

香港泳灘水質

Beach Water Quality

2011

in Hong Kong

為更佳泳灘水質而努力

Strive for better beach water quality



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



Our 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



The local community and overseas tourists all enjoy very much the beautiful beaches in Hong Kong!





Introduction

Many attractive beaches are found along the long coastline of Hong Kong. Each year, millions of beach-goers enjoy bathing in these beaches with clean water.



Kid enjoying summer fun at Stanley Main Beach

The objective of the Environmental Protection Department (EPD)'s Beach Water Quality Monitoring Programme is to monitor beach water quality and protect the health of bathers. The background and details of EPD's monitoring activities can be found at [EPD's Homepage \(http://www.epd.gov.hk\)](http://www.epd.gov.hk) or its [thematic website \(http://www.beachwq.gov.hk\)](http://www.beachwq.gov.hk).



Blue sky and clean water greet swimmers at Deep Water Bay Beach



This report summarises the beach monitoring data collected in 2011, the gradings of the beaches and their compliance with the Water Quality Objective (WQO) for bathing beaches. In 2011, the EPD monitored 41 gazetted beaches and three non-gazetted beaches in different parts of the territory. The gazetted beaches were monitored weekly during the bathing season from March to October, and EPD staff made field observations and collected samples for laboratory analyses of *E. coli* bacteria. EPD staff also took measurements of dissolved oxygen, pH, salinity, temperature and turbidity of beach water.



EPD inspectors monitor water quality at Lido Beach



Bacterial testing of beach water at EPD's laboratory



Hong Kong's beaches are assessed using a dual system: annual ranking and weekly grading which are both based on the *E. coli* level in beach water to indicate potential health risks associated with swimming. The annual ranking reflects the overall water quality of the beach over the entire bathing season, while the weekly grading denotes the recent water quality of the beach. Under the dual rating system, beaches are categorised into “Good”, “Fair”, “Poor” and “Very Poor”. Those ranked “Good” and “Fair” meet the WQO for bathing waters.

Annual Beach Ranking in 2011

All 41 gazetted beaches in Hong Kong complied with the WQO in 2011. Compared with the ranking in 2010, the number of beaches ranked as “Good” has increased from 23 (or 56%) to 31 (or 76%). The improvement was due to the progress of eight beaches from last year's ranking of “Fair” to “Good”. The remaining 10 beaches were ranked as “Fair”, and none as “Poor” or “Very Poor”.



The scenic Trio Beach



The beaches with a “Good” water quality ranking were largely located in the Southern District (Hong Kong Island South), Outlying Islands, Sai Kung and Tsuen Wan. All 12 beaches in the Southern District were ranked as “Good” in 2011. Of the nine beaches monitored on the Outlying Islands, eight were “Good” while Silver Mine Bay Beach was rated as “Fair”. In the Sai Kung area, all six beaches were “Good” in 2011. Among them, Hap Mun Bay Beach and Trio Beach were the cleanest gazetted beaches in Hong Kong in terms of overall *E. coli* levels. On the western side, all six beaches along the Tuen Mun coast received a “Fair” ranking in 2011.

The water quality of the Tsuen Wan beaches has continued to show improvement in 2011, which is mainly brought about by the full commissioning of the Advance Disinfection Facilities (ADF) in March 2010 to disinfect the treated effluent from the Stonecutters Island Sewage Treatment Works, and the completion of the sewerage works in the hinterland of the beaches. Since all the Tsuen Wan beaches



Hong Kong beaches offer respite from hustle and bustle of city life

have achieved the WQO for bathing, four previously closed beaches, namely Approach Beach, Casam Beach, Hoi Mei Wan Beach and Lido Beach, were reopened to the public for swimming in June 2011. The Government has planned to re-open the remaining three beaches, namely Anglers’ Beach, Gemini Beaches and Ting Kau Beach in the swimming season of 2013.

In 2011, Casam Beach, Hoi Mei Wan Beach, Lido Beach and Ma Wan Tung Wan Beach were ranked as “Good” while Approach Beach was ranked as “Fair”.



EPD also monitored three non-gazetted beaches in Hong Kong: Discovery Bay (a popular beach on Lantau Island), a sandy beach adjacent to Kiu Tsui Beach in Sai Kung, and a planned artificial beach in Lung Mei, Tai Po. Discovery Bay and the beach adjacent to Kiu Tsui Beach continued to be ranked as “Good” in 2011. Similar to 2010, Lung Mei was ranked as “Poor” in 2011. The public sewerage network is being extended to villages in the Lung Mei area, and other pollution abatement measures will be implemented to improve the water quality in the Lung Mei area in the next few years.



Fun for all ages at Hap Mun Beach

Weekly Beach Grading in 2011

The EPD issues weekly gradings of gazetted beaches which are open for swimming. The information is disseminated to the public through weekly press releases, EPD’s websites, the beach hotline and beach noticeboards.

In 2011, the water quality of beaches in the Southern District has shown great improvement. All ten gazetted beaches received mainly “Good” or “Fair” grading in the bathing season. Chung Hom Kok, Deep Water Bay, Hairpin, South Bay, St. Stephen’s, Stanley Main and Turtle Cove Beaches had the best water quality, achieving “Good” gradings on all rating occasions.





The water quality of the Sai Kung beaches was also generally good. Hap Mun Bay and Trio Beaches achieved “Good” gradings for all rating occasions, while the other beaches were mostly “Good” or “Fair”.

The beaches on the Outlying Islands were generally ideal for swimming, with Cheung Chau Tung Wan, Hung Shing Yeh, Kwun Yam, Tong Fuk and Upper Cheung Sha Beaches achieving 100% “Good” gradings. Lo So Shing and Lower Cheung Sha Beaches achieved “Good” gradings over 80% of the rating occasions.

The water quality of the beaches in the Tuen Mun area was generally fine and nearly all graded as “Good” or “Fair”. The water quality of Beaches in Tsuen Wan continued to show positive signs of improvement with gradings maintained mostly at either “Good” or “Fair”.



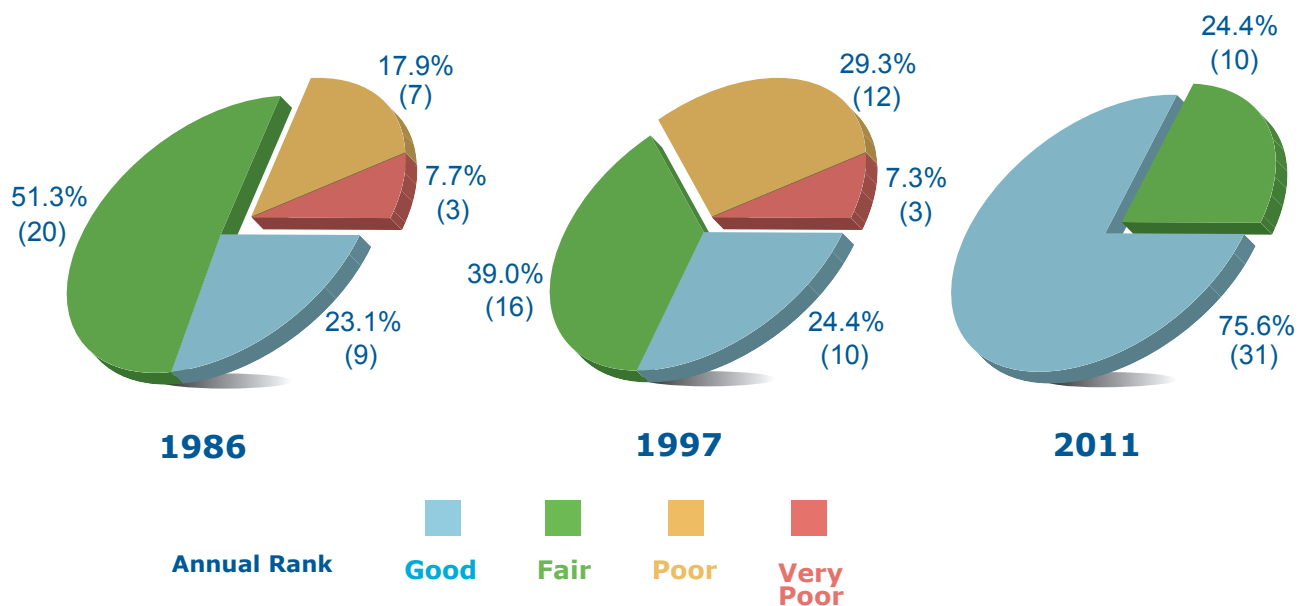
An impressive view of the Ting Kau Bridge
from the Casam Beach



Water Quality Trend

There has been a noticeable trend in the improvement of beach water quality in Hong Kong in recent years. The percentage of beaches complying with the WQO has changed from 74% in 1986 (29 of 39 beaches) to 63% (26 of 41 beaches) in 1997, and then improved to 100% in 2010 and 2011 (all 41 beaches).

Annual beach ranking of 1986, 1997 and 2011 compared



Note: Two beaches degazetted in 1995 were excluded from the calculation.

There was a drop in compliance rate in the mid-1990s due to population growth particularly in the new town areas. Since then, there has been progressive improvement in the last decade as a result of enforcement of environmental legislation, extension of the sewerage network and provision of new sewage treatment facilities across the territory including the beach hinterland. Major improvement measures implemented in the past are summarized in the following table.



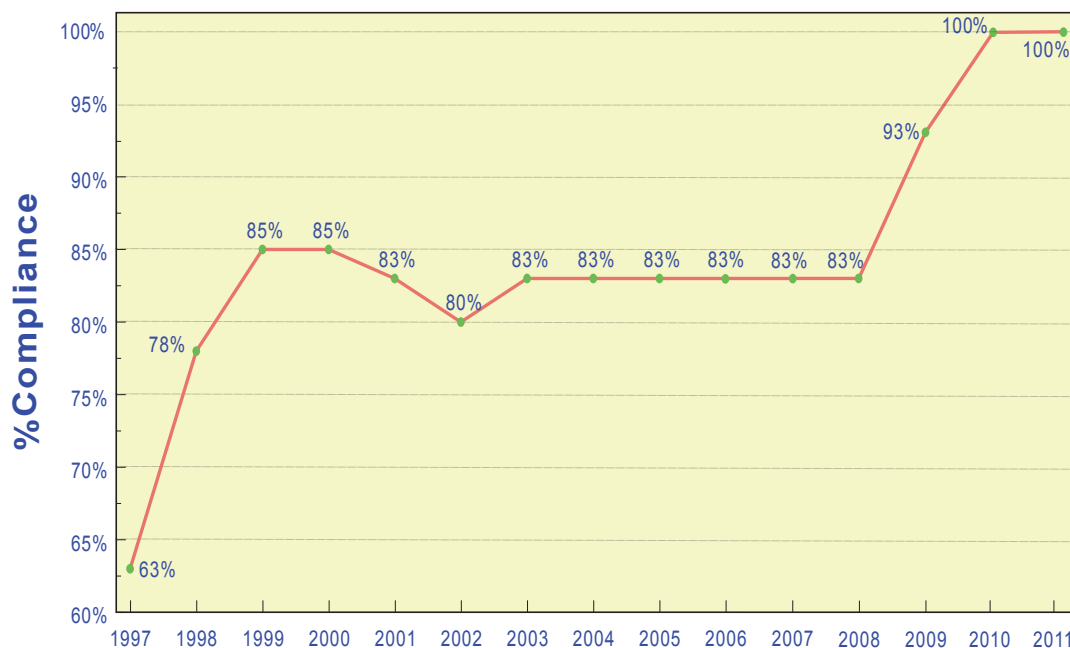
Major improvement measures for the beaches over the past 25 years	
1986 – 1990	
✱ Implementation of the Livestock Waste Control Scheme under the Waste Disposal (Livestock Waste) Regulation.	Most beaches, particularly Silver Mine Bay Beach
✱ Declaration of the Southern Water Control Zone (WCZ) under the Water Pollution Control Ordinance (WPCO) and legislative enforcement.	Southern beaches
✱ Interception and diversion of polluted storm drains at beaches in Southern District.	Southern beaches
1991- 1995	
✱ Implementation of chemical waste control.	All beaches
✱ Declaration of the North Western WCZ under the WPCO and legislative enforcement.	Tuen Mun beaches
✱ Diversion of polluted storm water drains away from Castle Peak Beach.	
✱ Provision of public sewers for So Kwun Wat and Sam Shing Estate.	
✱ Commissioning of Stanley Sewage Treatment Works (STW).	Stanley Main Beach
1996- 2000	
✱ Full implementation of the WPCO in all WCZs.	All beaches
✱ Commissioning of the Shek O Sewage Screening Plant and diversion of polluted storm water drains at Shek O Village .	Shek O Beach
✱ Completion of all major works under The Southern Sewerage Master Plan.	Southern beaches
✱ Commissioning of the new 2 km long Pillar Point sewage submarine outfall.	Tuen Mun beaches
2001 - 2005	
✱ Completion of HATS Stage 1.	Big Wave Bay, Shek O, Rocky Bay Beaches
✱ Provision of public sewers in the Silverstrand area.	Silverstrand Beach
✱ Full operation of the Sham Tseng STW .	Beaches along the Tsuen Wan coast
2006 - 2010	
✱ Commissioning of the Advance Disinfection Facilities at Stonecutters Island STW.	All Tsuen Wan beaches
✱ Extension of the public sewerage network to the beach hinterland along Castle Peak Road.	Beaches along the Tsuen Wan coast





As a result of these measures, the percentage of beaches ranked as ‘Good’ has significantly increased over the period, rising from just 23% in 1986 to 76% in 2011. Since 1999, the WQO compliance rate has been maintained at over 80%, a clear indication of sustained improvement in water quality. Between 1997 and 2011, out of the 41 gazetted beaches, those complying with the WQO have increased from 26 to 41 (63% to 100%). In the same period, the number of “Good” beaches has more than tripled from 10 to 31.

Compliance with WQO at gazetted beaches, 1997 - 2011



Back in the 1980s, many beaches were either closed, such as Cafeteria Old Beach, Castle Peak Beach and Silver Mine Bay Beach, or on the verge of being closed (e.g. Middle Bay Beach and Repulse Bay Beach) because of poor water quality. Through continuous efforts of the Government to implement pollution abatement measures over the past years, there were significant improvements at the beaches in various districts in the last few years. Silver Mine Bay Beach, Castle Peak Beach and Repulse Bay Beach were most remarkable as they have consistently complied with the WQO in recent years. All the seven closed Tsuen Wan beaches met the WQO in 2010 and 2011. All Hong Kong’s beaches have now achieved the required standard for bathing waters.



Water quality trend lines of individual beaches over the last 26 years are included in this report to show the changes over the years. More in-depth background and details of the beach monitoring programme are available at EPD's Homepage (<http://www.epd.gov.hk>) or its thematic website (<http://www.beachwq.gov.hk>), which provides user-friendly access to the annual beach reports as well as data published since 2000.

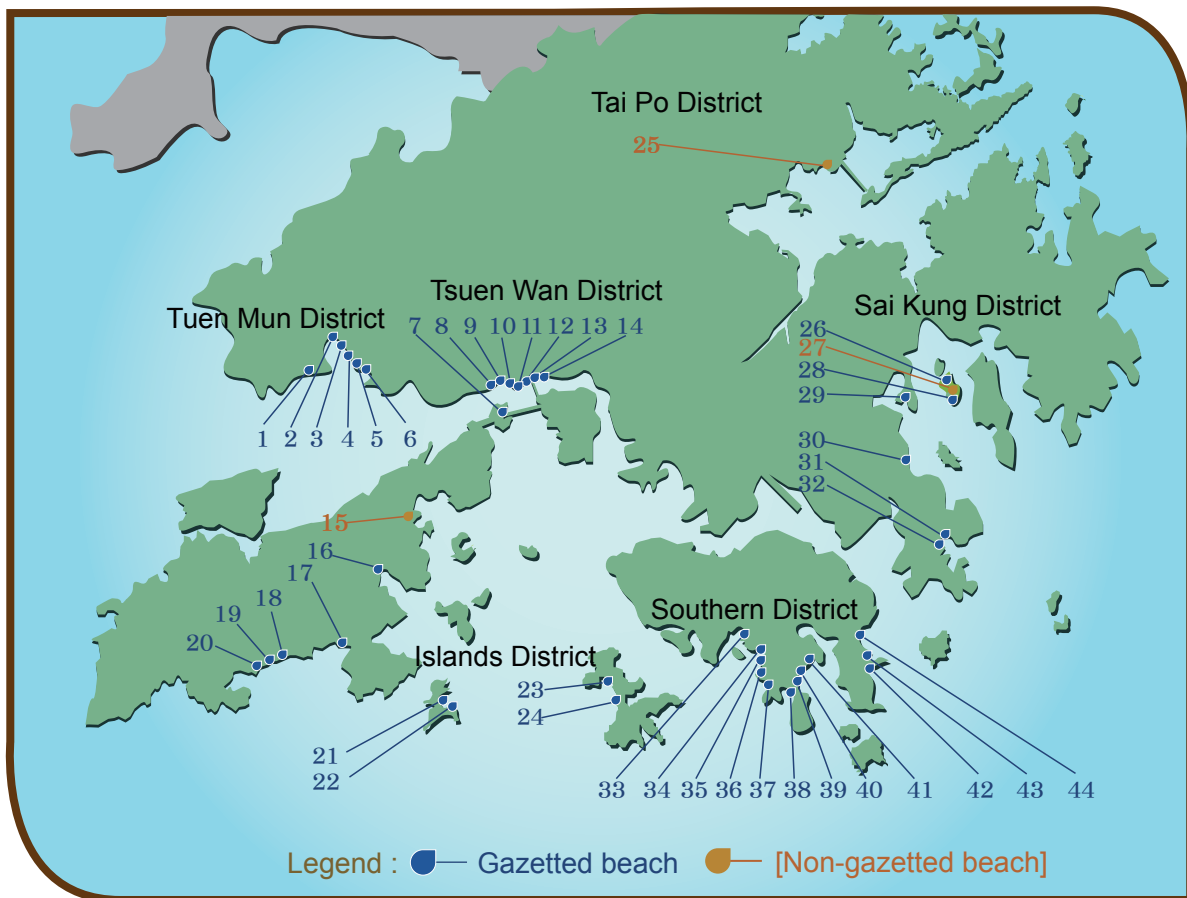


Paradise for kids





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. [Kiu Tsui (New)]
28. Hap Mun Bay
29. Trio
30. Silverstrand
31. Clear Water Bay First
32. Clear Water Bay Second

Southern District

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





Beach monitoring frequencies

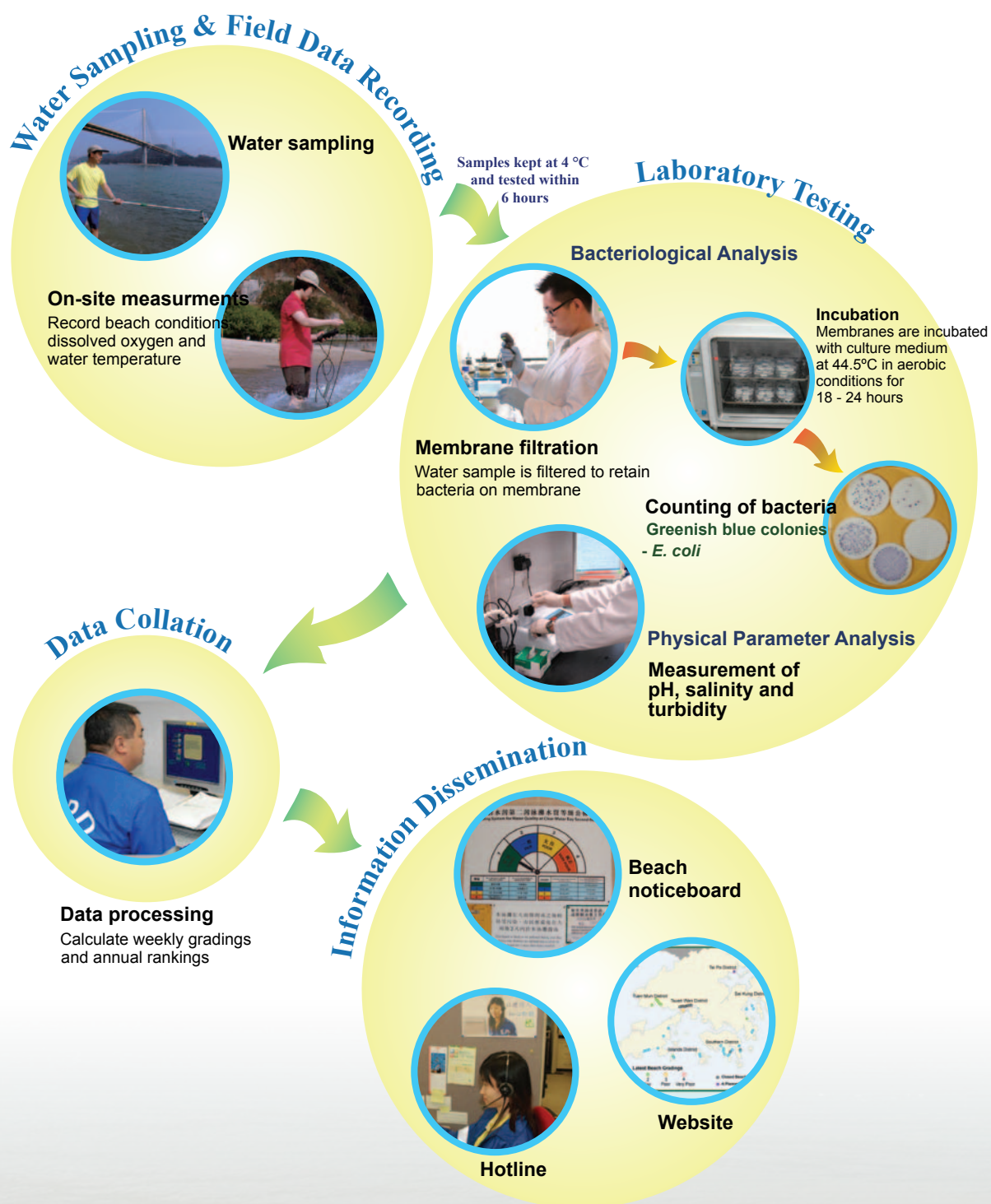
Beach	Monitoring frequency per month	
	Bathing season*	Non-bathing season
Gazetted beaches open all year round **	at least 3 times	at least 3 times
Other gazetted beaches	at least 3 times	once
Non-gazetted beaches	at least 3 times	once

* March to October

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



Overview of various stages of the Beach Monitoring Programme





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.

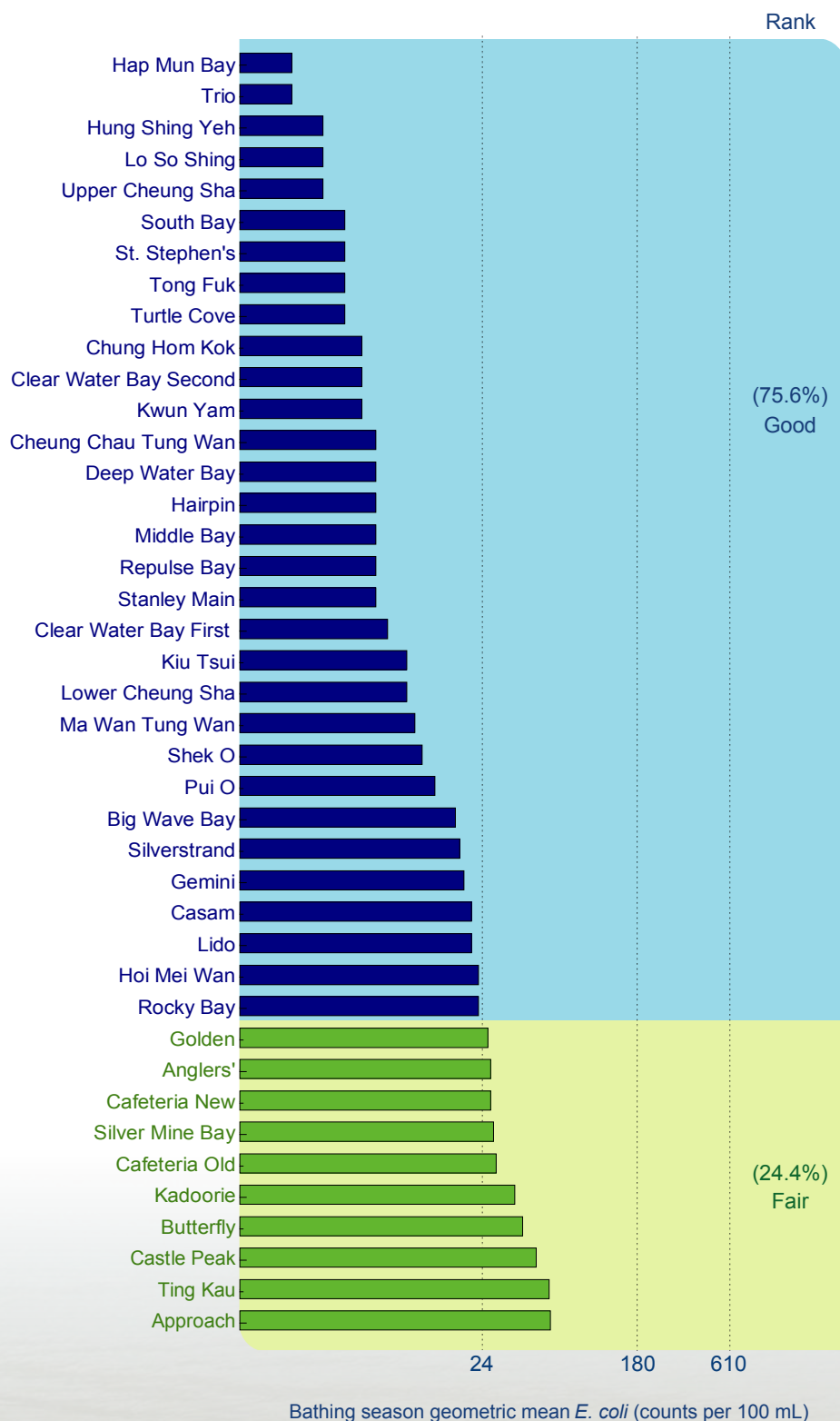
** Skin and gastrointestinal illnesses





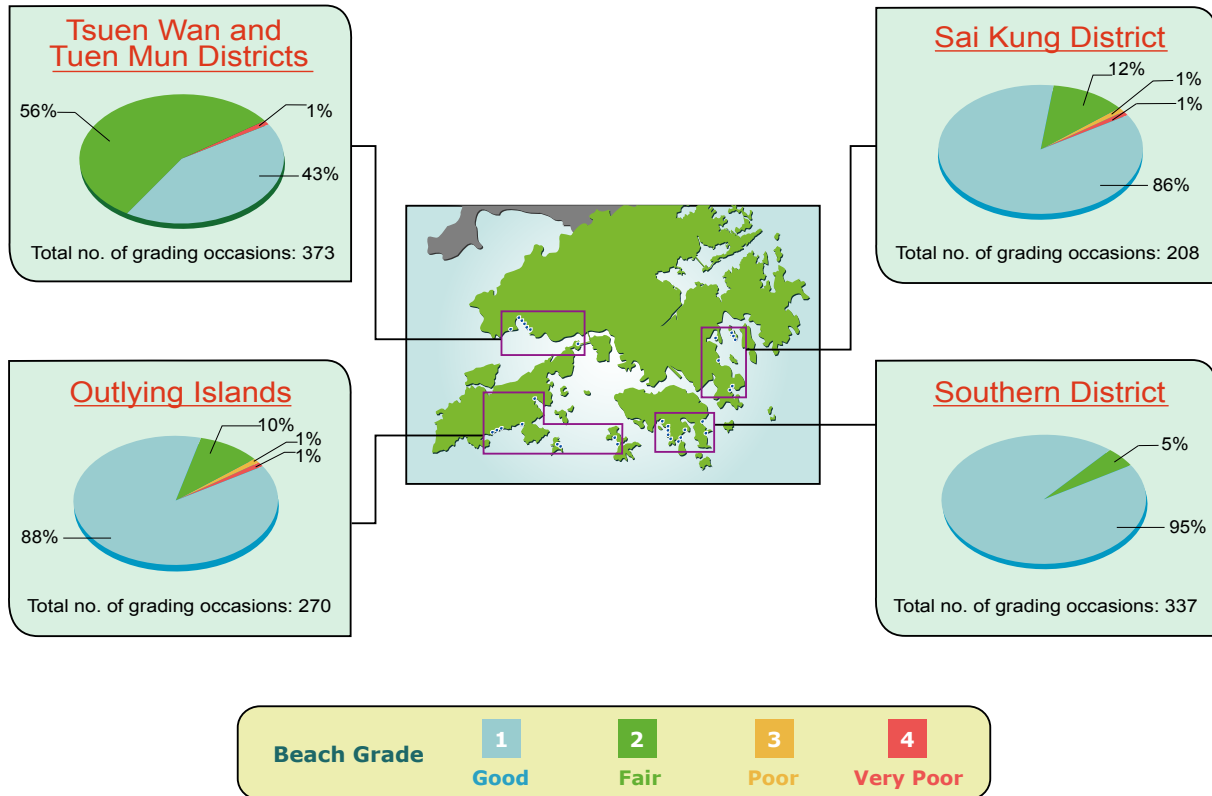
Hong Kong's gazetted beaches

2011 annual ranking





Beach grading summary by district in 2011





Annual Ranking of gazetted beaches at a glance





Southern District beaches

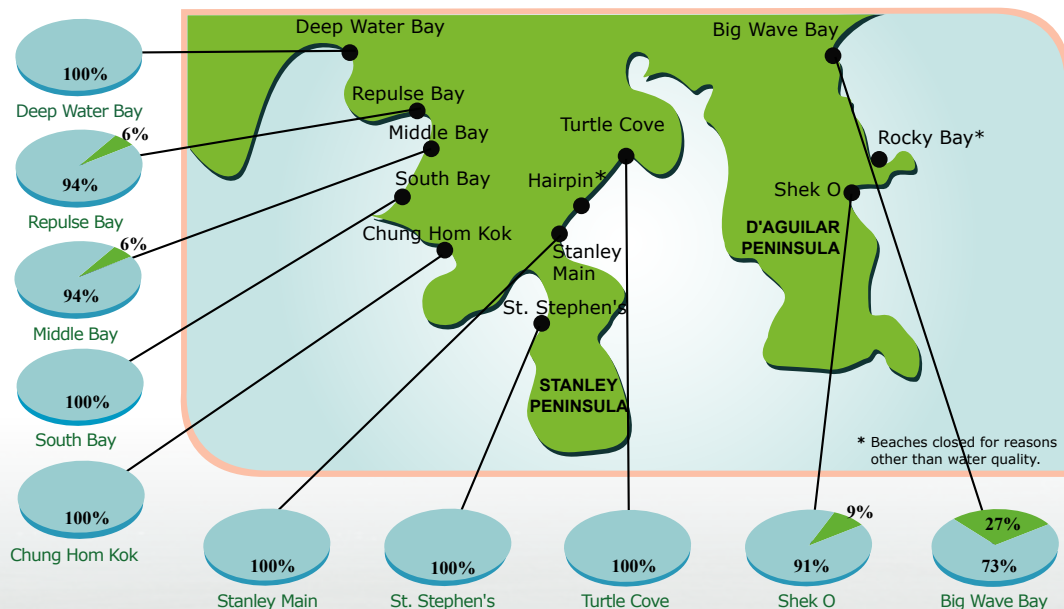
Annual ranking



Annual Rank

●	●	●	●
Good	Fair	Poor	Very Poor

Weekly grading



Beach Grade

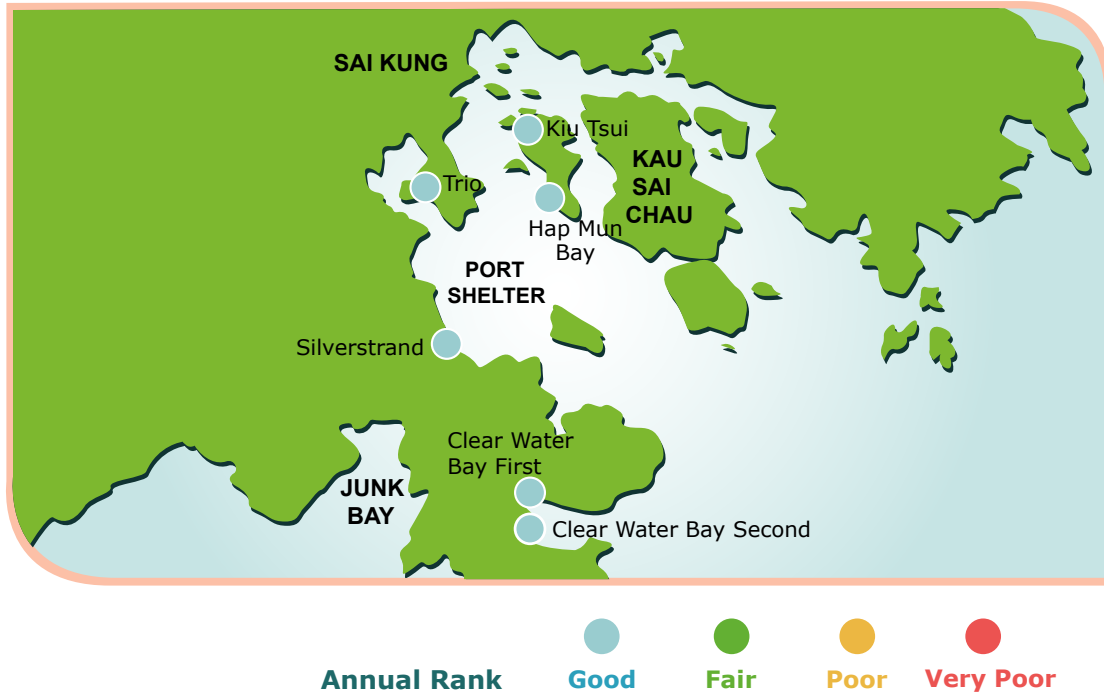
1	2	3	4
Good	Fair	Poor	Very Poor

* Closed beaches. No grading was made.

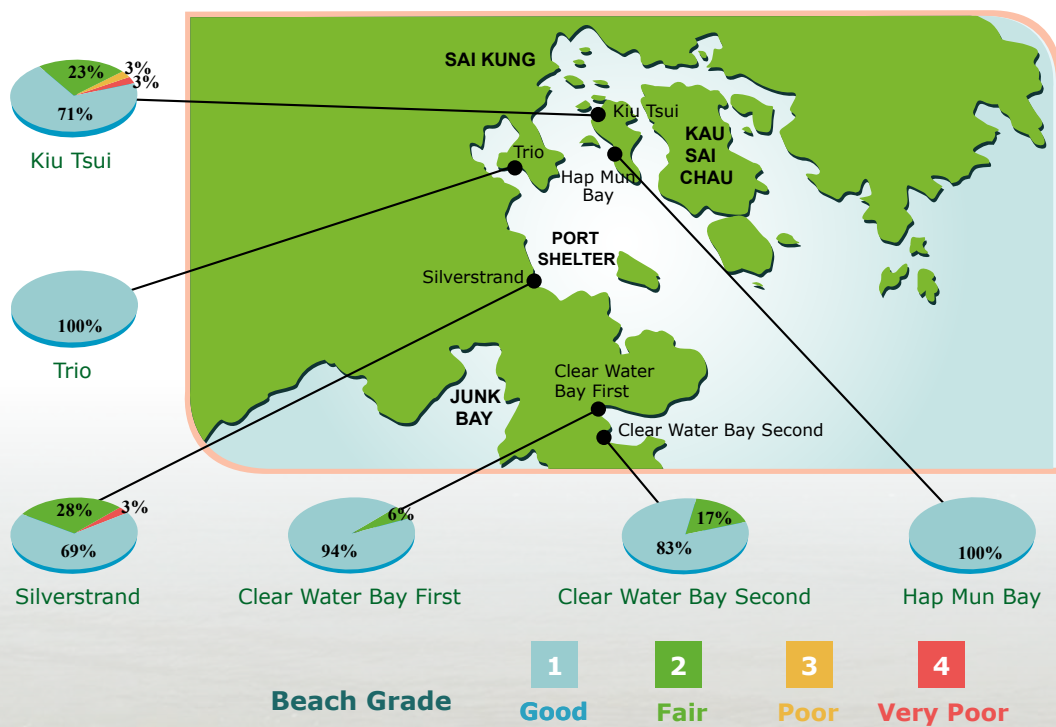


Sai Kung beaches

Annual ranking



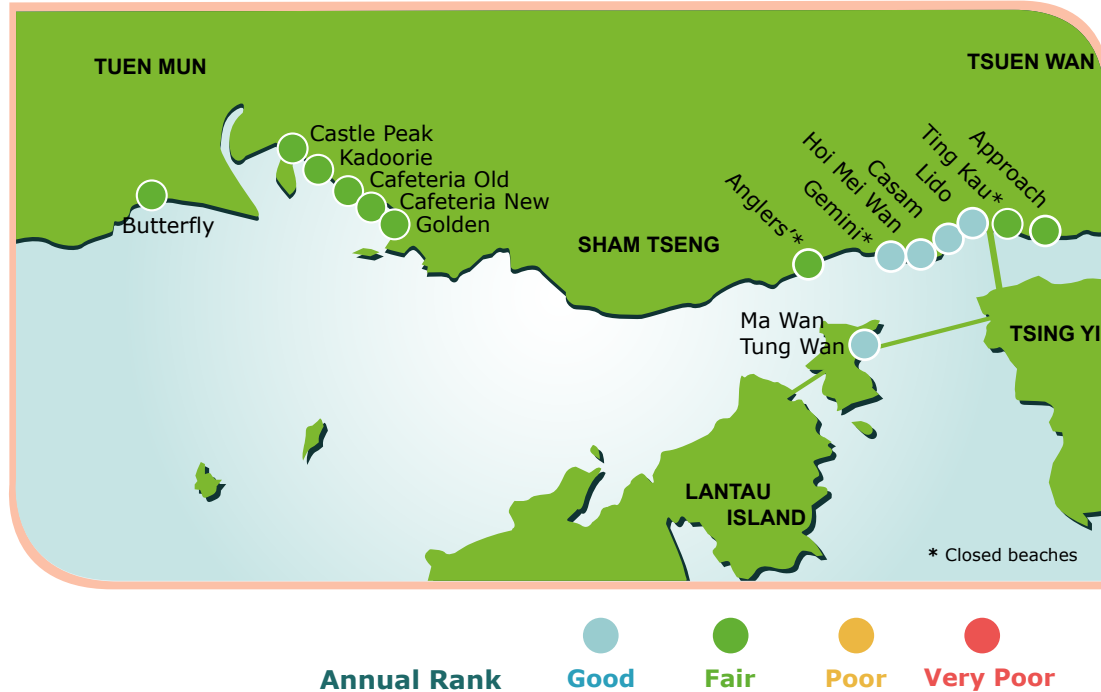
Weekly grading



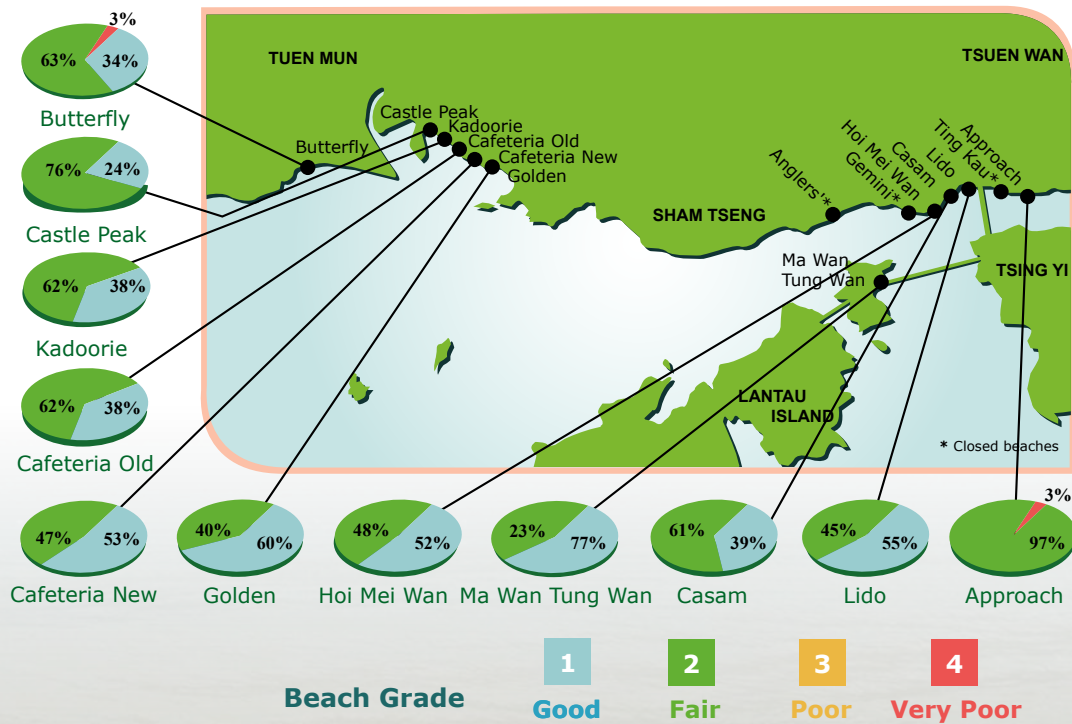


Tsuen Wan and Tuen Mun beaches

Annual ranking



Weekly grading



* Closed beaches. No grading was made.



Outlying Islands beaches

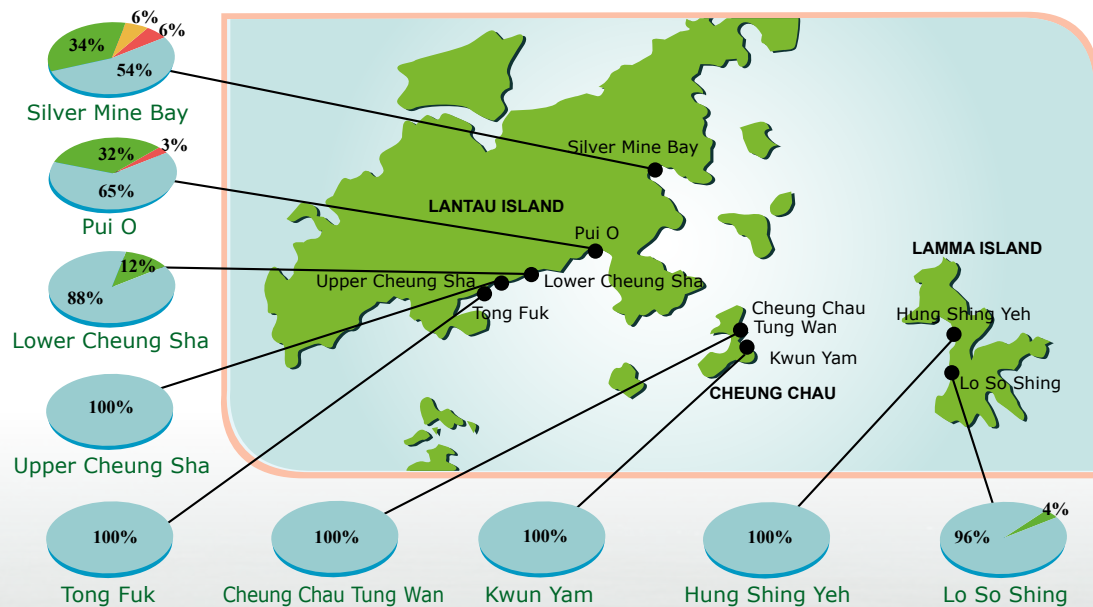
Annual ranking



Annual Rank

Good Fair Poor Very Poor

Weekly grading



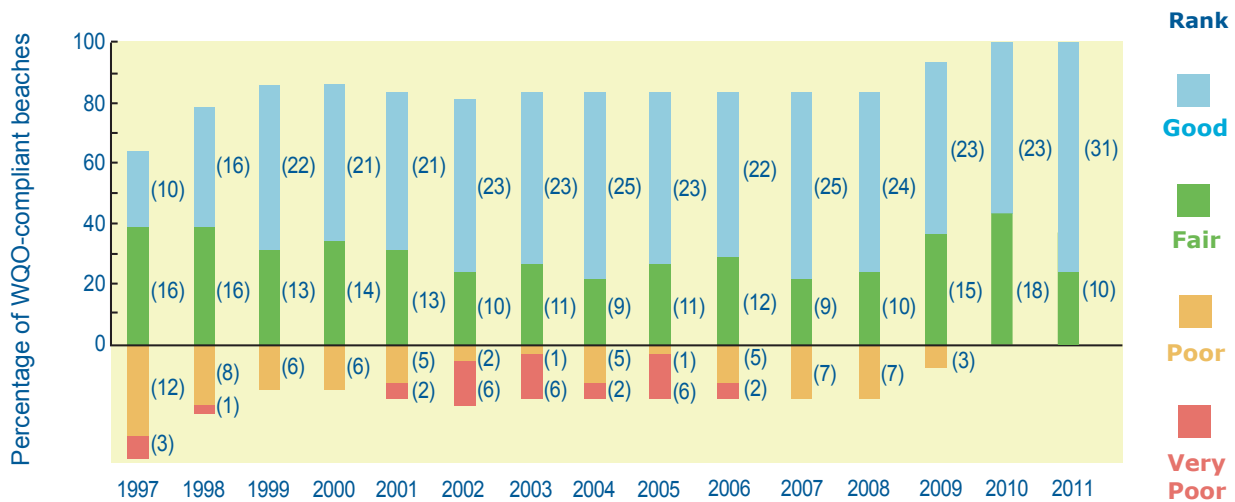
Beach Grade

1 2 3 4

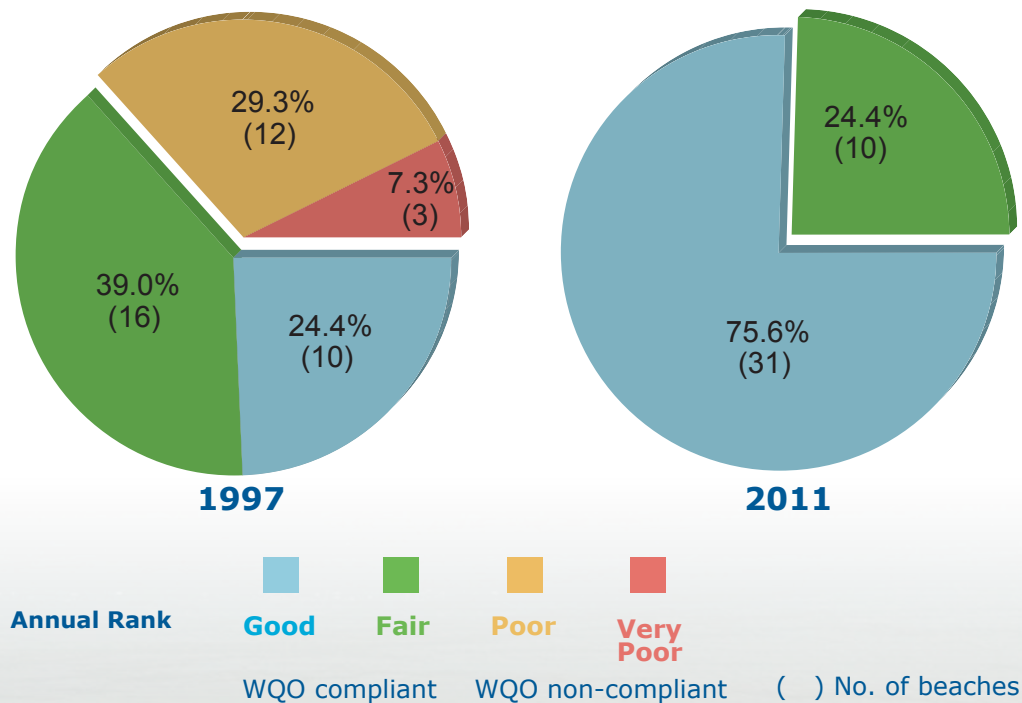
Good Fair Poor Very Poor



Annual beach rankings from 1997 to 2011

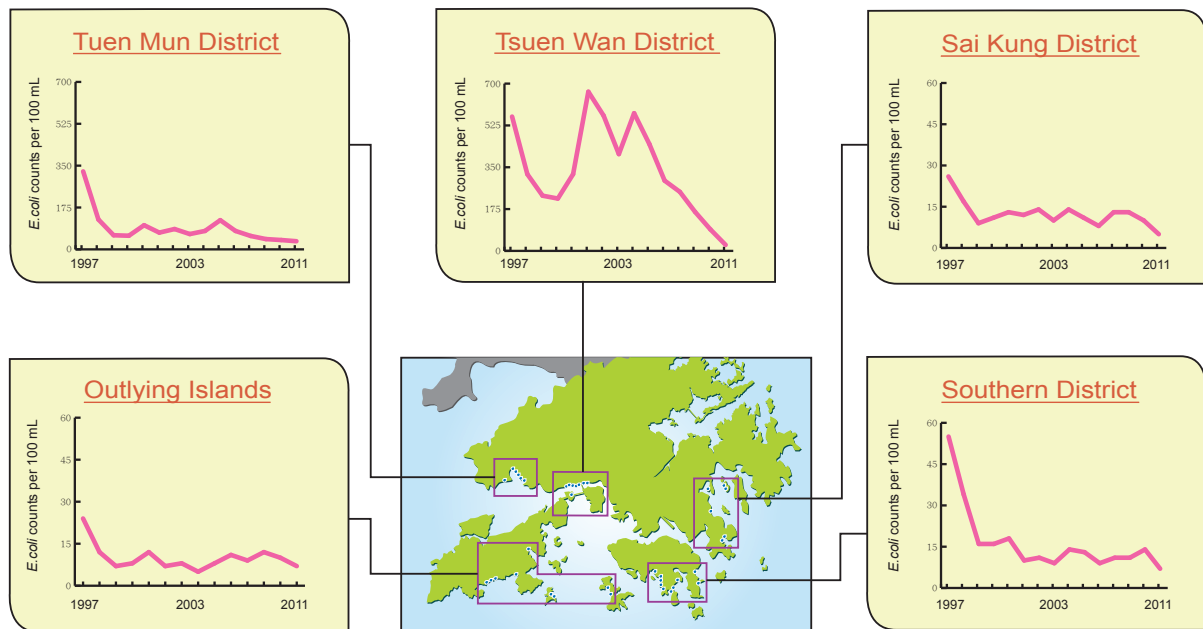


Annual beach ranking of 1997 and 2011 compared





Annual geometric mean *E. coli* levels by district, 1997 - 2011



Appendix A - Annual geometric mean *E. coli* levels (1997-2011)

Southern District

Annual geometric mean *E. coli* levels

Beach	<i>E. coli</i> counts per 100 mL														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Big Wave Bay	179	114	77	98	106	23	33	26	101	50	17	31	46	149	17
Chung Hom Kok	22	40	14	8	15	13	14	9	13	10	9	13	14	9	5
Deep Water Bay	55	46	14	16	18	9	9	7	8	7	7	9	12	9	6
Hairpin	44	72	17	18	10	6	7	7	13	11	19	10	12	33	6
Middle Bay	40	16	11	11	8	9	14	12	20	18	9	11	12	12	6
Repulse Bay	23	11	8	9	13	9	12	4	8	12	7	14	11	7	6
Rocky Bay	399	223	72	80	118	43	28	19	30	33	17	15	13	50	23
Shek O	102	70	32	29	31	13	11	16	19	24	18	22	11	19	11
South Bay	17	6	4	7	5	5	11	9	7	7	5	5	4	4	4
St. Stephen's	40	26	11	6	7	5	9	4	12	11	6	9	6	4	4
Stanley Main	72	24	13	12	9	8	6	5	7	10	9	10	13	20	6
Turtle Cove	40	14	12	11	15	8	4	5	8	7	5	5	5	8	4

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



Sai Kung District

Annual geometric mean *E. coli* levels

Beach	<i>E. coli</i> counts per 100 mL														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Clear Water Bay First	62	41	11	16	28	28	17	9	16	20	14	11	15	10	7
Clear Water Bay Second	66	44	12	26	22	14	21	10	19	13	9	19	27	13	5
Hap Mun Bay	3	2	2	2	1	2	4	3	4	4	3	5	3	3	2
Kiu Tsui	5	4	4	5	5	4	5	17	14	11	6	13	16	13	9
Silverstrand	148	99	32	61	100	133	97	74	67	30	33	35	51	28	18
Trio	30	21	17	10	12	6	10	2	6	5	2	12	5	6	2

Tuen Mun District

Annual geometric mean *E. coli* levels

Beach	<i>E. coli</i> counts per 100 mL														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Butterfly	259	121	44	61	74	60	74	55	55	94	84	56	49	30	41
Cafeteria New	309	100	60	51	104	62	80	54	70	120	68	48	38	31	27
Cafeteria Old	435	138	58	57	125	74	76	61	81	150	67	45	46	34	29
Castle Peak	332	199	57	58	105	58	64	80	90	139	64	47	35	63	49
Golden	352	98	44	50	87	66	84	46	62	117	87	63	42	37	26
Kadoorie	290	130	109	68	120	114	160	98	117	118	101	87	48	45	37

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





Tsuen Wan District

Annual geometric mean *E. coli* levels

Beach	<i>E. coli</i> counts per 100 mL														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Anglers'	691	502	442	326	621	1,169	693	619	895	772	496	510	276	134	27
Approach	1,009	435	387	316	411	696	762	470	663	599	352	251	208	124	59
Casam	609	239	231	209	233	741	702	594	716	426	305	289	144	102	21
Gemini	458	399	350	258	323	1,155	875	1,102	1,042	853	566	481	410	137	19
Hoi Mei Wan	471	280	109	177	199	547	442	287	641	308	286	271	130	87	23
Lido	600	262	231	181	269	683	734	523	782	459	280	296	178	87	21
Ma Wan Tung Wan	110	92	51	39	133	201	159	101	132	171	78	53	60	17	10
Ting Kau	1,583	1,045	515	593	739	742	831	412	512	469	405	258	145	141	58

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

Outlying Islands

Annual geometric mean *E. coli* levels

Beach	<i>E. coli</i> counts per 100 mL														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cheung Chau Tung Wan	24	19	11	12	16	17	11	12	14	37	21	15	17	12	6
Hung Shing Yeh	5	3	3	5	6	2	5	4	4	4	6	4	6	4	3
Kwun Yam	32	21	6	10	11	9	7	5	10	13	9	10	9	8	5
Lo So Shing	3	2	4	2	5	2	3	2	3	4	3	5	7	3	3
Lower Cheung Sha	85	23	10	12	22	10	14	7	12	11	12	20	13	11	9
Pui O	36	16	10	10	17	10	15	9	10	16	30	24	12	14	13
Silver Mine Bay	481	123	39	50	67	42	50	14	34	52	22	43	45	31	28
Tong Fuk	14	10	4	5	6	4	3	4	5	5	4	10	5	5	4
Upper Cheung Sha	8	3	2	3	5	3	3	3	3	4	4	7	5	4	3





Appendix B - 2011 beach visitor number

Southern District

Visitor numbers during the 2011 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Big Wave Bay	239	1,299	3,000	26,345	141,320
Chung Hom Kok	286	937	2,100	20,130	121,020
Deep Water Bay	978	4,472	15,000	120,400	512,715
Hairpin	103	435	800	8,560	51,305
Middle Bay	190	346	920	14,920	58,885
Repulse Bay	8,295	12,336	21,000	348,000	2,356,002
Rocky Bay	-	-	-	-	-
Shek O	2,398	6,473	26,000	276,700	906,550
South Bay	254	707	2,700	30,690	97,684
St. Stephen's	203	837	2,400	22,390	99,317
Stanley Main	857	3,106	9,800	85,880	386,225
Turtle Cove	60	348	1,250	7,625	37,301

Note: Information provided by the Leisure and Cultural Services Department



Sai Kung District

Visitor numbers during the 2011 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Clear Water Bay First	161	569	1,911	14,070	71,387
Clear Water Bay Second	2,025	7,338	24,500	255,900	911,300
Hap Mun Bay	397	921	4,880	44,698	138,362
Kiu Tsui	39	466	1,380	8,450	42,857
Silverstrand	144	423	1,800	15,995	57,101
Trio	316	1,040	3,930	35,085	134,074

Note: Information provided by the Leisure and Cultural Services Department

Tuen Mun District

Visitor numbers during the 2011 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Butterfly	803	1,493	2,250	37,950	251,200
Cafeteria New	846	1,816	4,740	64,250	284,070
Cafeteria Old	706	1,299	3,200	37,800	219,700
Castle Peak	430	1,391	1,800	23,800	180,750
Golden	1,809	5,762	9,500	124,350	757,700
Kadoorie	540	942	1,640	31,990	164,220

Note: Information provided by the Leisure and Cultural Services Department



Tsuen Wan District

Visitor numbers during the 2011 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Anglers'	22	131	260	2,530	13,974
Approach	58	181	860	6,643	23,929
Casam	15	44	659	1,621	5,966
Gemini	2	9	30	278	1,074
Hoi Mei Wan	8	22	72	752	3,052
Lido	275	1,092	5,960	42,805	131,256
Ma Wan Tung Wan	537	2,293	6,777	55,479	268,885
Ting Kau	11	11	23	600	2,673

Note: Information provided by the Leisure and Cultural Services Department

Outlying Islands

Visitor numbers during the 2011 bathing season

Beach	Daily average		Peak day	Peak month	Total
	Weekdays	Weekends & public holidays			
Cheung Chau Tung Wan	177	496	2,000	14,320	68,290
Hung Shing Yeh	141	617	1,310	13,960	71,790
Kwun Yam	65	196	600	5,465	26,145
Lo So Shing	43	146	400	3,970	18,710
Lower Cheung Sha	109	404	1,160	10,240	49,980
Pui O	195	526	1,440	15,090	73,800
Silver Mine Bay	147	338	3,550	11,840	50,930
Tong Fuk	107	248	710	9,690	37,220
Upper Cheung Sha	84	239	800	6,860	32,780

Note: Information provided by the Leisure and Cultural Services Department



Appendix C - Physicochemical water quality data for gazetted beach, 2011

Southern District :

Summary of physicochemical water quality data of gazetted beaches, 2011

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L) (% Saturation)	
<i>Big Wave Bay Beach</i>	8.4 (8.2 - 8.6)	30.6 (26.3 - 32.7)	3.0 (0.8 - 20.3)	25.5 (16.4 - 30.9)	7.0 (5.8 - 9.0)	97 (87 - 107)
<i>Chung Hom Kok Beach</i>	8.4 (8.2 - 8.7)	30.8 (25.0 - 32.9)	3.9 (1.1 - 19.2)	26.1 (16.7 - 31.4)	6.9 (4.9 - 9.7)	97 (74 - 125)
<i>Deep Water Bay Beach</i>	8.4 (8.2 - 8.7)	30.5 (24.9 - 32.9)	5.9 (1.5 - 18.7)	26.1 (17.1 - 31.4)	6.8 (5.5 - 8.1)	96 (85 - 118)
<i>Hairpin Beach [Closed]</i>	8.5 (8.3 - 8.7)	30.8 (26.3 - 32.6)	2.8 (1.0 - 16.9)	26.2 (17.0 - 30.3)	7.0 (5.5 - 10.0)	100 (86 - 121)
<i>Middle Bay Beach</i>	8.4 (8.2 - 8.7)	30.5 (22.4 - 33.0)	3.8 (1.4 - 11.8)	25.7 (16.3 - 30.8)	7.1 (5.8 - 9.6)	99 (85 - 127)
<i>Repulse Bay Beach</i>	8.4 (8.2 - 8.7)	30.7 (25.5 - 32.8)	3.6 (1.3 - 8.0)	25.6 (16.4 - 30.4)	6.9 (5.4 - 8.8)	97 (80 - 125)
<i>Rocky Bay Beach [Closed]</i>	8.4 (8.1 - 8.6)	31.2 (28.8 - 32.6)	3.0 (0.9 - 15.8)	25.3 (16.8 - 29.0)	6.9 (5.3 - 9.9)	96 (81 - 106)
<i>Shek O Beach</i>	8.4 (8.2 - 8.6)	31.2 (27.7 - 32.8)	4.6 (1.2 - 36.8)	25.7 (16.8 - 30.3)	7.1 (5.9 - 9.6)	98 (85 - 122)
<i>South Bay Beach</i>	8.4 (8.2 - 8.6)	30.7 (25.6 - 33.1)	2.8 (1.1 - 9.4)	26.1 (16.7 - 30.9)	6.9 (5.0 - 9.0)	98 (74 - 125)
<i>St. Stephen's Beach</i>	8.4 (8.2 - 8.6)	30.6 (24.4 - 33.2)	2.8 (0.9 - 10.9)	26.0 (16.7 - 31.1)	6.9 (5.3 - 7.9)	97 (80 - 116)
<i>Stanley Main Beach</i>	8.4 (8.2 - 8.7)	30.4 (25.3 - 32.5)	2.9 (1.0 - 12.6)	26.0 (17.6 - 30.5)	7.0 (5.4 - 9.6)	100 (86 - 120)
<i>Turtle Cove Beach</i>	8.4 (8.2 - 8.7)	30.7 (26.2 - 33.0)	4.7 (1.0 - 19.5)	26.2 (16.8 - 32.0)	6.8 (4.8 - 9.6)	98 (76 - 124)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit
Note: Data presented are arithmetic means; figures in brackets are ranges.





Sai Kung District :

Summary of physicochemical water quality data of gazetted beaches, 2011

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
<i>Clear Water Bay First Beach</i>	8.5 (8.3 - 8.6)	31.2 (26.5 - 32.9)	4.6 (1.0 - 26.1)	26.5 (17.9 - 31.4)	6.8 (5.4 - 8.4)	97 (80 - 117)
<i>Clear Water Bay Second Beach</i>	8.4 (8.3 - 8.6)	31.7 (29.1 - 33.1)	5.3 (1.1 - 20.5)	26.4 (17.7 - 32.1)	6.8 (5.9 - 8.5)	97 (88 - 112)
<i>Hap Mun Bay Beach</i>	8.5 (8.2 - 8.6)	31.6 (28.6 - 33.0)	2.2 (0.4 - 6.0)	26.9 (17.7 - 31.9)	6.6 (5.1 - 8.3)	97 (82 - 107)
<i>Kiu Tsui Beach</i>	8.5 (8.2 - 8.6)	31.5 (28.3 - 32.9)	1.8 (0.5 - 6.3)	26.8 (17.7 - 32.9)	7.0 (5.5 - 9.3)	100 (76 - 121)
<i>Silverstrand Beach</i>	8.4 (8.2 - 8.6)	30.7 (27.3 - 32.8)	3.8 (0.8 - 17.9)	26.0 (17.2 - 31.0)	6.8 (4.8 - 8.5)	97 (73 - 111)
<i>Trio Beach</i>	8.4 (8.2 - 8.6)	31.2 (28.6 - 32.9)	1.9 (0.6 - 4.6)	27.1 (17.8 - 33.5)	6.5 (5.2 - 8.9)	96 (80 - 111)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

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

Tsuen Wan District :

Summary of physicochemical water quality data of gazetted beaches, 2011

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
<i>Anglers' Beach [Closed]</i>	8.3 (8.1 - 8.7)	27.7 (16.3 - 32.1)	4.8 (1.7 - 9.7)	25.9 (17.2 - 30.0)	6.9 (4.9 - 10.0)	96 (76 - 122)
<i>Approach Beach</i>	8.3 (8.1 - 8.6)	27.7 (16.9 - 32.2)	4.3 (1.9 - 10.7)	25.8 (17.3 - 29.7)	6.8 (4.5 - 9.8)	96 (71 - 124)
<i>Casam Beach</i>	8.3 (8.1 - 8.7)	27.9 (18.9 - 32.2)	3.6 (1.5 - 7.8)	26.1 (17.4 - 30.6)	6.9 (5.5 - 8.6)	98 (80 - 126)
<i>Gemini Beaches [Closed]</i>	8.3 (8.1 - 8.6)	27.9 (17.7 - 32.2)	4.2 (1.4 - 12.4)	25.9 (16.9 - 30.3)	6.8 (4.6 - 9.7)	94 (73 - 120)
<i>Hoi Mei Wan Beach</i>	8.3 (8.1 - 8.6)	27.5 (18.0 - 32.3)	4.4 (1.3 - 10.8)	26.0 (17.2 - 29.9)	6.8 (4.5 - 9.4)	96 (72 - 114)
<i>Lido Beach</i>	8.3 (8.1 - 8.6)	27.9 (19.2 - 32.4)	4.4 (1.5 - 10.8)	25.9 (17.1 - 29.9)	6.8 (5.0 - 8.6)	96 (77 - 126)
<i>Ma Wan Tung Wan Beach</i>	8.3 (8.0 - 8.5)	28.7 (22.2 - 32.2)	6.4 (2.3 - 15.1)	25.8 (18.0 - 29.4)	6.4 (4.8 - 8.7)	90 (73 - 104)
<i>Ting Kau Beach [Closed]</i>	8.3 (8.1 - 8.6)	27.5 (16.9 - 32.1)	3.9 (1.8 - 9.6)	25.9 (17.1 - 29.8)	6.8 (4.6 - 8.6)	95 (74 - 116)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

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



Tuen Mun District :

Summary of physicochemical water quality data of gazetted beaches, 2011

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Butterfly Beach	8.3 (8.0 - 8.7)	25.3 (13.7 - 32.1)	8.6 (1.6 - 27.9)	26.9 (17.9 - 30.9)	6.5 (4.9 - 8.2)	93 (64 - 120)
Cafeteria New Beach	8.3 (8.1 - 8.8)	25.0 (12.3 - 31.9)	10.7 (2.1 - 25.2)	26.7 (17.8 - 30.5)	6.8 (4.8 - 9.5)	95 (76 - 153)
Cafeteria Old Beach	8.3 (8.0 - 8.7)	24.9 (12.5 - 31.9)	9.6 (1.9 - 36.4)	26.6 (17.8 - 30.5)	6.7 (4.6 - 10.0)	95 (72 - 152)
Castle Peak Beach	8.4 (8.0 - 8.8)	25.0 (12.6 - 32.0)	5.9 (1.3 - 23.2)	27.0 (18.0 - 30.9)	7.1 (5.1 - 10.0)	101 (82 - 139)
Golden Beach	8.3 (8.0 - 8.7)	25.1 (12.5 - 31.8)	11.4 (2.3 - 32.9)	26.3 (16.7 - 30.4)	6.8 (4.5 - 10.0)	95 (69 - 151)
Kadoorie Beach	8.3 (8.1 - 8.7)	25.1 (12.8 - 31.9)	9.1 (1.8 - 102.0)	26.9 (17.7 - 30.8)	6.8 (4.9 - 10.0)	97 (77 - 152)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

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

Outlying Islands :

Summary of physicochemical water quality data of gazetted beaches, 2011

Beach	pH	Salinity (psu) ¹	Turbidity (NTU) ²	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Cheung Chau Tung Wan Beach	8.3 (8.1 - 8.6)	29.6 (24.8 - 31.9)	4.2 (1.8 - 12.9)	25.5 (16.9 - 30.0)	6.8 (5.7 - 8.1)	95 (84 - 105)
Hung Shing Yeh Beach, Lamma	8.3 (8.2 - 8.6)	30.3 (22.4 - 33.0)	5.6 (1.7 - 17.8)	25.8 (16.8 - 31.0)	7.1 (5.2 - 8.9)	96 (76 - 108)
Kwun Yam Beach, Cheung Chau	8.3 (8.1 - 8.7)	29.4 (24.2 - 32.0)	4.1 (1.3 - 10.3)	25.4 (17.0 - 29.4)	6.8 (5.6 - 8.3)	96 (83 - 108)
Lo So Shing Beach, Lamma	8.3 (7.5 - 8.7)	29.9 (21.9 - 33.0)	5.9 (1.9 - 60.4)	26.1 (16.8 - 32.2)	6.9 (5.5 - 8.1)	96 (86 - 111)
Lower Cheung Sha Beach, Lantau	8.4 (8.2 - 8.6)	28.9 (20.8 - 32.5)	10.7 (2.2 - 35.6)	26.5 (16.7 - 33.3)	6.8 (5.1 - 8.0)	96 (73 - 105)
Pui O Beach, Lantau	8.4 (8.2 - 8.7)	28.5 (19.2 - 32.6)	15.0 (4.6 - 36.4)	27.2 (16.9 - 33.2)	6.8 (5.2 - 8.2)	96 (84 - 118)
Silver Mine Bay Beach, Lantau	8.3 (8.0 - 8.6)	27.0 (11.6 - 32.0)	12.3 (3.1 - 49.0)	27.2 (16.9 - 33.0)	6.6 (4.5 - 8.0)	94 (55 - 128)
Tong Fuk Beach, Lantau	8.4 (8.2 - 8.6)	29.1 (22.3 - 32.5)	7.2 (1.7 - 22.5)	26.4 (16.9 - 31.9)	6.8 (5.7 - 8.4)	96 (86 - 105)
Upper Cheung Sha Beach, Lantau	8.4 (8.2 - 8.6)	29.2 (22.6 - 32.2)	10.2 (1.8 - 38.5)	26.4 (16.9 - 31.9)	6.8 (5.5 - 8.0)	96 (85 - 104)

1. Practical Salinity Unit ; 2. Nephelometric Turbidity Unit

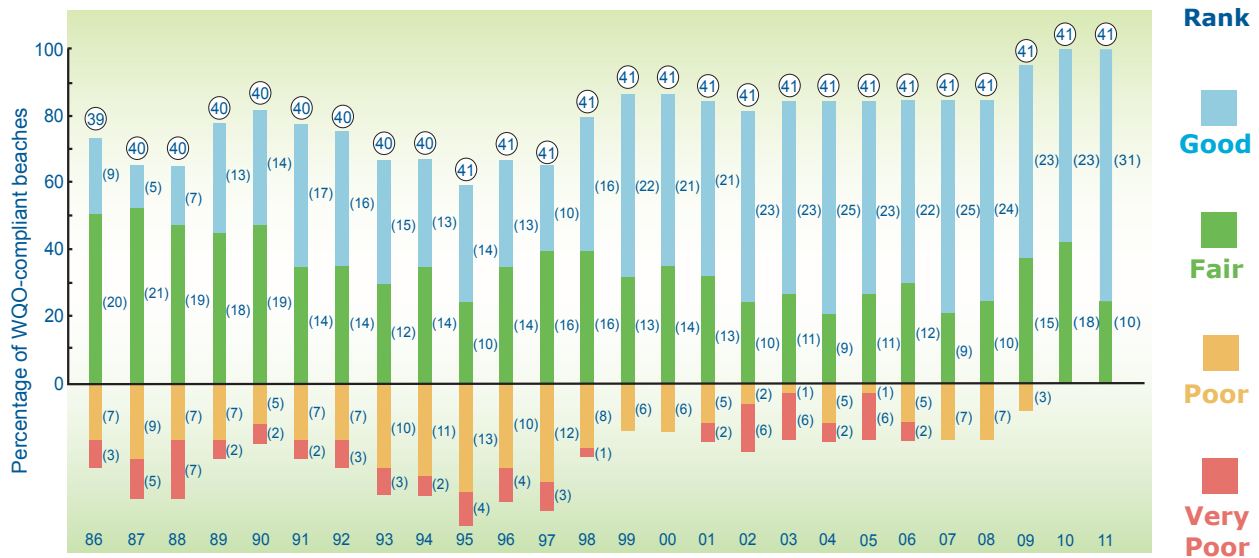
Note: Data presented are arithmetic means; figures in brackets are ranges.



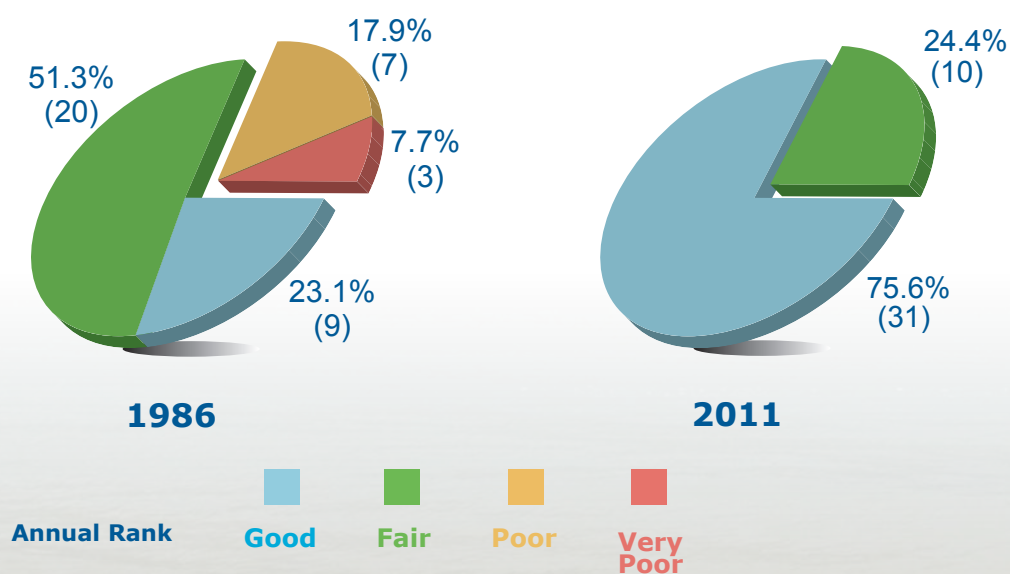


Appendix D - Long-term trend of beach water quality (1986 - 2011)

Annual beach rankings from 1986 to 2011



Annual beach ranking of 1986 and 2011 compared



WQO compliant WQO non-compliant () No. of beaches

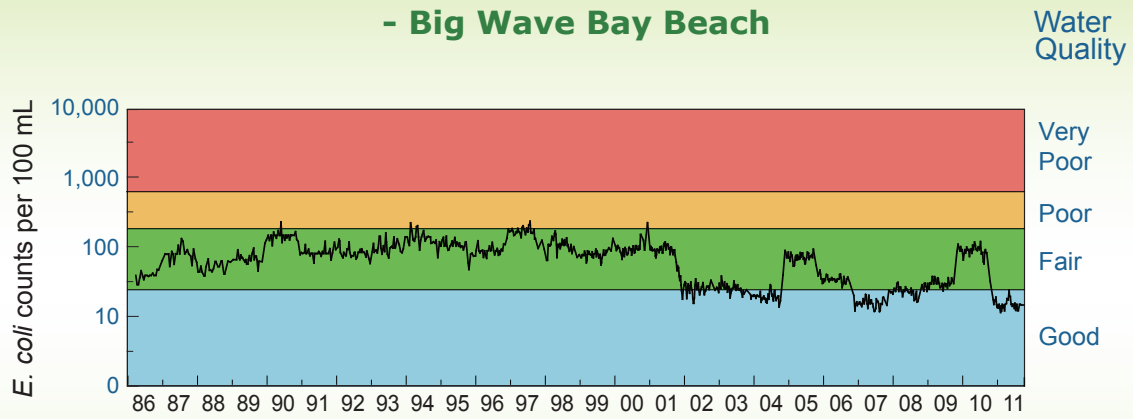
Note: Two beaches degazetted in 1995 were excluded from the calculation.





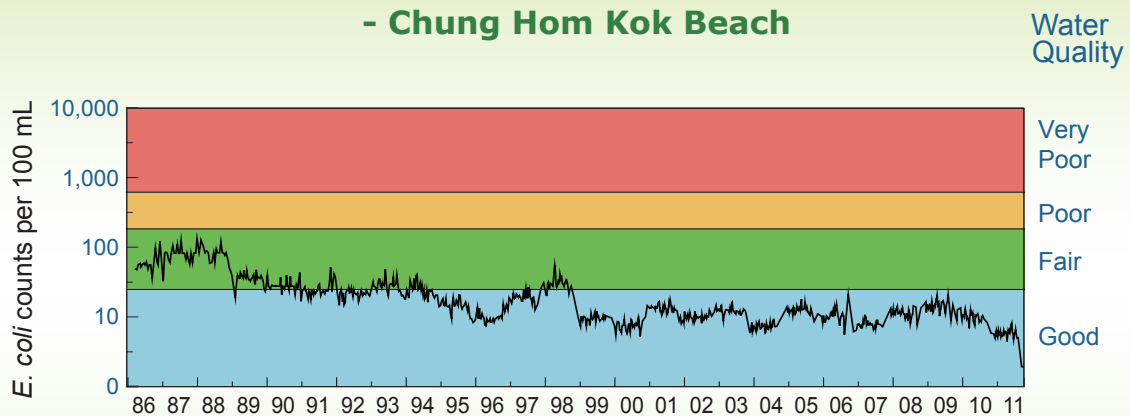
Southern District

Long-term trend of beach water quality - Big Wave Bay Beach



Legend: — 3-month running geometric mean trend line

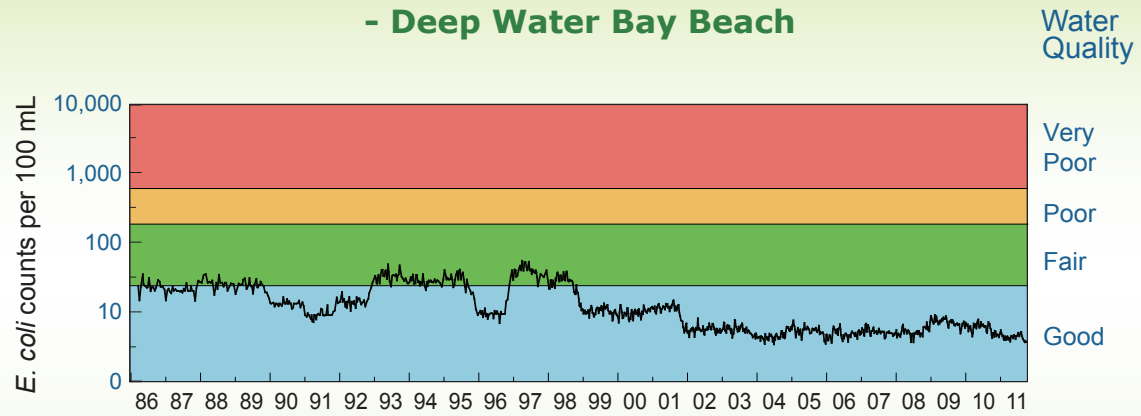
Long-term trend of beach water quality - Chung Hom Kok Beach



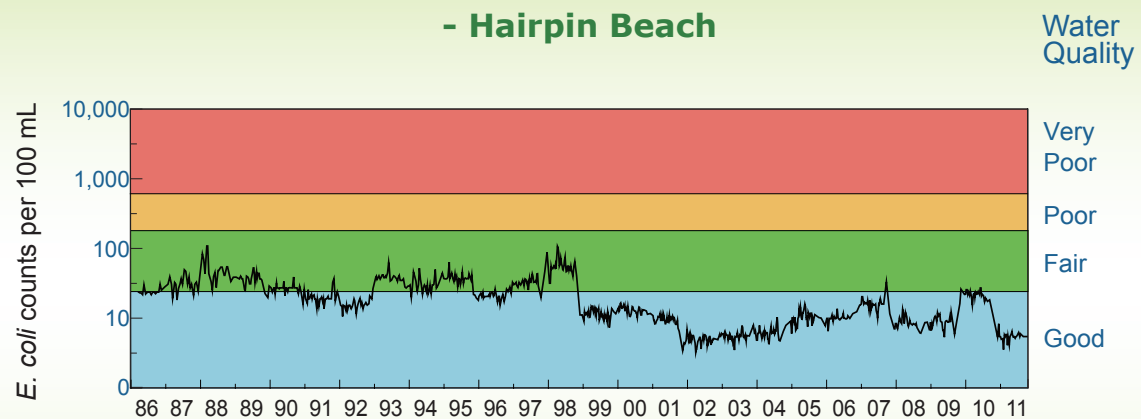
Legend: — 3-month running geometric mean trend line



Long-term trend of beach water quality - Deep Water Bay Beach

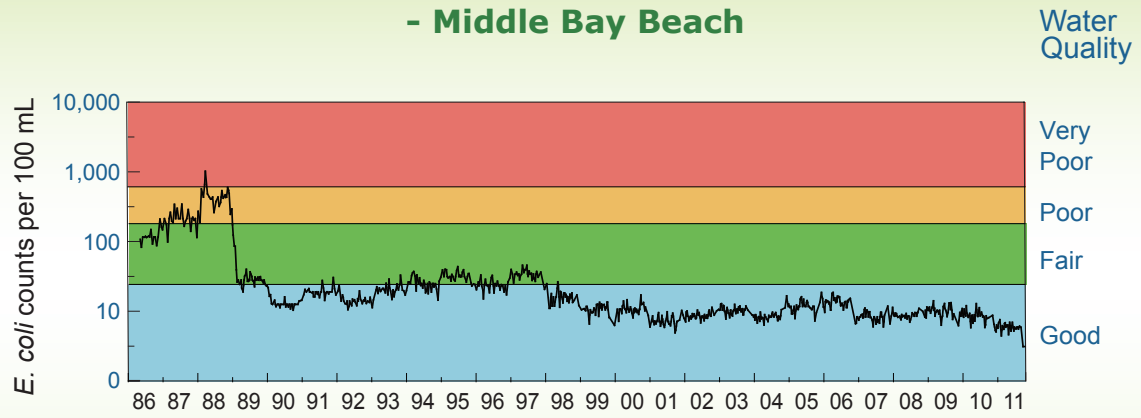


Long-term trend of beach water quality - Hairpin Beach



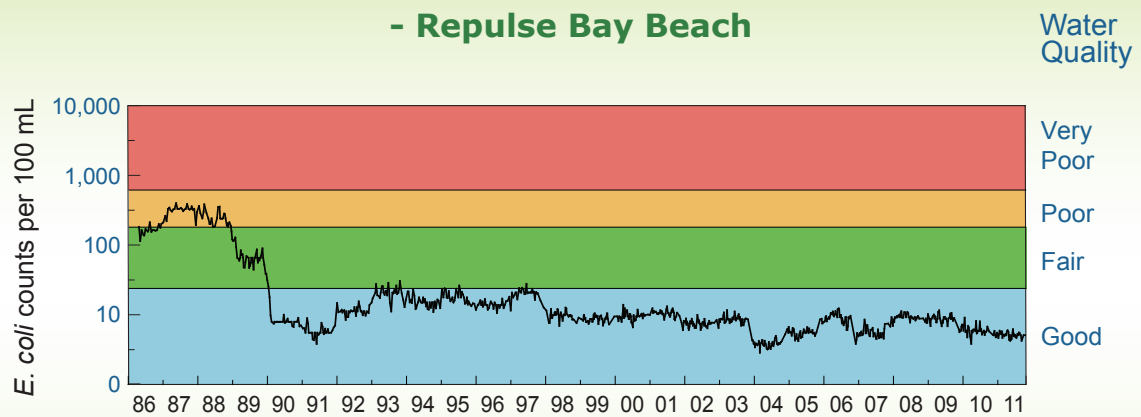


Long-term trend of beach water quality - Middle Bay Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Repulse Bay Beach

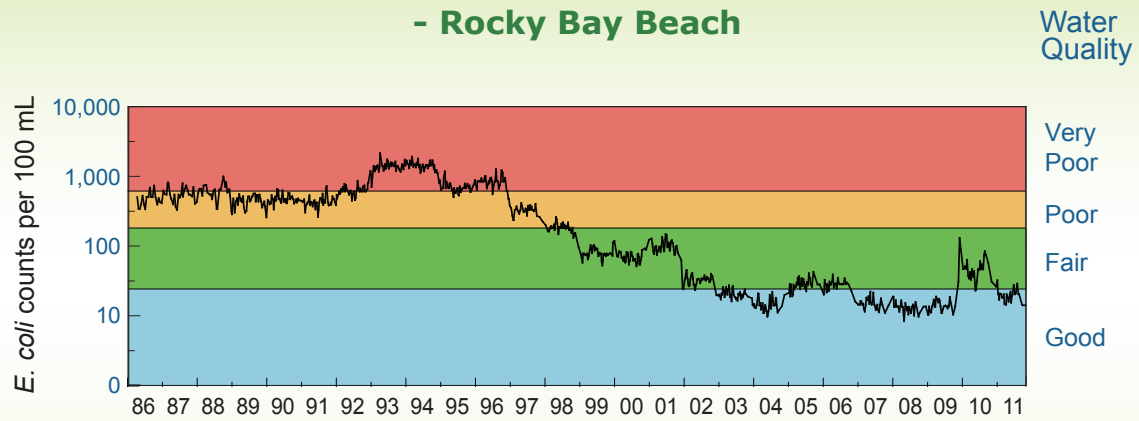


Legend: — 3-month running geometric mean trend line



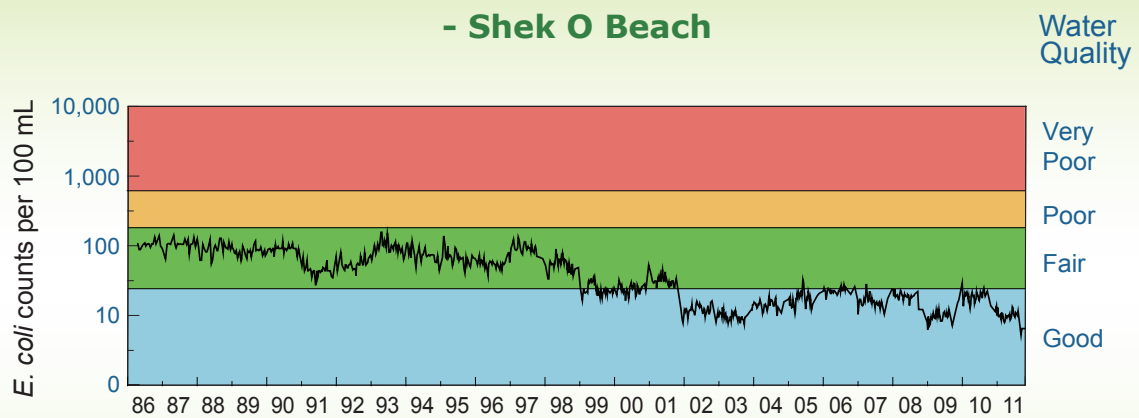


Long-term trend of beach water quality - Rocky Bay Beach



Legend: — 3-month running geometric mean trend line

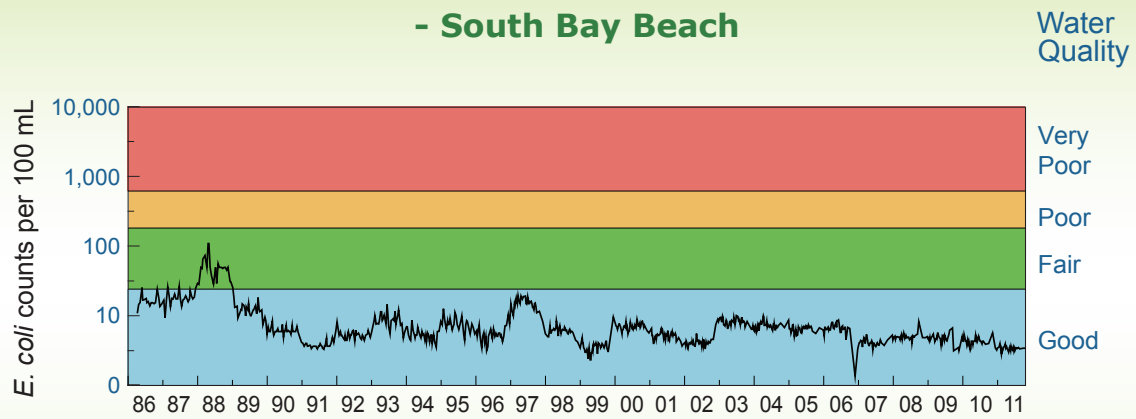
Long-term trend of beach water quality - Shek O Beach



Legend: — 3-month running geometric mean trend line

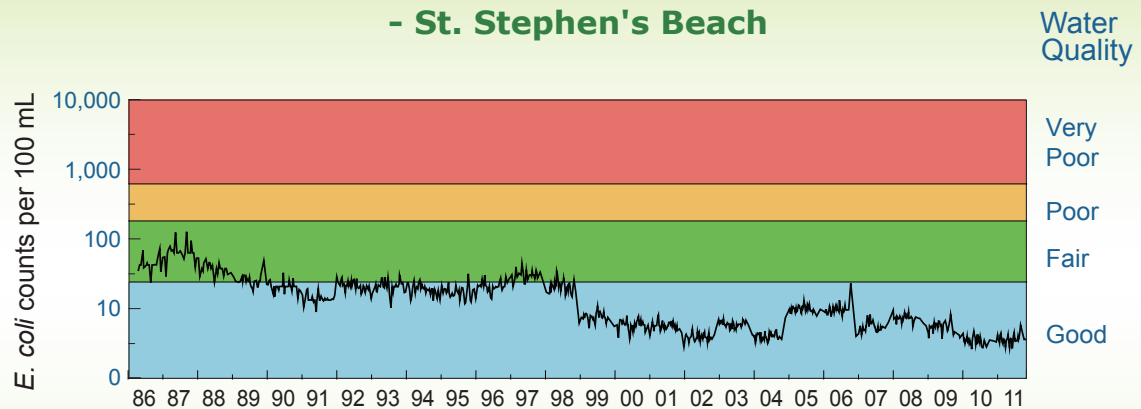


Long-term trend of beach water quality - South Bay Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - St. Stephen's Beach

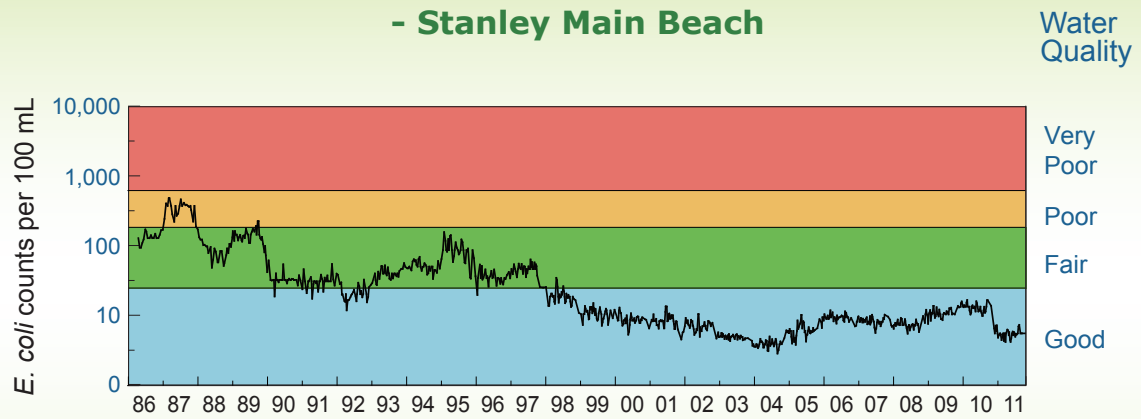


Legend: — 3-month running geometric mean trend line



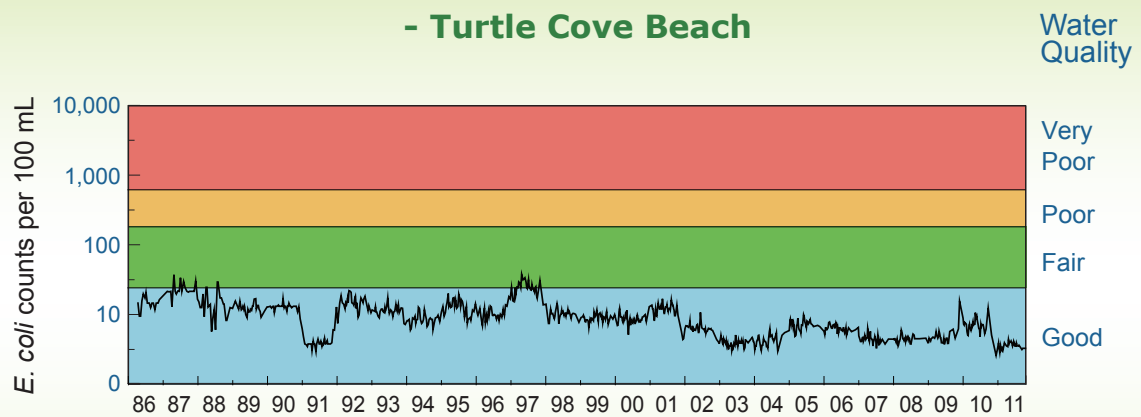


Long-term trend of beach water quality - Stanley Main Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Turtle Cove Beach



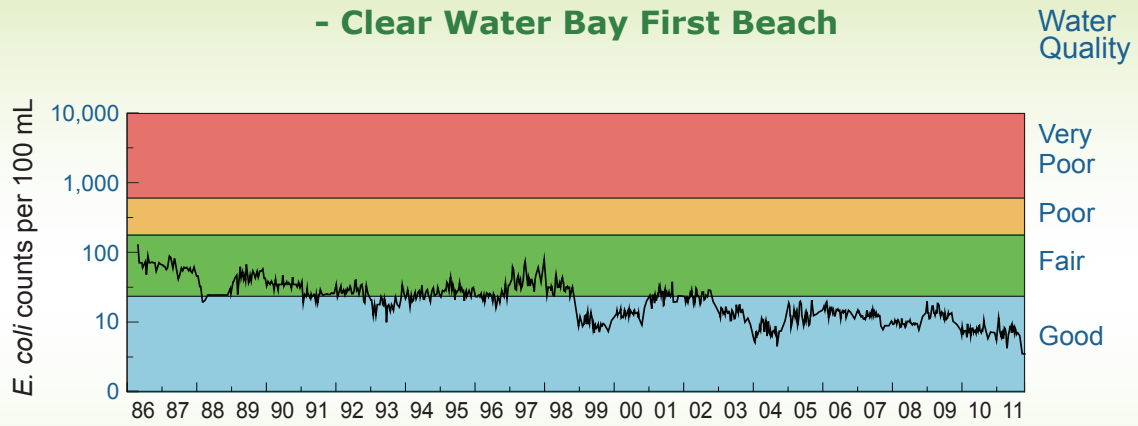
Legend: — 3-month running geometric mean trend line





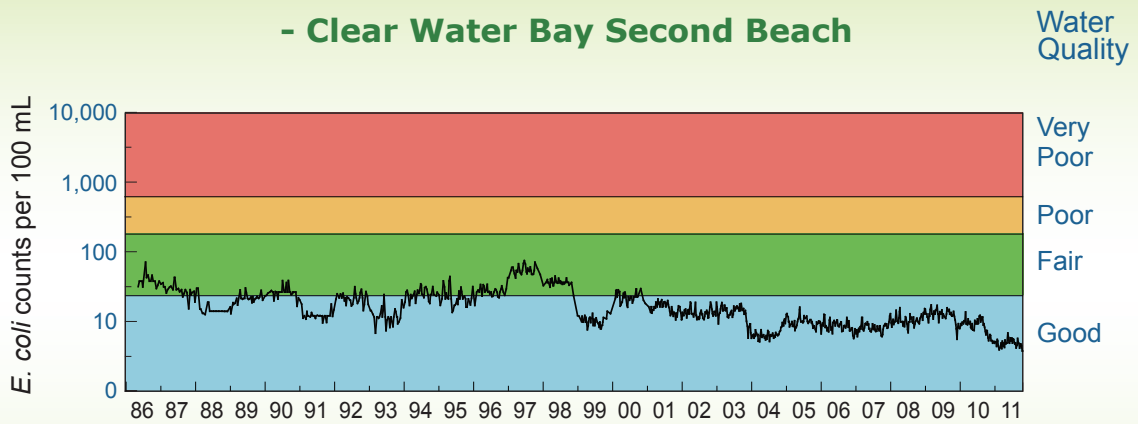
Sai Kung District

Long-term trend of beach water quality - Clear Water Bay First Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Clear Water Bay Second Beach

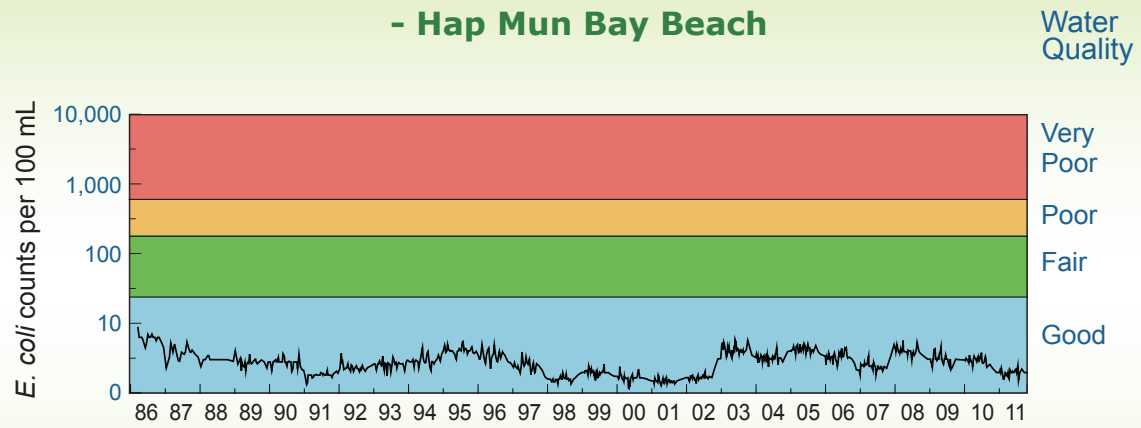


Legend: — 3-month running geometric mean trend line



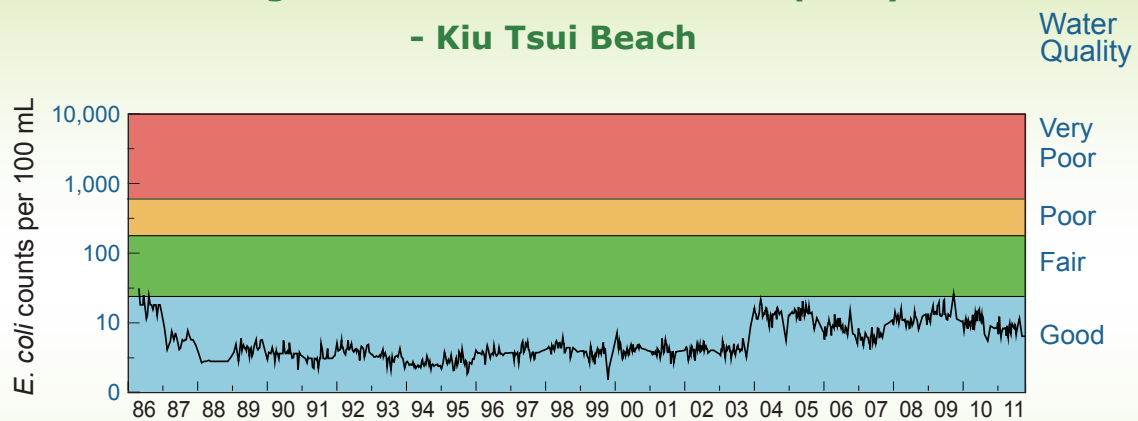


Long-term trend of beach water quality - Hap Mun Bay Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Kiu Tsui Beach

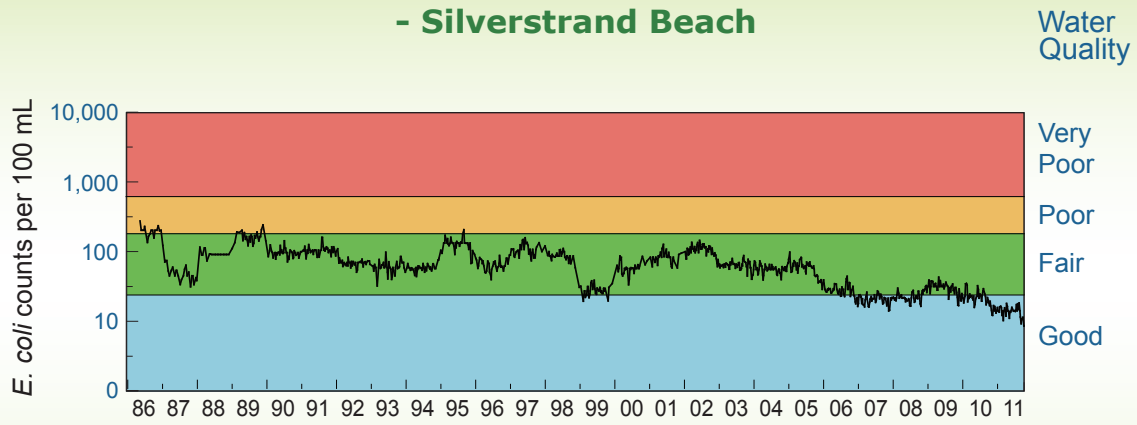


Legend: — 3-month running geometric mean trend line



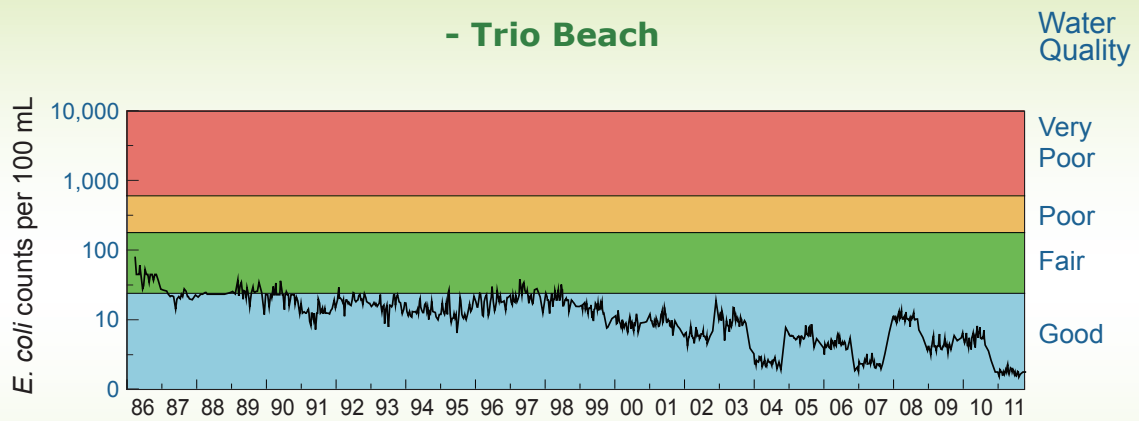


Long-term trend of beach water quality - Silverstrand Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Trio Beach



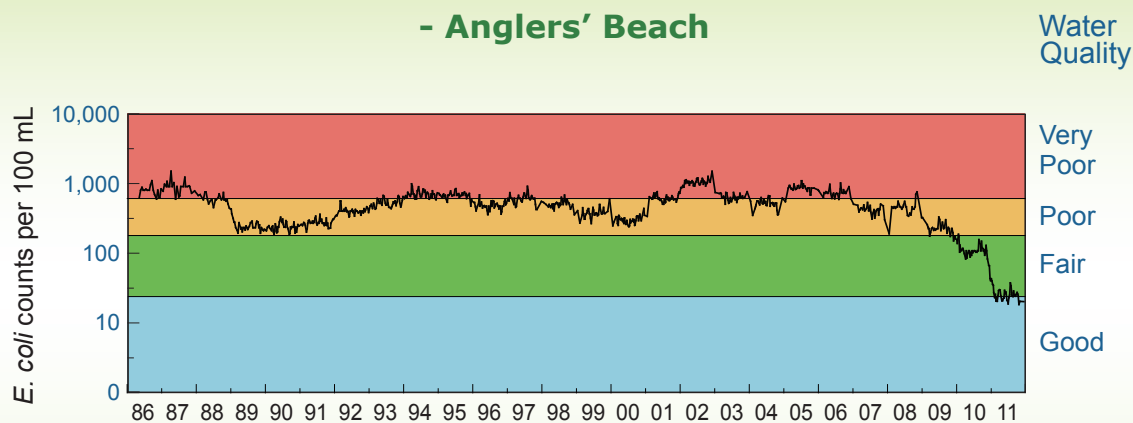
Legend: — 3-month running geometric mean trend line





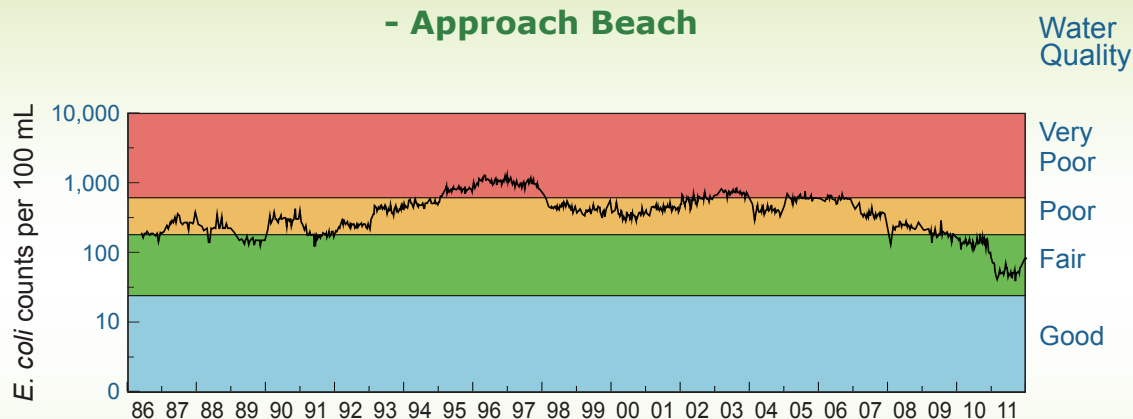
Tsuen Wan District

Long-term trend of beach water quality - Anglers' Beach



Legend: — 3-month running geometric mean trend line

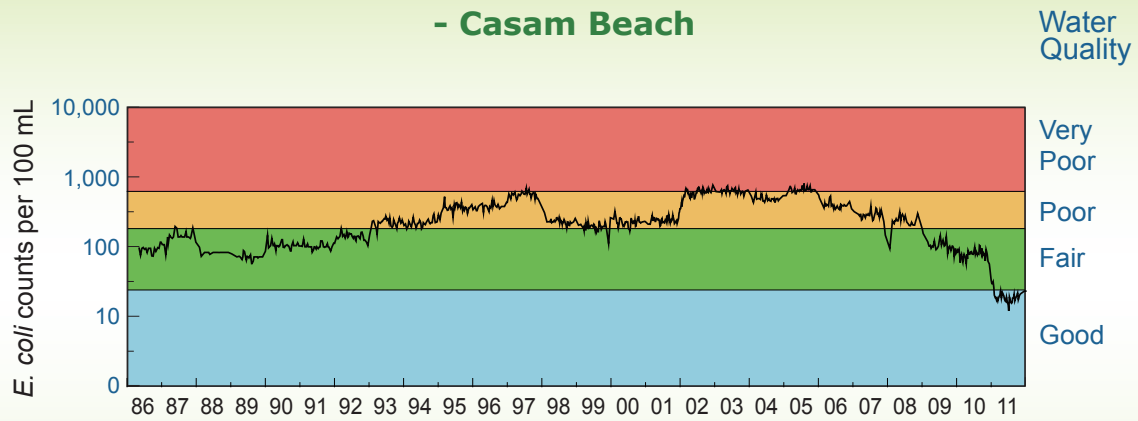
Long-term trend of beach water quality - Approach Beach



Legend: — 3-month running geometric mean trend line

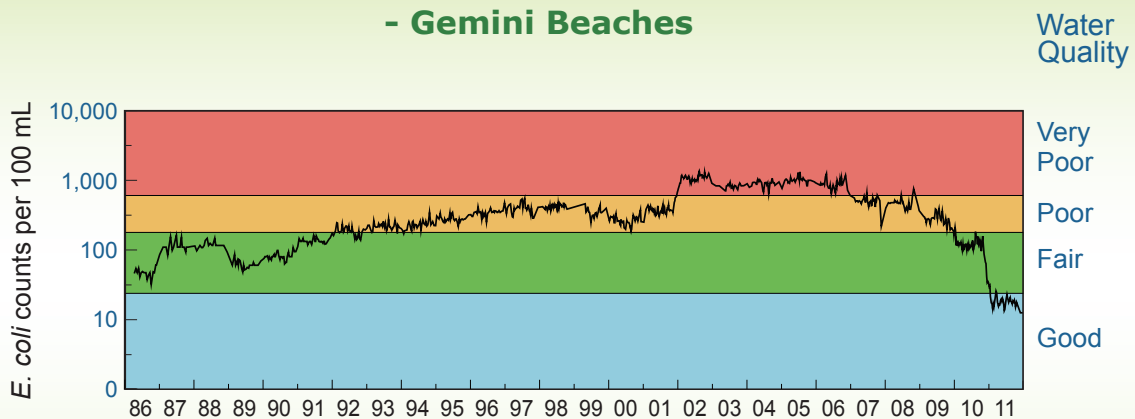


Long-term trend of beach water quality - Casam Beach



Legend: — 3-month running geometric mean trend line

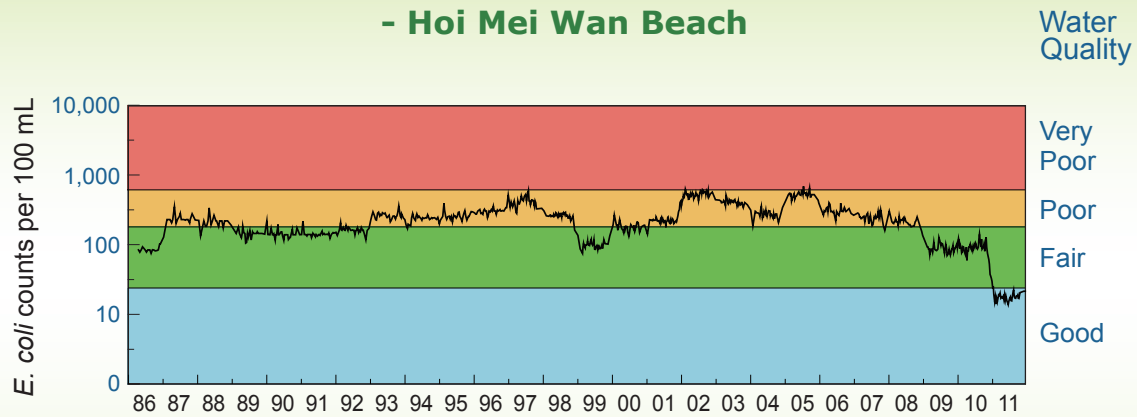
Long-term trend of beach water quality - Gemini Beaches



Legend: — 3-month running geometric mean trend line

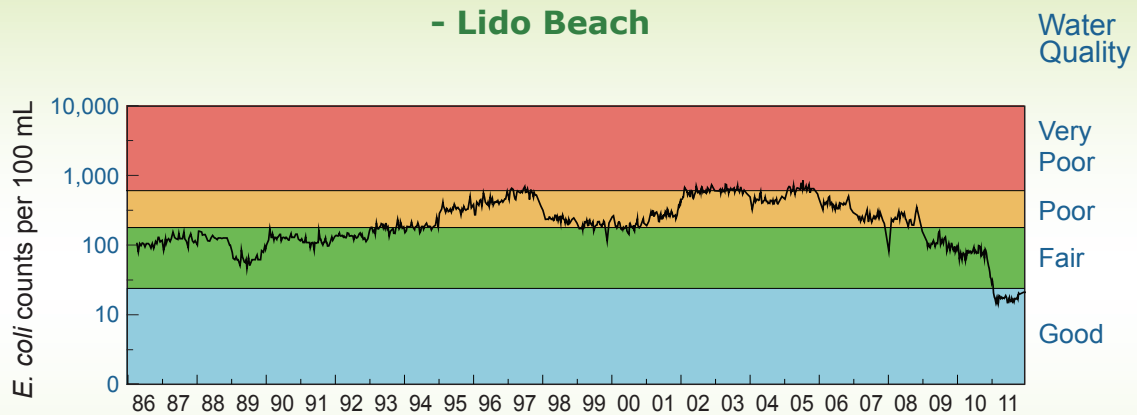


Long-term trend of beach water quality - Hoi Mei Wan Beach



Legend: — 3-month running geometric mean trend line

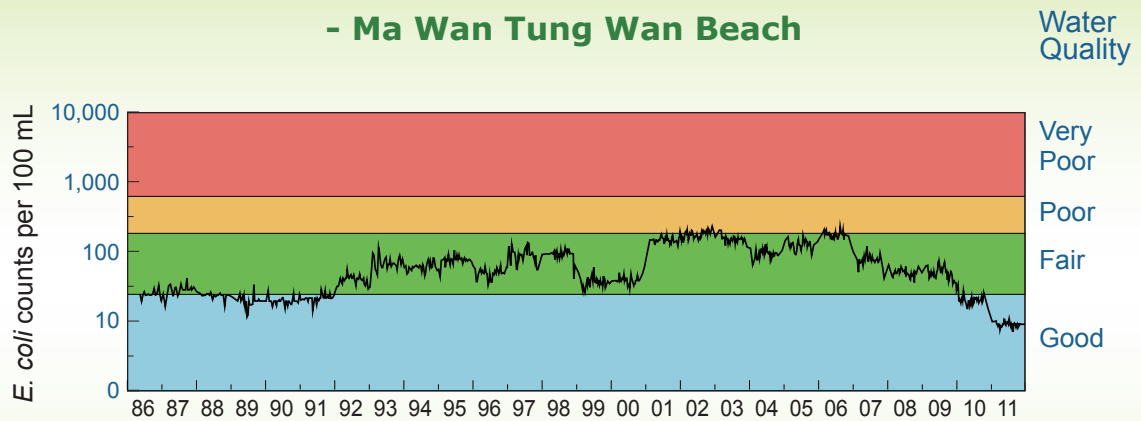
Long-term trend of beach water quality - Lido Beach



Legend: — 3-month running geometric mean trend line

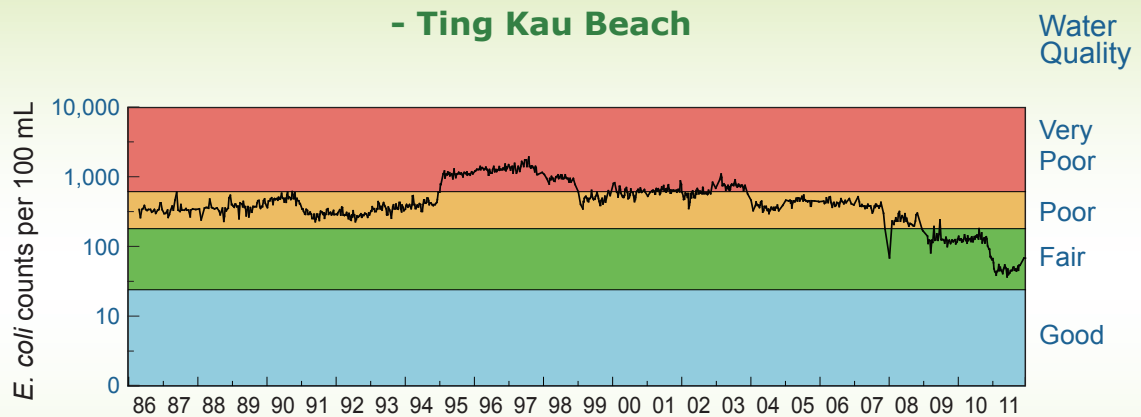


Long-term trend of beach water quality - Ma Wan Tung Wan Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Ting Kau Beach

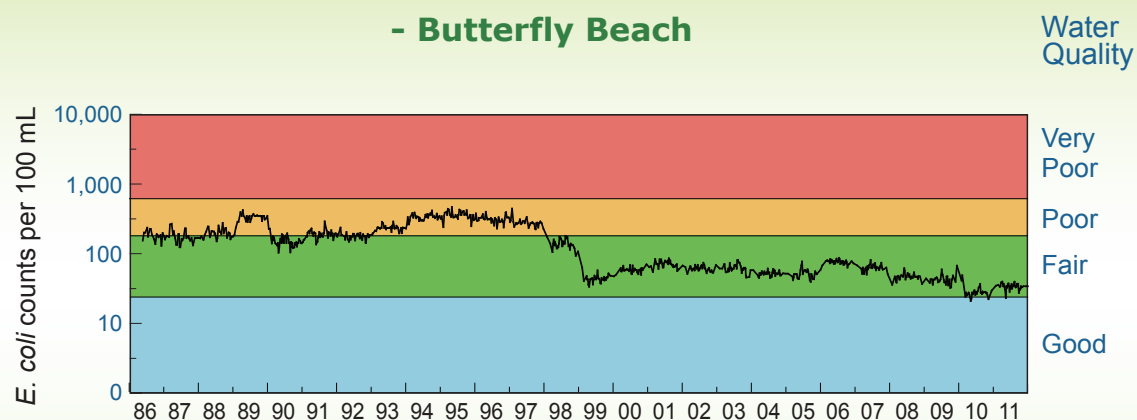


Legend: — 3-month running geometric mean trend line



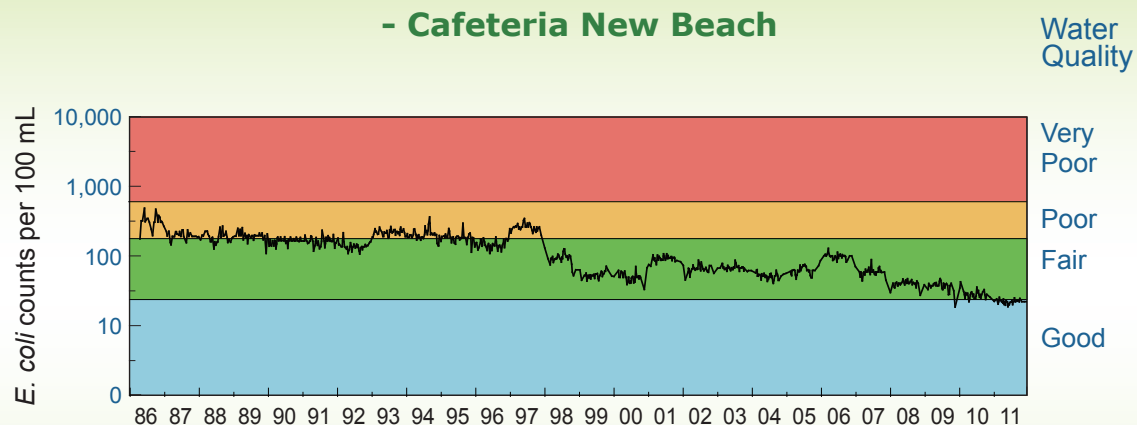
Tuen Mun District

Long-term trend of beach water quality - Butterfly Beach



Legend: — 3-month running geometric mean trend line

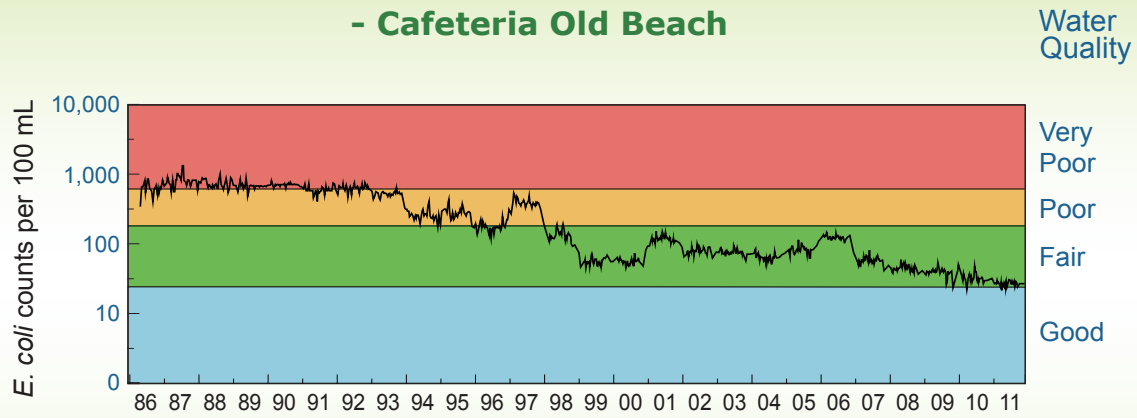
Long-term trend of beach water quality - Cafeteria New Beach



Legend: — 3-month running geometric mean trend line

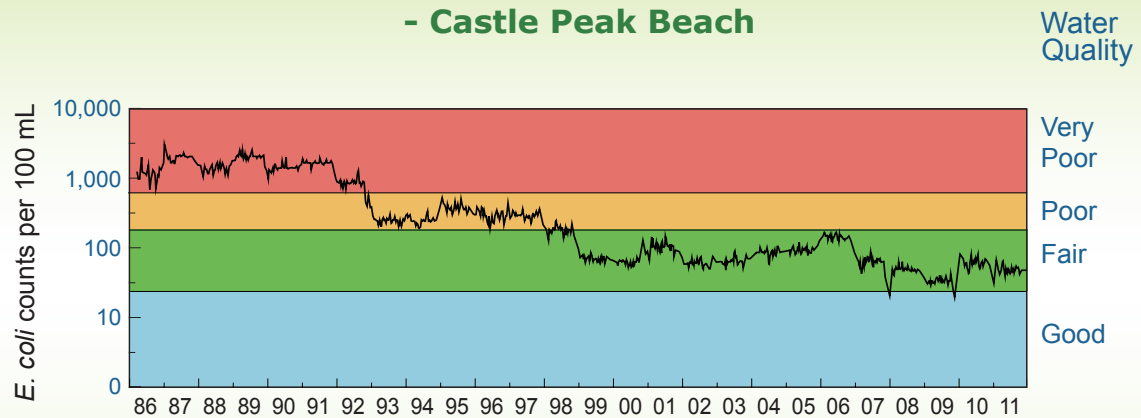


Long-term trend of beach water quality - Cafeteria Old Beach



Legend: — 3-month running geometric mean trend line

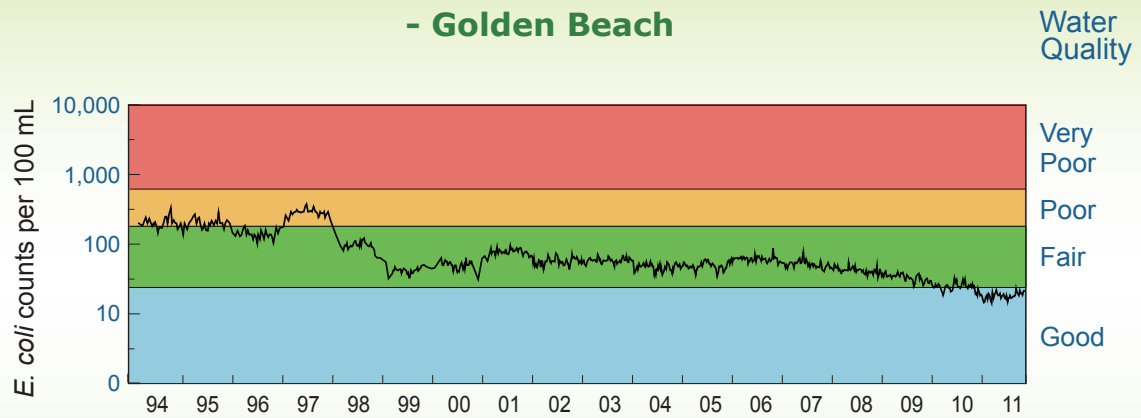
Long-term trend of beach water quality - Castle Peak Beach



Legend: — 3-month running geometric mean trend line



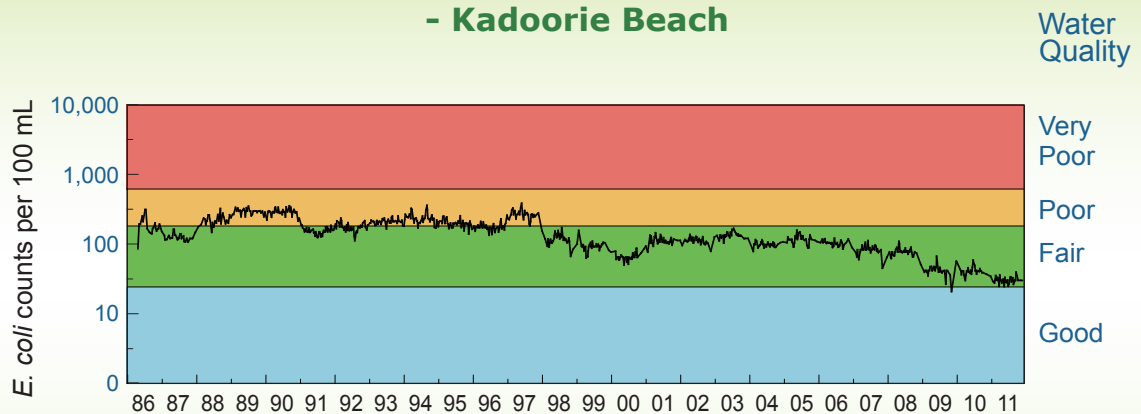
Long-term trend of beach water quality - Golden Beach



Golden Beach was gazetted in 1995

Legend: — 3-month running geometric mean trend line

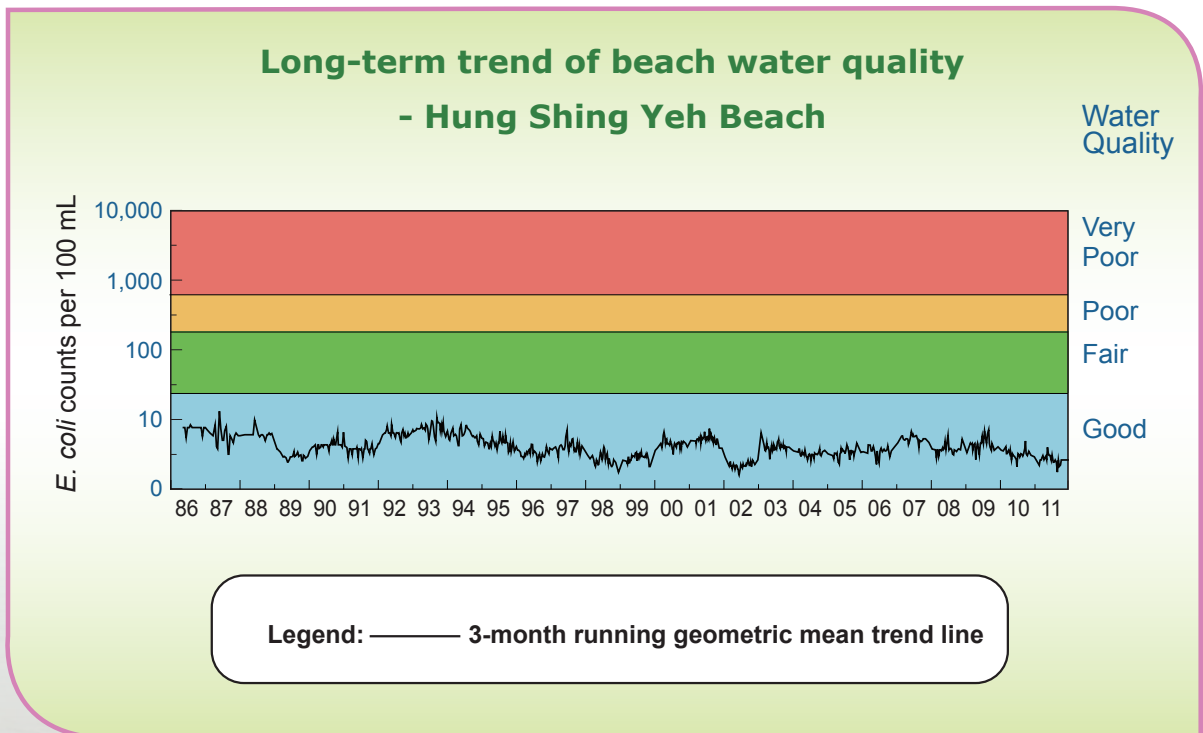
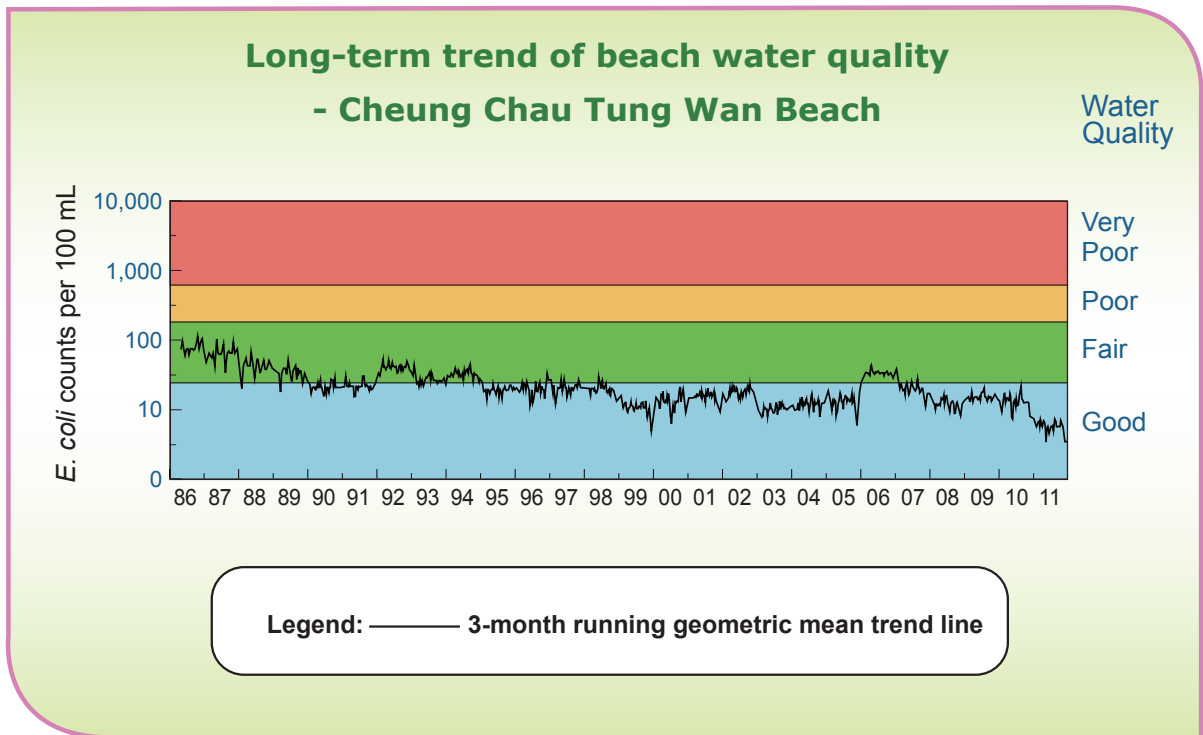
Long-term trend of beach water quality - Kadoorie Beach



Legend: — 3-month running geometric mean trend line

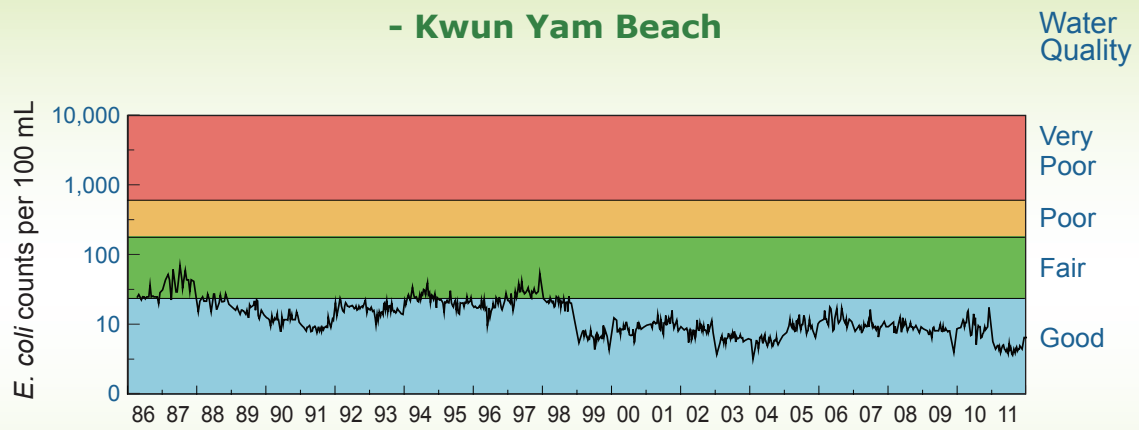


Outlying Islands



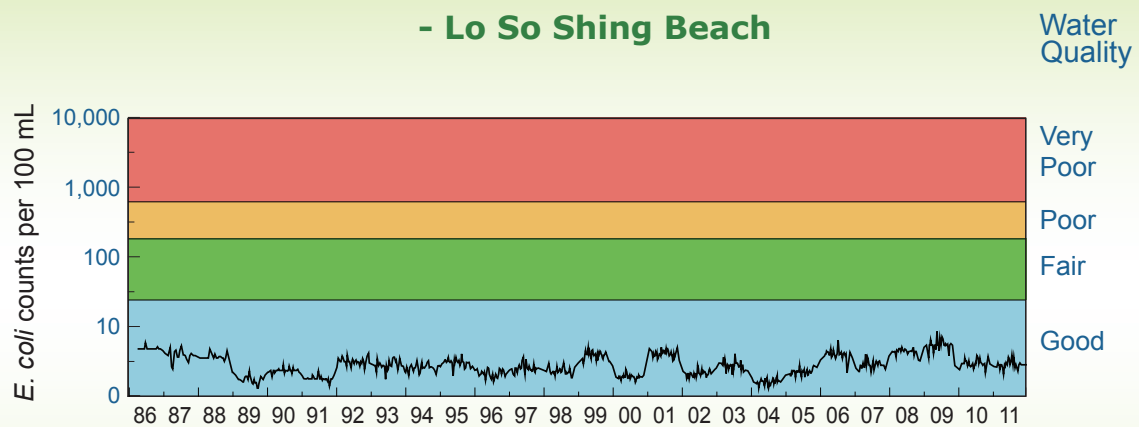


Long-term trend of beach water quality - Kwun Yam Beach



Legend: — 3-month running geometric mean trend line

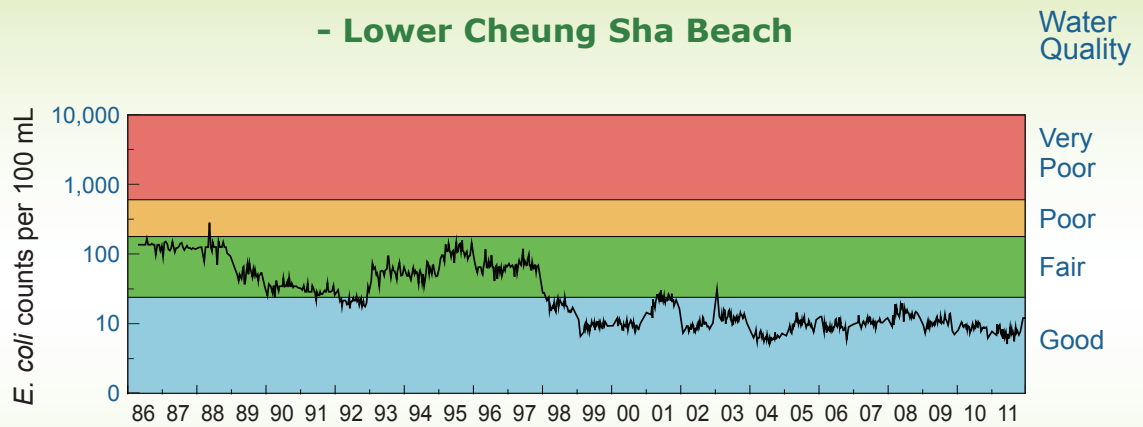
Long-term trend of beach water quality - Lo So Shing Beach



Legend: — 3-month running geometric mean trend line

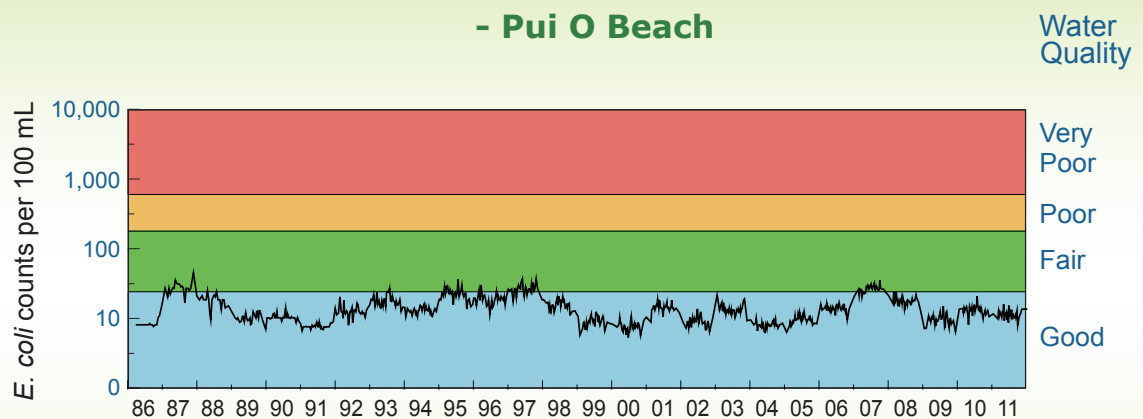


Long-term trend of beach water quality - Lower Cheung Sha Beach



Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Pui O Beach

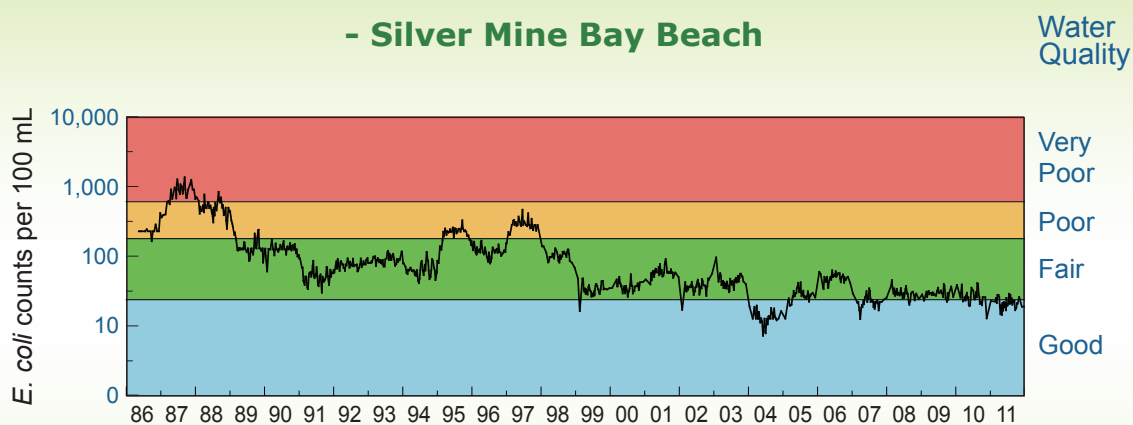


Legend: — 3-month running geometric mean trend line



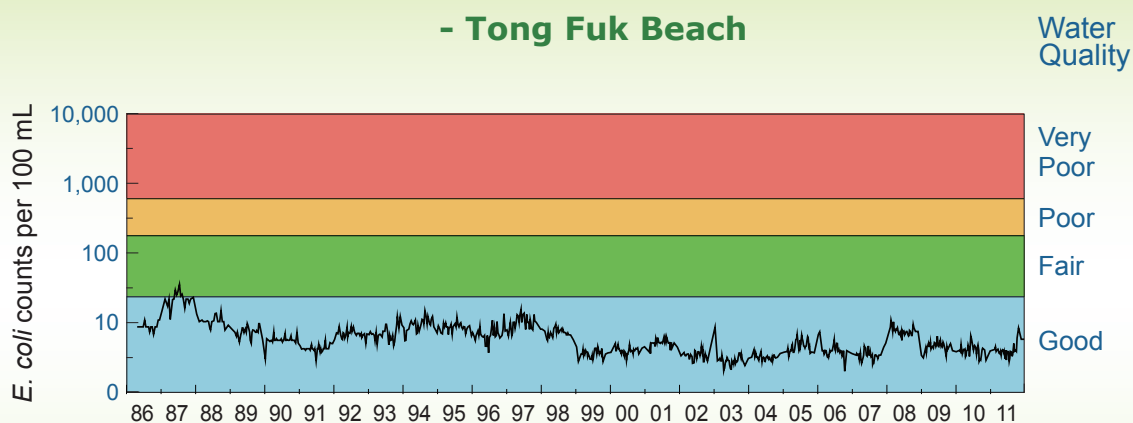


Long-term trend of beach water quality - Silver Mine Bay Beach

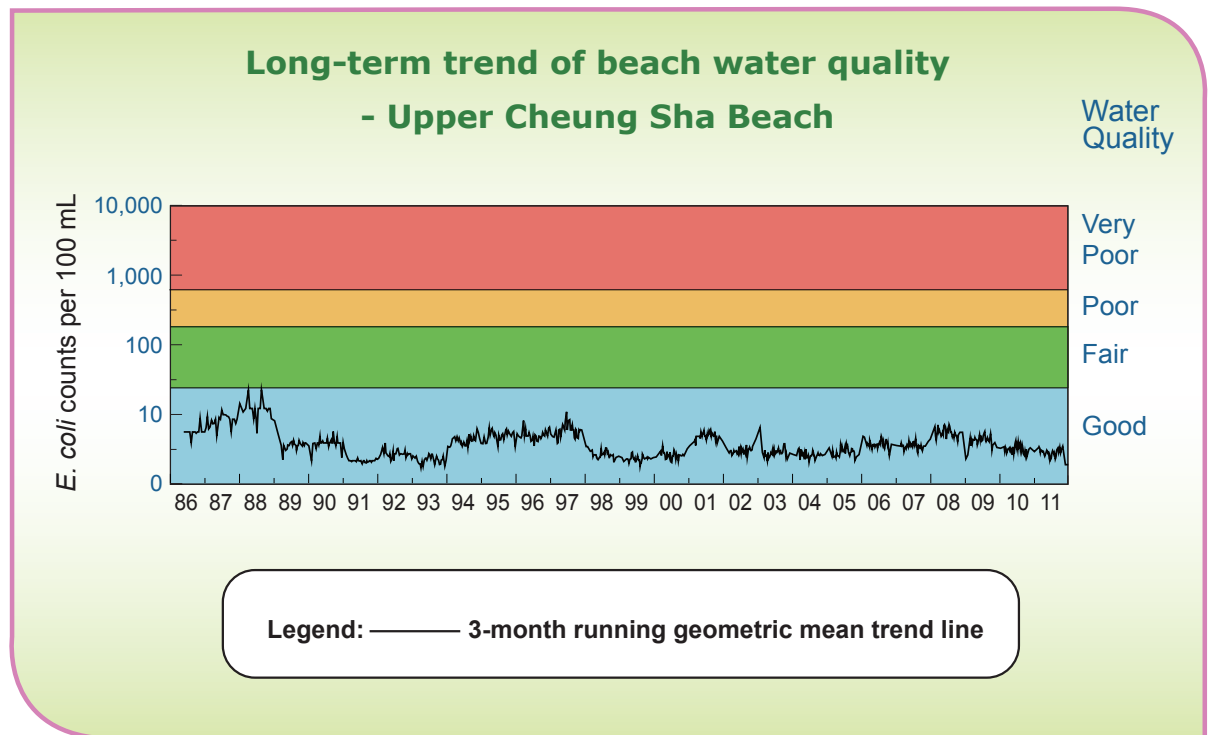


Legend: — 3-month running geometric mean trend line

Long-term trend of beach water quality - Tong Fuk Beach



Legend: — 3-month running geometric mean trend line



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