

PORT PHILLIP BAY
BEACH LITTER SURVEY 2003-04
APPENDICES

February 2005

APPENDIX A – METHODOLOGY

The survey sites were chosen to ensure that there was at least one site from each of the Victorian municipalities that surround Port Phillip Bay. The beaches used in this report were high-usage areas for their municipalities and where possible were close to a lifesaving club. The beaches include: Eastern beach, Mount Martha beach, Rye beach, Seaford beach, St Kilda beach, Williamstown Beach, Mordialloc beach, Port Melbourne, Queenscliff, Sandringham, Sorrento and Werribee South.

A diagram of the Port Phillip Bay beaches surveyed is included below.

Three types of litter survey methodologies were used at each of the 12 sites over the 10 surveys.

1. Full-scale survey: a 48 m² survey area is measured and then all litter in the area is counted, removed and weighed. The litter is removed to enable the surveyors to calculate the regeneration rate (litter accumulation between surveys).



Figure A1: Beaches (underlined) surveyed in the Beach Report

Full-scale survey, step by step

1. A site survey is undertaken and a permanent mark is chosen as the survey marker. This area is photographed so future surveys can be conducted at the same location.
2. A distance from the permanent marker is measured for the first marker of the survey area. This is then included on the KABV site information sheet.
3. A 48 m² site is measured and wickets hats are placed at the corners. The site is photographed and included on the KABV site information sheet for future survey information.
4. All litter in the survey area is counted and removed, with the litter survey data being entered onto a KABV litter survey form.
5. Sites are revisited over the summer period and, on each visit, litter is counted and removed.

2. Visible litter survey: a 48 m² survey area is measured and then all litter in the area is counted but not removed. The litter remains on the survey area, to observe the effectiveness of beach cleaning.

Visible litter survey, step-by-step

1. A site survey is undertaken and a permanent mark is chosen as the survey marker. This area is photographed so future surveys can be conducted at the same location.

2. A distance from the permanent marker is measured for the first marker of the survey area. This is then included on the KABV site information sheet.
3. A 48 m² site is measured and wickets hats are placed at the corners. The site is photographed and included on the KABV site information sheet for future survey information.
4. All litter in the survey area is counted, but not removed, with the litter survey data being entered onto a KABV litter survey form.
5. Sites are revisited over the summer period and on each visit, litter is counted but not removed.

3. Visual ratings survey: a 50 m length of beach is viewed and a visual rating is allocated. Visual ratings are between zero and 10, with zero representing a site with no litter and 10 representing a site covered with litter. Visual ratings provide a quick snapshot of the visual presence of litter on each surveyed beach.

Visual ratings survey, step-by-step

1. A site survey is undertaken and a permanent mark is chosen as the survey marker. This area is photographed so future surveys can be conducted at the same location.
2. A distance from the permanent marker is measured for the first marker of the survey area. This is then included on the KABV site information sheet.

3. A 50 m site is measured and witches hats are placed in the middle and at the corners. The site is photographed and included on the KABV site information sheet for future information.
4. All litter in the survey area is viewed but not removed, with the litter rating being entered onto the KABV litter site rating survey form.
5. Sites are rated zero through to 10, with zero representing no litter and 10 representing litter covering the entire site.
6. Sites are revisited over the summer period and, on each visit, a rating is given.

Please note: Where a single container had been dumped with a number of pieces of litter inside the container, this is included as only one item. Where the contents of that container have begun to spill out, the individual pieces are counted.

Data analysis

Data analysis is broken up into products, materials, regeneration rates and weight. The results may vary between surveys due to weather, rainfall, the number of people visiting the beach and timing of beach cleaning.

Material type, Where litter is identified according to its constituent elements. This allows the manufacturers of the raw materials to see the impact of their materials on the litter stream. Appendix B provides an example of which products are categorised into which material groups.

Product type. Where the litter is identified according to the nature of the item.

Regeneration rates. Regeneration rates can only be obtained from the full-scale litter count, as the litter is removed after each survey. The number of litter items that accumulate between each survey date defines regeneration. The number of items that regenerate per day measures the rate.

Weight. All litter from the full-scale survey is taken away and weighed.

APPENDIX B – MATERIAL GROUPS

Here are examples of the type of products in each material group.

Metal	Ceramics
Confectionery foil	Cement
Spirit cans	Bricks
Wire	Tiles
Miscellaneous	Paper
String and rope	Takeaway wrappers
Adhesive bandages	Business cards
Pens and pencils	Milk cartons
Wood	Plastic
Ice cream sticks	Cling wrap
Matches	Lollipop sticks
Construction material	Plastic bags
Rubber	Glass
Balloons/water bombs	Soft drink bottles
Rubber bands	Beer bottles
Tyres and tyre pieces	Wine bottles
Organic material	Cigarette butts
Cork	Cigarette butts
Fruit and Vegetables	
Dog faeces	

Table B1: Types of products in each material group

APPENDIX C – QUALITY ASSURANCE

To improve the accuracy of the surveys, quality assurance was undertaken. All surveyors completed a full day of training to ensure accuracy of the data they collected. During the survey period, the litter survey team leader performed a number of quality assurance checks .

Visual rating survey

The results obtained by the surveyors for the visual rating surveys are compared with the results obtained by the survey team leader. The correlations were very close, with only one discrepancy. Table C1 shows the differences between the actual survey and the quality assurance figures.

Visible survey

Quality assurance for the visible survey is undertaken by two of the survey teams separately counting the same 48 m² site. The results are then directly compared with each other to ensure that results are not due to extraneous variables such as surveying technique. Table C2 shows the results of this quality assurance, with an average discrepancy of 4.3 items per survey.

The main reason for this discrepancy is that there is the possibility of the first surveyor burying items underneath the sand when walking the length of the survey area. This can especially affect the data count when smaller litter items are buried in the site after the first surveyor has counted.

Beach	Date	Survey Site rating	Quality assurance Site rating	Difference
Eastern	5/01/2004	1	1	0
Eastern	27/01/2004	2	2	0
Eastern	9/03/2004	1	1	0
Sandringham	29/12/2003	3	2	1
Sandringham	12/01/2004	3	3	0
Sandringham	16/02/2004	3	3	0
Sorrento	20/12/2003	1	1	0
Sorrento	19/01/2004	1	1	0
Sorrento	16/02/2004	0	0	0

Table C1: Quality assurance data for visual rating survey

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

Beach	Date	Survey number	Visible	Quality assurance	Difference
			Items per survey	Items per survey	
Eastern	5/01/2004	4	29	25	4
Eastern	27/01/2004	7	95	90	5
Eastern	9/03/2004	10	17	16	1
Sandringham	29/12/2003	2	46	40	6
Sandringham	12/01/2004	5	48	45	3
Sandringham	16/02/2004	9	51	47	4
Sorrento	20/12/2003	1	17	15	2
Sorrento	19/01/2004	6	18	17	1
Sorrento	16/02/2004	9	15	15	0

Table C2: Quality assurance data for visible survey

APPENDIX D – EASTERN BEACH

Summary

Eastern beach is in the Greater City of Geelong and is a high-use area with a promenade and a car park in the immediate area. Also located nearby is an enclosed swimming area, manicured parklands and boat hire facilities.

Several festivals were held near Eastern beach over the summer period, including triathlon events. This did not seem to have a great impact on the amount of litter found, as the beach was cleaned after each festival

There was an increase in the amount of litter found in both the visible and full-scale surveys from past years. Out of the last five years, the summer of 2003-04 has produced the highest littered results for Eastern beach.

Visible and full-scale survey results

Over the past five years an average of 24.7 items was found per year at Eastern beach in the visible survey. The average amount of litter found in 2003-04 was 32.2 items per survey. This shows an increase of 46 per cent from the 2002-03 period, when the average was 22 items per survey.

An average of 25.6 items per year was recorded in the full-scale surveys over the past five years. The full-scale survey results increased by 50 per cent in 2003-04, when the litter count average was 34 items per survey compared to 22.6 during 2002-03.

Figure D1 illustrates the average number of litter items found at Eastern beach over the past five years.

Eastern beach 2003-04 quick stats

Visible survey

Avg. no of items found: 32.2 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 7 (95 items)

Full-scale survey

Avg. no of items found: 34.0 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 7 (60 items)
 Weight of litter: 215 grams

Site rating survey

Highest rating: 2 (Surveys 5, 7, 8 & 9)
 Lowest rating: 0 (Surveys 1 & 2)
 Eastern beach was ranked as the fifth most littered beach in both the visible and full-scale surveys.

Product types

Cigarette butts were the most littered item, accounting for 58 per cent of all litter found. In the visible litter count, the volume of cigarette butts found in 2003-04 has increased by 16 per cent from 1999-00. The second most littered item was string and rope, accounting for 10 per cent of all litter items found at Eastern beach in 2003-04.

The average number of products found per survey is shown in Figure D2.

Visual ratings

The average visual rating for Eastern beach was 1.2 per survey. The highest rating of 2 was recorded on surveys 5, 7, 8 and 9.

The highest average site rating was recorded in 2000-01, when Eastern beach was given an average rating of 2.4 per survey.

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

Figure D3 shows the ratings given to each survey by the survey teams for the past five years.

Material groups

Cigarette butts represent 58 per cent of all litter recorded on the visible survey, with an average of 18.7 items per survey. In the full-scale survey, an average of 20.1 cigarette butts was found per survey.

Plastic items were the second most littered group in both the visible and full-scale survey, with an average of 5.6 and 5.8 respectively.

Out of the 10 material groups, cigarette butts have been the most littered group in each of the past five years.

Figure D4 provides a breakdown of the average number of items found in each of the 10 material groups in 2003-04.

Regeneration rates

At Eastern beach, the highest regeneration rate was recorded between surveys 3 and 4, when 11.3 items

were regenerated per day. The lowest regeneration rate, of 1.8 items per day, occurred between surveys 9 and 10. Table D1 below shows the number of items regenerated per day between surveys.

Survey	Regeneration rate: items per day
Survey 1-2	2.6
Survey 2-3	5.3
Survey 3-4	11.3
Survey 4-5	7.6
Survey 5-6	2.4
Survey 6-7	7.5
Survey 7-8	5.8
Survey 8-9	3.1
Survey 9-10	1.8

Table D1: Regeneration rates at Eastern beach

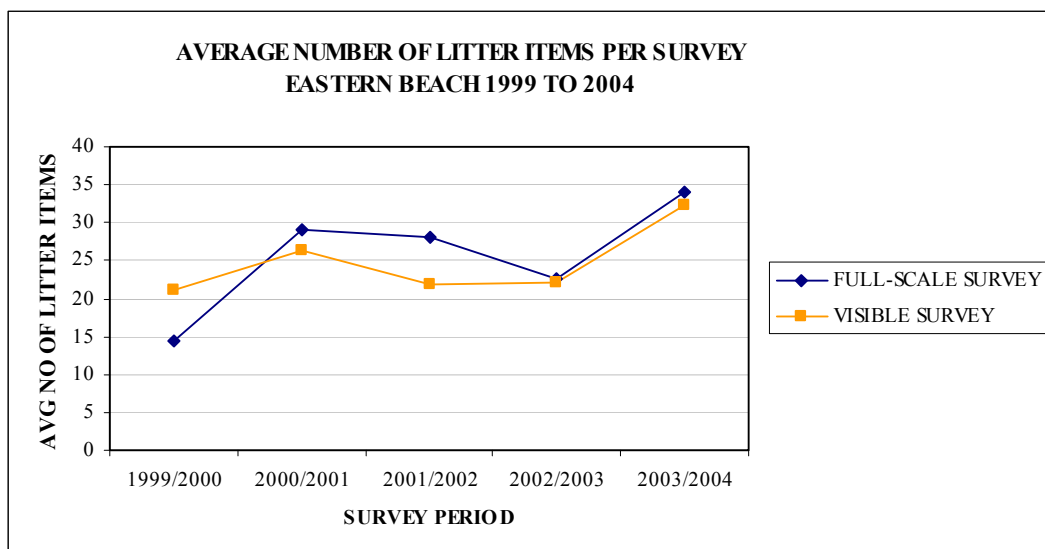


Figure D1: Average number of litter items counted in each survey at Eastern beach

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

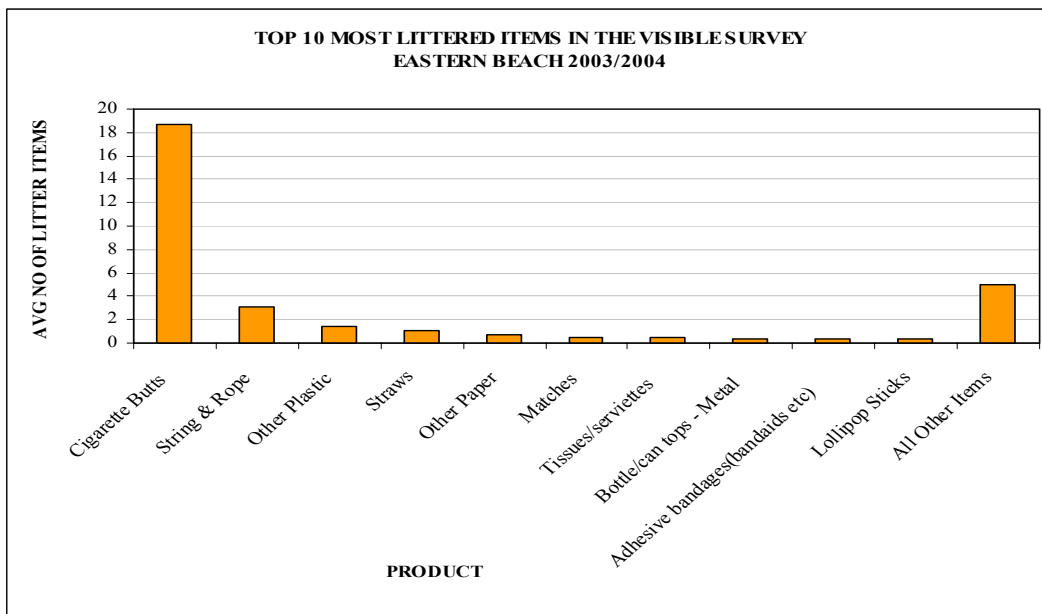


Figure D2: Top 10 most littered items, visible survey at Eastern beach

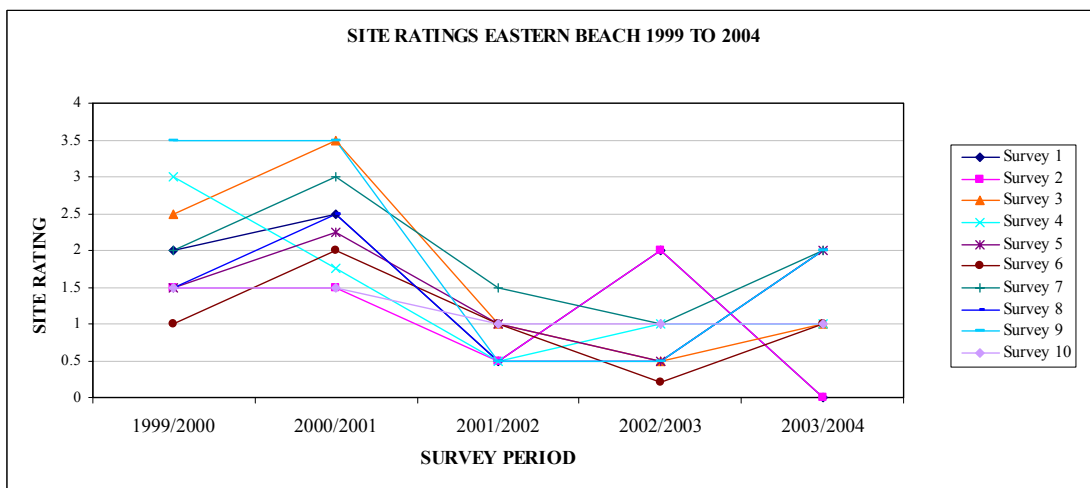


Figure D3: Visual site ratings at Eastern beach

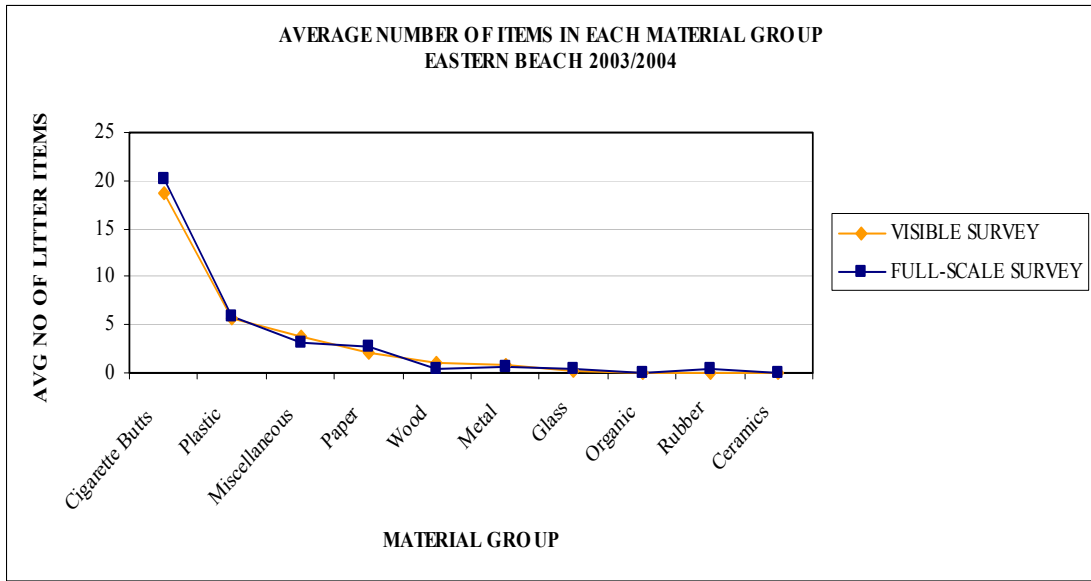


Figure D4: Material type found per survey at Eastern beach

APPENDIX E – MORDIALLOC BEACH

Summary

Mordialloc beach is located in the City of Kingston. The beach is located alongside a promenade, which contributes to the amount of litter found on the beach closer to the walkway.

Kingston City Council launched the ‘Summer by the Bay’ campaign on 10 January at Mordialloc beach². Kingston Council also supported the Association of Bayside Municipalities’ ‘BUTTsOUT’ campaign, which was also launched in January 2004. There were no obvious decreases in the results of the litter counts after these campaigns were launched.

The survey team observed that the beach was cleaned on a regular basis by mechanical cleaning. It was noticed that the machines travelled quite fast and weren’t picking up all the litter on the beach. It is the belief of this report that, if these machines travel a lot slower, they may pick up more of the litter that is currently left behind, especially smaller items like cigarette butts.

Visible and full-scale survey results

Over the past five years an average of 43.4 items was found per year at Mordialloc beach in the visible survey. The average amount of litter found in 2003–04 was 54 items per survey. This shows a decrease of 29 per cent from 2002–03, when the average number of items found was 76 items per survey.

Mordialloc beach was ranked the second most littered beach for the second consecutive year in the visible survey.

Mordialloc beach 2003–04 quick stats

Visible survey

Avg. no of items found: 54.0 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 7 (79 items)

Full-scale survey

Avg. no of items found: 42.0 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 7 (58 items)
 Weight of litter: 325 grams

Site rating survey

Highest rating: 3 (Survey 2 & 3)
 Lowest rating: 1 (Surveys 1, 4, 5 & 6)

An average of 40.6 items per year was recorded in the full- scale surveys over the past five years. In the full-scale survey, an average of 42 items was found in 2003–04, a decrease of 38 per cent from 2002–03, when the average number of items found was 67.3.

Mordialloc beach was ranked the fourth most littered beach in the 2003–04 full-scale surveys, compared to 2002–03 when it was the most littered beach in the Port Phillip Bay area.

Figure E1 illustrates the average number of litter items found at Mordialloc beach over the past five years.

Product types

The most littered item at Mordialloc beach was cigarette butts, which accounted for 62 per cent of all litter counted in the visible survey. An average of 33.3 cigarette butts was found per survey in 2003–04. In 2003–04 the amount of cigarette butts found increased by 151 per cent from 1999–2000.

PORT PHILLIP BAY BEACH LITTER SURVEY 2003–04

Other plastic items were the second most littered item, with an average of 3.7 items found per survey, accounting for seven per cent of all litter found.

Figure E2 shows the 10 most littered products at Mordialloc beach.

Visual ratings

The highest visual site rating in the 2003–04 period was 3, which was recorded during surveys 2 and 3 in December.

The average rating this year was 1.8. This shows a 20 per cent drop from an average of 1.5 in the 2002–03 survey period. The highest average site rating of 2.1 per survey was recorded in 1999–2000.

Figure E3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts represent 62 per cent of all litter recorded on the visible survey with an average of 33.3 items. In the full-scale survey, the average number of cigarette butts recorded on Mordialloc beach was 26 items per survey.

Plastic items were the second most littered group in both the visible and full-scale survey with an average of 11.9 and 9.9 items respectively. Plastic

items account for 23.6 per cent of all litter found in the full-scale survey and 22 per cent in the visible survey.

Figure E4 provides a breakdown of the average items found in the 10 material groups.

Regeneration rates

The highest regeneration rate was 11 items per day, which occurred between surveys 3 and 4. The lowest regeneration rate recorded was 2.3 items per day between surveys 1 and 2, as shown in Table E1.

Survey	Regeneration rate: items per day
Survey 1–2	2.3
Survey 2–3	10.3
Survey 3–4	11.0
Survey 4–5	6.9
Survey 5–6	4.6
Survey 6–7	7.3
Survey 7–8	7.2
Survey 8–9	2.6
Survey 9–10	2.6

**Table E1: Regeneration rates
at Mordialloc beach**

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

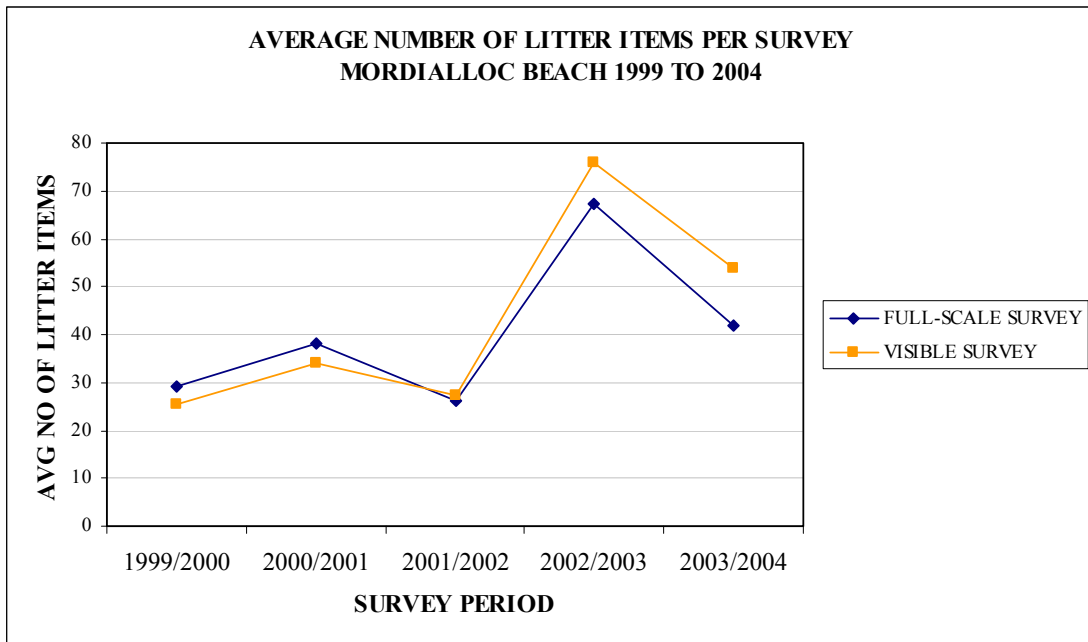


Figure E1: Average number of litter items counted in each survey at Mordialloc beach

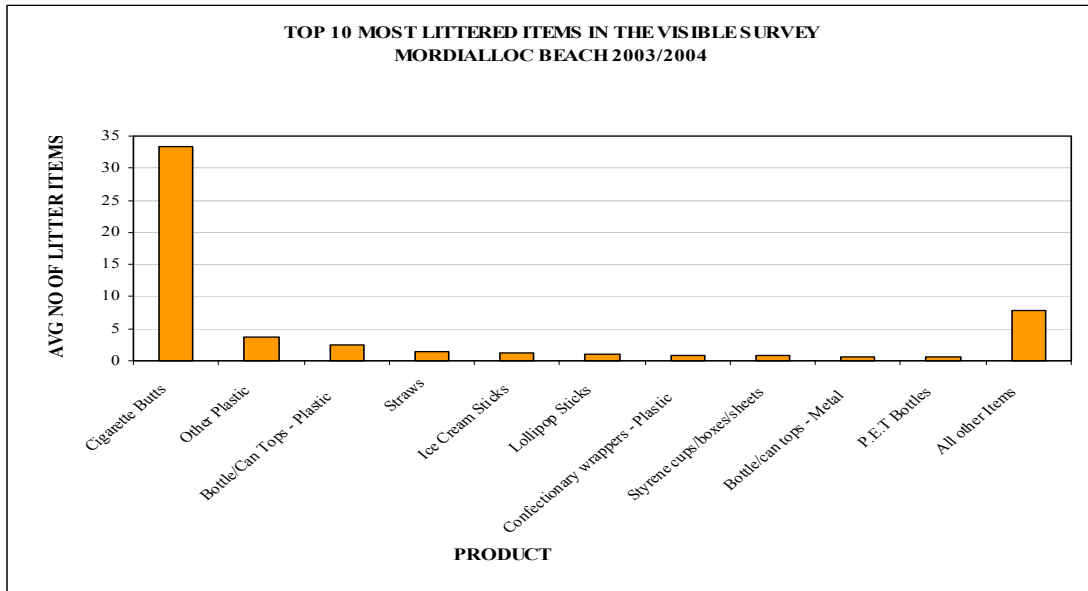


Figure E2: Top 10 most littered items, visible survey at Mordialloc beach

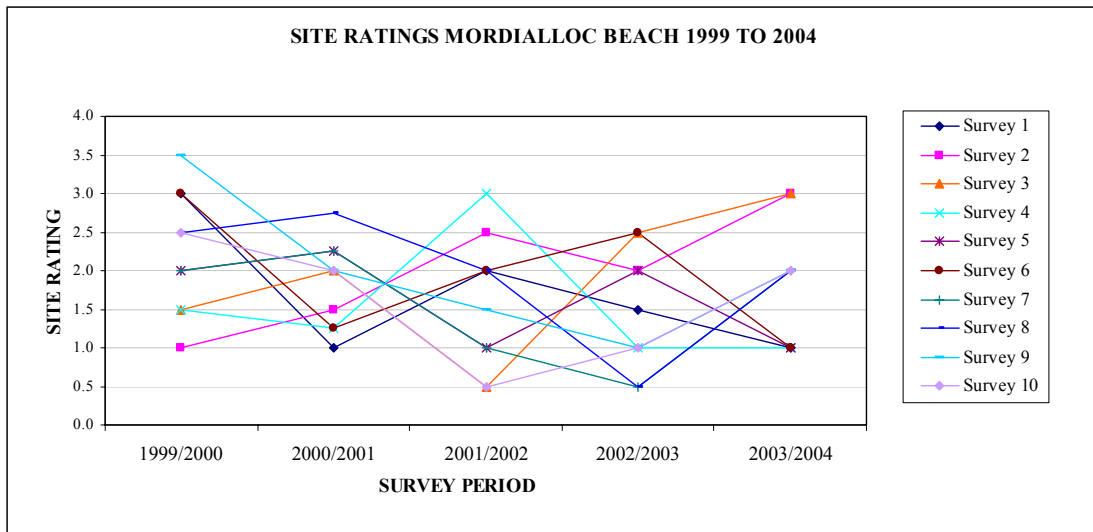


Figure E3: Visual site ratings at Mordialloc beach

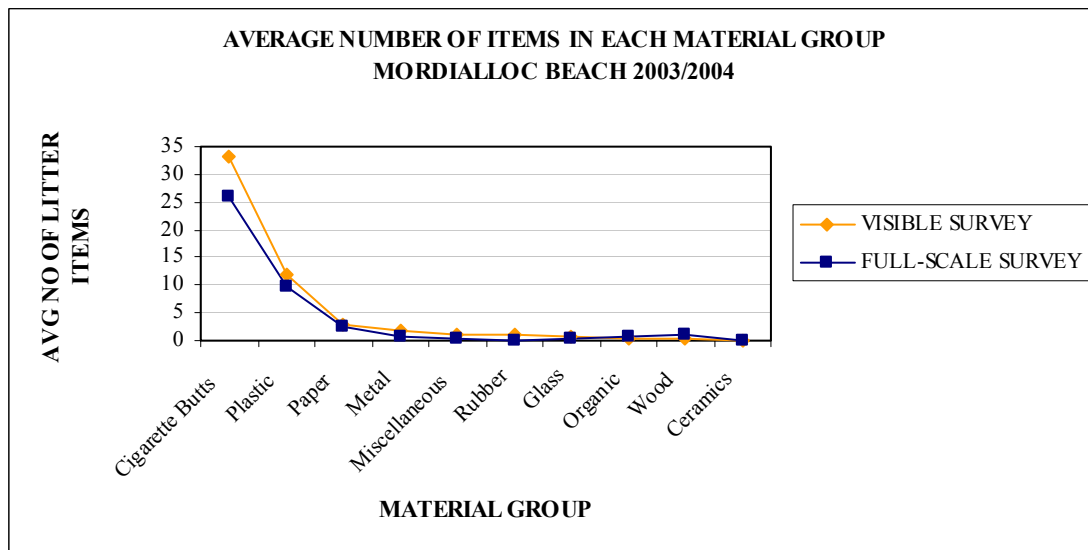


Figure E4: Material type found per survey at Mordialloc beach

APPENDIX F – MT MARTHA BEACH

Summary

Mt Martha is located in Mornington Shire and is the northernmost beach of the three surveyed beaches in the Shire. Bathing boxes line the beach area and it was observed by the litter survey teams that the majority of the owners tended to clean up the litter surrounding their boxes.

There are only two bins in close proximity to the beach and these were overflowing on several occasions. The survey team did not see any evidence that the beach had been mechanically cleaned, however this may have occurred after the surveys took place.

Mount Martha beach has been one of the least littered beaches for the past five years.

Visible and full-scale survey results

The amount of litter recorded at Mount Martha beach this year has increased in comparison with the past two years.

Over the past five years an average of 14.3 items was found per year at Mount Martha beach in the visible survey. The average amount of litter found in 2003-04 was 14.4 items. This was an increase of 38 per cent from 2002-03, when the average number of items found was 10.4 items per survey.

Mount Martha beach has been ranked the tenth most littered beach for the past three years in the visible survey.

An average of 13.9 items per year was recorded in the full scale surveys over the past five years. The average amount of litter found in the full-scale

Mt Martha beach 2003-04 quick stats

Visible survey

Avg. no of items found: 14.4 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 5 (29 items)

Full-scale survey

Avg. no of items found: 17.8 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 3 (36 items)
 Weight of litter: 190 grams

Site rating survey

Highest rating: 1 (Surveys 1 to 6, 8 & 10)
 Lowest rating: 0 (Surveys 7 & 9)

survey was 17.8 items in 2003-04, compared to 11.8 in 2002-03, an increase of 51 per cent.

Mount Martha beach has been ranked the tenth most littered beach for the past four years in the full-scale survey.

Figure F1 below illustrates the average number of litter items found at Mount Martha beach over the past five years.

Product types

Cigarette butts were the most littered item, with an average of five items found per survey. Cigarette butts accounted for 35 per cent of all litter found at Mount Martha beach in 2003-04, a decrease of 32 per cent when compared to 2002-03, when an average of 3.8 items were found in the visible survey. When compared to results from 1999-2000, a 62 per cent increase was found.

Other plastic items were the second most littered product, accounting for 15 per cent of all items surveyed, and recording an average of 2.2 items per

survey. This showed an increase of 122 per cent when compared to 2002-03.

Figure F2 shows the 10 most littered products at Mount Martha beach in the visible survey.

Visual ratings

Less litter has been found during visual site ratings in 2003-04 than in previous years. The average rating this year was 0.8, down from an average of 1.05 in the 2002-03 survey period. The highest site rating was recorded in 1999-2000, when the average site rating was 2.1 per survey.

Figure F3 shows the site ratings per survey for the past five years.

Material groups

Plastic items represent 42 per cent of all litter recorded during the visible survey, with an average of six items per survey. In the full-scale survey, the average number of plastic items found was 7.8 items per survey, accounting for 42 per cent of all litter counted.

Cigarette butts were the second most littered group in the visible and full-scale surveys, with an average of five and 6.4 items respectively.

Figure F4 provides a breakdown of the average items found in the 10 material groups.

Regeneration rates

The highest regeneration rate was nine items per day between surveys 2 and 3. The lowest regeneration rate was 0.2 items per day between surveys 8 and 9, as shown in Table F1.

Survey	Regeneration rate: items per day
Survey 1-2	1.2
Survey 2-3	9.0
Survey 3-4	6.7
Survey 4-5	4.0
Survey 5-6	2.6
Survey 6-7	0.9
Survey 7-8	3.0
Survey 8-9	0.2
Survey 9-10	0.6

Table F1: Regeneration rates at Mt Martha beach

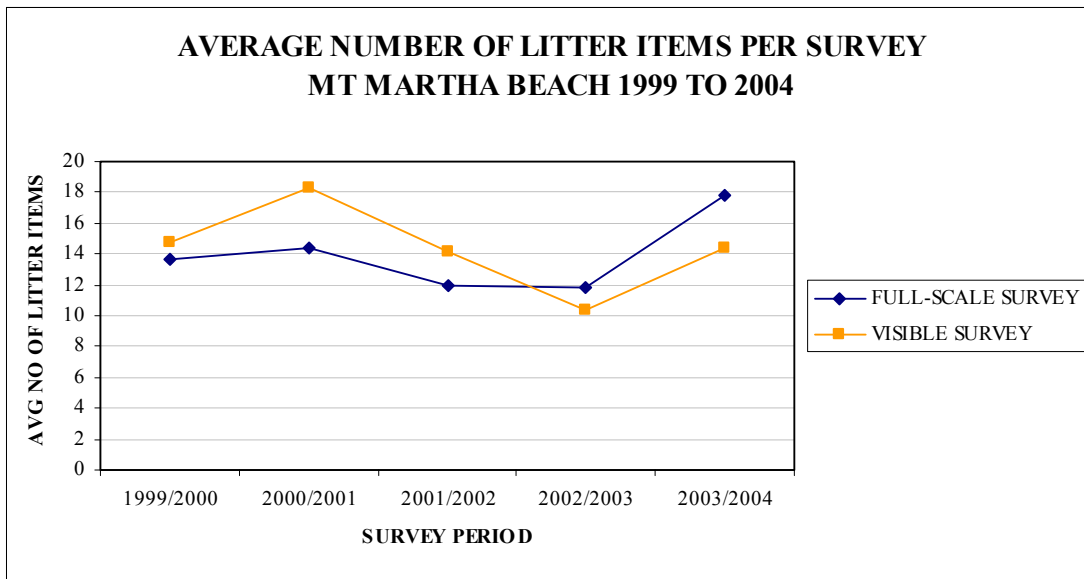


Figure F1: Average number of litter items counted in each survey at Mt Martha beach

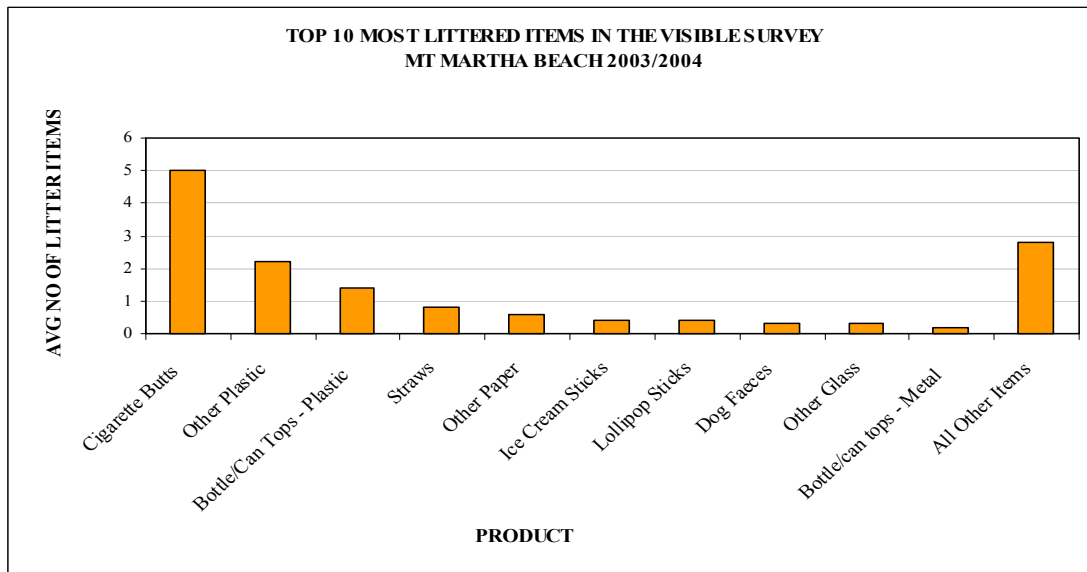


Figure F2: Top 10 most littered items, visible survey at Mt Martha beach

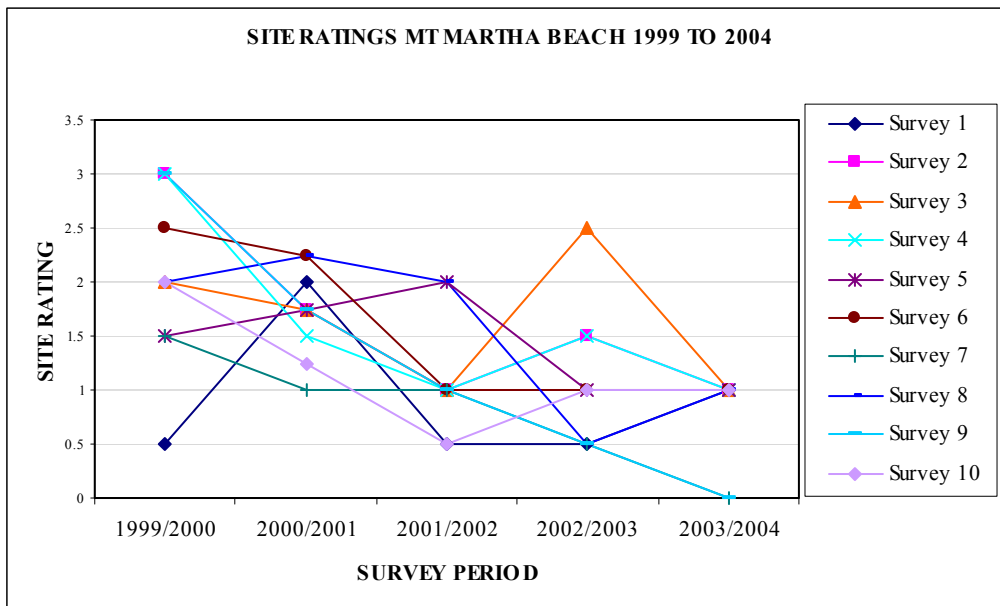


Figure F3: Visual site ratings at Mt Martha beach

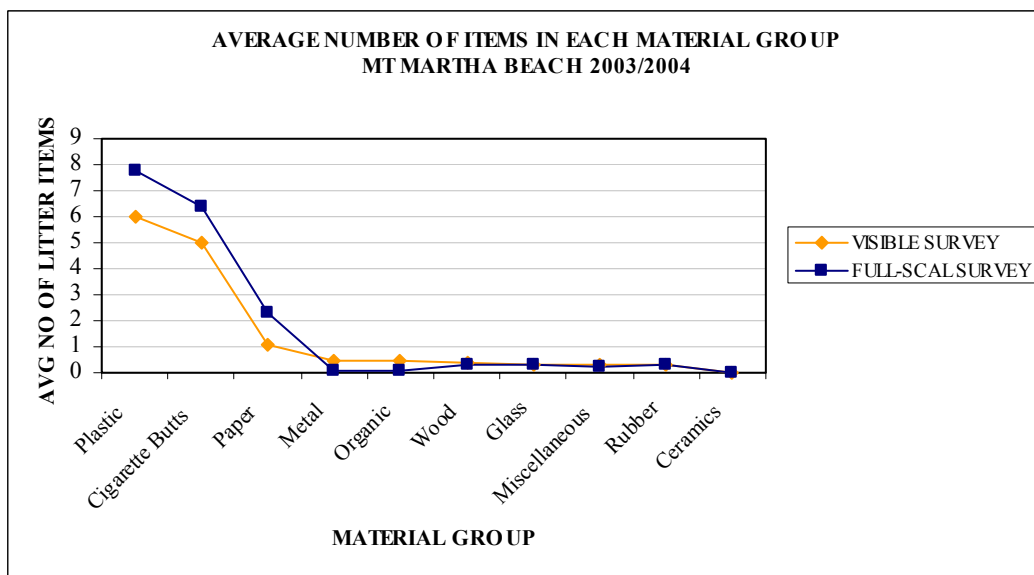


Figure F4: Material type found per survey at Mt Martha beach

APPENDIX G – PORT MELBOURNE BEACH

Summary

Port Melbourne beach is the northernmost beach in the reporting program on the east side of Port Phillip Bay and is located near a lifesaving club. The lifesaving club also has a small kiosk located on the side of the building.

It was observed on a few occasions that people were dropping their litter around the steps of the lifesaving club and often the rubbish was wind-blown onto the beach. There is only one bin located on the beach, although other bins are located on the promenade.

During summer, the beaches are cleaned mechanically up to three times per week and are manually cleaned daily, according to the City of Port Phillip website³.

Port Melbourne beach is in the top three of the most littered beaches for both the visible and full-scale surveys.

Visible and full-scale survey results

The amount of litter recorded this year at Port Melbourne beach has increased, compared to the two previous years.

Over the past five years an average of 26.5 items was found per year at Port Melbourne beach in the visible survey. The average amount of litter found in 2003–04 was 36.6 items. This shows an increase of 45 per cent from 2002–03, when the average items found were 25.2 items per survey. Port Melbourne beach was ranked the third most littered beach in the visible survey for the 2003–04 period.

Port Melbourne beach 2003–04 quick stats

VISIBLE SURVEY

Avg. no of items found: 36.6 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 6 (85 items)

FULL-SCALE SURVEY

Avg. no of items found: 45.7 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 3 (74 items)
 Weight of litter: 295 grams

SITE RATING SURVEY

Highest rating: 3 (Surveys 3, 6 & 10)
 Lowest rating: 1 (Surveys 1, 5, 7 & 8)

Product types

Cigarette butts were the most littered item, with an average of 17.9 items found per survey. This accounted for 39 per cent of all litter found at Port Melbourne beach, an increase of 39 per cent from 2002–03, when the average number of cigarette butts found was 12.9 items in the visible survey. There was an increase of 124 per cent in 2003–04 compared to the number of cigarette butts found in 1999–2000.

Plastic bottle/can tops were the second most littered product, accounting for 12 per cent of all items surveyed, with an average of 5.7 items found per survey. An increase of 185 per cent was recorded in the number of plastic bottle/can tops found in 2003–04 compared to 2002–03.

Figure G2 shows the 10 most littered products in the visible survey.

Visual ratings

Visual ratings have only increased slightly from previous years. The highest rating in the 2003–04

survey period was 3, which was recorded on surveys 3, 6 and 10. The average rating in 2003-04 was 1.9, up from an average of 1.75 in the 2002-03 survey period.

The highest average rating was recorded in 2000-01 when the average rating was 3.8 per survey.

Figure G3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts represent 43 per cent of all litter recorded on the visible survey, with an average of 15.7 items per survey. An average of 17.9 cigarette butts per survey was recorded during the full-scale surveys.

Plastic items were the second most littered group in both the visible and full-scale surveys, with an average of 12.2 and 16.9 items respectively.

Cigarette butts and plastic items have been the two material groups most found over the past five years.

Figure G4 provides a breakdown of the average items found in the 10 material groups.

Regeneration rates

The highest regeneration rate was 19 items per day between surveys 3 and 4, while the lowest was 0.9 items per day between surveys 8 and 9 as shown in Table G1.

Survey	Regeneration rate: items per day
Survey 1-2	7.0
Survey 2-3	18.5
Survey 3-4	19.0
Survey 4-5	8.9
Survey 5-6	7.6
Survey 6-7	6.0
Survey 7-8	1.3
Survey 8-9	0.9
Survey 9-10	2.8

Table 12: Regeneration rates at Port Melbourne beach

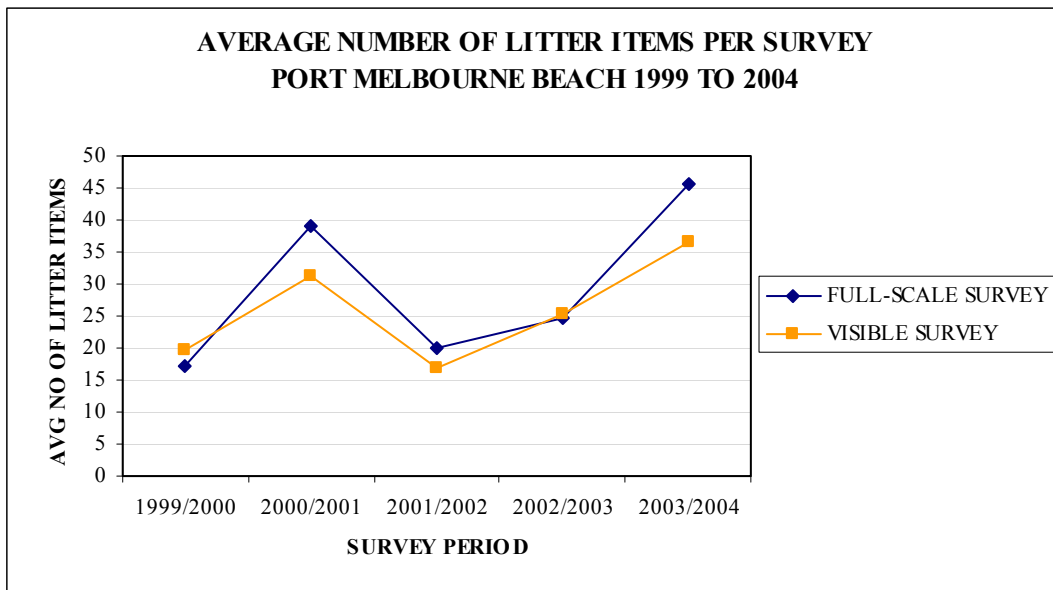


Figure G1: Average number of litter items counted in each survey at Port Melbourne beach

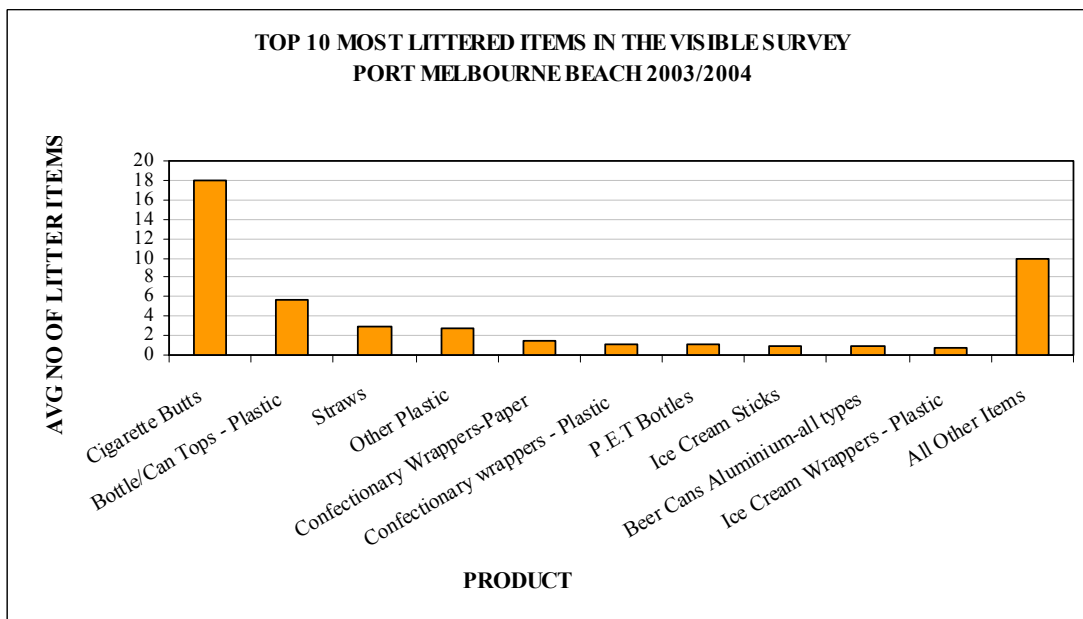


Figure G2: Top 10 most littered items, visible survey at Port Melbourne beach

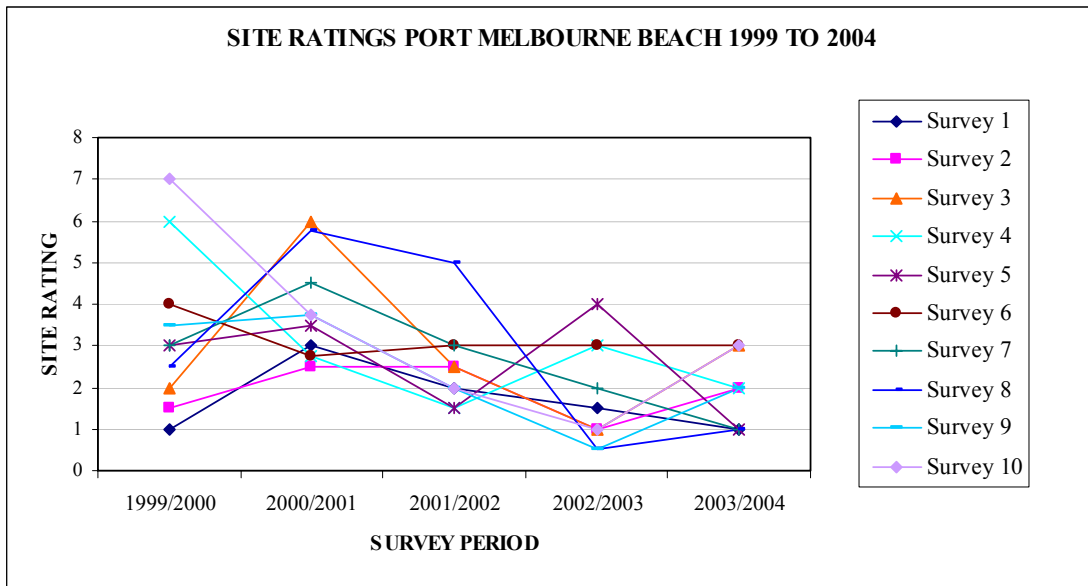


Figure G3: Visual site ratings at Port Melbourne beach



Figure G4: Material type found per survey at Port Melbourne beach

APPENDIX H – QUEENSCLIFF BEACH

Summary

Queenscliff beach is located in the Borough of Queenscliff and is the southernmost surveyed beach on the western side of Port Philip Bay.

The litter count for Queenscliff was very low, due to the lack of people using the beach. It is mainly used by dog walkers, as the amount of seaweed prohibits people from swimming at the beach.

The nearest rubbish bins were located approximately 50 metres away, near a picnic area, which is right next to the service road.

There was no bin signage along the beach or the barbecue areas.

Visible and full-scale survey results

The amount of litter recorded this year at Queenscliff beach has decreased compared to the two previous years.

Over the past five years an average of 6.4 items was found per year at Queenscliff beach in the visible survey. The average amount of litter found in 2003-04 was 2.7 items per survey. This is a decrease of 13 per cent from 2002-03, when the average number of items found was 3.1 items per survey. Queenscliff beach was ranked the second least littered beach in the visible survey for the 2003-04 period.

An average of 6.7 items per year was recorded in the full-scale surveys over the past five years. The average amount of litter found in the full-scale survey during 2003-04 was 1.8 items, compared to 2.9 items in the 2002-03 period. This shows a decrease of 38 per cent.

Queenscliff beach 2003-04 quick stats	
Visible survey	
Avg. no of items found:	2.7 per survey
Most littered item:	Cigarette butts
When most litter found:	Survey 9 (6 items)
Full-scale survey	
Avg. no of items found:	1.8 per survey
Most littered item:	Cigarette butts
When most litter found:	Survey 6 (4 items)
Weight of litter:	60 grams
Site rating survey	
Highest rating:	7 (Survey 1 – high-level seaweed)
Lowest rating:	0 (Surveys 3 to 10)

Queenscliff beach was ranked the second least littered beach in the full-scale survey.

Figure H1 illustrates the average number of litter items found at Queenscliff beach over the past five years.

Product types

Cigarette butts were the most littered item, with an average of 1.9 items found per survey. This accounted for 70 per cent of all litter found at Queenscliff beach, an increase of 171 per cent compared to 2002-03, when the average amount of cigarette butts found was 0.7 items in the visible survey. A decrease of 43 per cent was recorded in 2003-04 when compared to the number of cigarette butts found in 1999-2000.

Plastic confectionery wrappers were the second most littered product, with an average litter count of 0.3 items per survey, accounting for 11 per cent of all items surveyed.

Figure H2 shows the 10 most littered products in the visible survey.

Visual ratings

The average visual ratings have decreased from previous years. The highest rating in the 2003-04 survey period was 7, which was recorded during the first survey. This was due to the large amount of seaweed located on the beach. The seaweed was excluded in subsequent site ratings. The average rating this year was 0.8, a decrease of 76 per cent from the 2002-03 survey period.

The highest site rating was recorded in 2001-02, when the average rating was 5.7 per survey. This rating included seaweed as litter.

Figure H3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts represent 70 per cent of all litter recorded on the visible survey, with an average of 1.9 items per survey. An average of 0.9 cigarette butts were found during the full-scale surveys, accounting for 50 per cent of all litter found.

Plastic items were the second most littered group in both the visible and full-scale surveys, with an average of 0.6 and 0.2 respectively.

Figure H4 below provides a breakdown of the average items found in the 10 material groups.

Regeneration rates

The highest regeneration rate was 0.6 items per day between surveys 5 and 6, while the lowest was zero items per day between surveys 6 and 7, as shown in Table H1.

Survey	Regeneration rate: items per day
Survey 1-2	0.3
Survey 2-3	0.5
Survey 3-4	0.3
Survey 4-5	0.1
Survey 5-6	0.6
Survey 6-7	0.0
Survey 7-8	0.3
Survey 8-9	0.2
Survey 9-10	0.1

Table H1: Regeneration rates at Queenscliff beach

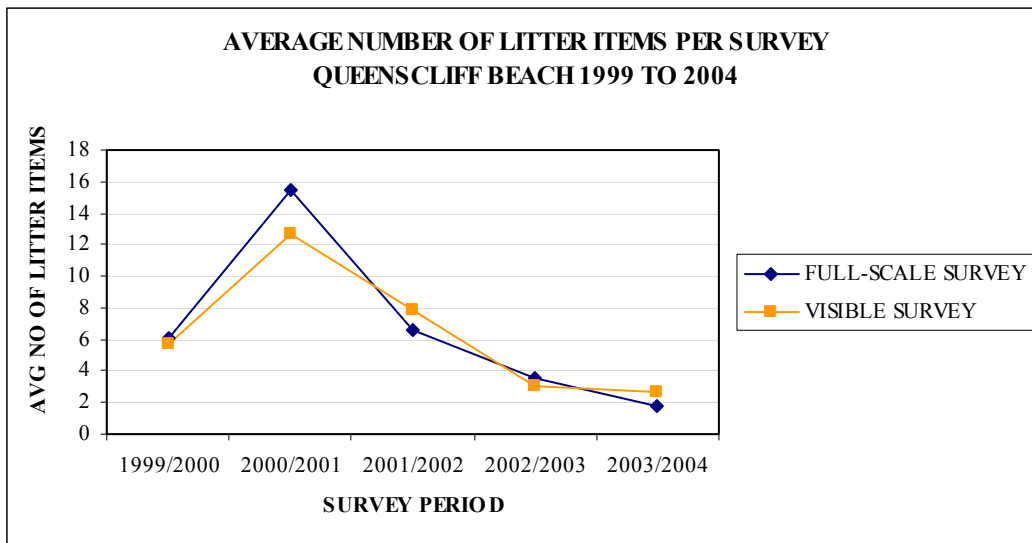


Figure H1: Average number of litter items counted in each survey at Queenscliff beach

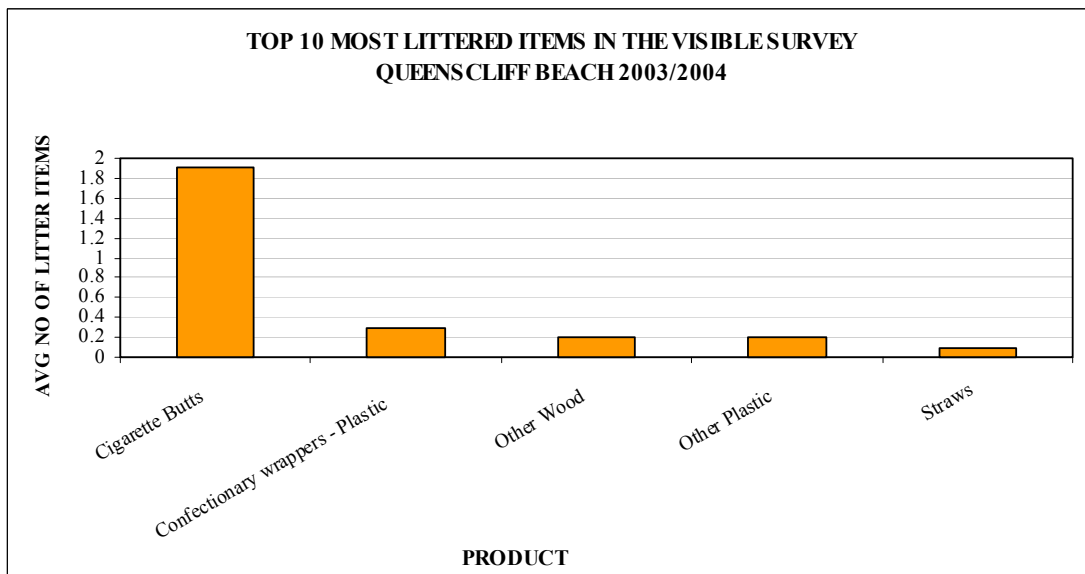


Figure H2: Top 10 most littered items, visible survey at Queenscliff beach

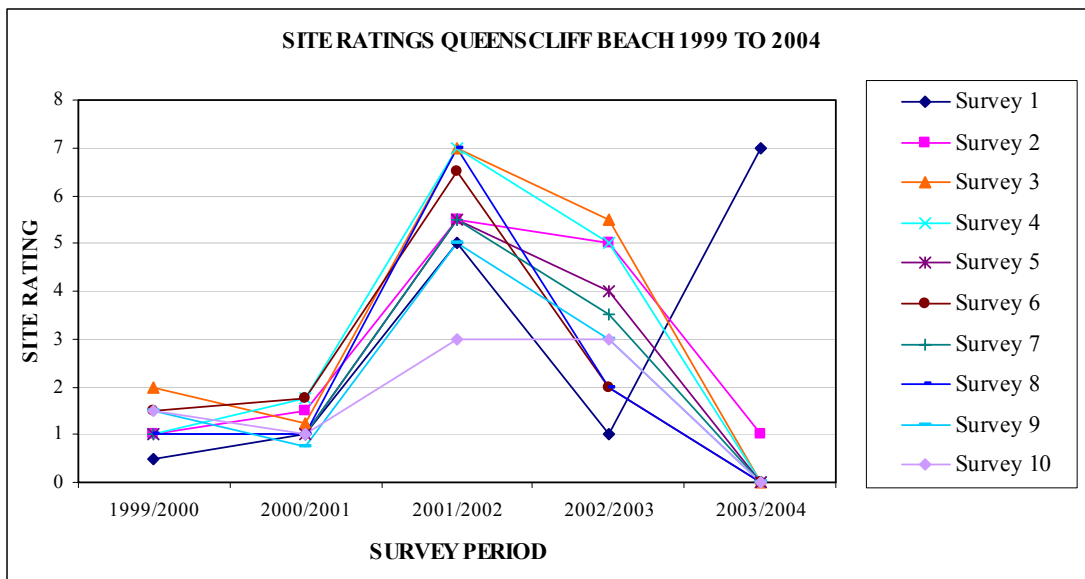


Figure H3: Visual site ratings at Queenscliff beach

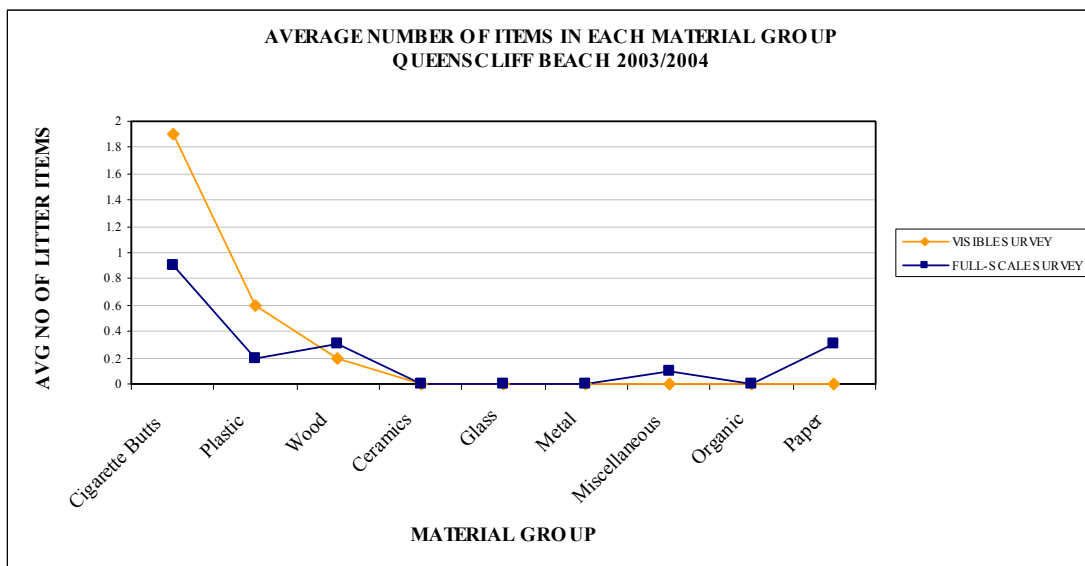


Figure H4: Material type found per survey at Queenscliff beach

APPENDIX I – RYE BEACH

Summary

Rye beach is one of three beaches surveyed in Mornington Shire. Rye beach is one of the most popular holiday destinations along the peninsula during the summer period.

Rye beach is a high-use area, with a caravan park, picnic areas and car park located on the nearby foreshore. Litter is often left by beachgoers.

Barricades between the beach and the bins could be contributing to the amount of litter left on the beach.

Rye beach is also in a windy area and the lighter litter items were often observed being blown into the water and to the fence line.

Visible and full-scale survey results

Over the past five years an average of 24.3 items were found per year at Rye beach in the visible survey. The average number of litter items found in 2003-04 was 30.8 items per survey. This shows an increase of 41 per cent from 2002-03, when the average number of items found was 21.8 items per survey.

Rye beach was ranked the sixth most littered beach in the visible survey for the 2003-04 period.

An average of 28.8 items per year was recorded in the full-scale surveys over the past five years. The average amount of litter found in the full-scale survey during 2003-04 was 31.5 items. When compared with the 28.2 items found during the 2002-03 period, this was an increase of 12 per cent.

In 2003-04, Rye beach was ranked as the seventh most littered beach in the full-scale survey.

Rye beach 2003-04 quick stats	
Visible survey	
Avg. no of items found:	30.8 per survey
Most littered item:	Cigarette butts
When most litter found:	Survey 8 (54 items)
Full-scale survey	
Avg. no of items found:	31.5 per survey
Most littered item:	Cigarette butts
When most litter found:	Survey 5 (45 items)
Weight of litter:	240 grams
Site rating survey	
Highest rating:	3 (Survey 2)
Lowest rating:	0 (Survey 4)

Figure I1 illustrates the average number of items found at Rye beach for the past five years.

Product types

Cigarette butts were the most littered item, with an average of 14.5 items found per survey, accounting for 47 per cent of all litter found at Rye beach. This shows an increase of 61 per cent when compared to 2002-03, when the average number of cigarette butts found was nine items in the visible survey.

Other organic items were the second most littered product, accounting for 12 per cent of all items surveyed.

Figure I2 shows the 10 most littered products in the visible survey.

Visual ratings

The highest rating in the 2003-04 survey period was 3, which was recorded on the second survey, while the lowest rating was 0, recorded on the fourth survey. The average rating this year was 1.1, a

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decrease of 27 per cent from the 2002-03-survey period.

The highest average visual rating of 3.2 per survey was recorded in 1999-2000.

Figure I3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts represent 47 per cent of all litter recorded on the visible surveys, with an average of 14.5 items. An average of 14.8 cigarette butts was found per survey during the full-scale surveys.

Paper items were the second most littered group in the visible surveys, with an average of 4.7 items per survey. In the full-scale surveys, plastic items were the second most littered material group, with an average of eight items found per survey.

Figure I4 provides a breakdown of the average items found in the 10 material groups.

Regeneration rates

The highest regeneration rate was 10 items per day between surveys 3 and 4, while the lowest regeneration rate was 1.7 items per day between surveys 5 and 6, as shown below in Table I1.

Survey	Regeneration rate: items per day
Survey 1-2	2.2
Survey 2-3	8.8
Survey 3-4	10.0
Survey 4-5	6.4
Survey 5-6	1.7
Survey 6-7	3.1
Survey 7-8	6.8
Survey 8-9	2.3
Survey 9-10	1.9

Table I1: Regeneration rates at Rye beach

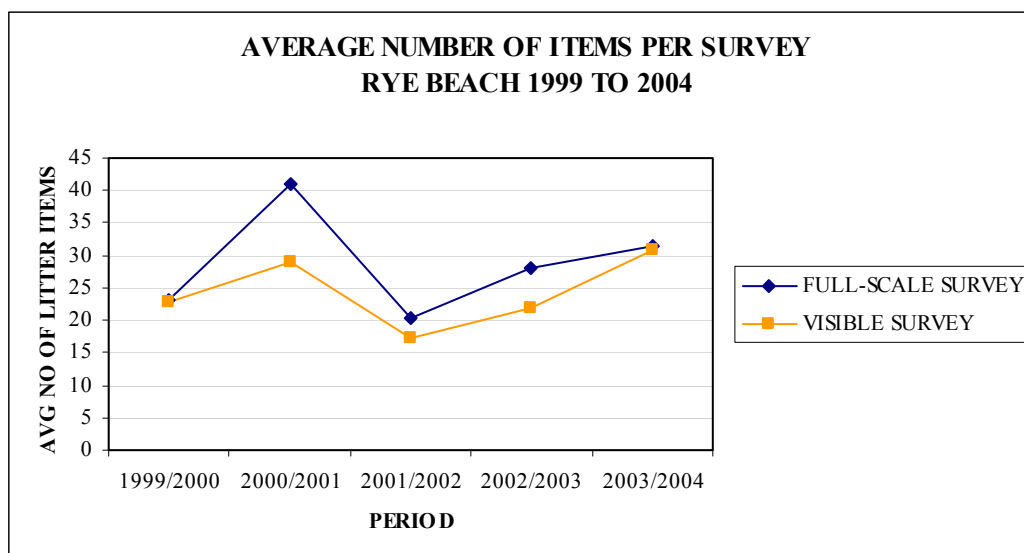


Figure I1: Average number of litter items counted in each survey at Rye beach

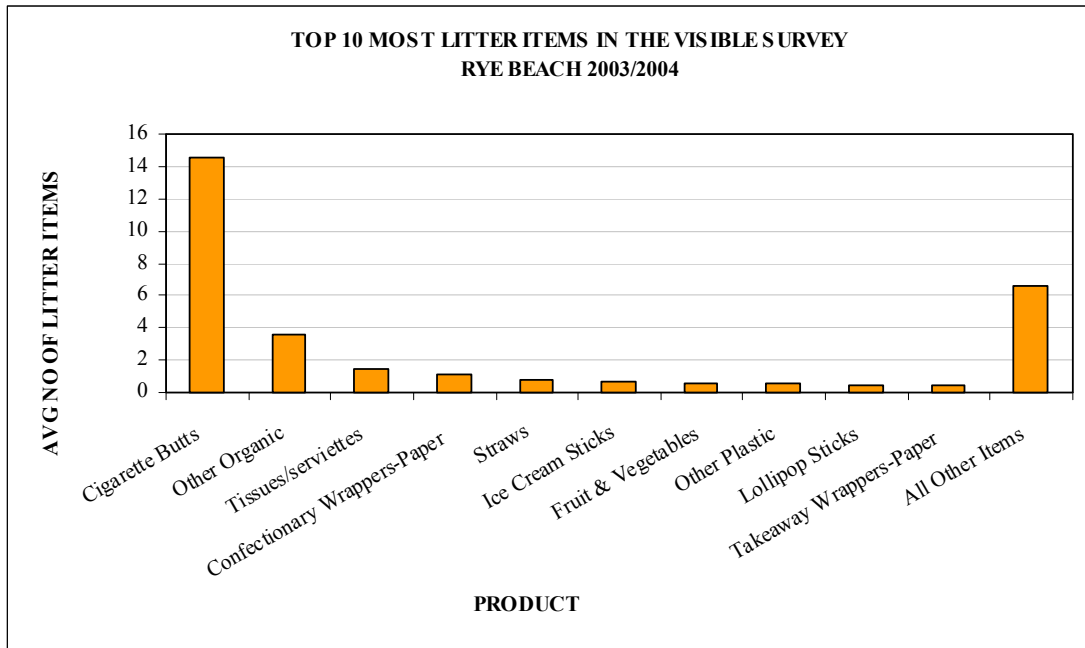


Figure 12: Top 10 most littered items, visible survey at Rye beach

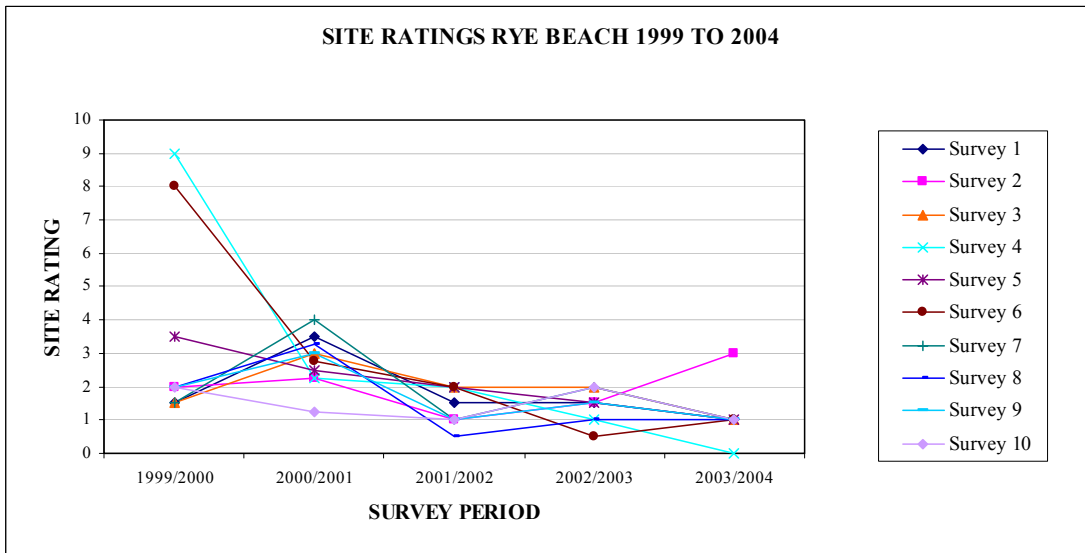


Figure 13: Visual site ratings at Rye beach

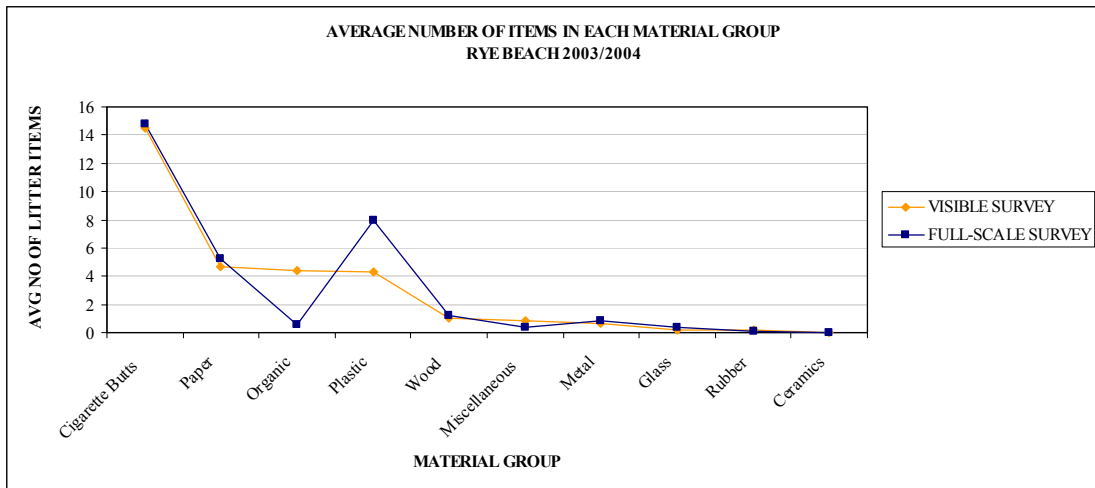


Figure 14: Material type found per survey at Rye beach

APPENDIX J – SANDRINGHAM BEACH

Summary

The Sandringham beach site is located in the municipality of Bayside City Council. Near the survey area is a walkway/promenade and a surf lifesaving club.

Sandringham beach was the most littered beach in 2003-04 in both the visible and full-scale surveys.

It did not appear that the surveyed section of the beach had been mechanically cleaned at all during the three months that the surveys took place. There was only one bin located within 100 metres of the survey area; this only appeared to be overflowing once in the survey period.

There was a large accumulation of rubbish along the retaining wall and in the shrubs along the beach.

The stormwater drain also contributed to large amounts of litter being washed up onto the beach after it had rained.

Visible and full-scale survey results

Over the past five years an average of 49.9 items was found per year at Sandringham beach in the visible survey. The average amount of litter found in 2003-04 was 56.2 items per survey. This was an increase of 100 per cent from 2002-03, when the average items found were 28.1 items per survey.

Sandringham beach is ranked the most littered beach in the visible survey for the 2003-04 period.

An average of 47.9 items per year was recorded in the full-scale surveys over the past five years. The average amount of litter found in the full-scale

Sandringham beach 2003-04 quick stats

Visible survey

Avg. no of items found: 56.2 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 8 (101 items)

Full-scale survey

Avg. no of items found: 54.6 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 3 (89 items)
 Weight of litter: 490 grams

Site rating survey

Highest rating: 4 (Survey 8)
 Lowest rating: 1 (Survey 1)

0.5 items in the 2002-03 period, an increase of 35 per cent.

Sandringham beach is ranked as the most littered beach in the full-scale survey.

Figure J1 illustrates the average number of litter items found at Sandringham beach over the past five years.

Product types

Cigarette butts were the most littered item, with an average of 30.4 items found per survey, accounting for 54 per cent of all litter found at Sandringham beach. This was an increase of 114 per cent compared to 2002-03, when the average number of cigarette butts found was 14.2 in the visible survey.

Other plastic items were the second most littered product, accounting for seven per cent of all items surveyed. There was an increase of 27 per cent in 2003-04 when comparing the count of other plastic items to 2002-03.

Figure J2 below shows the top 10 most littered products in the visible survey.

Visual ratings

The highest rating in this year’s survey period was 4, which was recorded during survey 8. The average rating this year was 2.6, an increase of 86 per cent from the 2002-03-survey period.

The highest average visual rating of 4.4 per survey was recorded in 1999-2000.

Figure J3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts were the highest littered material group, accounting for 54 per cent of all litter counted in the visible surveys and 55 per cent of all litter in the full-scale surveys.

Plastic items were the second most littered material group, with an average of 14.8 items found in the visible surveys and 11.6 in the full-scale surveys.

Figure J4 shows the average number of material items found at Sandringham beach.

Regeneration rates

The highest regeneration rate was 27.7 items per day between surveys 3 and 4, while the lowest regeneration rate was 2.5 items per day between surveys 9 and 10, as shown in Table J1.

Survey	Regeneration rate: items per day
Survey 1-2	2.7
Survey 2-3	22.3
Survey 3-4	27.7
Survey 4-5	11.7
Survey 5-6	6.3
Survey 6-7	6.8
Survey 7-8	9.0
Survey 8-9	3.6
Survey 9-10	2.5

Table J1: Regeneration rates at Sandringham beach

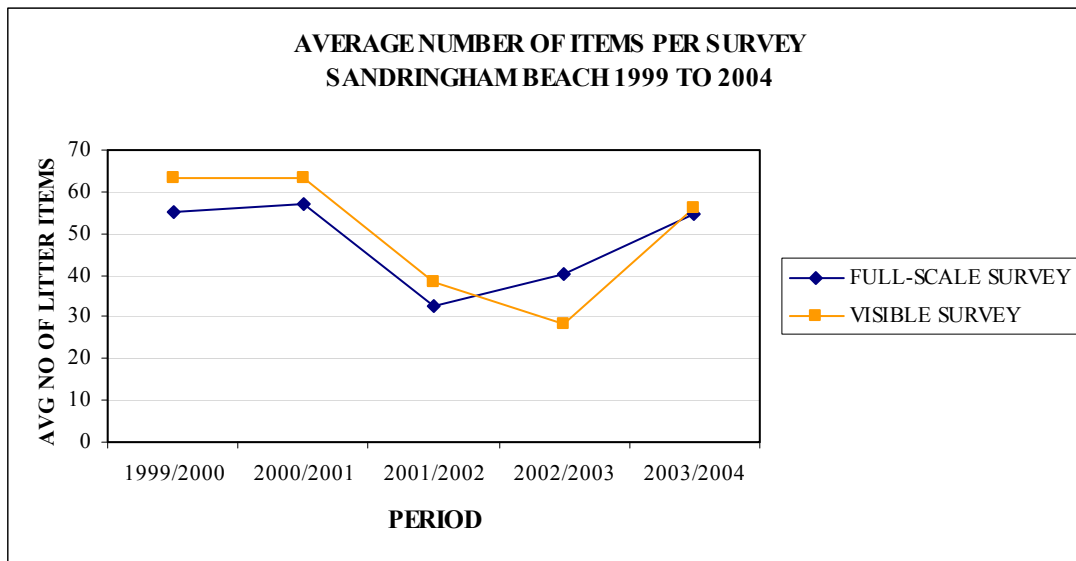


Figure J1: Average number of litter items counted in each survey at Sandringham beach

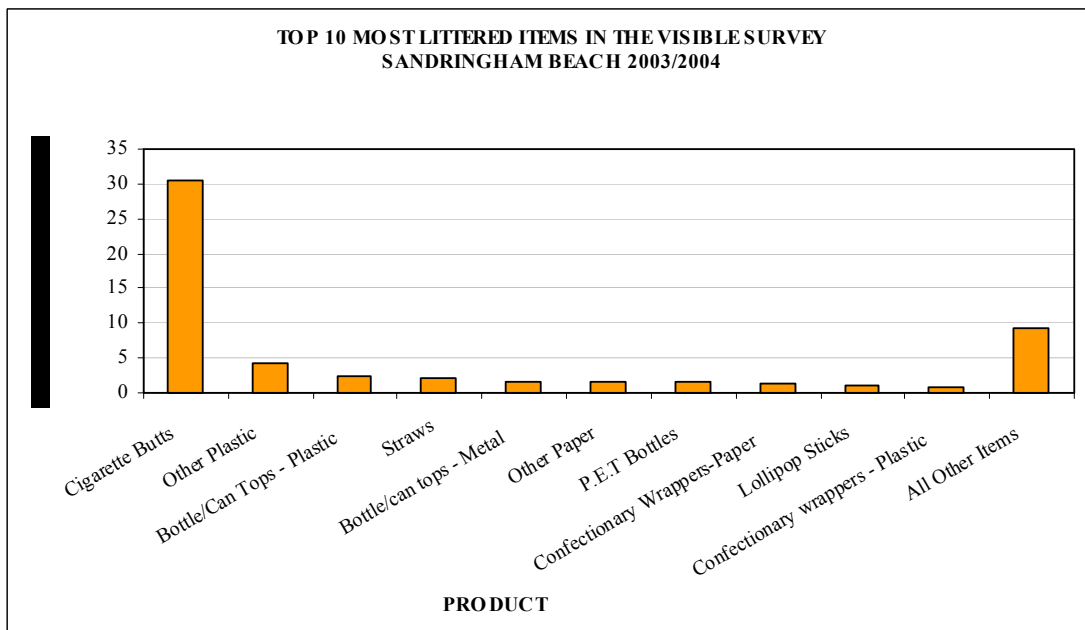


Figure J2: Top 10 most littered items, visible survey at Sandringham beach

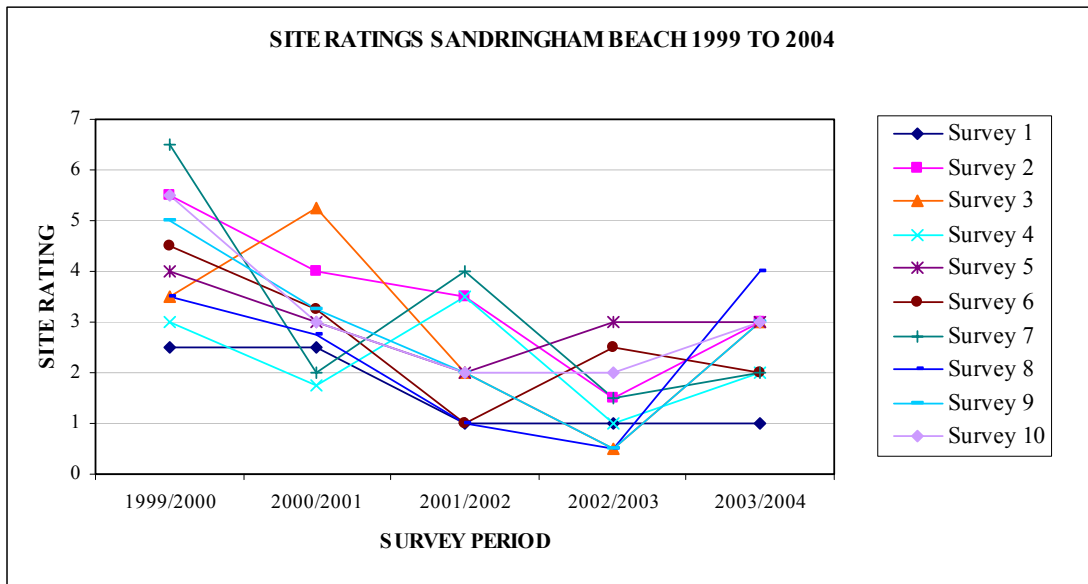


Figure J3: Visual site ratings at Sandringham beach

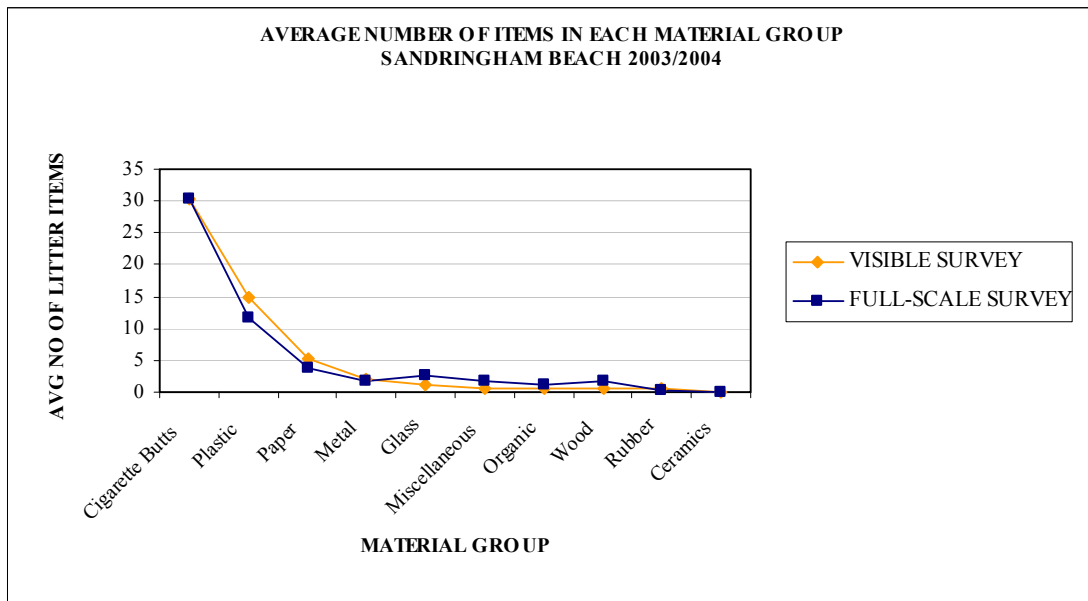


Figure J4: Material type found per survey at Sandringham beach

APPENDIX K – SEAFORD BEACH

Summary

Seaford beach is located in Frankston and the survey areas are located close to a lifesaving club and the Seaford pier. It seemed that the lifesaving club was non-operational this year and that the concrete steps leading from the lifesaving club to the beach had eroded quite badly. This gave a neglected look to the area, which could have resulted in more litter being left in the area.

Access paths were blocked off, which made it more difficult for beach users to access bins located on the foreshore area. Seaford beach was affected by high tides during the survey period and a lot of rubbish on the beach was observed being washed out to sea.

Visible and full-scale survey results

Over the past five years an average of 33.3 items was found per year at Seaford beach in the visible survey. The average amount of litter found in 2003–04 was 36.5 items per survey. This shows an increase of 29 per cent from 2002–03, when the average items found were 28.3 items per survey.

Seaford beach was ranked the fourth most littered beach in the visible survey for the 2003–04 period.

An average of 36.5 items per year was recorded in the full-scale surveys over the past five years. The average amount of litter found in the full-scale survey during 2003–04 was 28.6 items, compared to 35.2 items in the 2002–03 period, a decrease of 19 per cent.

Seaford beach is ranked as the eighth most littered beach in the full-scale survey.

Seaford beach 2003–04 quick stats

Visible survey

Avg. no of items found: 36.5 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 3 (74 items)

Full-scale survey

Avg. no of items found: 28.6 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 7 (64 items)
 Weight of litter: 590 grams

Site rating survey

Highest rating: 3 (Surveys 2 & 5)
 Lowest rating: 0 (Surveys 6, 8, 9 & 10)

Figure K1 illustrates the average number of litter items found at Seaford beach over the past five years.

Product types

Cigarette butts were the most littered item, with an average of 20.5 items found per survey, accounting for 56 per cent of all litter found at Seaford beach. This was a decrease of 20 per cent compared to 2002–03, when the average number of cigarette butts found was 17.1 items in the visible survey.

Other paper items were the second most littered product, accounting for eight per cent of all items surveyed.

Figure K2 shows the top 10 most littered products in the visible survey.

Visual ratings

The highest rating in this year’s survey period was 3, which was recorded on the second as well as the fifth survey. The average rating this year was 1.1, a

decrease of 35 per cent from the 2002-03 survey period.

The highest visual rating of 3.6 per survey was recorded in 1999-2000.

Figure K3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts were the highest littered material group, accounting for 56 per cent of all litter counted in the visible surveys and 53 per cent of all litter in the full-scale surveys.

Plastic items were the second most littered material group, with an average of 6.4 items found in the visible surveys and 6.8 in the full-scale surveys.

Figure K4 shows the average number of items per material group for Seaford beach.

Regeneration rates

The highest regeneration rate was 10.8 items per day between surveys 2 and 3, while the lowest regeneration rate was zero items per day between surveys 8 and 9, as shown in Table K1.

Survey	Regeneration rate: items per day
Survey 1-2	2.6
Survey 2-3	10.8
Survey 3-4	10.0
Survey 4-5	5.3
Survey 5-6	2.7
Survey 6-7	8.0
Survey 7-8	4.5
Survey 8-9	0.0
Survey 9-10	0.6

Table K1: Regeneration rates at Seaford beach

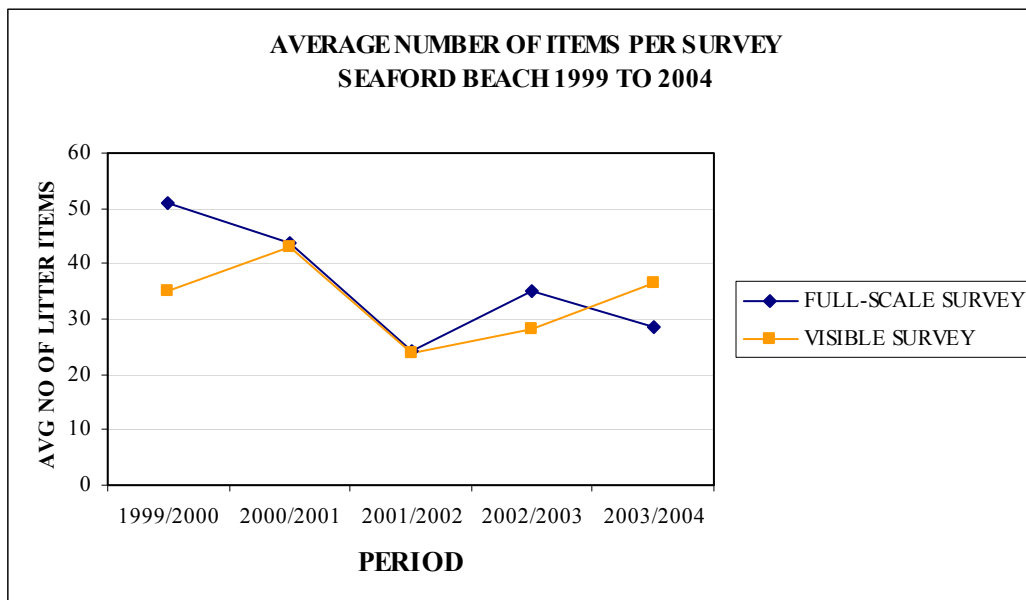


Figure K1: Average number of litter items counted in each survey at Seaford beach

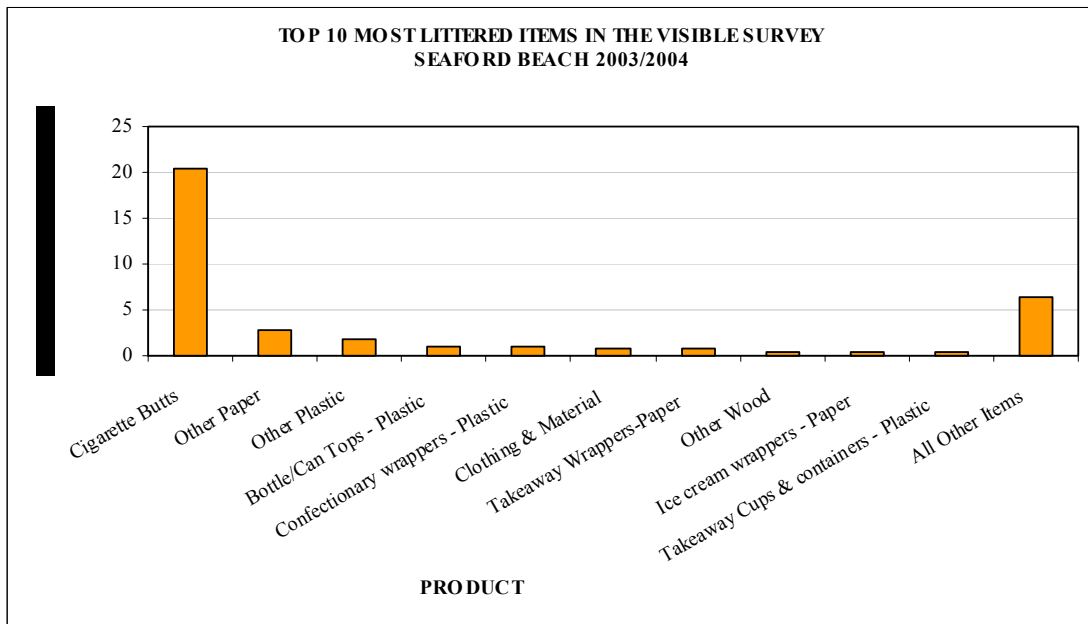


Figure K2: Top 10 most littered items, visible survey at Seaford beach

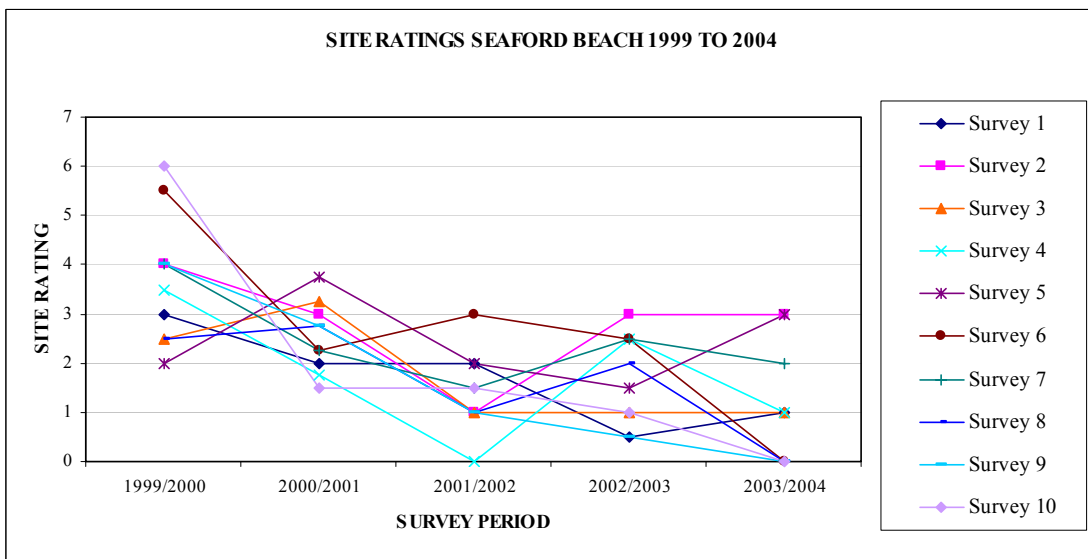


Figure K3: Visual site ratings at Seaford beach

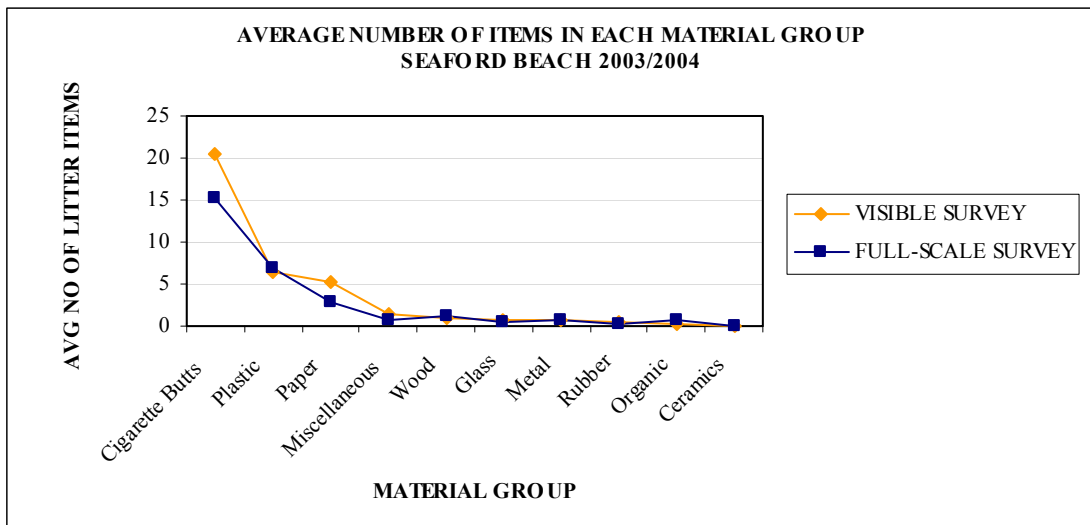


Figure K4: Material type found per survey at Seaford beach

APPENDIX L – SORRENTO BEACH

Summary

Sorrento beach is located in Mornington Peninsula Shire and is the southernmost beach of the three beaches in the Shire. The survey areas are located close to a caravan site. There are no bins on the beach but there is one located in the caravan car park.

There are no stormwater outlets in the immediate vicinity and it was observed that, on a few occasions, cigarette butts were deposited on the beach at high tide.

The majority of the litter was left on grass areas. This litter mostly comprised cigarette butts.

Visible and full-scale survey results

Over the past five years an average of 20.5 items was found per year at Sorrento beach in the visible survey. The average number of litter items found in 2003-04 was 28.1 items per survey. This was an increase of 37 per cent from 2002-03, when the average items found were 20.5 items per survey.

Sorrento beach was ranked the seventh most littered beach in the visible survey for the 2003-04 period.

An average of 26.7 items per year was recorded in the full scale surveys over the past five years. The average number of litter items found in the full-scale survey during 2003-04 was 42.6 items, compared to 30.9 items in the 2002-03 period. This shows an increase of 38 per cent.

Sorrento beach is ranked as the third most littered beach in the full-scale survey.

Sorrento beach 2003-04 quick stats

Visible survey

Avg. no of items found: 28.1 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 10 (52 items)

Full-scale survey

Avg. no of items found: 42.6 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 10 (141 items)
 Weight of litter: 320 grams

Site rating survey

Highest rating: 3 (Surveys 5 & 7)
 Lowest rating: 0 (Survey 9)

Figure L1 illustrates the average number of items found at Sorrento beach for the past five years.

Product types

Cigarette butts were the most littered item, with an average of 15.4 items found per survey, accounting for 55 per cent of all litter found at Sorrento beach. This was an increase of three per cent compared to 2002-03, where the average amount of cigarette butts found was 14.9 items in the visible survey.

Other plastic items were the second most littered product, accounting for five per cent of all items surveyed.

Figure L2 shows the 10 most littered products in the visible survey.

Visual ratings

The average site rating for Sorrento beach was 1.6 per survey. The highest rating of 3 was recorded on two occasions, surveys 5 and 7.

The highest visual rating of 1.8 per survey was recorded in 2001-02.

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

Figure L3 illustrates the site ratings for the past five years.

Material groups

Cigarette butts were the highest littered material group, accounting for 55 per cent of all litter counted in the visible surveys and 61 per cent of all litter in the full-scale surveys.

Plastic items were the second most littered material group, with an average of 4.5 items found in the visible surveys and 6.3 in the full-scale surveys.

Figure L4 below shows the average number of items per material group for Sorrento beach.

Regeneration rates

The highest regeneration rate was 11.3 items per day between surveys 3 and 4, while the lowest

regeneration rate was 1.1 items per day between surveys 8 and 9, as shown in Table L1.

Survey	Regeneration rate: items per day
Survey 1-2	2.1
Survey 2-3	5.3
Survey 3-4	11.3
Survey 4-5	7.4
Survey 5-6	4.0
Survey 6-7	8.6
Survey 7-8	5.5
Survey 8-9	1.1
Survey 9-10	6.4

Table L1: Regeneration rates at Sorrento beach

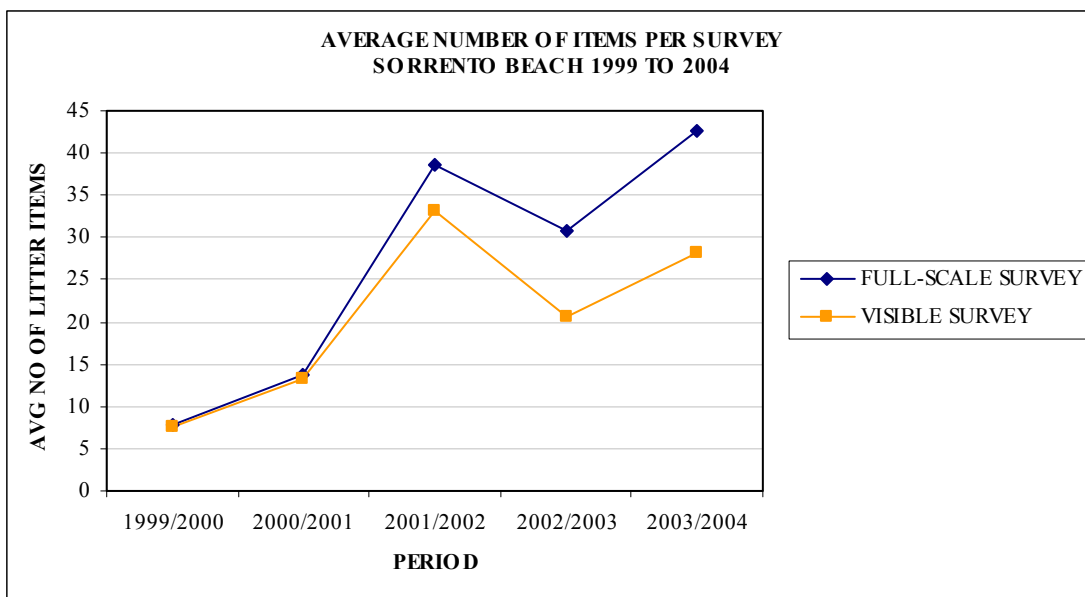


Figure L1: Average number of litter items counted in each survey at Sorrento beach

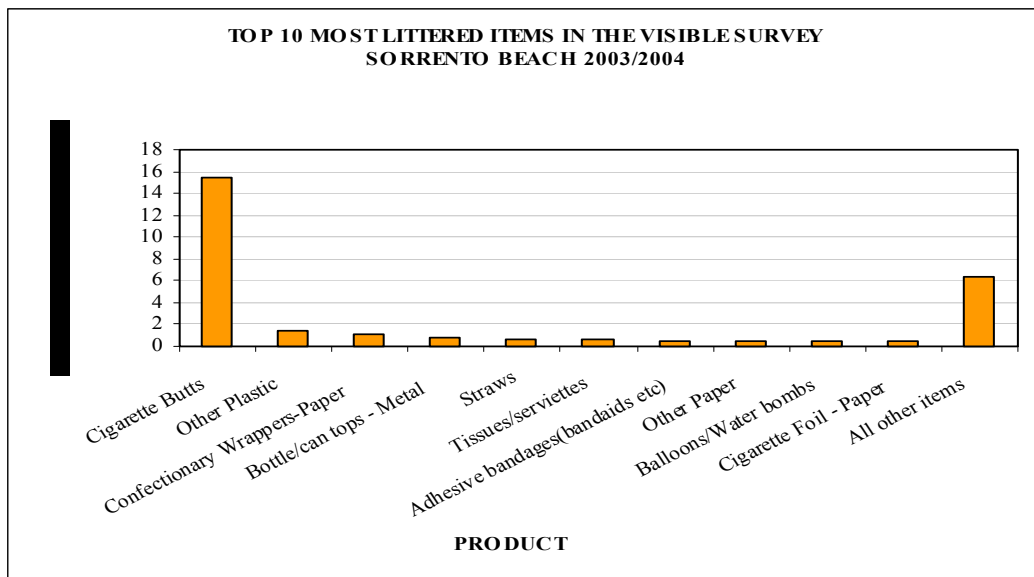


Figure L2: Top 10 most littered items, visible survey at Sorrento beach

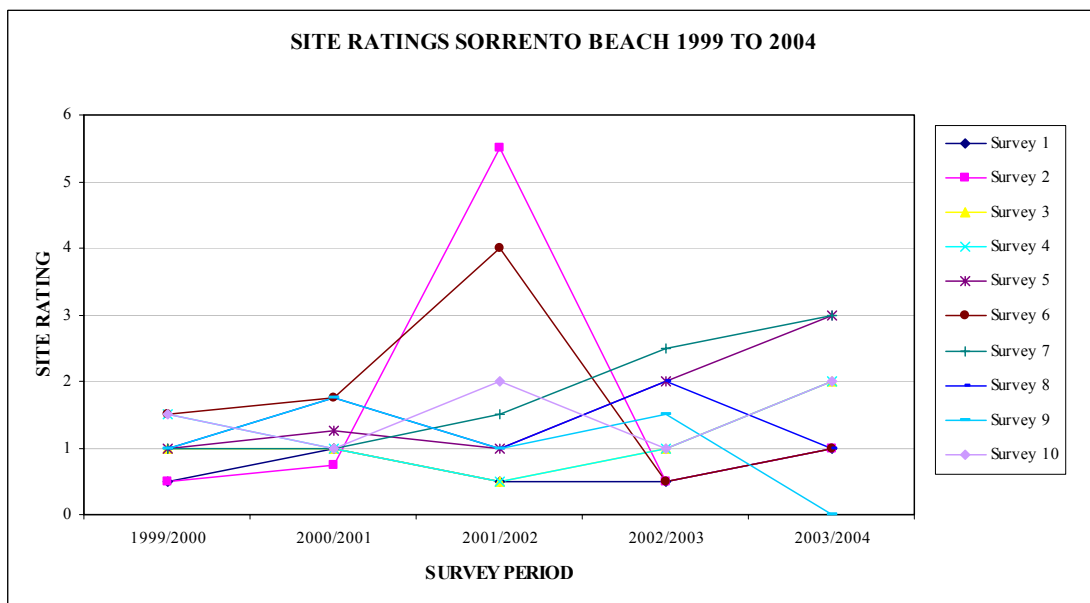


Figure L3: Visual site ratings at Sorrento beach

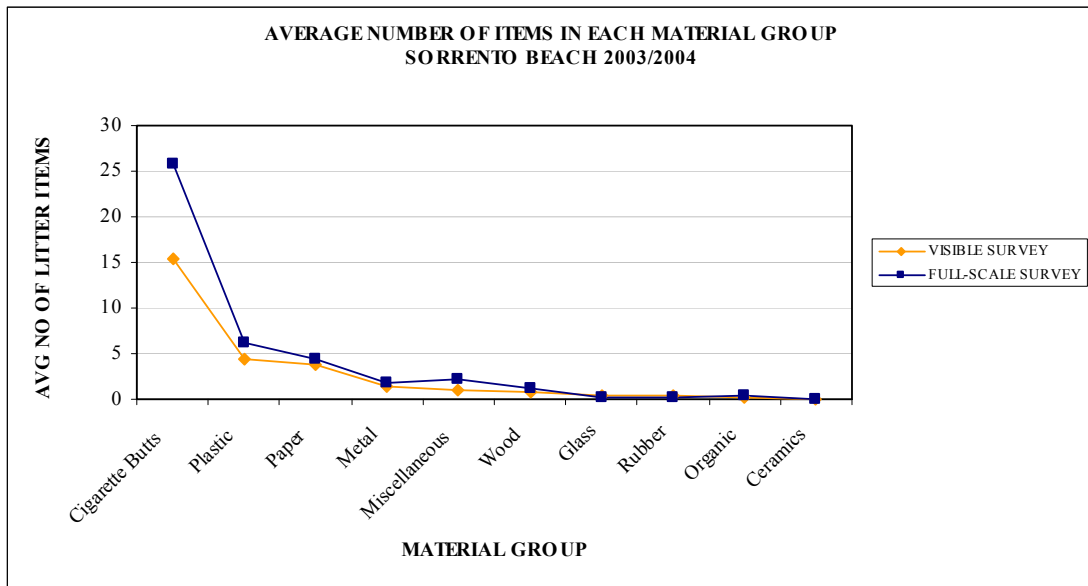


Figure L4: Material type found per survey at Sorrento beach

APPENDIX M – ST KILDA BEACH

Summary

St Kilda Beach is located within the municipality of Port Phillip City Council on the eastern side of Port Phillip Bay.

St Kilda beach is in a high-use area and adjoins a number of restaurants. The beach is mechanically cleaned weekly according to the council’s web page³ and manually cleaned daily during the summer.

There was a build-up of rubbish along the esplanade wall and surrounding the stormwater drains. There was also a high level of litter washed up onto the beach from high tide on most of the survey days.

Visible and full-scale survey results

Over the past five years an average of 44.6 items was found per year at St Kilda beach in the visible survey. The average amount of litter found in 2003–04 was 27.2 items per survey. This was a decrease of 23 per cent from 2002–03, when the average items found were 35.2 items per survey.

St Kilda beach was ranked the eighth most littered beach in the visible survey for the 2003–04 period.

An average of 43.9 items per year was recorded in the full scale surveys over the past five years. The average amount of litter found in the full-scale survey during 2003–04 was 25.9 items, a decrease of 21 per cent when compared to 32.6 items in the 2002–03 period.

St Kilda beach is ranked the ninth most littered beach in the full-scale survey.

St Kilda beach 2003–04 quick stats	
Visible survey	
Avg. no of items found:	27.2 per survey
Most littered item:	Cigarette butts
When most litter found:	Survey 5 (54 items)
Full-scale survey	
Avg. no of items found:	25.9 per survey
Most littered item:	Cigarette butts
When most litter found:	Survey 6 (63 items)
Weight of litter:	280 grams
Site rating survey	
Highest rating:	4 (Surveys 2 & 6)
Lowest rating:	1 (Surveys 1, 7 & 10)

The average number of items found per survey at St Kilda beach is shown in Figure M1.

Product types

Cigarette butts were the most littered item, with an average of 12.2 items found per survey, accounting for 45 per cent of all litter found at St Kilda beach. This was a decrease of 73 per cent compared to 2002–03, where the average amount of cigarette butts found was 21.1 items in the visible survey.

Other plastic items were the second most littered product, accounting for 10 per cent of all items surveyed.

Figure M2 below shows the 10 most littered products in the visible survey.

Visual ratings

The average site rating for St Kilda beach was 2.2 per survey. The highest rating was recorded on surveys 2 and 6, where the beach was given a rating of 4.

The highest visual rating was recorded in 1999–2000, when the average rating was 5.1 per survey.

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

Figure M3 illustrates the site ratings for the past five years.

Material groups

Cigarette butts were the most littered material group, accounting for 45 per cent of all litter counted in the visible survey.

Plastic items were the second most littered material group, with an average of seven items found in the visible surveys and the full-scale surveys.

The average number of items per material group for St Kilda beach is shown in Figure M4.

Regeneration rates

The highest regeneration rate was 11.3 items per day, observed between surveys 3 and 4, while the lowest regeneration rate of 1.1 items per day

occurred between surveys 8 and 9. The number of items regenerated per day for St Kilda is shown in Table M1.

Survey	Regeneration rate: items per day
Survey 1-2	2.1
Survey 2-3	5.3
Survey 3-4	11.3
Survey 4-5	7.4
Survey 5-6	4.0
Survey 6-7	8.6
Survey 7-8	5.5
Survey 8-9	1.1
Survey 9-10	6.4

Table M1: Regeneration rates at St Kilda beach

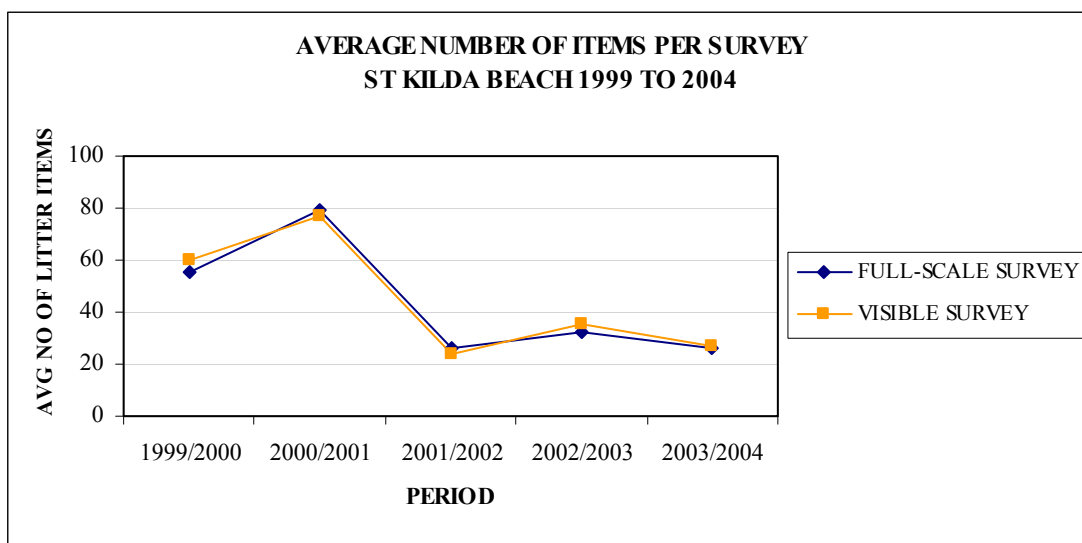


Figure M1: Average number of litter items counted in each survey at St Kilda beach

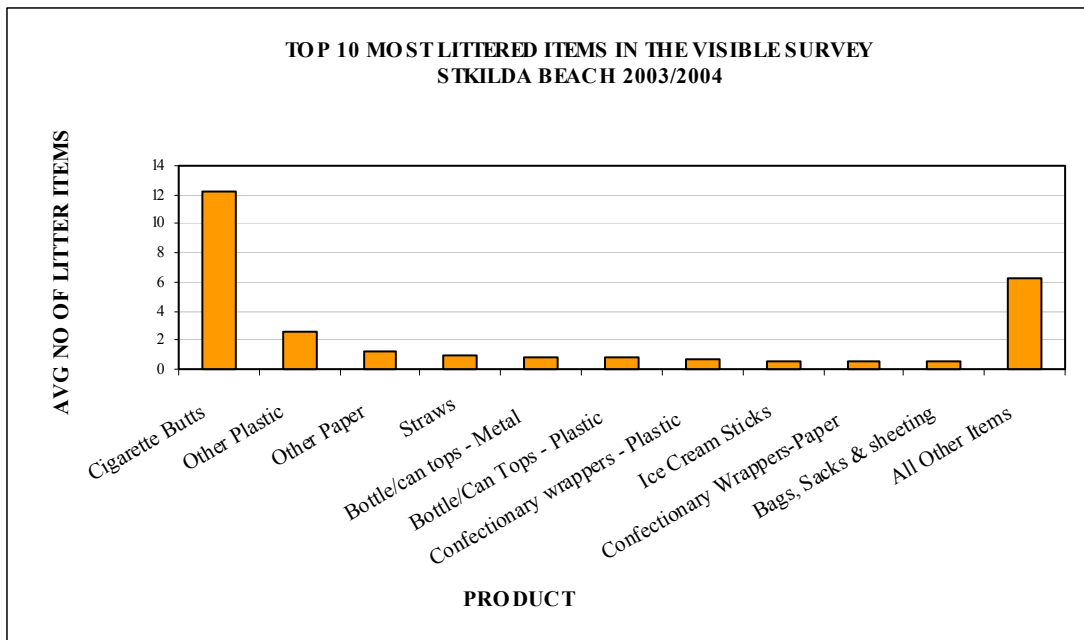


Figure M2: Top 10 most littered items, visible survey at St Kilda beach

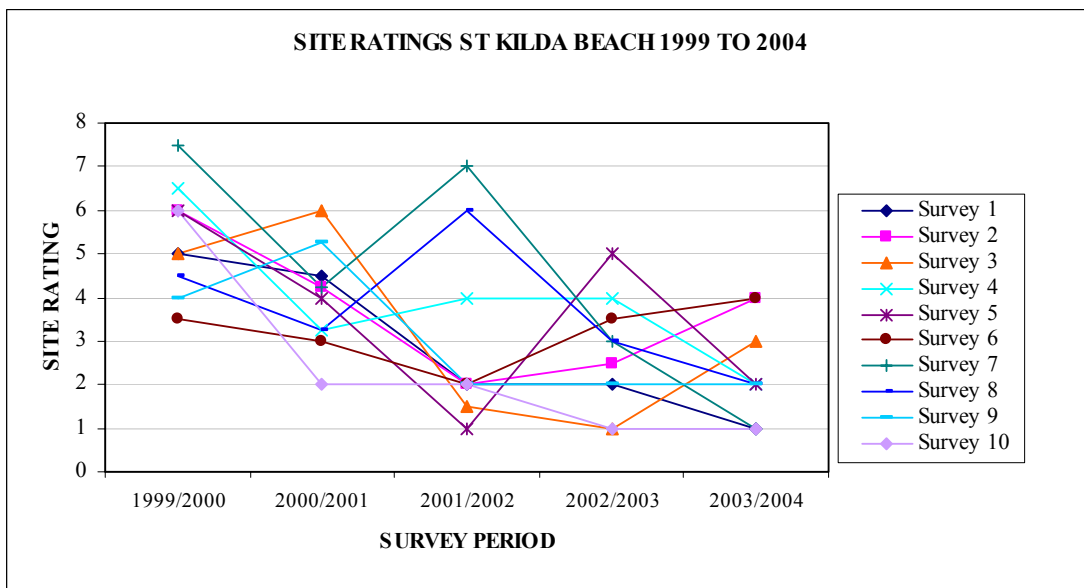


Figure M3: Visual site ratings at St Kilda beach

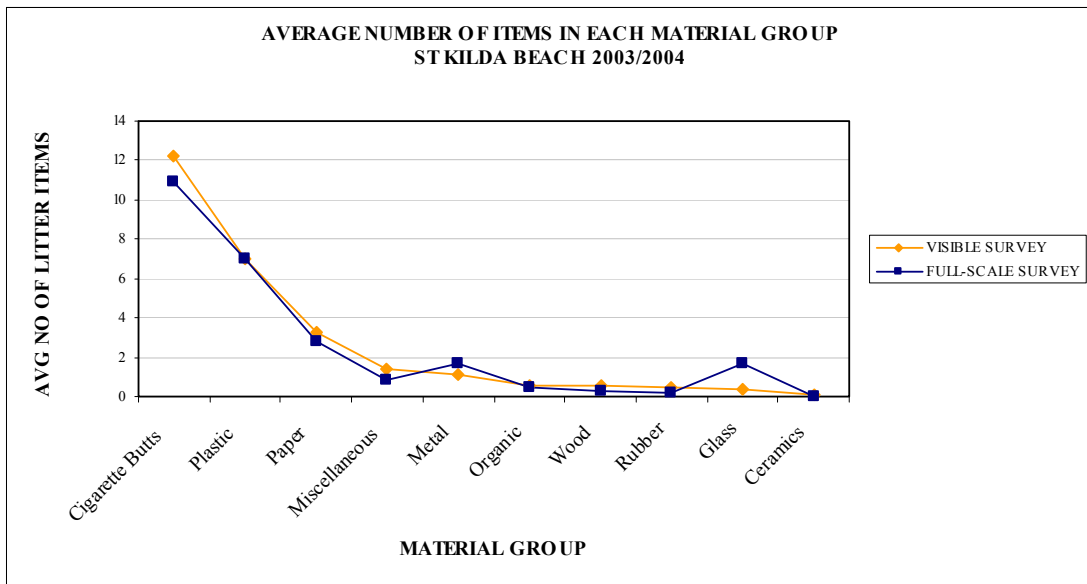


Figure M4: Material type found per survey at St Kilda beach

APPENDIX N – WERRIBEE SOUTH BEACH

Summary

Werribee South beach is in the municipality of Wyndham City Council, located on the north-west side of Port Phillip Bay. Werribee South is not a highly frequented beach. It is surrounded by farmland and the closest town is over 10 kilometres away.

Over the past three years it has been observed that the vegetation is spreading closer to the water and this year there was only a small beach area left.

There was an 84 per cent decrease in the amount of litter found this year, with only one product type (clothing and material) remaining in the visible survey area over six surveys.

Visible and full-scale survey results

Over the past five years an average of 3.9 items was found per year at Werribee South beach in the visible survey. The average amount of litter found in 2003-04 was 0.6 items per survey. This was a decrease of 84 per cent from 2002-03, when the average items found were 3.8 items per survey.

Werribee South beach was ranked as the least littered beach in the visible survey for the 2003-04 period.

An average of 3.1 items per year was recorded in the full-scale surveys over the past five years. The average amount of litter found in the full-scale survey during 2003-04 was 0.4 items, compared to 2.8 items in the 2002-03 period, a decrease of 86 per cent.

Werribee South beach is ranked as the least littered beach in the full-scale survey.

Werribee South beach 2003-04 quick stats

Visible survey

Avg. no of items found: 0.6 per survey
 Most littered item: Clothing/material
 When most litter found: Surveys 1 to 6 (1 item)

Full-scale survey

Avg. no of items found: 0.4 per survey
 Most littered item: Other paper
 When most litter found: Survey 5 (3 items)
 Weight of litter: 20 grams

Site rating survey

Highest rating: 0 (Rated 0 each survey)
 Lowest rating: 0 (Rated 0 each survey)

The average number of items found per survey at Werribee South is illustrated in Figure N1.

Product types

There was only one item of clothing and material found at Werribee South beach, which was found in each of the first six surveys. Then, for the subsequent four surveys, this item lay just outside the survey area.

In the full-scale survey the highest littered item was other paper with a total of two items found over the 2003-04 period. The other two items found in the full-scale survey were one item of bags, sack & sheeting and one cigarette butt.

Packaging and boxes was the most littered item in 2002-03 visible and full-scale surveys with an average of 1.4 and 1.3 items found per survey respectively. These items were not found in 2003-04.

Figure N2 shows the full-scale survey for Werribee South beach, as there was only one item found in

PORT PHILLIP BAY BEACH LITTER SURVEY 2003-04

the visible survey. As illustrated, only three different products were found this year.

Visual ratings

The site rating for each survey in 2003-04 was 0, compared to an average rating of 0.85 per survey in the 2002-03 period.

The highest visual rating was recorded in 2000-01 when the average rating was 1.9 per survey.

Figure N3 shows the site ratings during the past five years.

Material groups

The miscellaneous material group had the highest number of litter items in the visible survey, with an average of 0.6 items per survey.

Paper items were the most common type of litter in the full-scale surveys, with an average of 0.2 items per survey, as shown in Figure N4.

Regeneration rates

Regeneration rates were zero for all survey intervals apart from surveys 4 to 5, when the regeneration rate was 0.4 items per day. The number of items that were generated per day between surveys is shown in Table N1.

Survey	Regeneration rate: items per day
Survey 1-2	0.0
Survey 2-3	0.0
Survey 3-4	0.0
Survey 4-5	0.4
Survey 5-6	0.0
Survey 6-7	0.0
Survey 7-8	0.0
Survey 8-9	0.0
Survey 9-10	0.0

Table N1: Regeneration rates at Werribee South beach

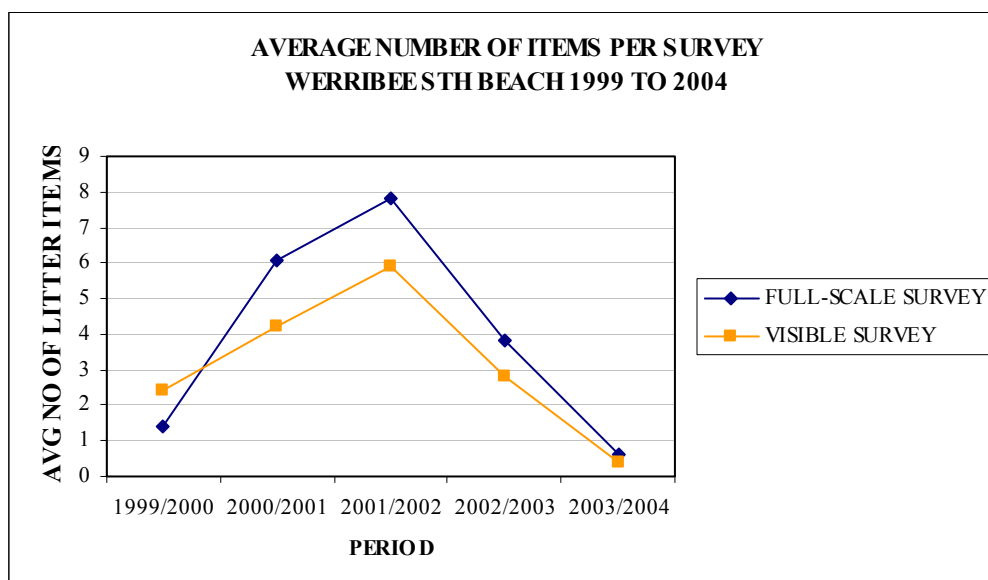


Figure N1: Average number of litter items counted in each survey at Werribee South beach

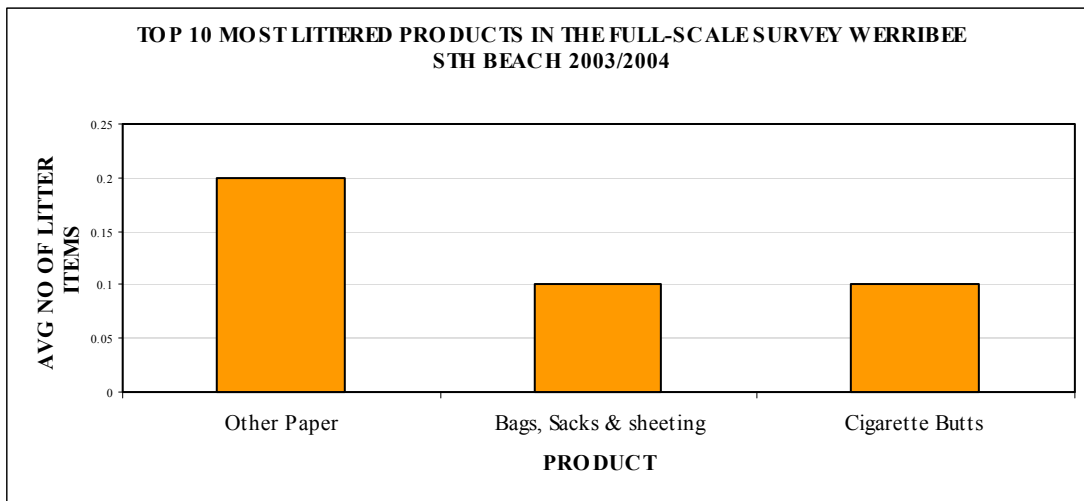


Figure N2: Top 10 most littered items, visible survey at Werribee South beach

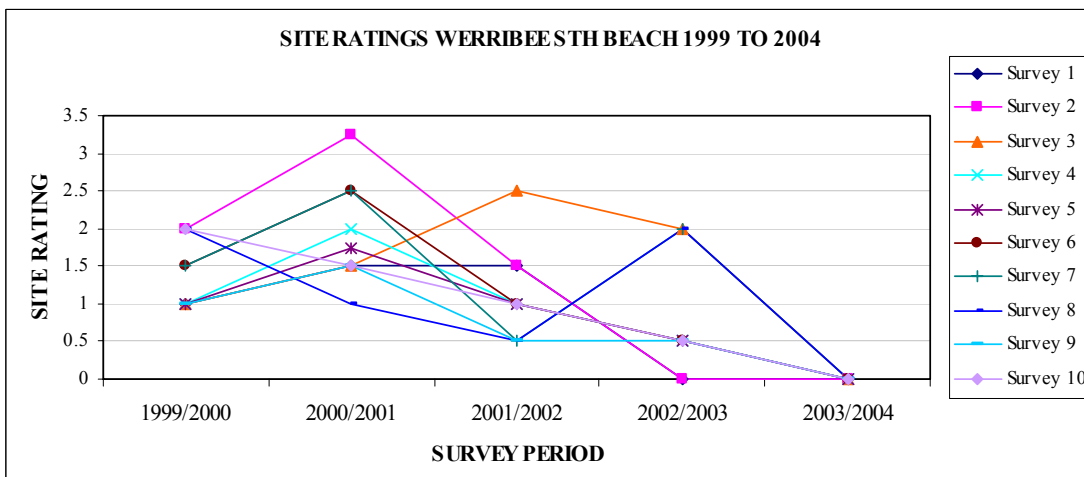


Figure N3: Visual site ratings at Werribee South Beach

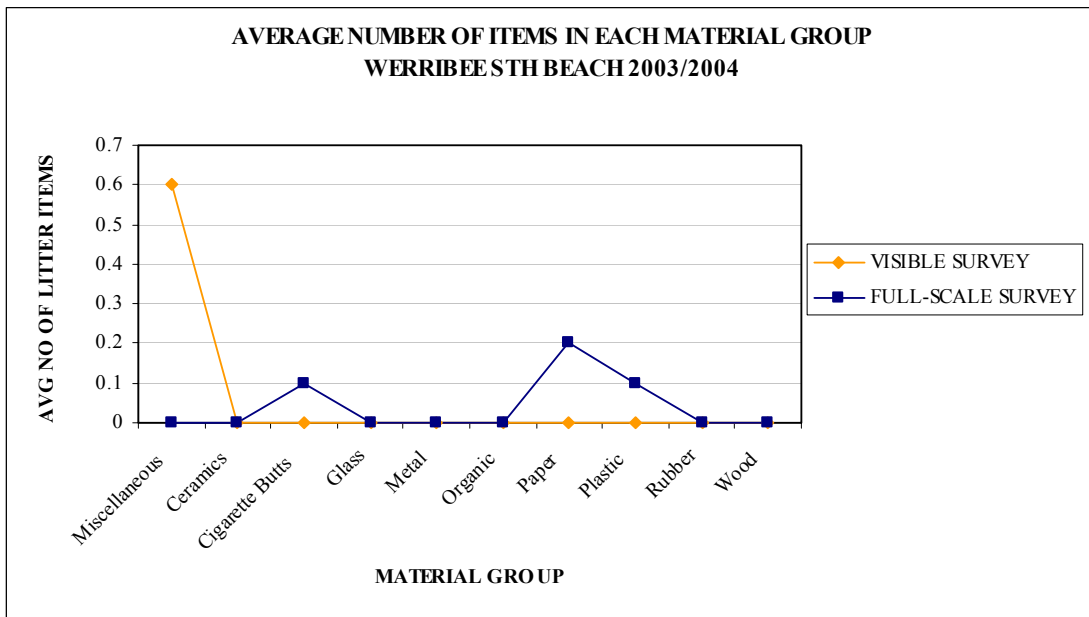


Figure N4: Material type found per survey at Werribee South beach

APPENDIX O – WILLIAMSTOWN BEACH

Summary

Williamstown Beach is in the City of Hobsons Bay, located on the north-west of Port Phillip Bay.

The amount of litter recorded this year on Williamstown beach has decreased dramatically compared to previous years. This has been mainly due to the results of the 2002–03 EPA litter report, which highlighted Williamstown as the worst littered beach. The Hobson Bay City Council decided, in addition to other measures, to purchase new cleaning equipment⁴.

A Beach Tech 2000 beach cleaner, purchased by the City of Frankston, was trialled at Hobsons Bay beaches on Wednesday 15 January and did an excellent job in removing litter, as well as a substantial amount of cigarette butts. The litter count at Williamstown beach decreased by 72 per cent between the survey before the use of the beach cleaner (survey 5) and the survey after using it (survey 6) in the 2002–03 visible surveys. This equipment was used on a permanent basis during the surveys in 2003–04.

The beach was raked before the surveys on most survey days, which could explain the reduction in litter found during this survey period.

Visible and full-scale survey results

Over the past five years an average of 75 items was found per year at Williamstown beach in the visible survey. Due to the high volume of cigarette butts found in 2002–03 the yearly average is extremely high.

Williamstown beach 2003–04 quick stats

Visible survey

Avg. no of items found: 15.3 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 5 (28 items)

Full-scale survey

Total litter items found: 33.6 per survey
 Most littered item: Cigarette butts
 When most litter found: Survey 2 (64 items)
 Weight of litter: 110 grams

Site rating survey

Highest rating: 2 (Survey 10)
 Lowest rating: 0 (Surveys 3 to 8)

The average amount of litter found in 2003–04 was 15.3 items per survey. This was a decrease of 90 per cent from 2002–03, when the average number of items found per survey was 152.3.

Williamstown beach was ranked as the ninth most littered beach in the visible survey for the 2003–04 period.

An average of 47 items per year was recorded in the full-scale surveys over the past five years. The average amount of litter found in the full-scale survey during 2003–04 was 33.6 items, a 40 per cent decrease when compared to the 56.3 items in the 2002–03 period.

Williamstown beach is ranked as the sixth most littered beach in the full-scale survey.

At Williamstown beach, the amount of litter recorded this year has decreased dramatically compared to previous years, as illustrated in Figure O1.

Product types

The most littered item in 2003–04 was cigarette butts, which accounted for 72 per cent of all litter counted in the visible survey. An average of 11 cigarette butts was found per survey in 2003–04, a 91 per cent decrease from the 125 cigarette butts in 2002–03. There was a decrease of 69 per cent in 2003–04 when comparing results with those from 1999–2000.

Other plastic items were the second most littered item, with an average of one item found per survey as shown in Figure O2.

Visual ratings

Visual ratings also decreased from previous years. The highest rating in the 2003–04 survey period was 2, and this was recorded on the last survey date in March. The lowest rating was 0, which was recorded from surveys 3 through to 8.

The average rating in 2003–04 was 0.5, a 78 per cent decrease from an average of 2.25 in the 2002–03 survey period.

The highest average visual rating of 4.4 was recorded in 1999–2000.

Figure O3 shows the site ratings per survey for the past five years.

Material groups

Cigarette butts represent 72 per cent of all litter recorded during the visible survey, with an average of 11 items per survey. An average of 25.8 cigarette butts was found per survey during the full-scale surveys in 2003–04.

Plastic items were the second most littered group in the visible surveys and the full-scale surveys, with an average of 2.4 and 4.1 respectively.

Cigarette butt and plastic items have been the material groups most found out of the 10 groups over the past five years.

Figure O4 provides a breakdown of the average items found in the 10 material groups.

Regeneration rates

The highest regeneration rate was 14.3 items per day between surveys 3 and 4, while the lowest regeneration rate was 0.9 items per day between surveys 8 and 9, as shown in Table O1.

Survey	Regeneration rate: items per day
Survey 1–2	7.1
Survey 2–3	7.5
Survey 3–4	14.3
Survey 4–5	4.6
Survey 5–6	3.0
Survey 6–7	2.6
Survey 7–8	2.7
Survey 8–9	0.9
Survey 9–10	2.3

Table O1: Regeneration rates at Williamstown beach

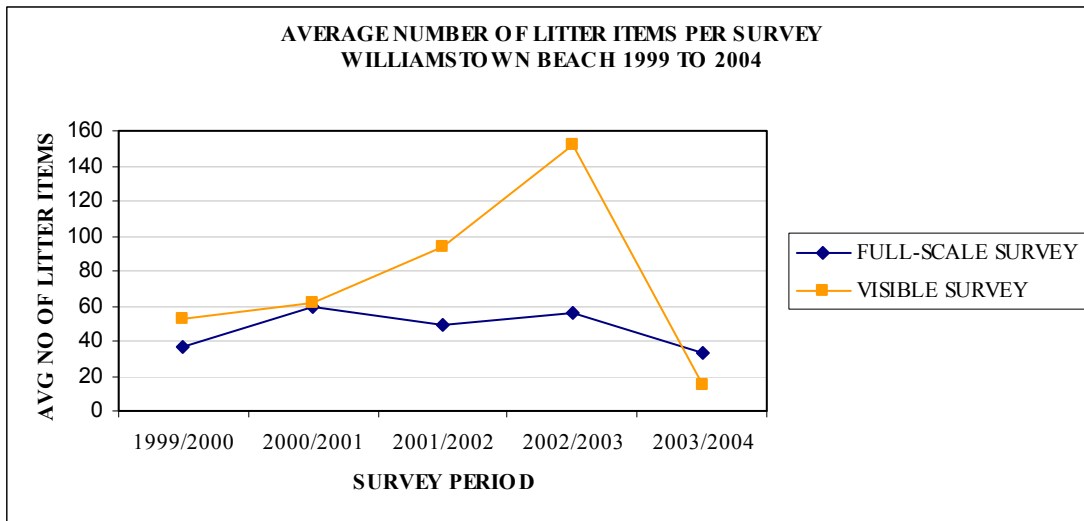


Figure O1: Average number of litter items counted in each survey at Williamstown beach

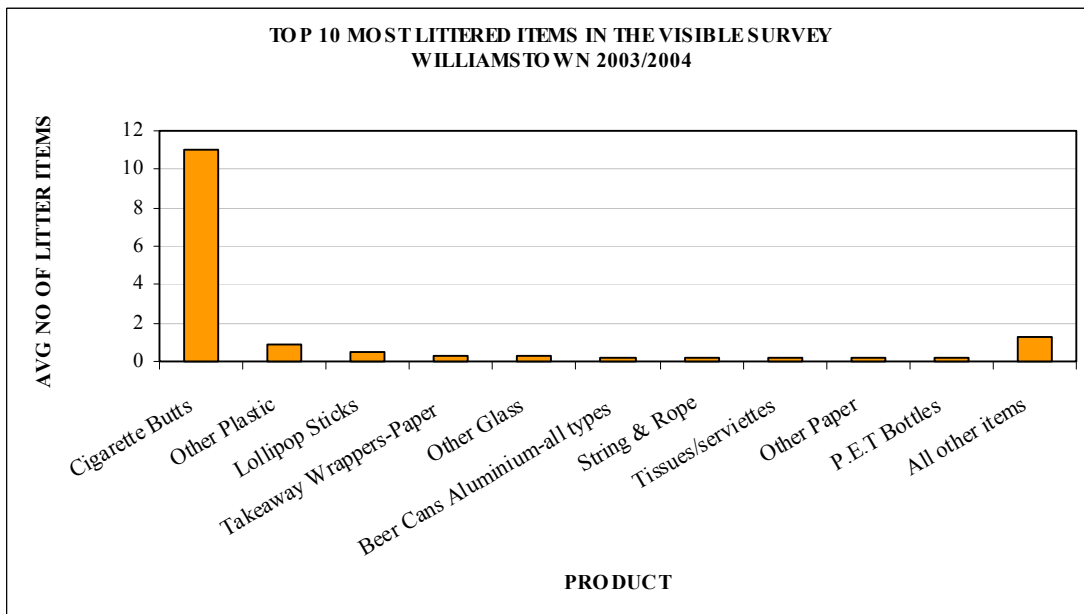


Figure O2: Top 10 most littered items, visible survey at Williamstown beach

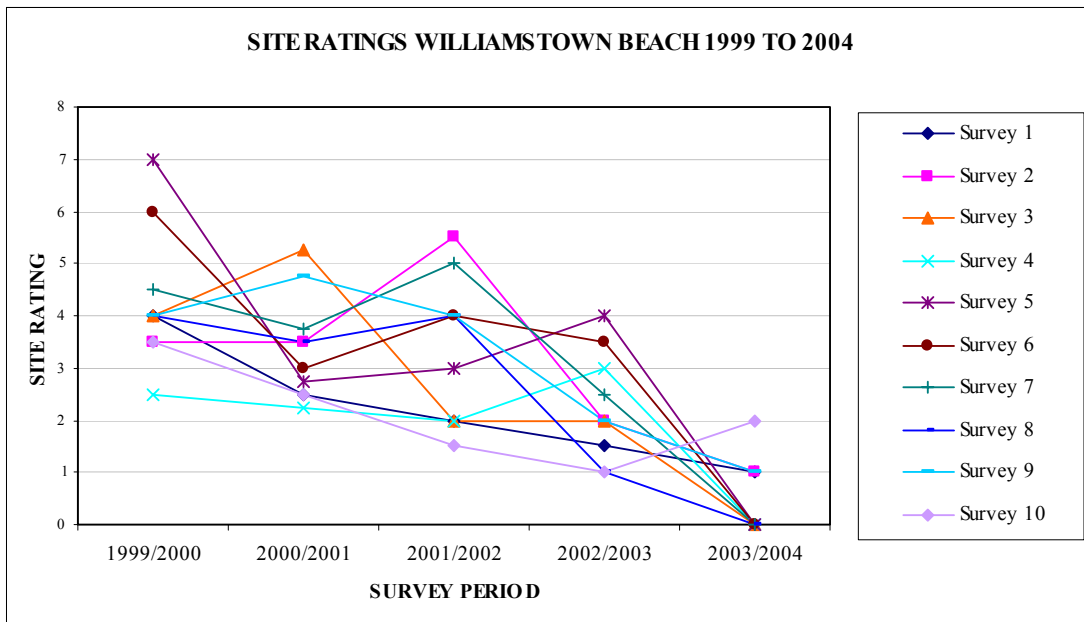


Figure O3: Visual site ratings at Williamstown beach

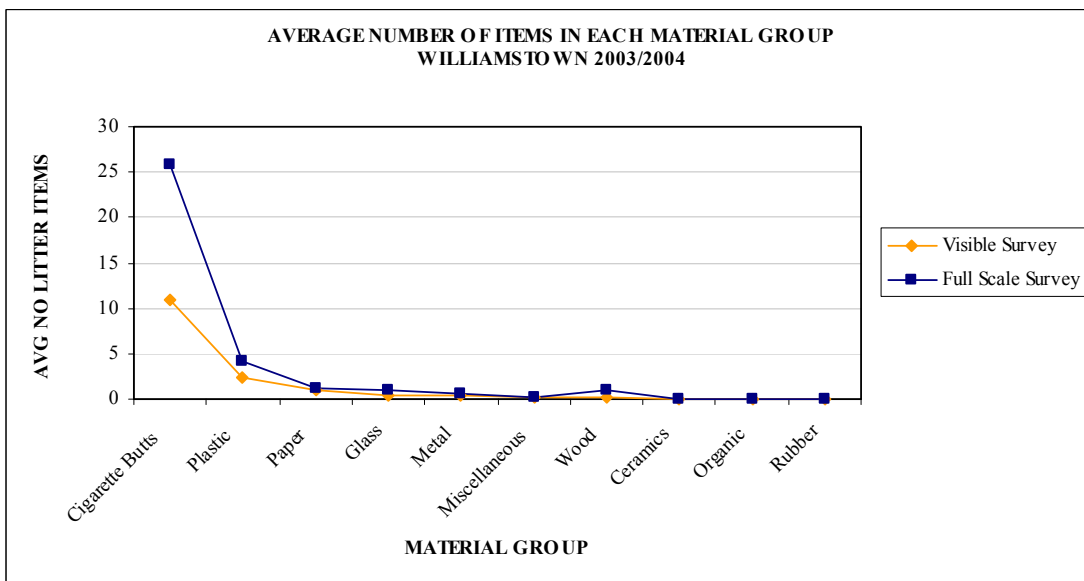


Figure O4: Material type found per survey at Williamstown beach

REFERENCES

Note	Reference	Page no.
1	Bureau of Meteorology	11†
2	Kingston City Council website www.kingston.vic.gov.au	12†, 11
3	City of Port Phillip website www.portphillip.vic.gov.au/summer_cleaning.html	14†, 17†, 19, 43
4	Hobson Bay City Council*** www.hobsons.vic.gov.au	18†, 52

† indicates page number in the main litter survey document (Publication 966).

*** Note: Council meeting minutes (Audit & Accountability special committee) for February 2003 details the budget for new beach-cleaning equipment.