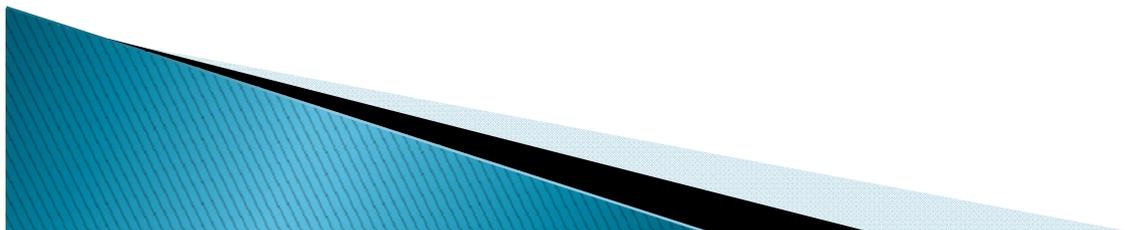


BeachPatrol Australia



Volunteer group to clean litter off Beaches

ALBERT PARK	PORT MELBOURNE
ELWOOD	ST KILDA
BRIGHTON	SO. MELBOURNE
SANDRINGHAM	MENTONE
RICKETTS POINT	HAMPTON
PARKDALE	ASPENDALE
CHELSEA	WILLIAMSTOWN
RYE	SEAFORD
FRANKSTON	WERRIBEE
MORDIALLOC	ALTONA
TOOTGAROOK	DROMANA
MT ELIZA	ROSEBUD/MCCRAE



BeachPatrol Australia



- Approx 2700 people
- Visit school class rooms to conduct talks with children



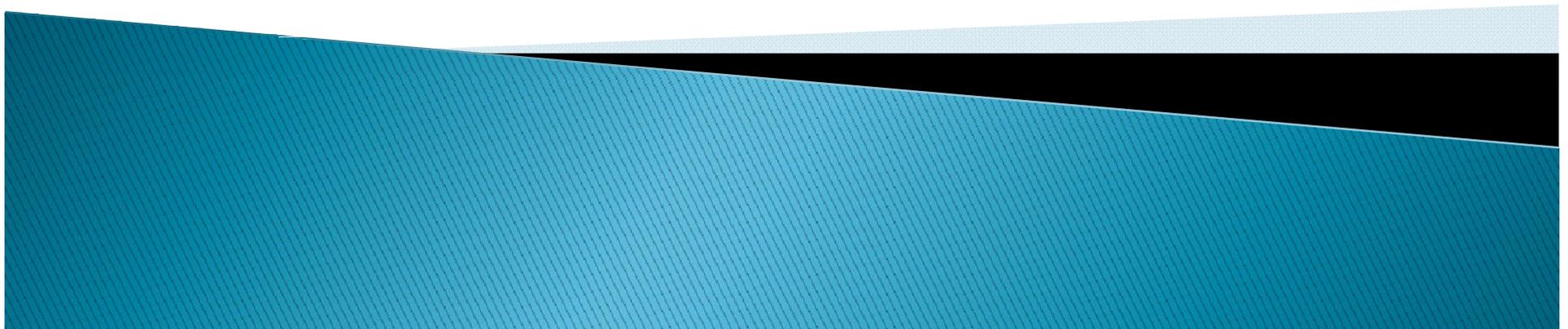
- Conduct cleans and audits with corporate groups

- Host community events like a film night on marine plastic pollution





Predicting the Type and Amount of Plastic Litter in Port Phillip Bay

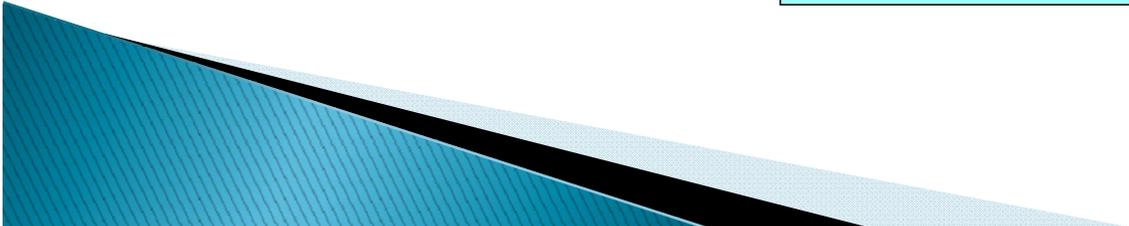
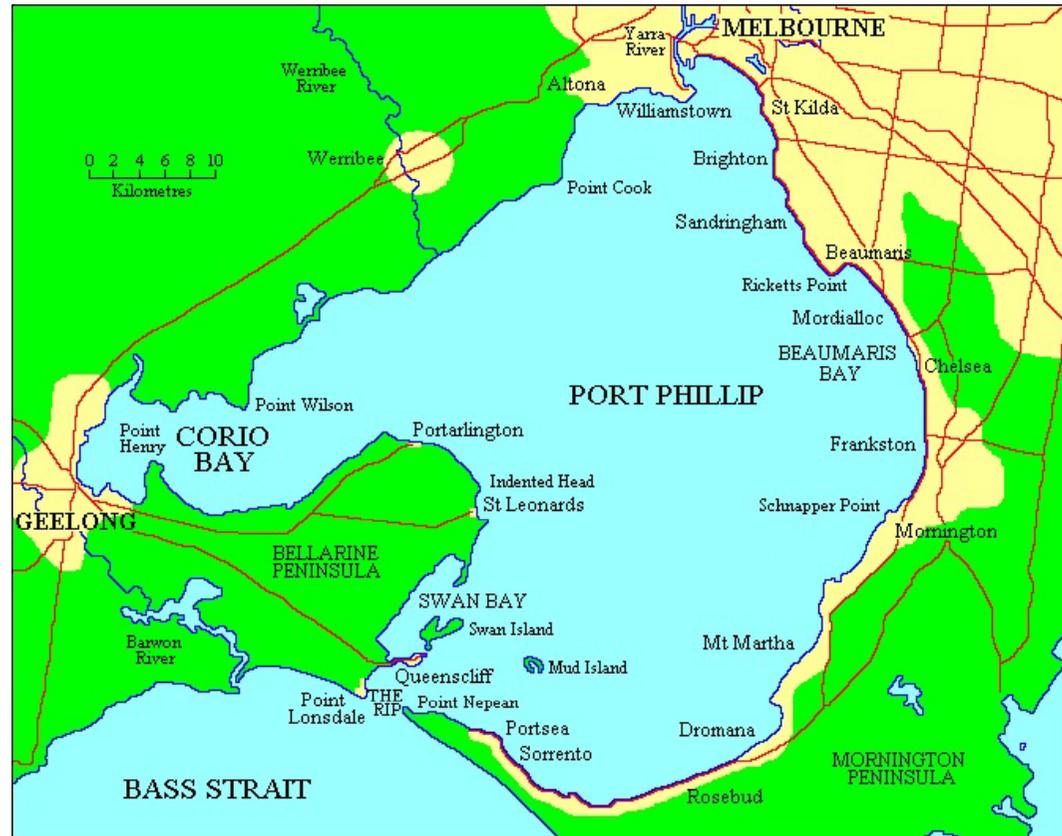


Port Phillip Bay



Features

- Perimeter 264 km
- Only a few inlets
- One outlet at the heads
- Very little litter exits or enters through the heads



New Type of Survey Method

- ▶ Tide line survey – what washes in
- ▶ Conducted every 24 hours
- ▶ Early in the morning before dog walkers or council cleaners
- ▶ Includes time as a factor



Survey Area

- ▶ Picked same 45m of beach every day
- ▶ Collected and counted every bit of visible plastic that washed in over the previous 24 hours
- ▶ Collated them into 12 types of plastic product plus 3 generic size types (mostly clear film)
 - greater than 50 mm
 - between 5 and 50 mm
 - micro plastics <5 mm

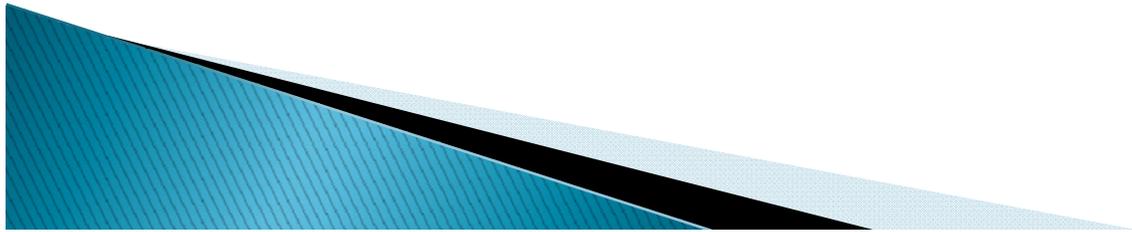
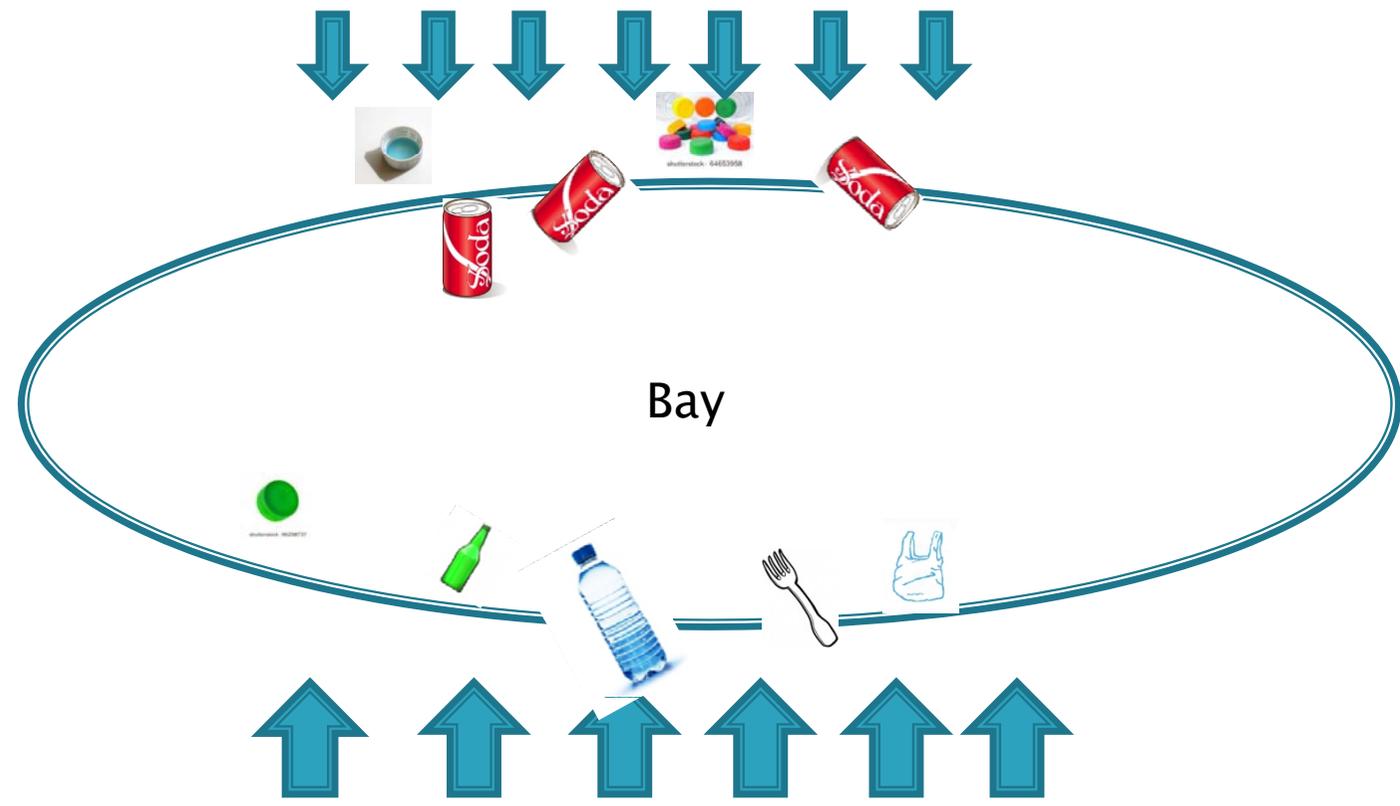
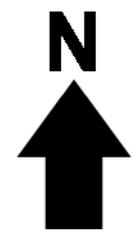


Wind factor

- ▶ On shore winds cause heavy loads washed on beaches
- ▶ Off shore winds do the opposite
- ▶ Winds vary with in a day
- ▶ Different seasons have different seasonal dominant winds



Wind Effect



Wind Days & Bay Orientation

1) Record the Wind. Speed and direction as variables.

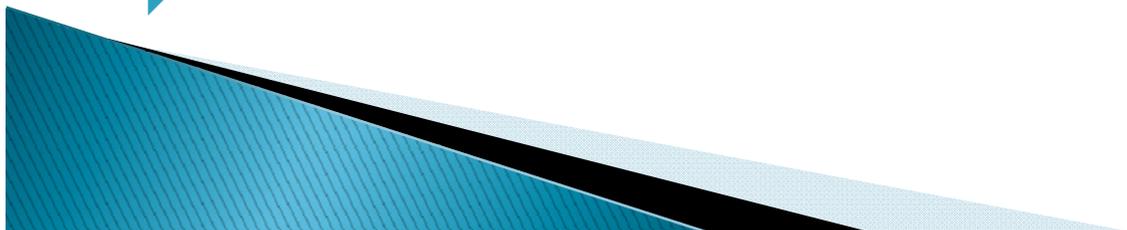
Defining a Wind day as the distance it blows per day

- ▶ e.g. A 12 km/h N wind for $\frac{1}{2}$ day is 6 N wind day units and 20 km/h W wind for a day is 20 W wind day units for that day.



2) Bay perimeter divided into:

- ▶ South facing beach 86,091 m
- ▶ North facing beach 87,827 m
- ▶ East facing beach 77,731 m
- ▶ West facing beach 84,882 m



Yearly Wind day Data*

▶ Wind-Day Direction	Wind Day Units
▶ North wind vector day	2107
▶ South wind vector day	1143
▶ West wind vector day	866
▶ East wind vector day	321

* Wind taken from Weatherzone website, recording wind speed and direction at 10 minute increments for Port Melbourne for 24 Mar 16 to 24 March 17

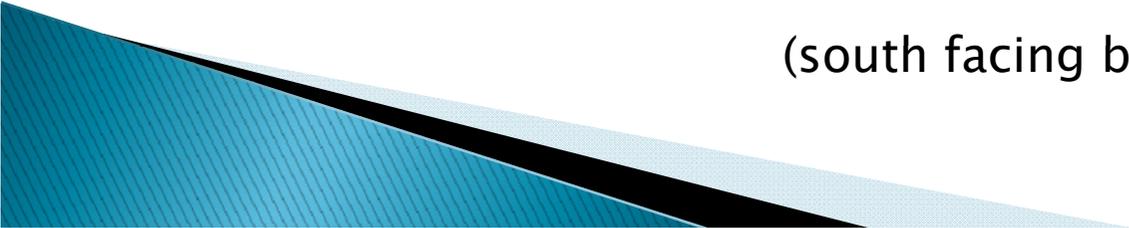


45 m Collection Data

Plastic>5cm*	5mm<Plastic<5cm	Micro Pieces	Plastic Bags	Plastic Bait Bags	Straws	Bottle Tops	Bottles/Cans
39064	42459	21412	1237	116	1590	1273	227
28%	31%	15%	0.89%	0.08%	1.15%	0.92%	0.16%

Bottle Labels	Wrappers	Food Containers	Balloons and B'strings	Butts	Polystyrene	Syringe	Total Bits
1051	15051	856	787	2688	10958	23	138,792
0.76%	11%	0.62%	0.57%	1.94%	7.90%	0.02%	100%

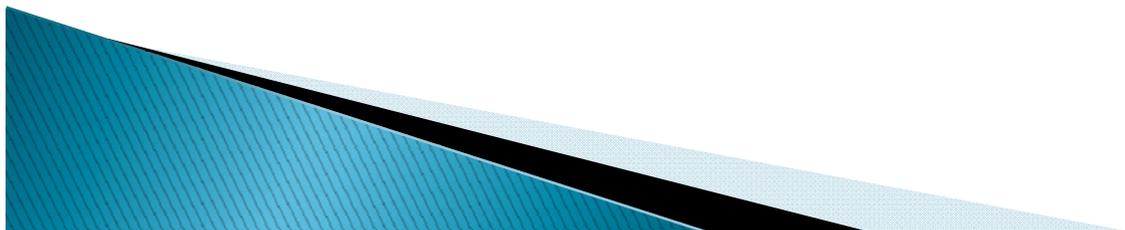
(south facing beach)



Plastic Estimation per Metre

- ▶ A second sampling point was made on a southern beach (North facing) to refine data.

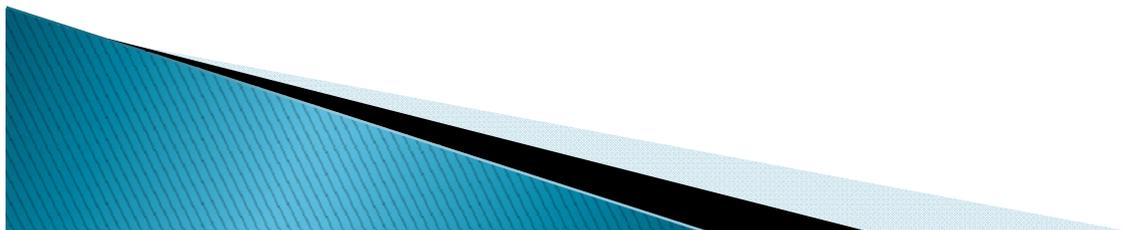
Beach Location	Total pieces counted	Beach Length surveyed	On shore wind-days	Pieces/meter/wind-day
North,	138,792	45	1143 South wind-days	2.7
South, 30 days of data	1452	50	270 North wind-days	0.11



Extrapolation for the Whole Bay

- ▶ Finally with pieces /m/windday known, then

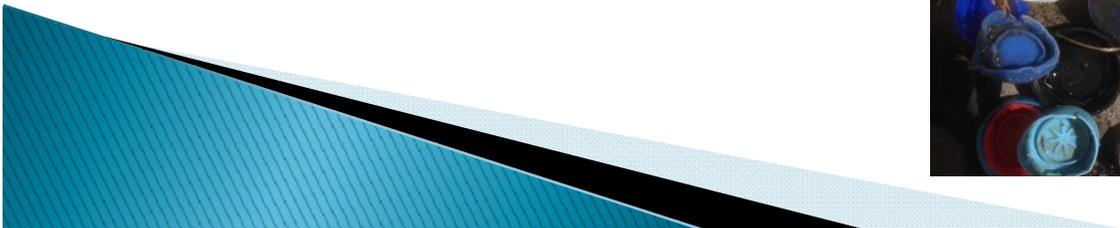
Beach Facing Direction	Beach Length Facing wind [m]	On shore wind-days	Pieces/meter/wind-day	Extrapolated Plastic items washed ashore per year
North wind	87,827	2107	0.11	19,798,233
South wind	86,091	1143	2.7	265,528,466
West wind	84,882	866	1.4	103,109,023
East wind	77,731	321	1.4	34,934,999
			Total	423,370,720



Item Annual Projections

Plastic>5cm*	5mm<Plastic<5cm	Micro Pieces	Plastic Bags	Plastic Bait Bags	Straws	Bottle Tops	Bottles/Cans
119,160,662	129,516,756	65,315,075	3,773,340	353,846	4,850,129	3,883,154	692,440

Bottle Labels	Wrappers	Food Containers	Balloons and B'strings	Butts	Polystyrene	Syringe	Total Bits
3,205,966	45,911,508	2,611,139	2,400,662	8,199,464	33,426,237	70,342	423,370,720



2nd Year of Data 25 Mar 17 – 24 Mar 18

In the 2nd year some changes were made.

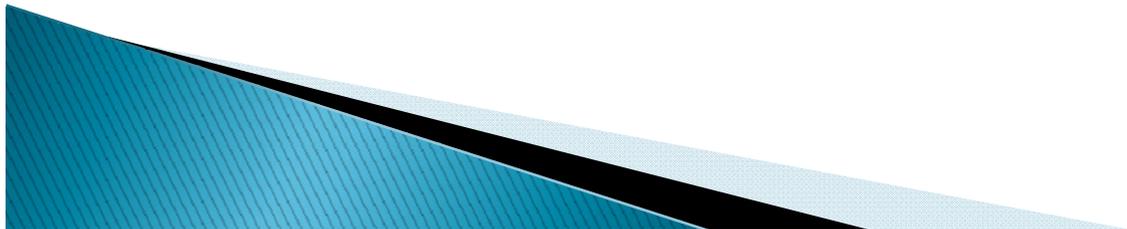
- ▶ Increased the survey length to 55 m
- ▶ Separated out some specific categories Nurdles, Zip Lock bags & cutlery
- ▶ Paid more attention to microplastics

Total plastic pieces predicted for;

2016–2017 year 423,370,720

2017–2018 year 554,354,888

1.5M per day



Year to Year % Comparison

Survey Year	Totals	Plastic Plastic>5cm*	Plastic 5mm<5cm	Micro<5 mm *^	Nurdles	Plastic Bags	Ziplock*	Bait Fishing	Straws	Bottle Tops
2017-2018	% Tot	24%	27%	21%	3.22%	0.50%	0.15%	0.09%	0.84%	0.55%
2016-2017	% Tot	28%	31%	15%	NR	0.89%	NR	0.08%	1.15%	0.92%

Bottles/Cans	Bottle Labels**	Wrappers	Food Containers	Cutlery	Balloons & B'strings	Butts	Polystyrene	Syringe	Totals
217	3,154	41,916	1,112	88	1,208	2,758	2,275	24	233,710
0.09%	1.35%	18%	0.48%	0.04%	0.52%	1.18%	0.97%	0.01%	100%
0.16%	0.76%	11%	0.62%	NR	0.57%	1.94%	7.90%	0.02%	59%

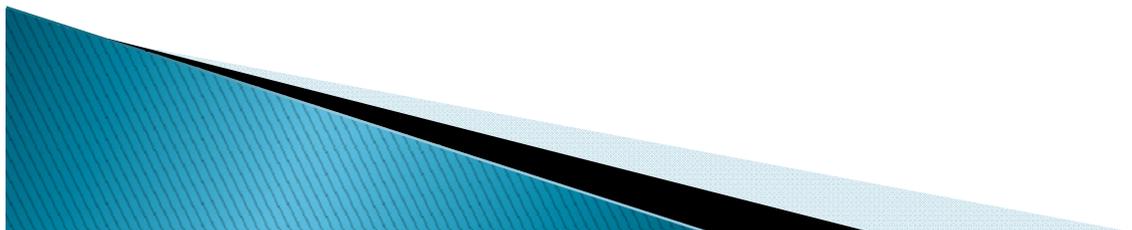
NR= not recorded at that time

* = only separated out 25 Jan 18, Included in Plastic bags prior to that

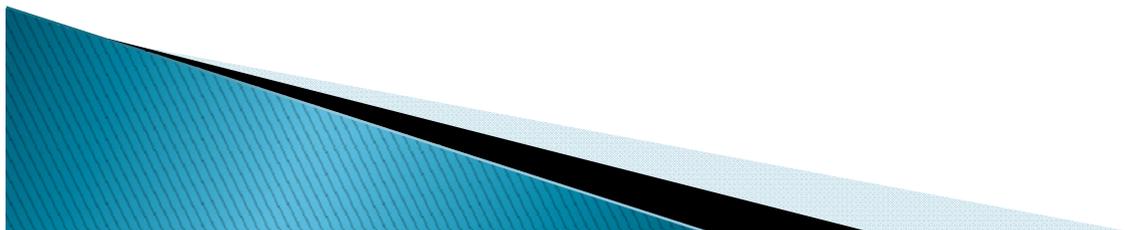
*^ = only separated out 29 Sept 16 (6 mos after start in Mar 2016), Included in <5 cm prior to that

** = only separated out 24 Apr 16 (1 month after start in Mar 2016), inc in Wrappers prior to that

□

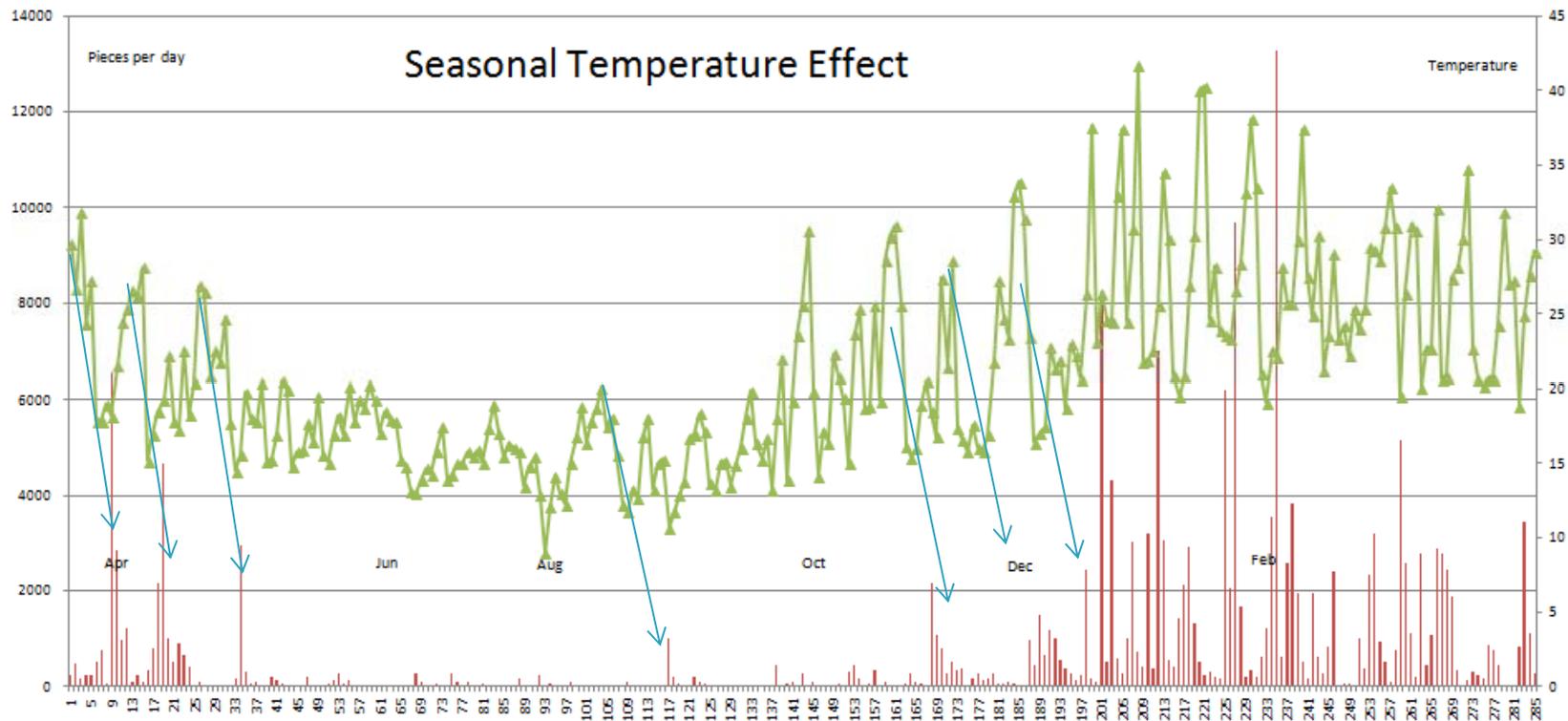


When does litter occur?



Why does litter occur?

- May seem obvious to us –
- Lazy people?
- Uneducated People?
- No value placed on ‘rubbish’?



People go outside!

Thank You

- ▶ Any questions?



www.beachpatrol.com.au