)	26.2 (17.0 - 31.2)	6.6 (5.3 - 8.2)	91 (70 - 106)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

Note: Data presented are arithmetic means; figures in brackets are ranges.

Outlying Islands**Physicochemical water quality data of gazetted beaches, 2006**

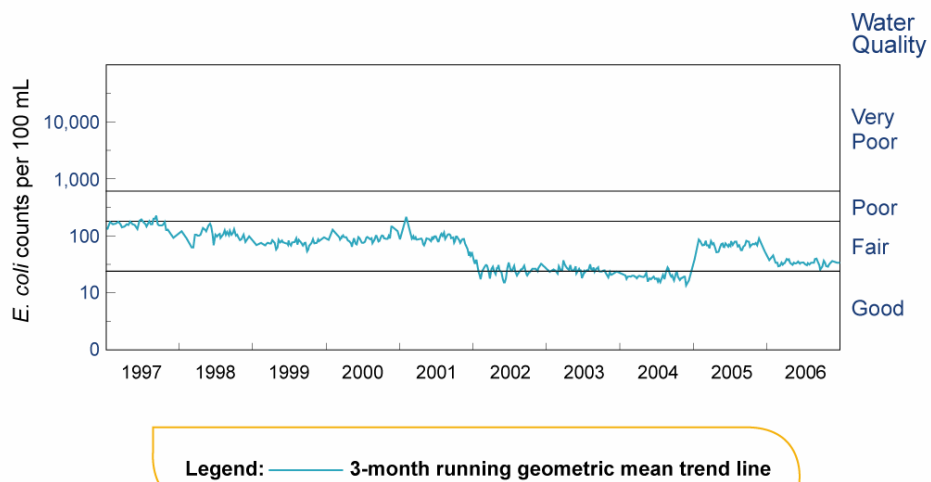
Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Cheung Chau Tung Wan	8.1 (7.9 - 8.4)	27.7 (18.9 - 32.3)	4.4 (1.6 - 13.6)	25.8 (16.9 - 30.9)	6.8 (5.1 - 9.4)	95 (74 - 138)
Hung Shing Yeh	8.1 (8.0 - 8.7)	28.5 (14.4 - 33.1)	6.2 (2.0 - 12.0)	25.8 (18.4 - 31.4)	6.7 (5.3 - 7.7)	95 (80 - 114)
Kwun Yam	8.1 (7.9 - 8.4)	27.7 (19.6 - 32.3)	4.3 (1.6 - 11.5)	25.7 (16.6 - 31.3)	6.9 (5.6 - 9.6)	97 (80 - 140)
Lo So Shing	8.1 (8.0 - 8.6)	28.8 (11.3 - 33.0)	4.3 (1.2 - 14.9)	25.7 (17.3 - 30.5)	6.8 (5.9 - 7.6)	94 (84 - 103)
Lower Cheung Sha	8.2 (7.9 - 8.7)	26.9 (13.5 - 32.5)	11.6 (2.2 - 41.6)	26.4 (15.2 - 32.0)	6.7 (5.4 - 7.8)	93 (80 - 110)
Pui O	8.2 (7.9 - 8.6)	26.7 (14.6 - 32.5)	13.1 (2.3 - 49.4)	26.9 (15.4 - 32.0)	6.6 (5.6 - 7.6)	94 (82 - 122)
Silver Mine Bay	8.1 (7.7 - 8.5)	25.2 (11.1 - 32.0)	9.8 (2.1 - 36.6)	26.9 (15.9 - 32.3)	6.5 (4.9 - 8.9)	93 (75 - 123)
Tong Fuk	8.2 (8.0 - 8.7)	27.2 (15.2 - 32.5)	13.1 (1.8 - 75.5)	26.2 (15.6 - 30.7)	6.8 (5.4 - 7.6)	96 (76 - 104)
Upper Cheung Sha	8.2 (8.0 - 8.6)	27.3 (14.8 - 32.5)	13.8 (1.7 - 61.3)	26.0 (15.6 - 31.2)	6.8 (5.2 - 7.9)	95 (77 - 105)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

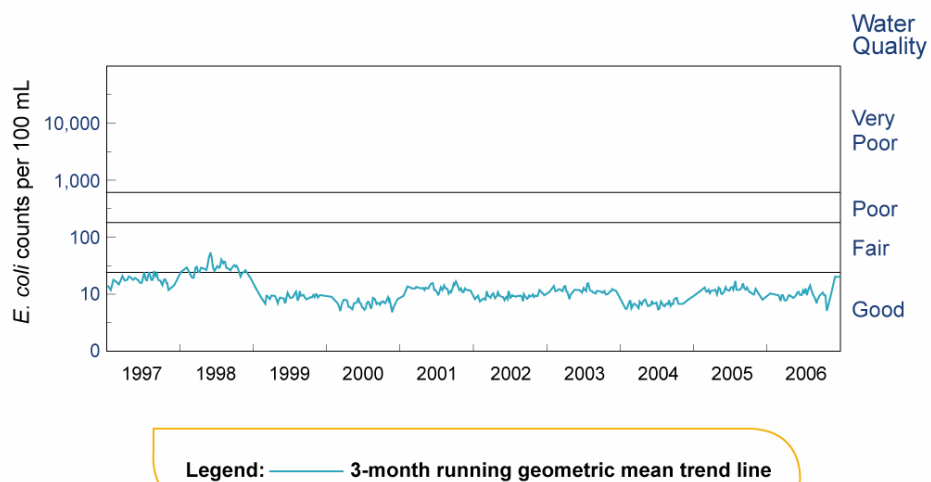
Note: Data presented are arithmetic means; figures in brackets are ranges.

Appendix D - Trends in beach water quality over 10 years
- Southern District

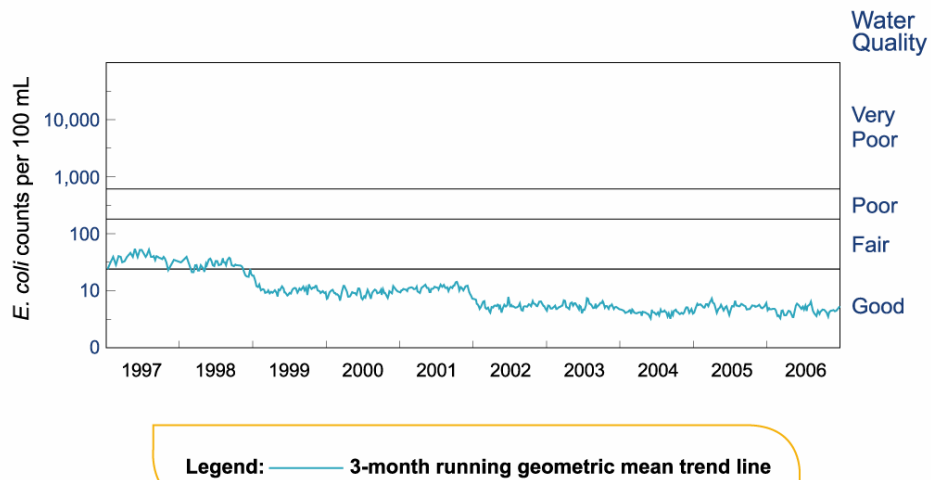
Trends in beach water quality over 10 years
- Big Wave Bay Beach



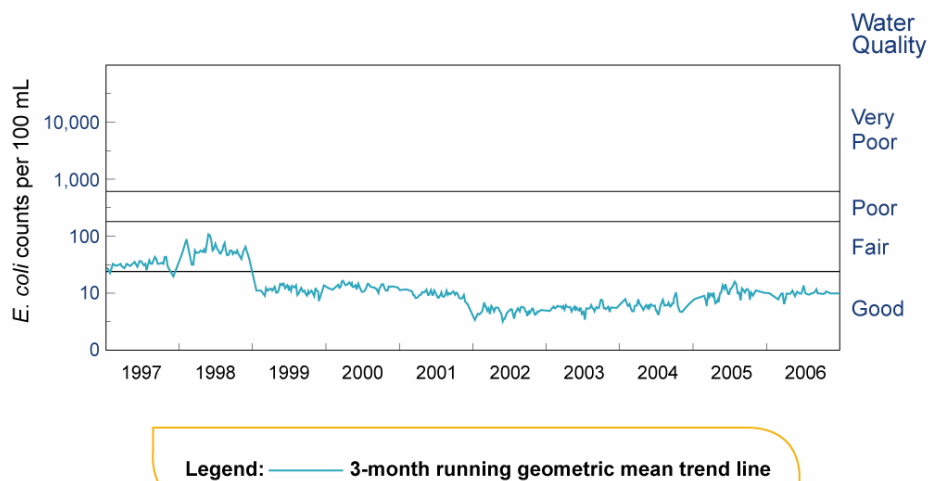
Trends in beach water quality over 10 years
- Chung Hom Kok Beach



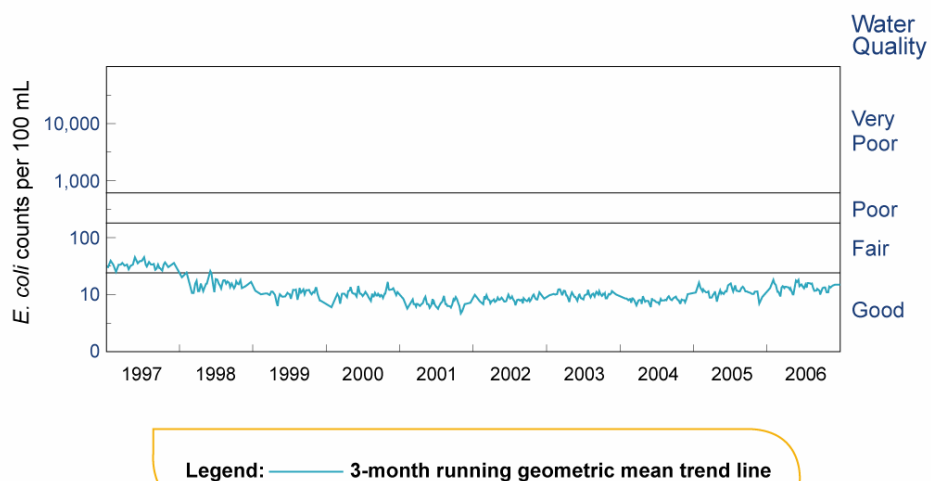
Trends in beach water quality over 10 years - Deep Water Bay Beach



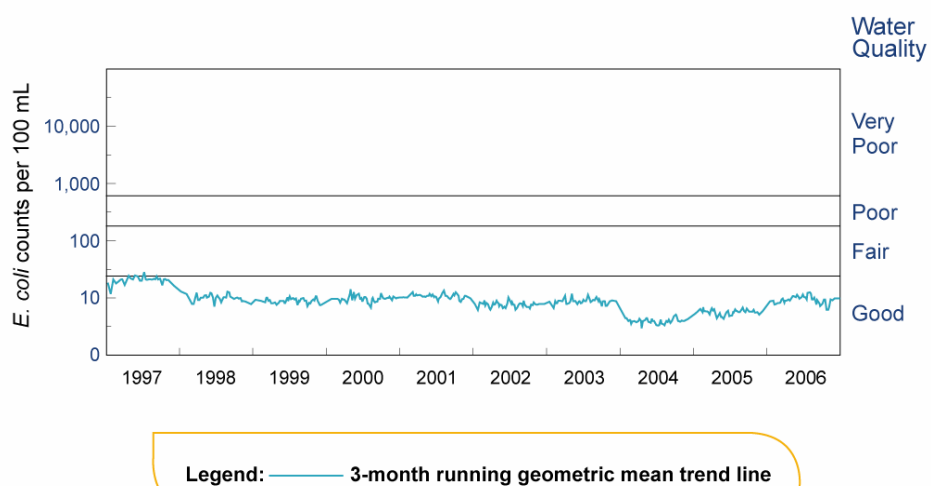
Trends in beach water quality over 10 years - Hairpin Beach



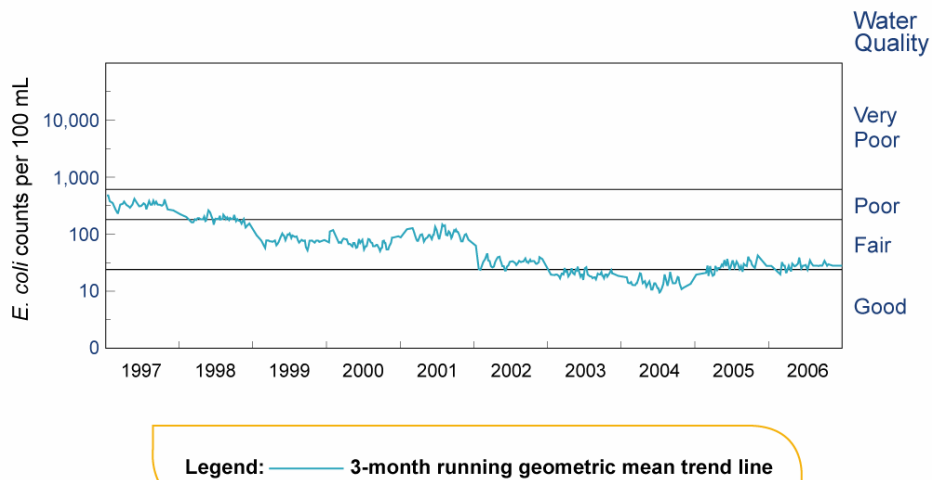
Trends in beach water quality over 10 years - Middle Bay Beach



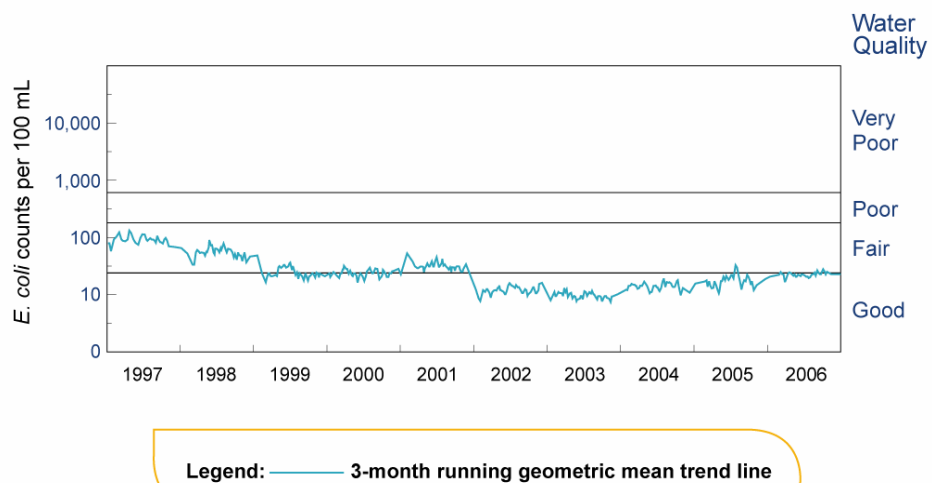
Trends in beach water quality over 10 years - Repulse Bay Beach



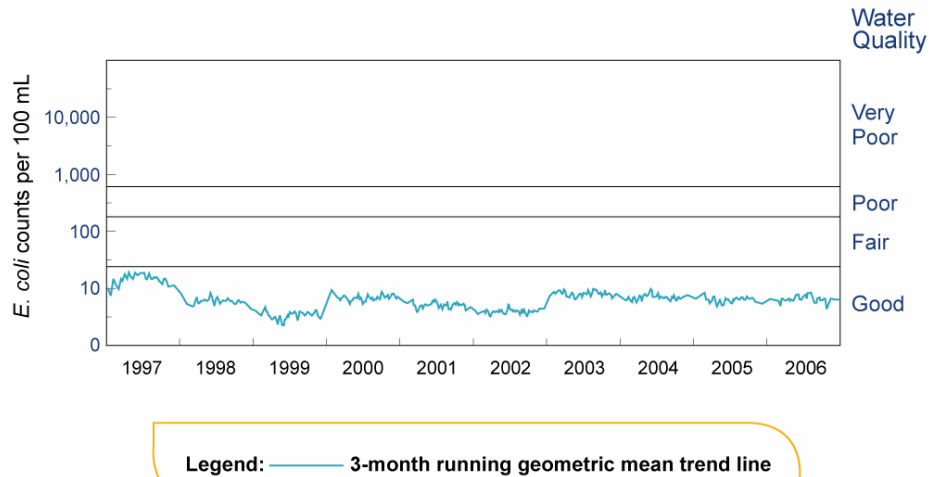
Trends in beach water quality over 10 years - Rocky Bay Beach



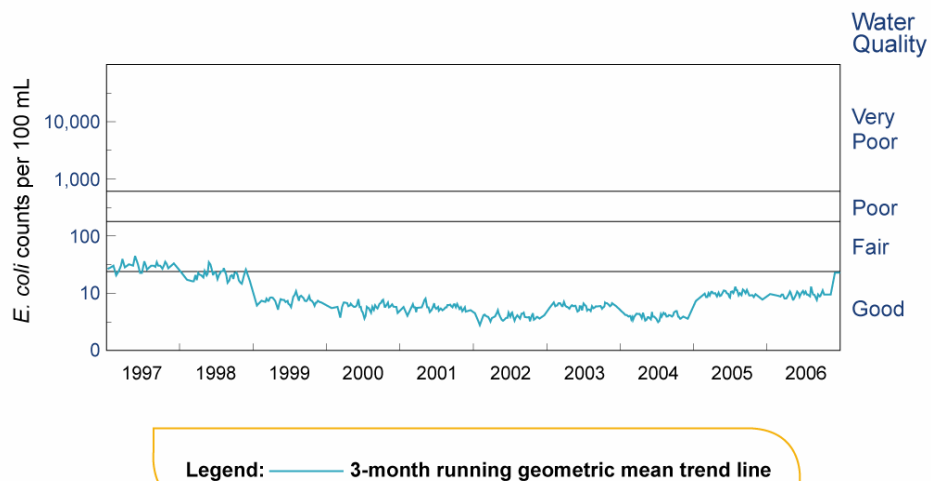
Trends in beach water quality over 10 years - Shek O Beach



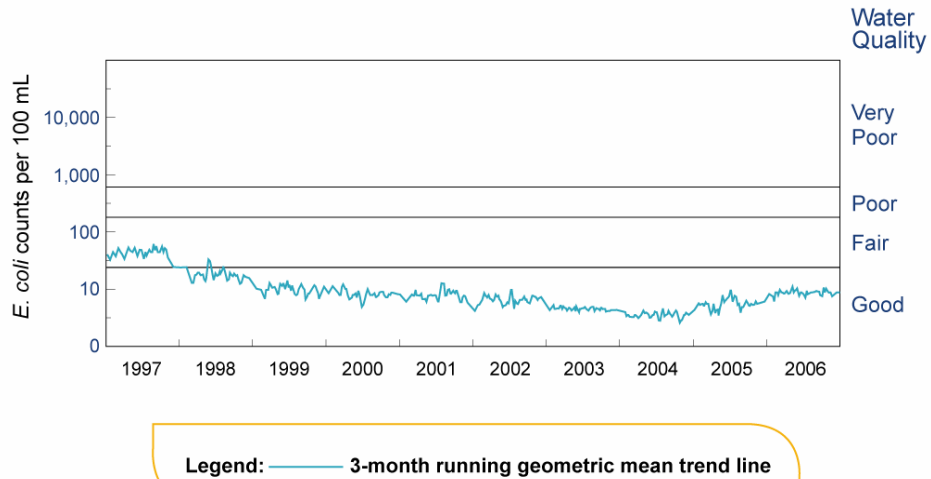
Trends in beach water quality over 10 years - South Bay Beach



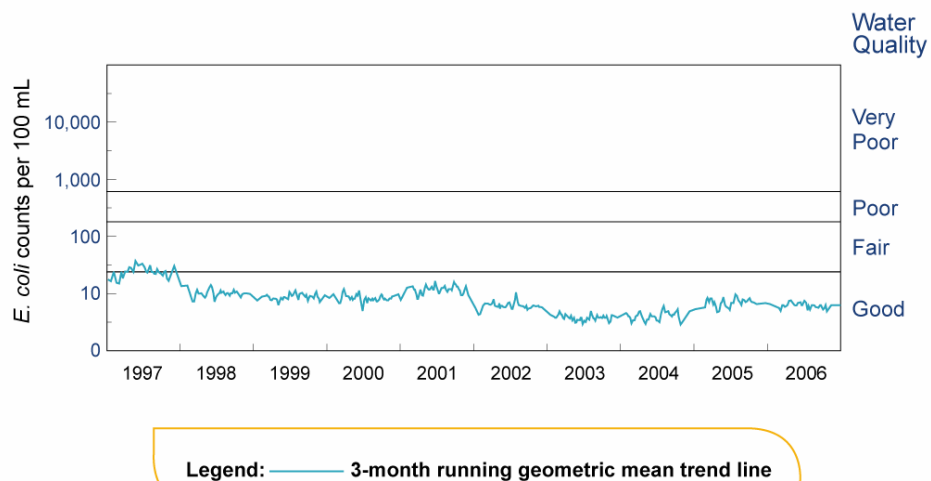
Trends in beach water quality over 10 years - St. Stephen's Beach



Trends in beach water quality over 10 years - Stanley Main Beach

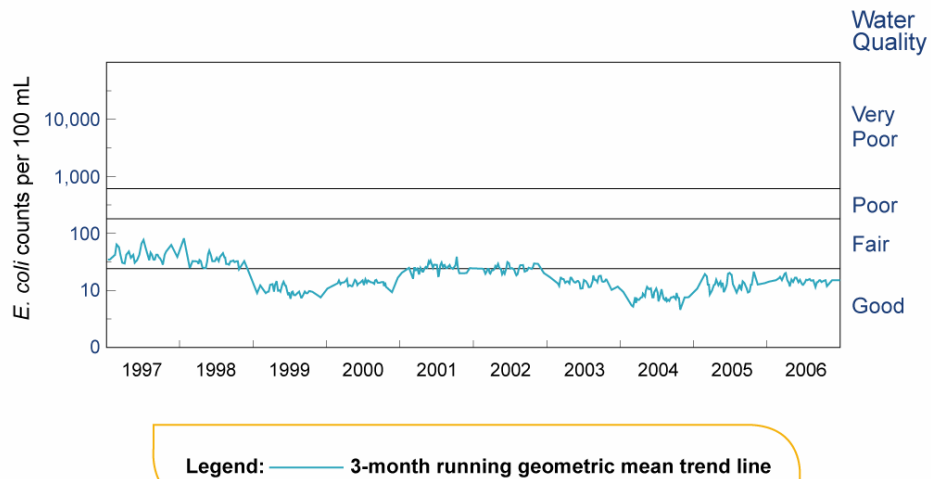


Trends in beach water quality over 10 years - Turtle Cove Beach

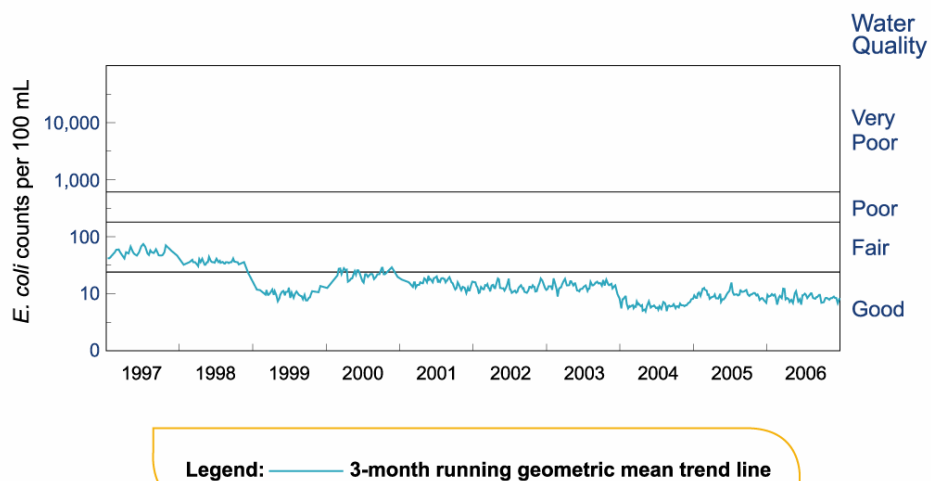


- Sai Kung District

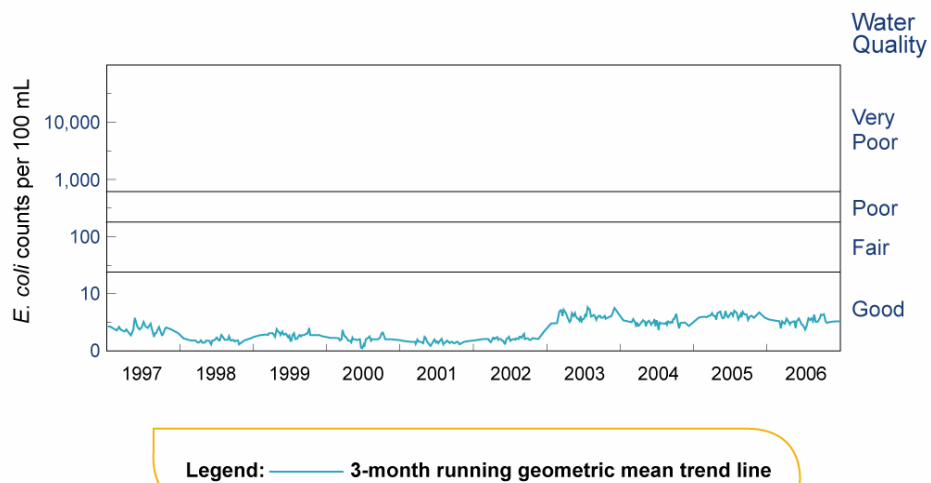
**Trends in beach water quality over 10 years
- Clear Water Bay First Beach**



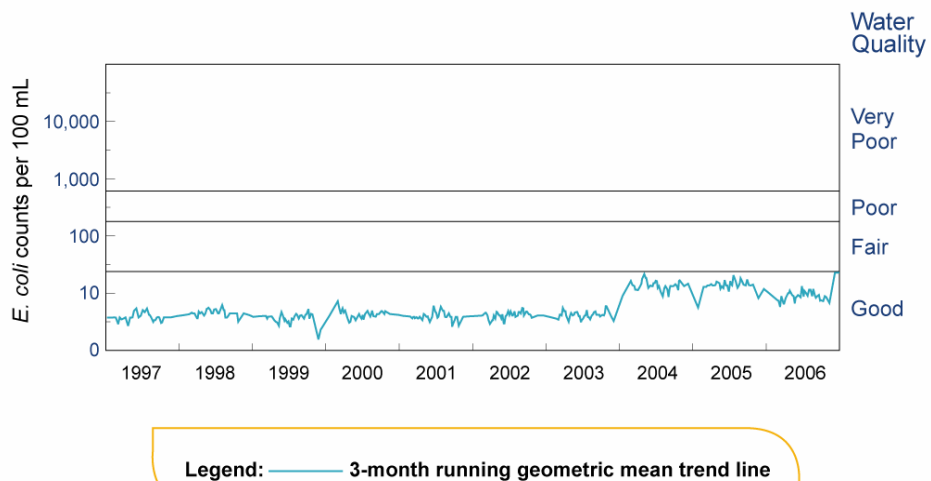
**Trends in beach water quality over 10 years
- Clear Water Bay Second Beach**



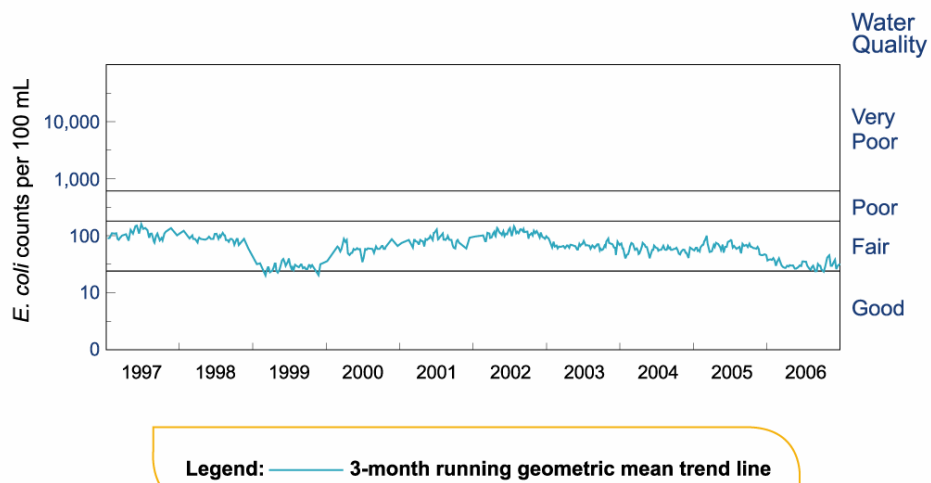
Trends in beach water quality over 10 years - Hap Mun Bay Beach



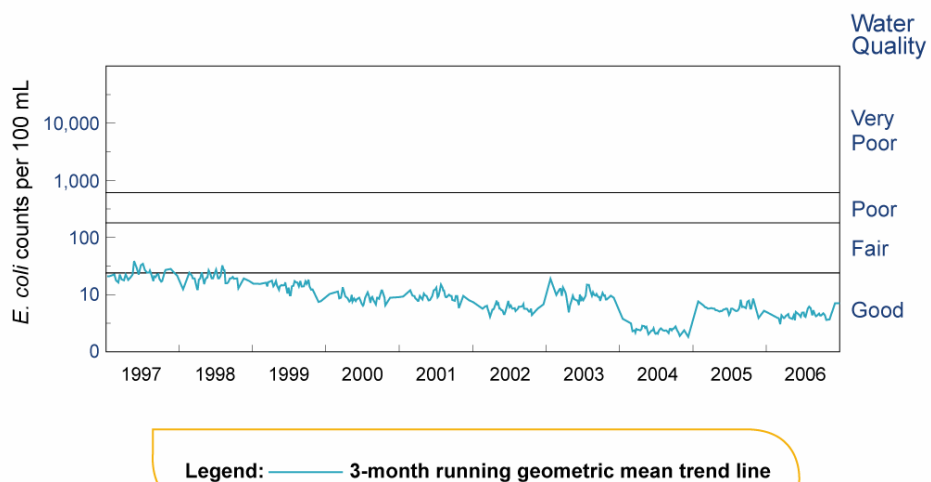
Trends in beach water quality over 10 years - Kiu Tsui Beach



Trends in beach water quality over 10 years - Silverstrand Beach

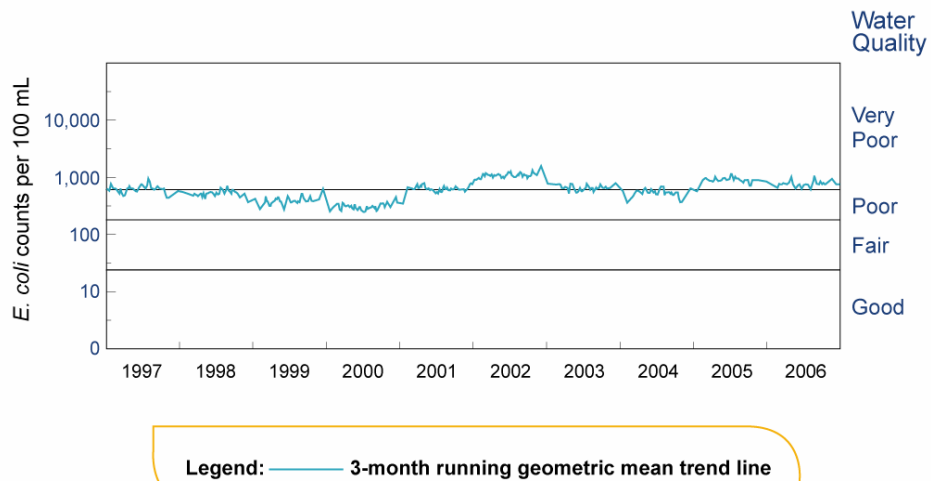


Trends in beach water quality over 10 years - Trio Beach

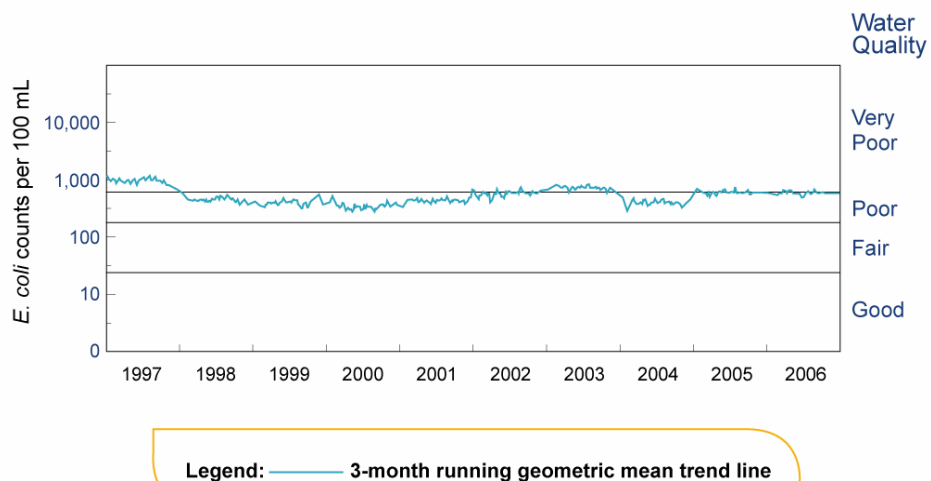


- Tsuen Wan District

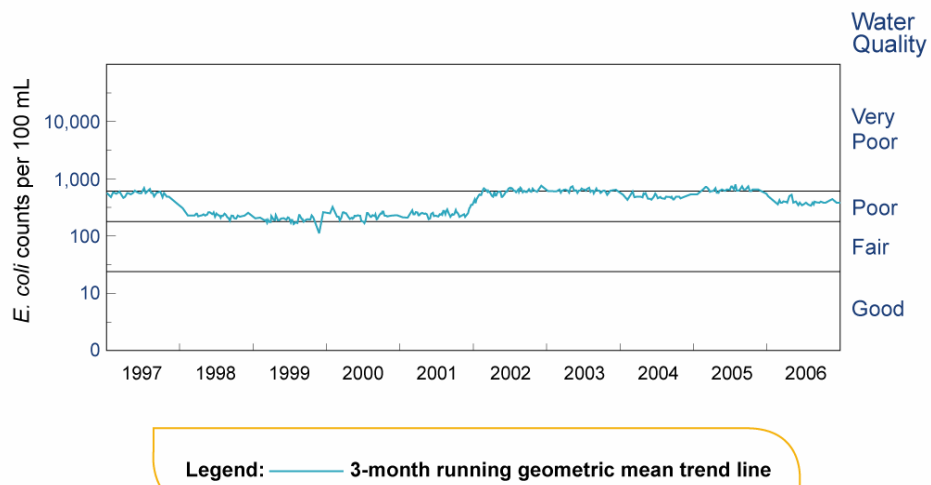
**Trends in beach water quality over 10 years
- Anglers' Beach**



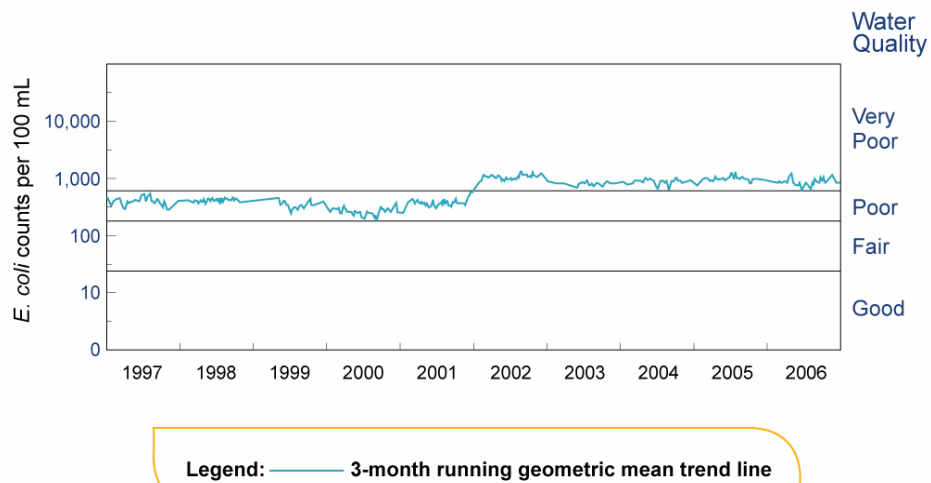
**Trends in beach water quality over 10 years
- Approach Beach**



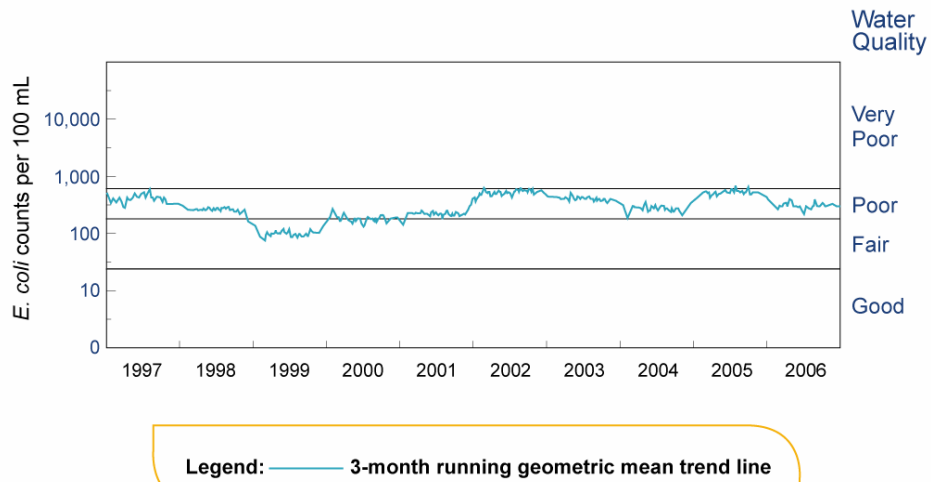
Trends in beach water quality over 10 years - Casam Beach



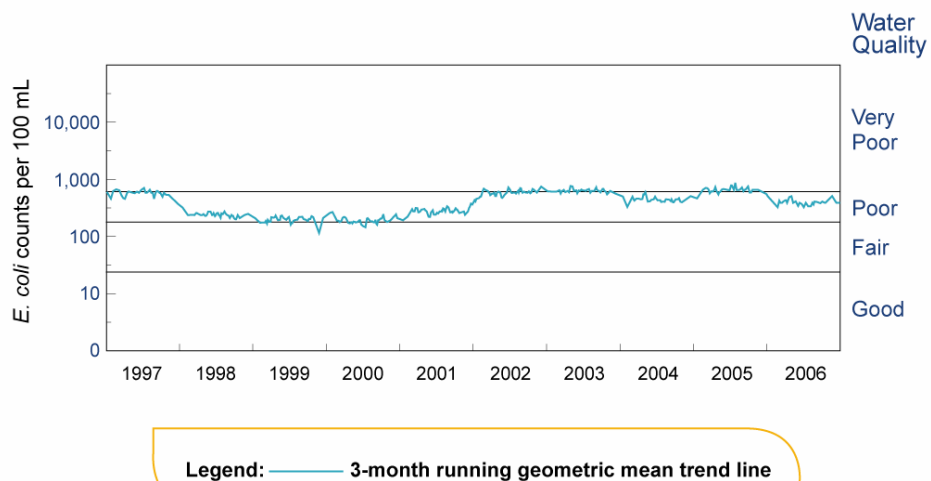
Trends in beach water quality over 10 years - Gemini Beaches



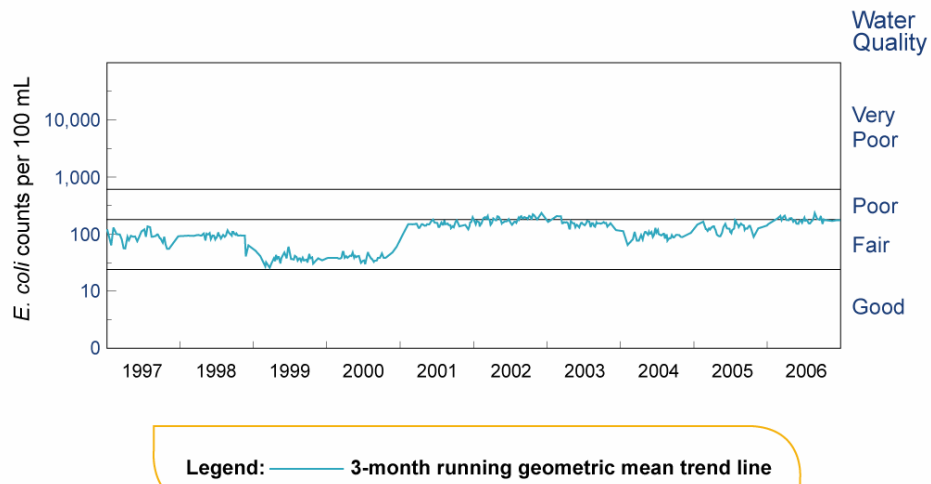
Trends in beach water quality over 10 years - Hoi Mei Wan Beach



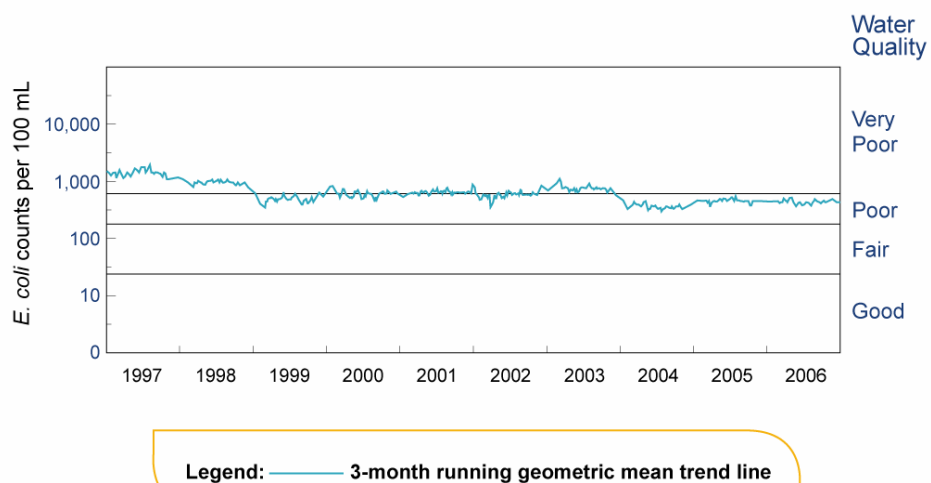
Trends in beach water quality over 10 years - Lido Beach



Trends in beach water quality over 10 years - Ma Wan Tung Wan Beach

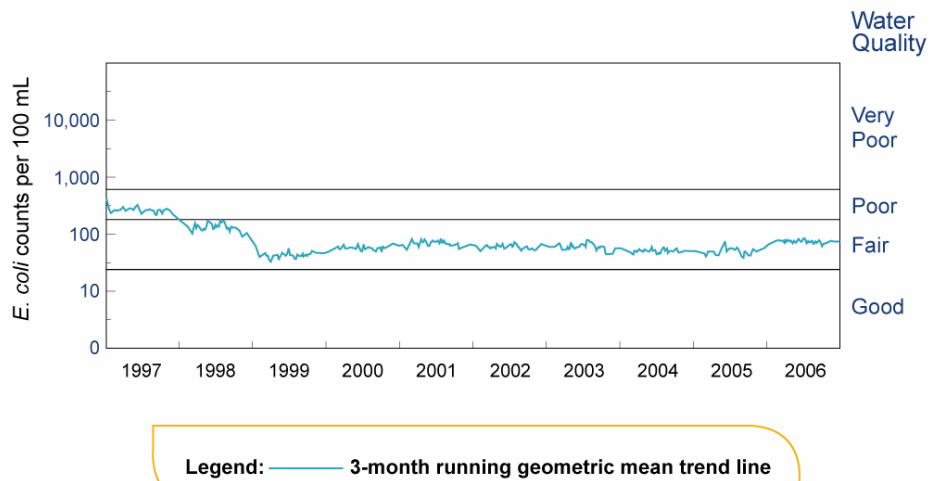


Trends in beach water quality over 10 years - Ting Kau Beach

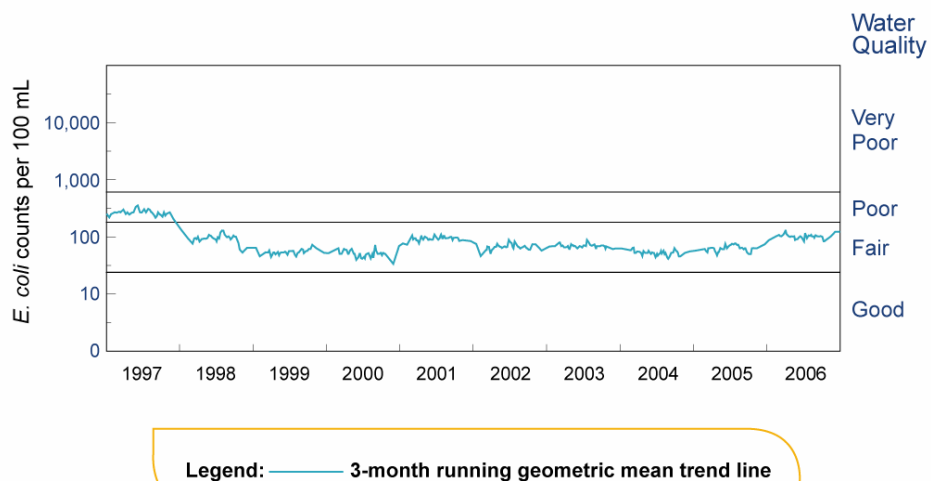


- Tuen Mun District

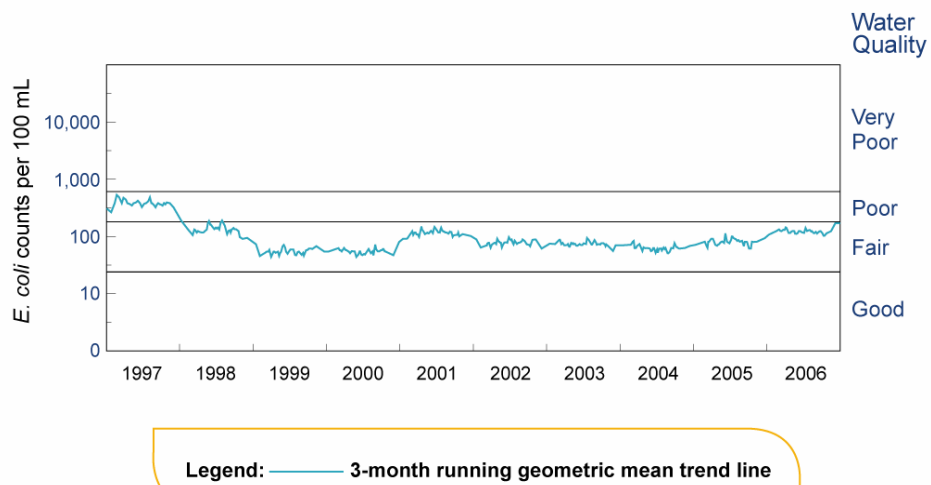
**Trends in beach water quality over 10 years
- Butterfly Beach**



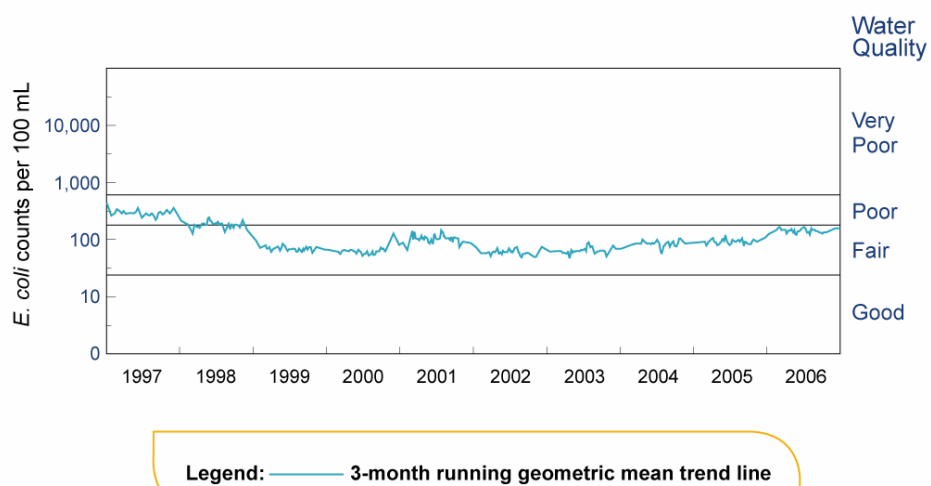
**Trends in beach water quality over 10 years
- Cafeteria New Beach**



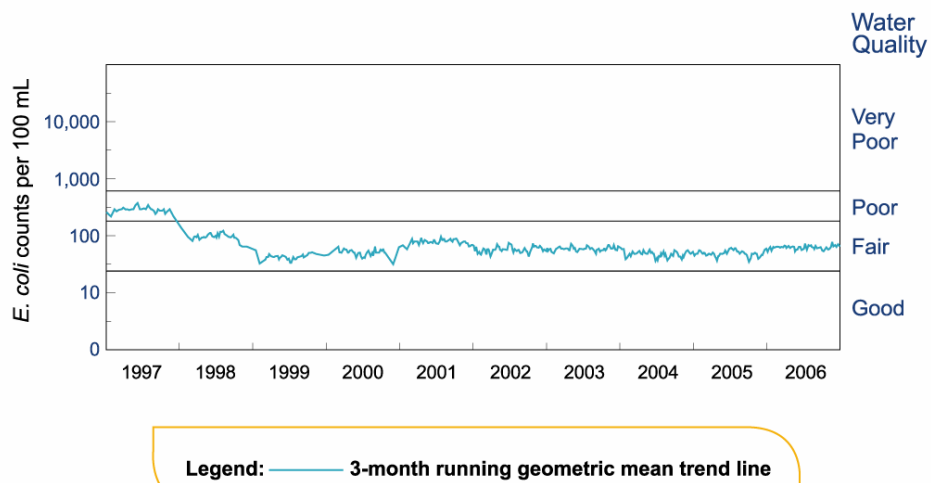
Trends in beach water quality over 10 years - Cafeteria Old Beach



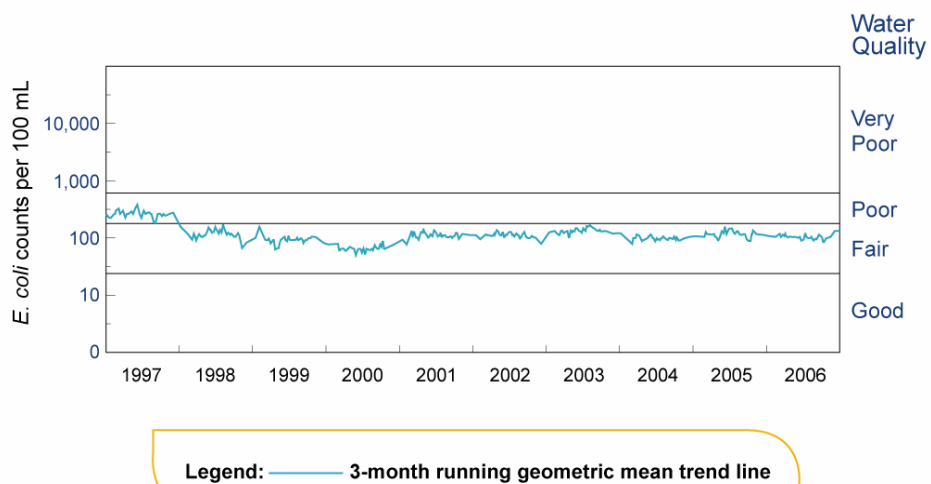
Trends in beach water quality over 10 years - Castle Peak Beach



Trends in beach water quality over 10 years - Golden Beach

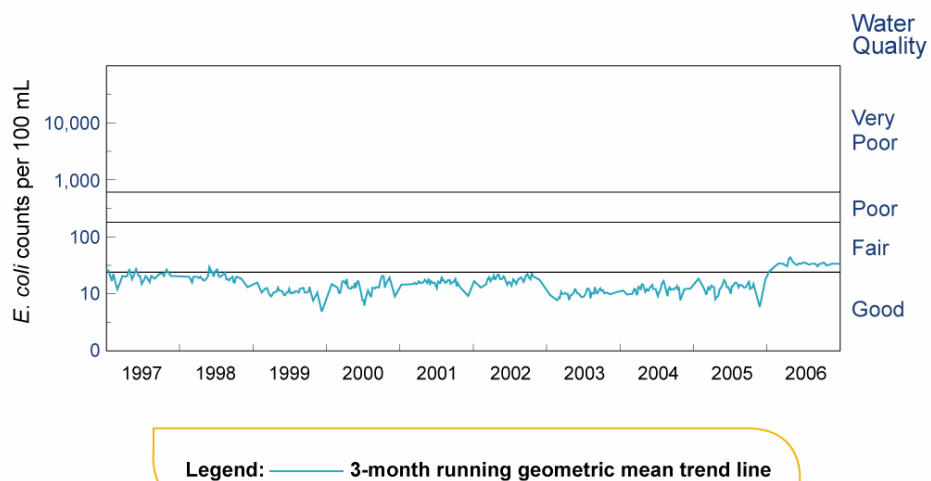


Trends in beach water quality over 10 years - Kadoorie Beach

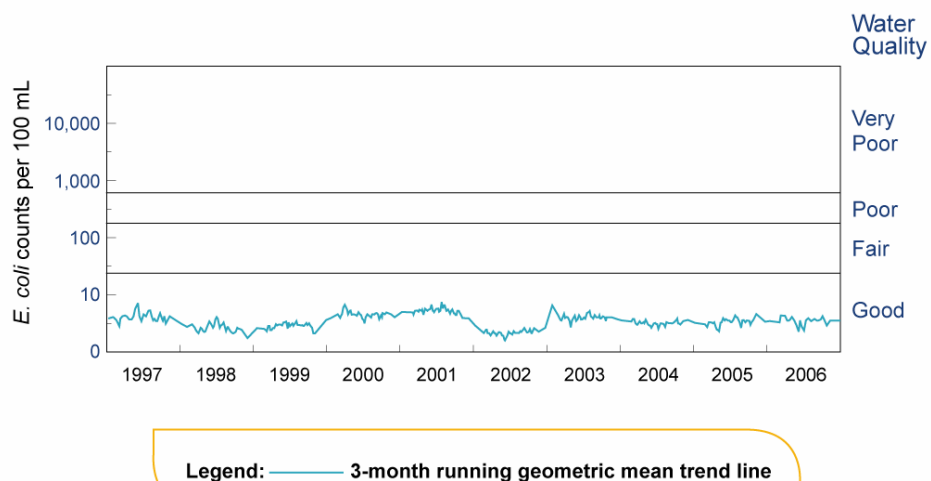


- Outlying Islands

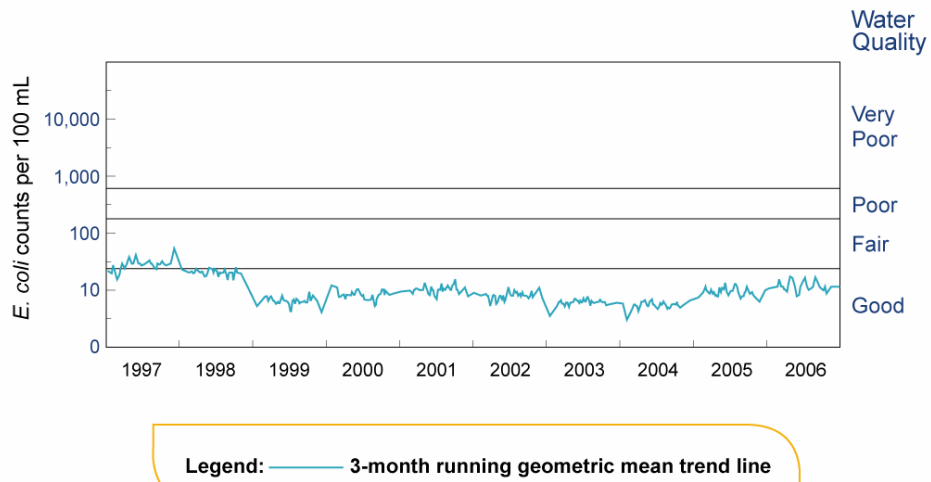
**Trends in beach water quality over 10 years
- Cheung Chau Tung Wan Beach**



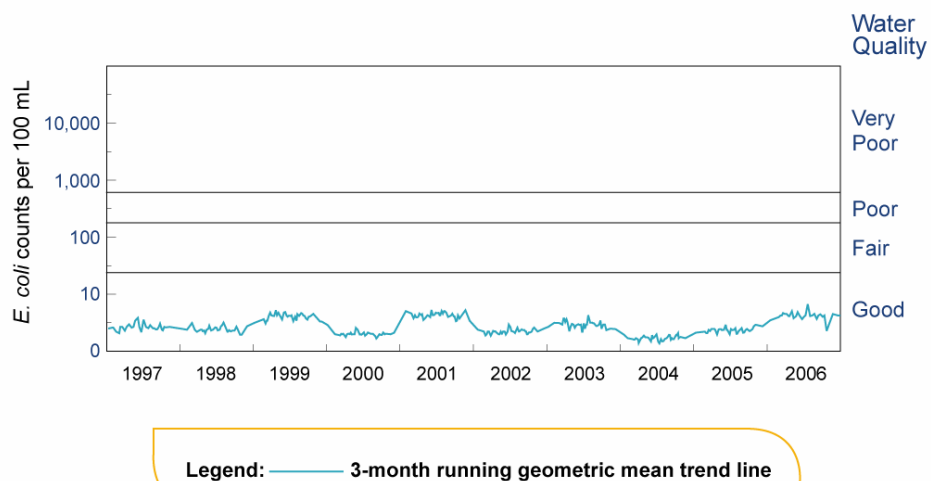
**Trends in beach water quality over 10 years
- Hung Shing Yeh Beach**



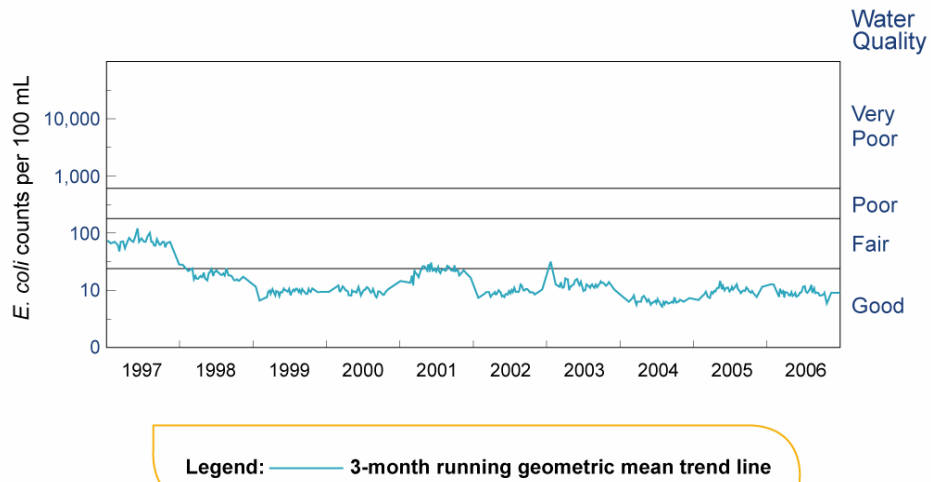
Trends in beach water quality over 10 years - Kwun Yam Beach



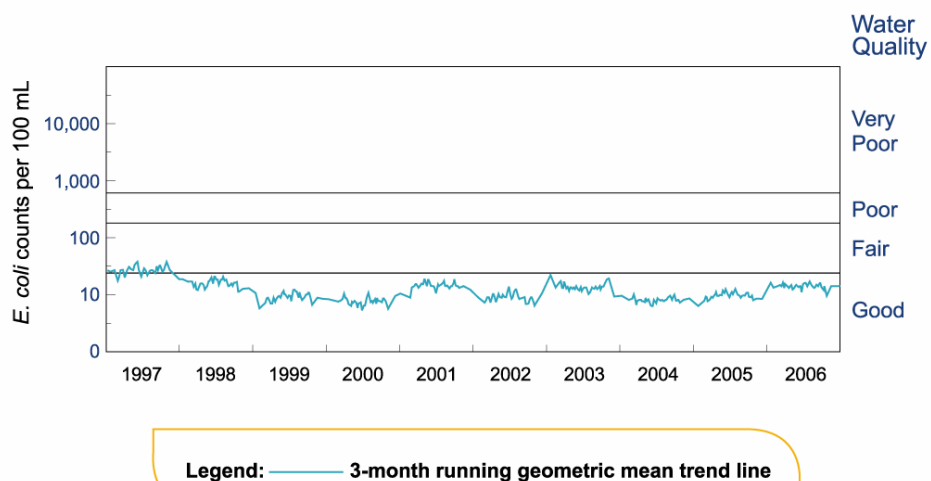
Trends in beach water quality over 10 years - Lo So Shing Beach



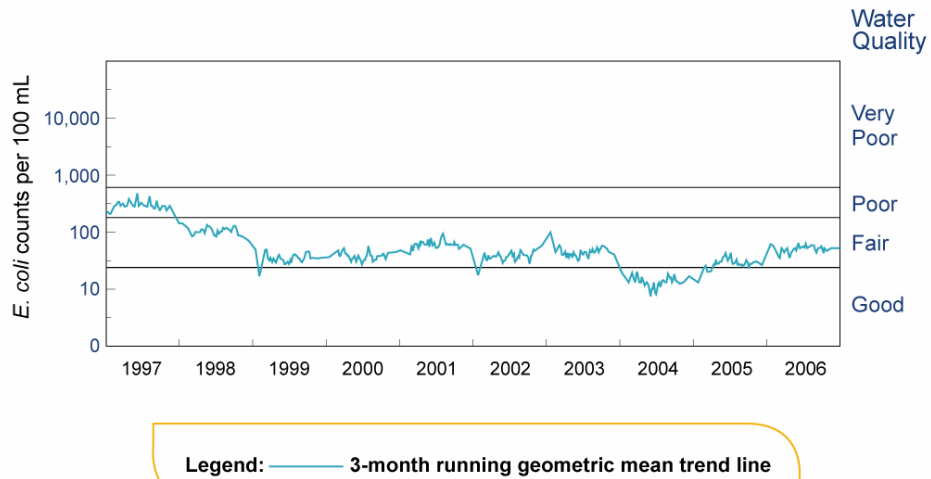
Trends in beach water quality over 10 years - Lower Cheung Sha Beach



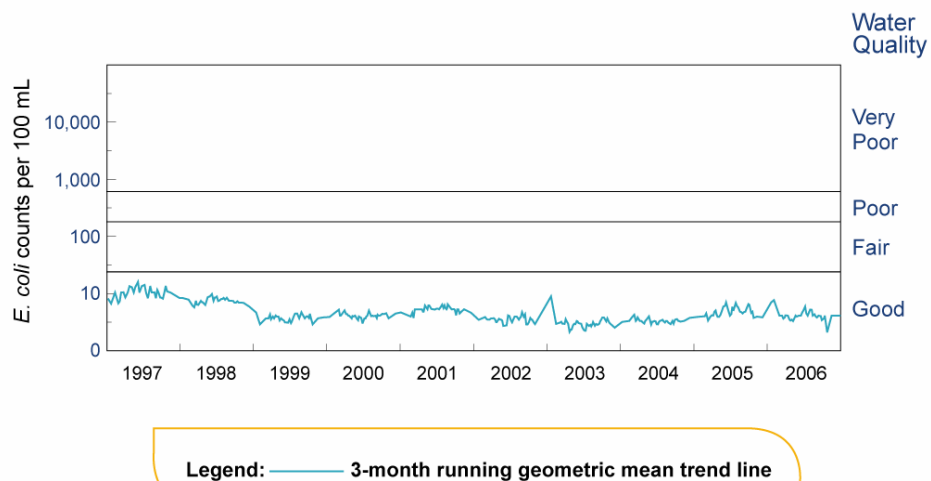
Trends in beach water quality over 10 years - Pui O Beach



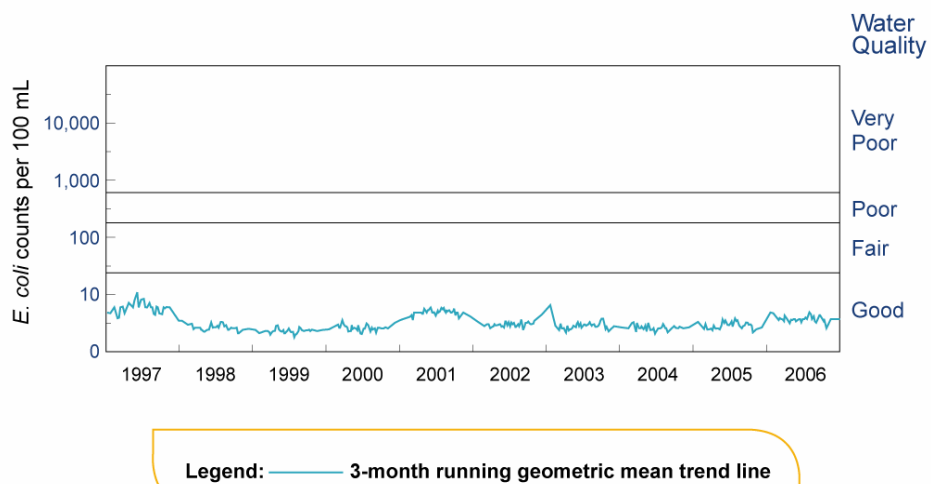
Trends in beach water quality over 10 years - Silver Mine Bay Beach



Trends in beach water quality over 10 years - Tong Fuk Beach



Trends in beach water quality over 10 years - Upper Cheung Sha Beach





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