

anti-littering campaign

impact report sorrento, italy

report compiled by Ellipsis Earth
august 2020

ellipsis

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**#piccoligesti
grandicrimini**

**#smallgesture
bigcrime**

For over 30 years, cigarette butts have been the number one most commonly littered item in the world,¹ comprising up to 90% of litter counts² and frequently listed as a major pollutant of city streets.

Disposing of cigarettes on the ground or out of a car is so common that 65% of smokers admit to littering their butts 75 percent of the time; an estimated 4.5 trillion cigarette butts are littered globally every year – that's 12 billion a day.

In Italy, 24% of people smoke an average of 1,500 cigarettes each per year, equating to 14 billion mismanaged butts per year in Italy alone. For the small Italian touristic city of Sorrento, this equates to 3,425 cigarettes being thrown on the city's picturesque streets every day.

While 90% of people agree dropping a cigarette butt on the street is littering, only 63% say the same about putting a butt down a drain (which often leads directly to the ocean) and only 43% were aware that cigarette butts are toxic to marine life.³

"It's the last remaining acceptable form of littering. People are more likely to pick up their dog poop than cigarette butts." Tom Novotny, San Diego State University

The butts find their way into sewers, rivers, and eventually, our oceans, with mismanagement of litter on land being a major source of ocean plastic pollution.⁴

an expensive habit

Cigarettes are difficult to clean up due to their widespread presence, small size and inability to easily filter from waste collection. The cost of cigarette butt clean-up is significant, for example US\$6 million a year for San Francisco alone⁵ and £34 million a year in Scotland.⁶ The tobacco industry sees an estimated natural capital cost of \$166 million a year, and dirty coastlines cause a loss of tourism revenue of up to \$148 million a year⁷ in California with additional clean up costs of \$486 million. The Italian region of Campania earns €10 billion annually from tourism which could be similarly impacted if key tourist sites are perceived as too dirty; for example, 85% of tourists in South Africa said they would be deterred from visiting beaches with more than 2 litter items per metre.⁸

Costing the earth

The cigarette butt filter is the most resilient part of tobacco product waste, made from fibrous plastic substance cellulose acetate, which can persist in the environment for decades. The butts contain over 4000 chemicals, many of which are toxic and carcinogenic, including arsenic, formaldehyde, ammonia, hydrogen cyanide and nicotine. These toxins can severely damage marine ecosystems – multiple studies have found that just 1 butt per litre of water kills half the marine life in the tank, including fish,⁹ and the heavy metals in filters have been found to inhibit plant growth.¹⁰

**“
Campaigns
that cut
through to
smokers,
funded by
the industry,
are needed
now because
so many
still think
butts are
harmless
”**

ALLISON OGDEN-NEWTON
KEEP BRITAIN TIDY

Additional risks include ingestion by wildlife, forest fires, social risks including children or pets touching or ingesting toxic butts on beaches or in parks, and the negative mental health impacts of living in litter-heavy environments.¹¹

Today, the existing information we have on environmental pollution and mismanaged litter is highly inadequate:¹² the majority of the world has zero baseline data, many sample sites are insufficient and non-representative, surveys are sporadic and non-systematic, data collection methods are highly subjective and even directly biased, and susceptible to human error. In addition, manual data collection is extremely time-consuming, labour-intensive and either manpower-costly or reliant on a non-scientific volunteer workforce, and can be dangerous, impractical or simply impossible. In short, there is a lack of a standardised or reliable sampling, datasets are non-comparable.¹³

No smoke without fire

Unfortunately, this lack of robust data on cigarette littering numbers and zero baseline data in Sorrento on litter

quantities or distribution prevents appropriate, targeted actions from being delivered, or impacts determined. Better information is needed about the quantities, proportions and movements of cigarettes through local systems to demonstrate impact. The acquisition of baseline and comparative data are therefore critical to gaining a grasp on the cigarette litter issue.

“Acting to tackle this requires adequate metrics to guide and prioritise action at different levels, ranging from regional infrastructure to policies and enforcement”
Guillaume Billard and Julien Boucher, Environmental Action

time to act

Given that cigarette butts are often classified as toxic waste, are present in large numbers and require substantial resources to remove them from the environment, they represent an ‘economic externality’ of smoking¹⁴ — that is, smoking carries a cost that is borne by people who are not involved with smoking. Strategies to address this problem include tobacco companies, retailers and smokers being responsible for the cost of cigarette butt clean-up. However, to determine the true burden of cigarette butt waste in the environment and to aid in assessing clean-up costs, trusted data is needed.¹⁵

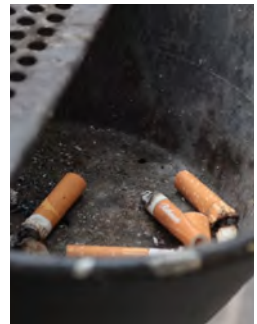
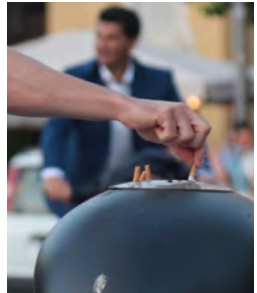


Breath of fresh air

The EU has recently announced a reduction of non-banned plastic items by at least 25% by 2025 in each member state.¹⁶ Tobacco companies that make major changes to reduce their environmental impact now could buy themselves time before regulators legislate.

And just last week (August 2020), the UK Environment Minister published an open letter urging tobacco manufacturers to take responsibility for reducing cigarette littering or face government legislation, in a bid to meet new targets for the UK to be cigarette litter free by 2030.¹⁷

With this renewed environmental focus on the tobacco industry, it has never been a better time to demonstrate the power of innovative data-driven initiatives for reducing the impact of cigarette butt littering in cities across the world.



An estimated 65% of smokers throw their cigarette butts on the ground instead of in an ashtray

**4.5 trillion
cigarette butts
are littered
each year**



project statement

“
we simply can't have
the impact we want
without this data
”

RAFFAELLA GIUGNI
MAREVIVO



Ellipsis Earth worked in collaboration with British American Tobacco (BAT), Italian environmental NGO Marevivo and the Italian Ministry for Environment to deliver an anti-littering public awareness campaign over two months in 2020, during the busy summer tourist season in Sorrento, Italy.

The campaign incorporated numerous approaches to combine education on littering and ocean literacy with stricter legislative measures and resource provision for improved waste capture.

Campaign actions included:

- Installation of 50 new integrated-ashtray trash cans across the city
- Display of 100 campaign posters across all key tourist sites
- Installation of a statement artwork in the main square
- Distribution of 4000 pocket ashtrays along with educational resources
- Training for local law enforcement to distribute fines of up to EUR\$300 for littering
- Extensive media coverage across 146 local and national media channels, with a readership of approximately 2,342,000 and online reach of 489 million

Ellipsis Earth's role in the campaign was to provide scientifically robust data on specific quantities of cigarette and other litter before and after the campaign, along with subsequent insights as follows:

- Pre- and post-campaign surveying of representative sites across the city, using our unique AI software for litter identification and mapping
- Based on our findings, recommending where to deploy the campaign trash cans, ashtrays, posters and law enforcement, and recommendations for improving municipal cleaning schedules and locations
- Comparative analysis of pre- and post-campaign results with evaluation of mitigation strategies and recommendations for further improvement
- Communication of impact outcomes with innovative, creative and accessible report content for public and stakeholder engagement

This was supplemented on the ground by delivery of on-site public engagement throughout the campaign plus press coverage and media content production, helping to raise awareness of the campaign and wider education on cigarette littering and ocean health.

sites



A total of 16 sites were chosen across three main regions in Sorrento – its beaches, the historic port and the touristic city centre. Site selection was representative of these regions and included a range of land use types, intensity of use and local vs tourist populations. 11 of these sites participated in the anti-littering campaign.

Surveys were conducted twice daily (am and pm) over a one week period before the public-awareness campaign (from 14 to 21 July 2020) and another one week period after the campaign (from 08 to 15 August 2020). Morning surveys were conducted immediately following the city cleaning team's overnight deep clean, giving the baseline zero data, and evening surveys were conducted after the busiest periods of use, e.g. at the close of the beaches, giving the total quantity of litter accumulated each day.

Surveys were conducted using a combination of drones, smartphones and fixed cameras to capture representative transects in each subsite. Transects ran from East to West with parallel transects aligned North - South and a minimum of three repeats of each transect. The total land area surveyed was 9140m².

The images captured were processed by Ellipsis Earth's machine learning technology to automatically detect 47 categories of litter including cigarette butts and packets to over 90% accuracy and certainty. Our unique dual layer verification was conducted to ground-truth and verify data accuracy. Finally, distribution of cigarettes and other litter was mapped by location and concentration, with results being comparable across all sites for easy analysis.

key findings

The pre-campaign surveys revealed total weekly cigarette butt litter to be 21,995 (3,136 butts per day) and total other litter as 5,168 items.

Due to covid-19, there were very few tourists in Sorrento during the pre-campaign period, with the majority being the 16,500 local population plus the early arrival of some Italian national tourists. These quantities therefore reflect a small and uncharacteristically quiet tourist town, yet it is clear that cigarette butts are a major and very common litter item here.

With total annual visitor numbers exceeding 650,000, the quantities of litter over the course of an entire tourist season become extremely high even at covid-impacted levels. If left unmanaged, this leads to extremely damaging quantities of cellulose acetate filters entering the oceans.

city slicker

Our results show that cigarette butts make up 78–81% of all total litter in Sorrento. This is lower than the average urban cigarette proportion of 90%, indicating a higher than expected trash count for the area.

Participation

Of the 16 sites surveyed, 11 took part in the campaign, either by increased cleaning, addition of trash cans, ashtrays and posters or a combination of all initiatives. The 5 non-participating sites were therefore useful benchmarks for impact comparison.

Post-campaign impacts

Ellipsis Earth measured a significant and impressive reduction in both cigarettes and other litter following the campaign, with a specific reduction in cigarette littering demonstrating the success of the campaign focus.

Overall reduction of cigarettes

41% across all sites
69% across participating sites

Overall reduction of other litter

30% across all sites
45% across participating sites

before 13,173m

stacked end to end, Sorrento's mountain of cigarette butts was taller than Mt. Everest

Mt. Everest 8,848m

after 7,832m

all sites



before 21,955 cigarettes
5,168 other litter
after 13,053 cigarettes
3,625 other litter

participants ★



before 17,358 cigarettes
4,403 other litter
after 4,785 cigarettes
1,559 other litter

70%
less litter within
20m of newly
installed bins

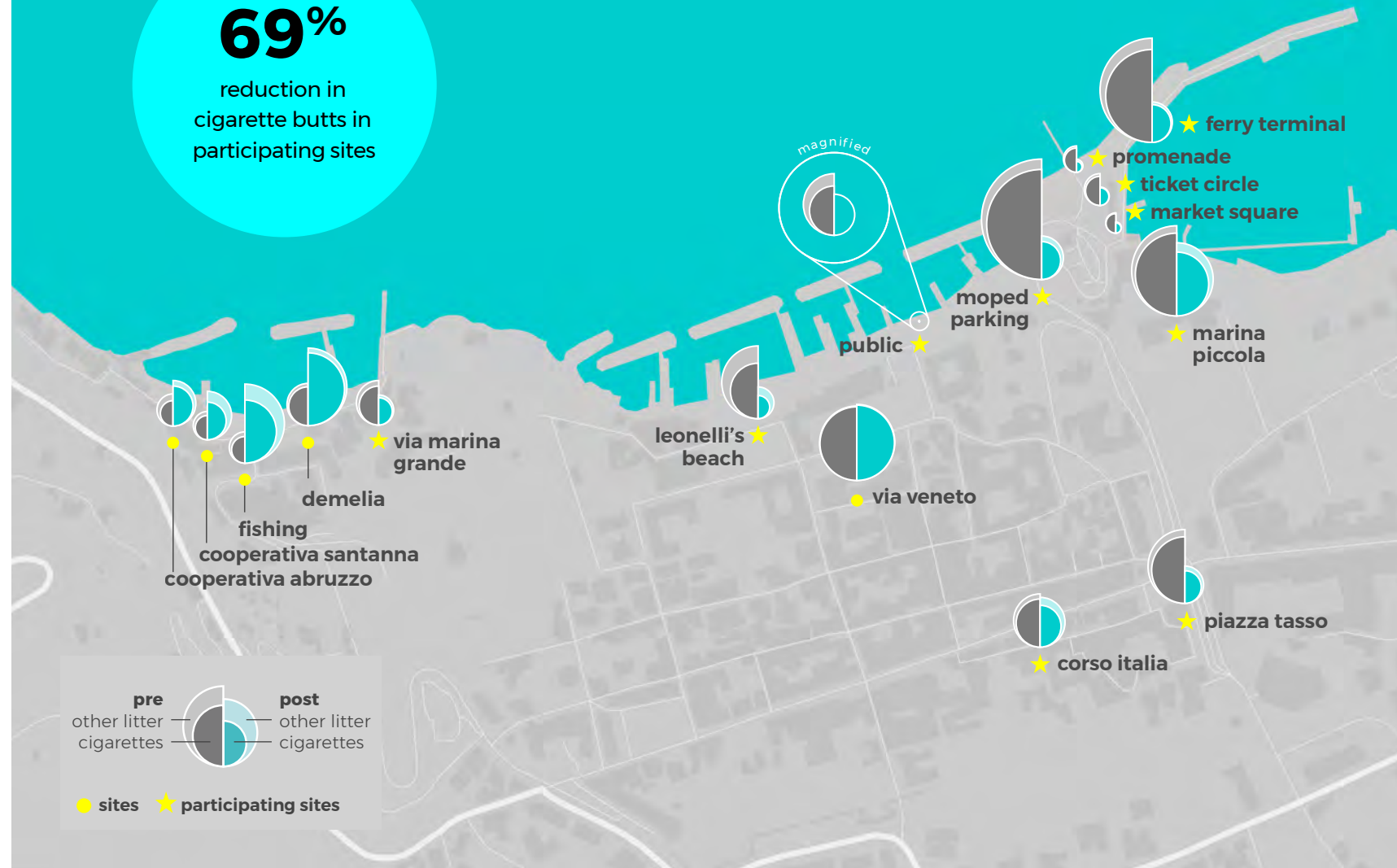
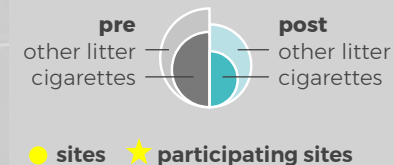
The most improved sites were the Moped parking lot (88%), Ferry Terminal (85%) and Promenade (80%) (all at the Port), Piazza Tasso (76%) and Leonelli's beach (83%), all of which followed Ellipsis Earth's recommendations for trash can placement and additional cleaning schedules.

The least improved sites were Demelia (-238%) and Fishing Beaches (-535%) which are both private unmanaged beaches that did not participate in the campaign.

Average post-campaign results range from a 23% increase for all sites to 64% reduction in campaign participating sites.

For more detailed results and breakdown by site and litter type, please request access to our online interactive map.

69%
reduction in
cigarette butts in
participating sites



key site: port



campaign impacts

- The Moped Parking at the port and Marina Piccola were two of the most littered sites in the city, despite being the first impression for many arriving visitors
- There were previously no trash cans or ashtrays on marina piccola or the car park, and neither site had been cleaned since the start of the season. Following our recommendations, a full deep clean of both sites was carried out at the start of the campaign with intermittent additional cleaning throughout
- Following our recommendations, 21 new trash cans were added along the Promenade, Ferry Walkway and Circle, with a dedicated ashtray added at the entrance of Marina Piccola
- The new bins and ashtrays were observed in frequent use, with smokers walking up to 15m to stub out cigarettes if they could see a receptacle
- Post-campaign results show a significant and impressive reduction of all litter of 87% at the car park, 85% reduction along the ferry walkway, and an overall reduction of 77% litter across the entire port site
- There was also a 35% overall reduction of litter at Marina Piccola, with 98% of this being cigarettes, highlighting the impact of the newly installed ashtray. The majority of litter on this beach is now from floating litter left by the tide - with more cigarettes being deposited by waves than people, the biggest polluter is now ironically the ocean itself

key site: leonelli's beach



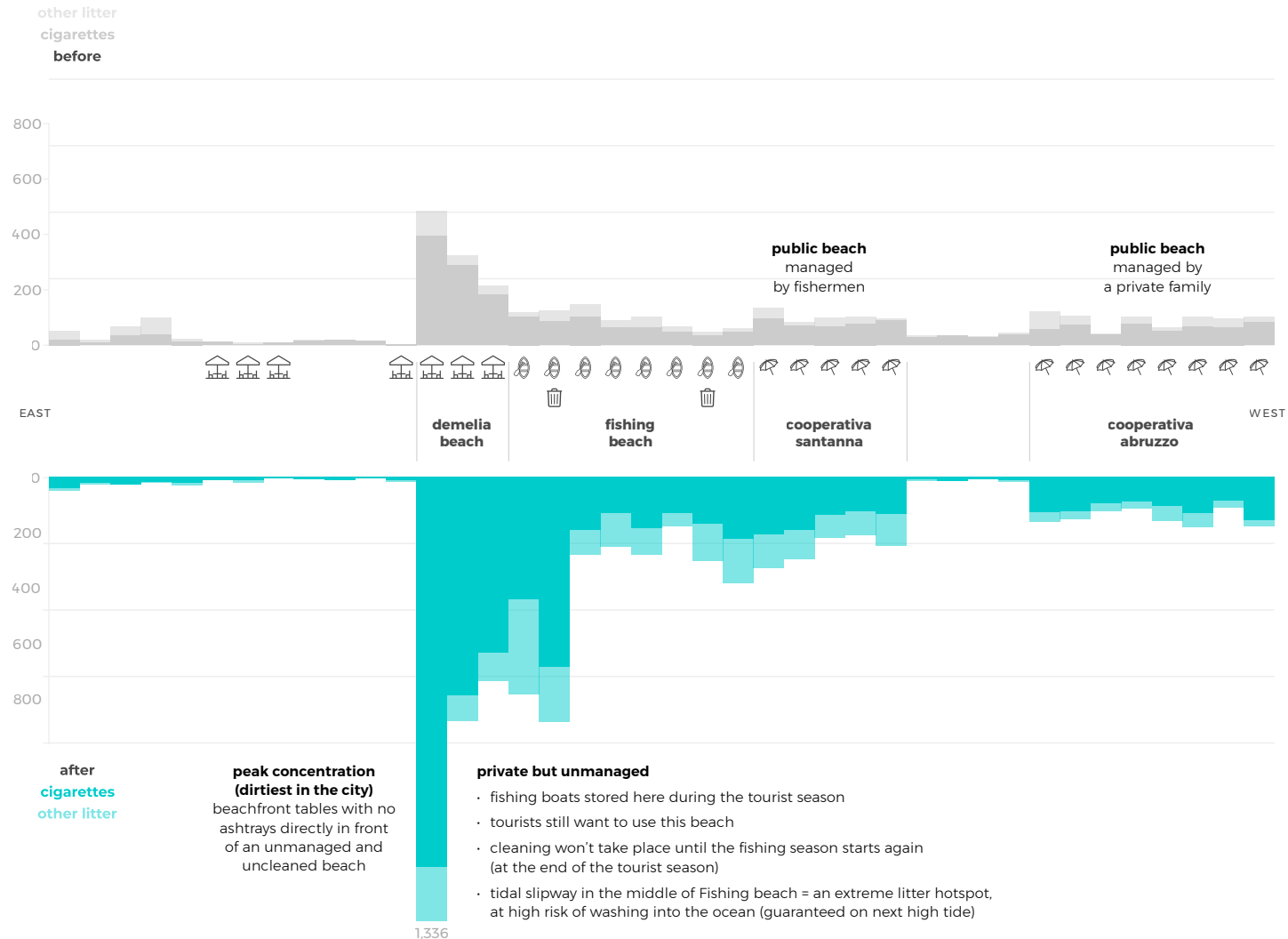
campaign impacts

- Beach owner Marina Leonelli has worked tirelessly with her family and staff to manage littering on this popular private beach
- Initiatives include additional recycling bins, sunbed and umbrella ashtrays, educational posters and warnings for littering, as well as banning of single use plastic cups, straws and bottles on the beach and provision of biodegradable alternatives
- Marina's team cleans for 1-2 hours, twice per day, to manage the daily build-up of litter discarded by beach users
- The sunbed and umbrella ashtrays were observed in heavy use and constant presence of staff deterred users from littering cigarette butts in the sand
- Switching from paper receipts to online ordering and payment through use of an app and QR code has created an electronic receipt system, drastically reducing paper littering
- Post-campaign results showed a reduction of 83% fewer cigarette butts and 79% less general litter, despite a steady increase in tourist numbers throughout the season and campaign period
- This is the gold standard of beach management and sets an impressive example to other beaches in Sorrento, whether private or public, as to the standards possible with dedicated regular cleaning and detailed and thorough management

key site: marina grande

campaign impacts

- Additional cleaning was undertaken along Via Marina Grande, but no additional trash cans or ashtrays were distributed in this area
- A decrease of 78% was seen for fishing litter across this site, likely due to the winding down of the fishing season and transition to tourism
- Unlike Leonelli's beach which had restricted visitor numbers due to coronavirus, the public beaches on Marina Grande had unrestricted increase in tourist use, with an estimated 500% increase in number of daily users
- The two unmanaged beaches, Demelia and Fishing, are the dirtiest sites in the city with increases of 238% and 535% in total litter, respectively
- Although not participants in this campaign, Co. Abruzzo and Co. Sant'anna have their own litter management in place, hence the increases here were lower, at 100% and 198%, respectively, demonstrating that these teams are working extremely hard to cope with the seasonal rise in litter
- Co. Sant'anna saw a surge in retail litter with a high number of paper receipts produced from increased boat trip bookings, and a high number of plastic bags brought on to the beach from nearby shops and cafes



key site: city – piazza tasso



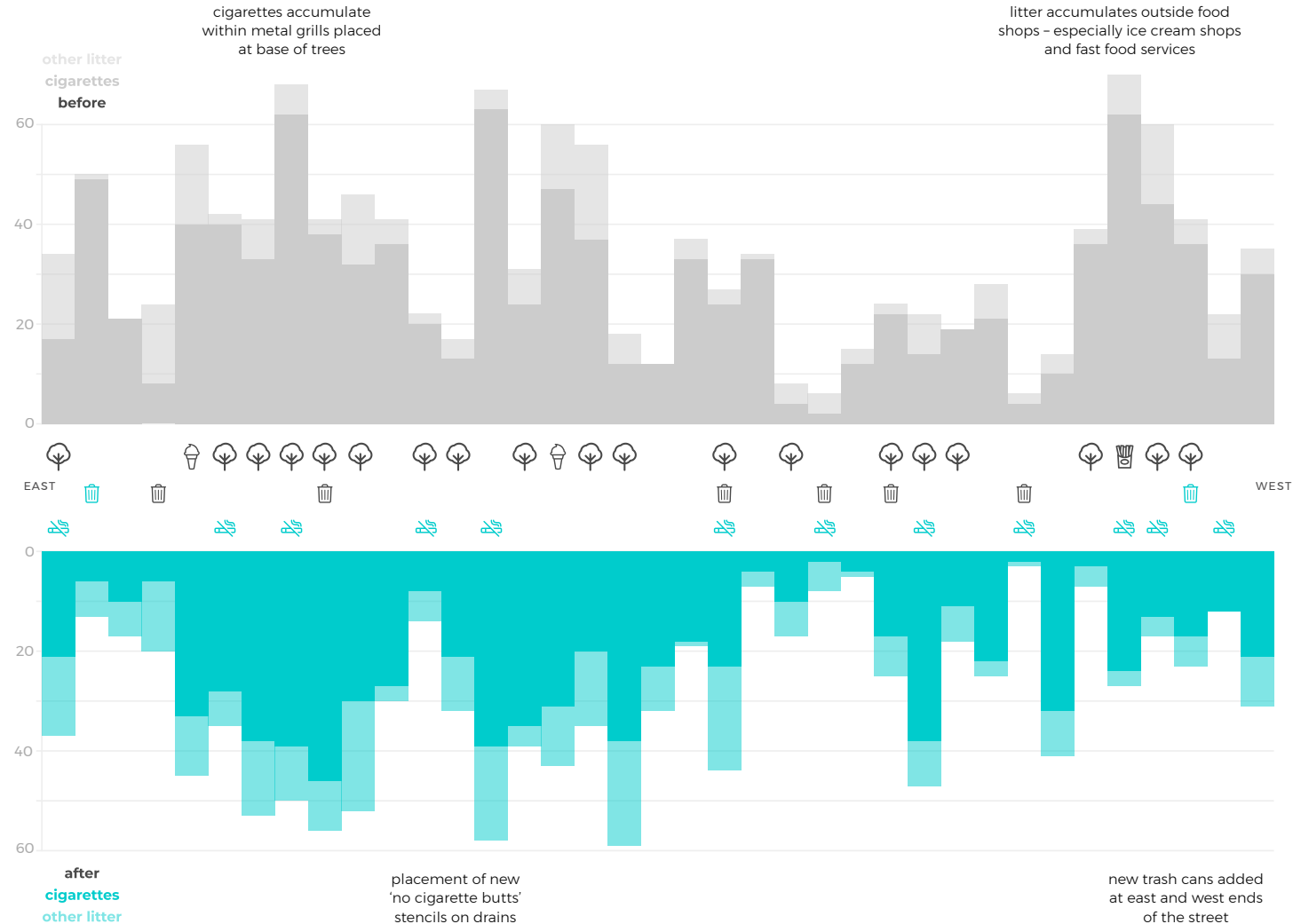
campaign impacts

- Piazza Tasso is the main city square and is heavily populated by both local and tourist visitors
- The 9 new bins installed throughout the campaign were observed in frequent use, with an average capture of up to 30 cigarettes per bin per day over the course of the post-campaign survey period
- Littering was concentrated to peak periods of the day, with 90% of cigarette butts discarded in the evenings, after dinner and after bars and clubs closed
- The impact of overnight cleaning in the piazza is clear, being practically spotless every morning despite heavy littering each night; without this, litter quantities would quickly become unmanageable
- The square saw an overall litter reduction of 75% during the campaign period, with 76% decrease in cigarette butt littering and 68% decrease in other litter
- The biggest reductions were in cigarettes, followed by retail and food litter, with lower but still significant reductions in drinks litter
- There was also a reduction in discarded PPE (predominantly facemasks) compared to the pre-campaign, possibly due to increased availability of reusable masks as tourist numbers increased

key site: city – corso italia

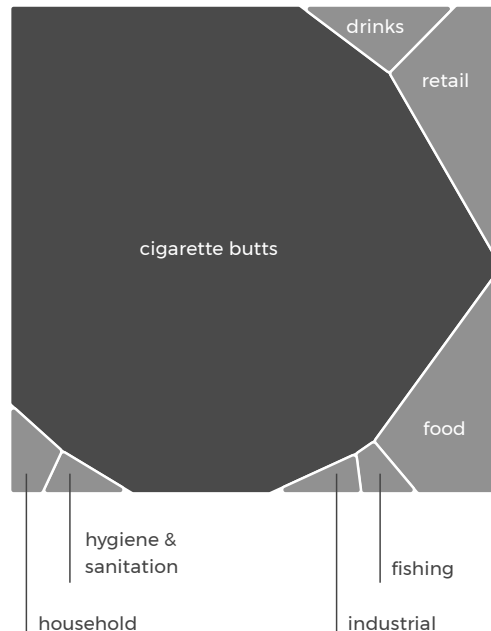
campaign impacts

- Corso Italia is the main shopping street in the centre of the town, with heavy footfall throughout the day peaking in the evenings and weekends
- Littering here is predominantly cigarettes, followed by retail litter (such as plastic bags and paper receipts) and food litter (such as ice cream spoons and napkins)
- Placement of 4 new bins at the east and west ends of the street caused a noticeable reduction in localised littering though this didn't reduce littering along the street as a whole
- The street saw an overall reduction in all litter of just 13% during the campaign period, despite a decrease of 25% in cigarette butt littering, due to significantly higher tourist numbers by the end of the campaign
- The quantity of non-cigarette litter rose from 18% in the pre-campaign period to 30% (with cigarette litter falling from 82% to 70% respectively), due to a surge in retail litter including plastic bags and paper receipts
- The overall reduction is lower than anticipated but this site was already exceptionally clean at its baseline, due to the extremely effective overnight cleaning conducted by the city cleaning team every night

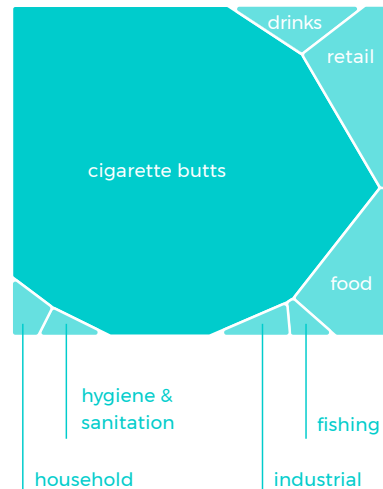


litter breakdown

before



after



Proportions of cigarettes ranged from 98% in areas of continuous pedestrian throughflow (e.g. Via Veneto, the main walkway between Marina Grande and the other beaches), down to 51% in areas where people congregate for longer periods (eg beaches and street cafes), with an average of 81% pre-campaign and 78% post-campaign.

The most common non-cigarette categories were retail (incl. plastic bags and paper receipts), food litter (incl. wrappers, plastic cutlery, sachets) and drinks litter (incl. bottles, cans, cups and straws).

The most common non-cigarette items were paper receipts, bottle caps and lids, plastic drinks cups, straws and fishing net, all of which contributed more than 75% of other litter.

Plastic bottle, straw and wet wipe littering was highest on beach sites, while rubber and wire littering was highest in the port. Paper receipt and plastic bag littering were highest in the city. All other categories make up less than 10% of all litter.

The biggest proportional reduction throughout the campaign was fishing material (nets, rope and buoys) which fell by 89% – in line with the transition from the fishing season to tourism – while all other items decreased by 20–30%.

The largest absolute decrease was in food litter where there was a significant

reduction in food packaging; this was noted as a common item in the newly installed trash cans indicating popular uptake of their use.

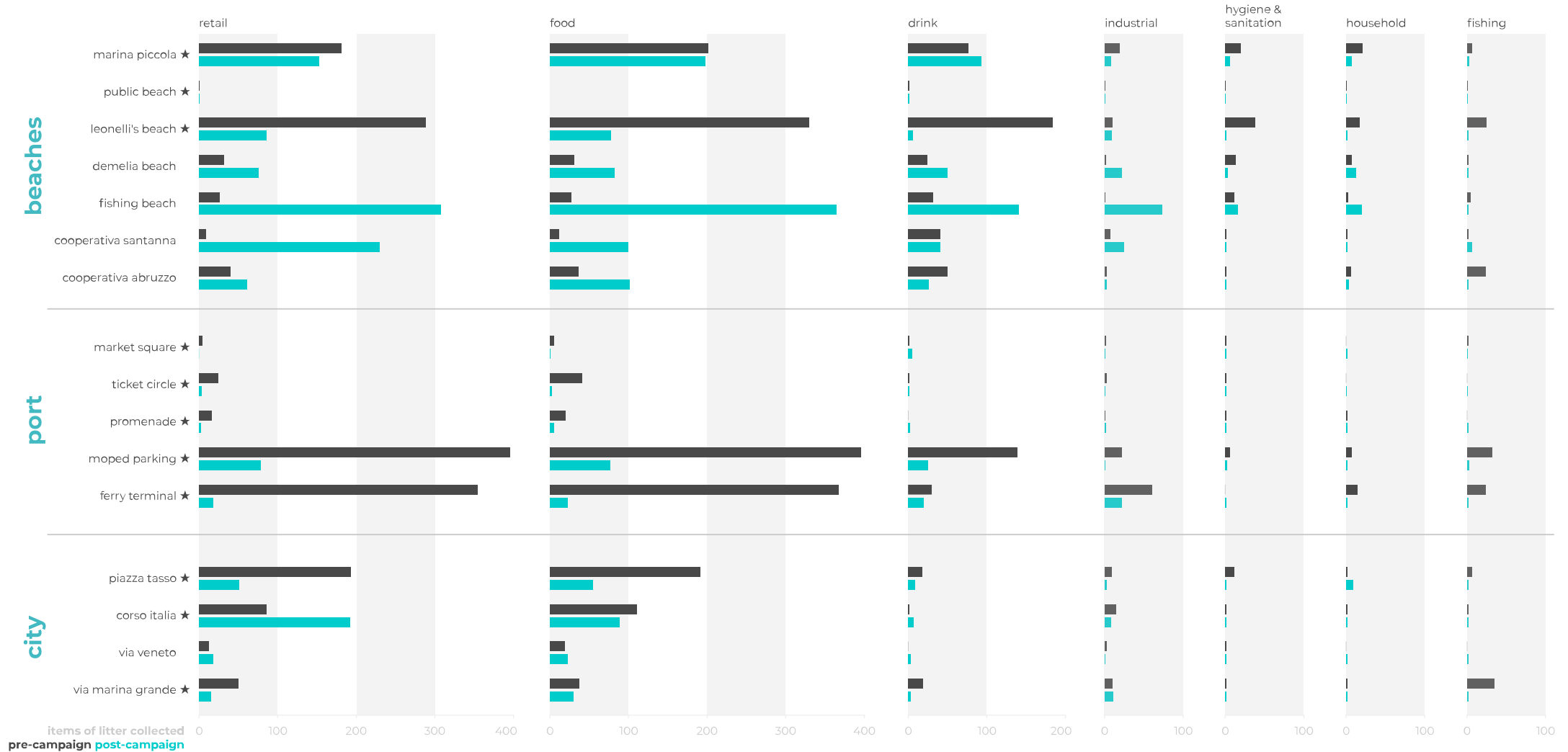
The transition to biodegradable food and drinks containers at Leonelli's beach and some ice cream shops also trialling wooden or biodegradable ice cream spoons has caused a significant reduction in food and drinks litter.

Increases in all litter at Fishing beach, and increases in food and drinks litter on all beaches in Marina Grande reflect the surge in tourist use at sites with insufficient cleaning and management.

covid-19 impacts

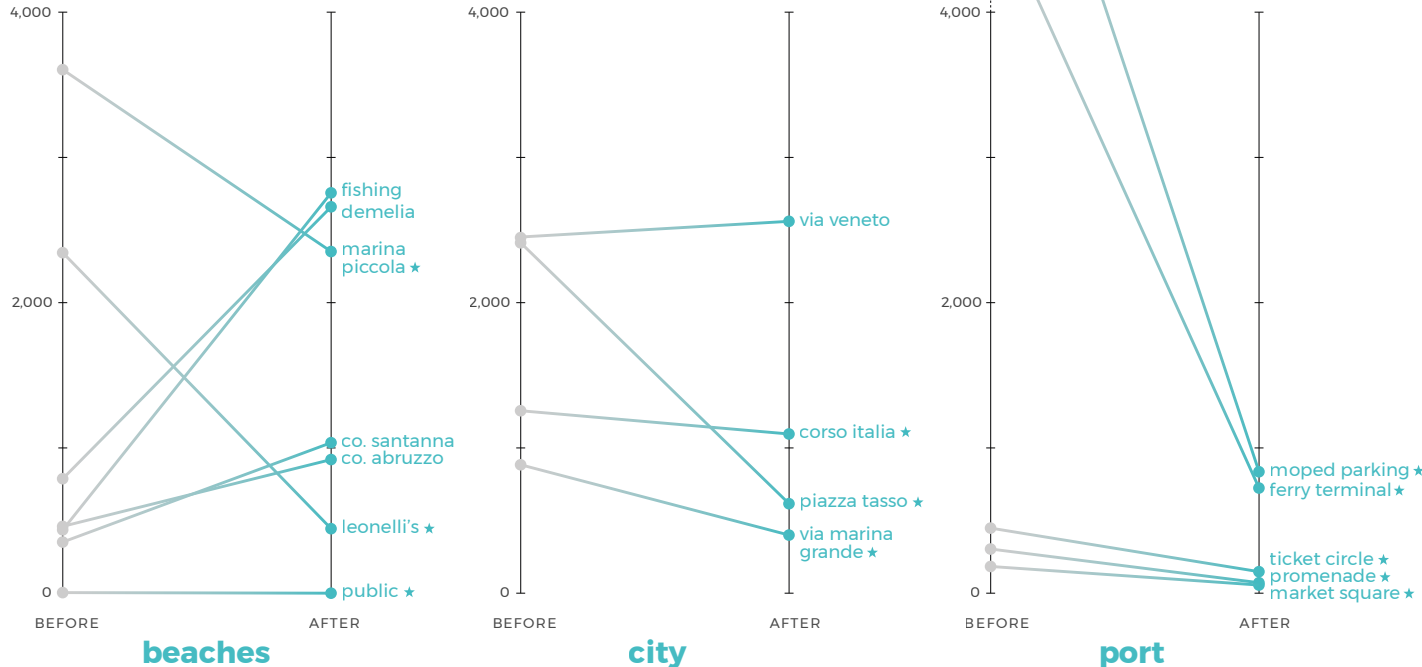
Whilst PPE items such as face masks and gloves were detected in both the pre and post campaign surveys, they made up just 0.5% of all other litter (0.1% of total litter) and did not contribute considerably to the total. However, it is worth noting their presence as a new item this year, and the 56% reduction created by sales of cloth facemasks in the post-campaign period.

A more positive impact of covid-19 has been the popular adoption of QR codes and apps for menu ordering, use of contactless card payment and associated digital receipts; all of which significantly reduced paper littering.



impact summary

total litter identified



The Sorrento anti-littering campaign was delivered during an uncertain post-covid period, with a steady and significant increase in tourism, and over a relatively short timeframe of just five weeks. Yet it is clear to see that participating sites showed a rapid and robust response with a reduction in all litter, with particularly impressive improvements in noted sites such as the Port, Piazza and Marina Piccola.

Proportional reductions

These reductions do not take into account the drastic influx of visitors to the city during the campaign period, with visitor numbers reaching their annual peak towards the end of the campaign. With previous years seeing tourism numbers of 640,000 per season, and on-location observation of at least 500% increase in beach users, the percentages of reduction achieved here are actually even more impressive, and sites appearing to have worsened in fact mask a proportional improvement relative to actual population numbers.

Comparable data

The non-participation of four beach sites in Marina Grande and the inclusion of a control site at Via Veneto allowed the specific impact of the campaign initiatives to be evaluated.

The Marina Grande sites included two public managed beaches and two private unmanaged beaches, each of which had varying levels of litter control measures and all of which were subject to increased daily use.

Via Veneto was included as a non-participating site outside of the requested survey areas which saw increased traffic but was not a specific tourist hotspot, thus acting as a control site for comparative analysis.

Inclusion of these sites in impact measurement allows for fair and objective analysis of results between each site, and a clearer understanding of the significance and scale of the impact in participating sites relative to the rest of the city. This is especially useful for highlighting particular wins, evaluating campaign deliverables or justifying additional mitigation measures.

impact discussion

It is worth noting that even before the campaign, Sorrento is an extremely well-managed city with impeccable standards of street cleanliness throughout the municipality.

city-wide collaboration

The municipal cleaning team is extensive, dedicated and hardworking, collectively contributing hundreds of hours per week of thorough cleaning – predominantly overnight – to give residents and visitors the best possible experience of the city. During peak tourist periods – on which the city depends – this effort serves to curb and control escalating litter levels, and is for the most part extremely successful.

The majority of littering – both by cigarettes and other litter – is concentrated to specific areas which act as accumulation sites, downgrading the city average. It is no surprise that these sites revolve around tourist use, either for travel (such as the port and ferry sites) or leisure (such as beaches and cafes).

These focused locations can be targeted with specific mitigation strategies, monitoring and impact measurement and localised assignment of management and oversight.

It takes a village

Renato Esposito is the grandfather of the Astarita family who manage Cooperativa Abruzzo, currently led by grandsons Renato Jr and Luigi. Renato Sr has cleaned this beach for several hours per day, every day for 47 years, even throughout the winter. His dedication should be commended and recognised as a major positive influence on litter numbers for this particular beach. On Co. Sant'anna beach, it is a similar story for local fisherman Carlo Pane and his team. Further east, Marina Leonelli has strived for decades to improve behaviour and waste management on her family's beach, introducing initiatives to support and complement the city's campaigns and setting the standard for beach litter management.



private
e.g. leonelli's



public
e.g. co. santanna

managed

Individuals like Renato Sr, Carlo and Marina, their families and staff, need to be supported by municipal waste management, law enforcement and education providers, to lighten their workload and optimise their efforts.

Taking ownership

Throughout the surveying the data showed a consistent and clear difference between certain sites, with patterns emerging based on management and ownership type.

Private, managed beaches like Leonelli's can set the benchmark example for successful implementation, delivery and ongoing management of litter, boosting revenue while helping the environment.

Public, managed beaches have the potential to demonstrate similar positive outcomes if managed well and supported by municipal cleaning. Two of the Marina Grande beaches – Cooperativa Sant'anna and Cooperativa Abruzzo – absorbed the biggest increase in tourism numbers and



private
e.g. demelia, fishing



public
e.g. marina piccola

unmanaged

still managed to prevent runaway growth in littering by relying on a dedicated private cleaning team, constant site monitoring and disposal enforcement to keep numbers from rising exponentially.

Public, unmanaged beach Marina Piccola had the worst initial data but was able to significantly improve with campaign recommendations for intervention, including initial and ongoing municipal cleaning and additional trash cans/ ashtrays to maintain this beach to long term high standards.

Unmanaged, private beaches cause a significant negative impact on overall city data and prevent mitigation strategies from being applied universally. The two adjacent beaches on Marina Grande – Fishing and Demelia – had neither the campaign initiatives nor private management, and consequently saw an uncontrolled escalation of littering as visitor numbers surged. Private beaches must therefore be better managed to match the standards of the rest of the city.



***This beach
is our family,
our home,
our office.
We want to
protect it
for our staff
and visitors
today, and
for our
children
tomorrow***



CARLO PANE
COOPERATIVA
SANT'ANNA

Full house

Not only are the overall city statistics highly encouraging, but individual sites each have their own success stories; Marina Piccola is a particular example of the power of data to drive impact. Prior to the campaign, this port-side 'beach' was densely distributed with persistent and ingrained litter, with a single handful of sand containing dozens of cigarette butts; it was, unsurprisingly, largely abandoned as a dumpsite. Following our data analysis and recommendations, the beach underwent a deep clean followed by regular maintenance cleaning, and provision of a fixed ashtray at the beach entrance. Within days, Marina Piccola was busy with tourists; predominantly families preferring the quieter location and safe water, and despite the influx, litter numbers stayed lower.

A clean sweep

Across the street, the Moped Parking staff were similarly dispirited working in a heavily littered environment, with little incentive to use even their own ashtrays. Following a deep clean, the staff themselves took on daily sweeping to maintain their newly improved surroundings, and users of the car park were less inclined to litter.

The impressive reduction of litter seen across participating sites in just a few short weeks is testament to the strength of the campaign, with noticeable behaviour change by the public

demonstrating the power of correctly-targeted action, and the reference of non-participating sites serving as a caution of what can happen in Sorrento or elsewhere without the delivery of these actions.

- The estimated capture by new bins over a season is up to 250,000 additional cigarettes, now being prevented from entering the ocean
- The newly installed bins and ashtrays therefore account for 50% of the reduction in cigarette littering
- The educational materials (artwork, posters, pocket ashtrays) were extremely well-received, drawing huge interest and encouraging good use of the associated QR code to find out more information
- Visible presence of law enforcement at key sites and key times and awareness of severity of littering fines acted as a strong deterrent to improper disposal

All-inclusive benefits

The overall impact of the campaign is clear from a quantitative perspective; an impressive statistical reduction in both cigarette and other littering across all participating sites, despite a backdrop of increasing pressure on the city's waste management infrastructure. Reductions of this scale have a direct physical benefit in terms of environmental impacts, with an average of 15,900 unique items of previously mismanaged waste now being captured and retained within the waste management system every week.

Not only does this mean less waste ending up in the ocean, and therefore less harm to wildlife and natural ecosystems, but more of this waste can be recycled, more efficiently and cost-effectively, funneling it back into the circular economy and boosting economic stability within the local waste system.

The economic benefits also include the continued injection of funding to the region through tourism, boat trips and watersports, which rely on attractive city streets, safe beaches, an ocean free from debris and a healthy marine environment. For a small town to cope with an influx of visitors nearly 40 times its population, it is crucial that waste management be strictly controlled to prevent rapid deterioration of the litter situation and a loss of reputation and perception as a jewel in Italy's tourism crown.

“
**Thank
you for
giving us
this data,
now we
understand
better how
to keep
our city
beautiful**
”

LUIGI ASTARITA
COOPERATIVA
ABRUZZO

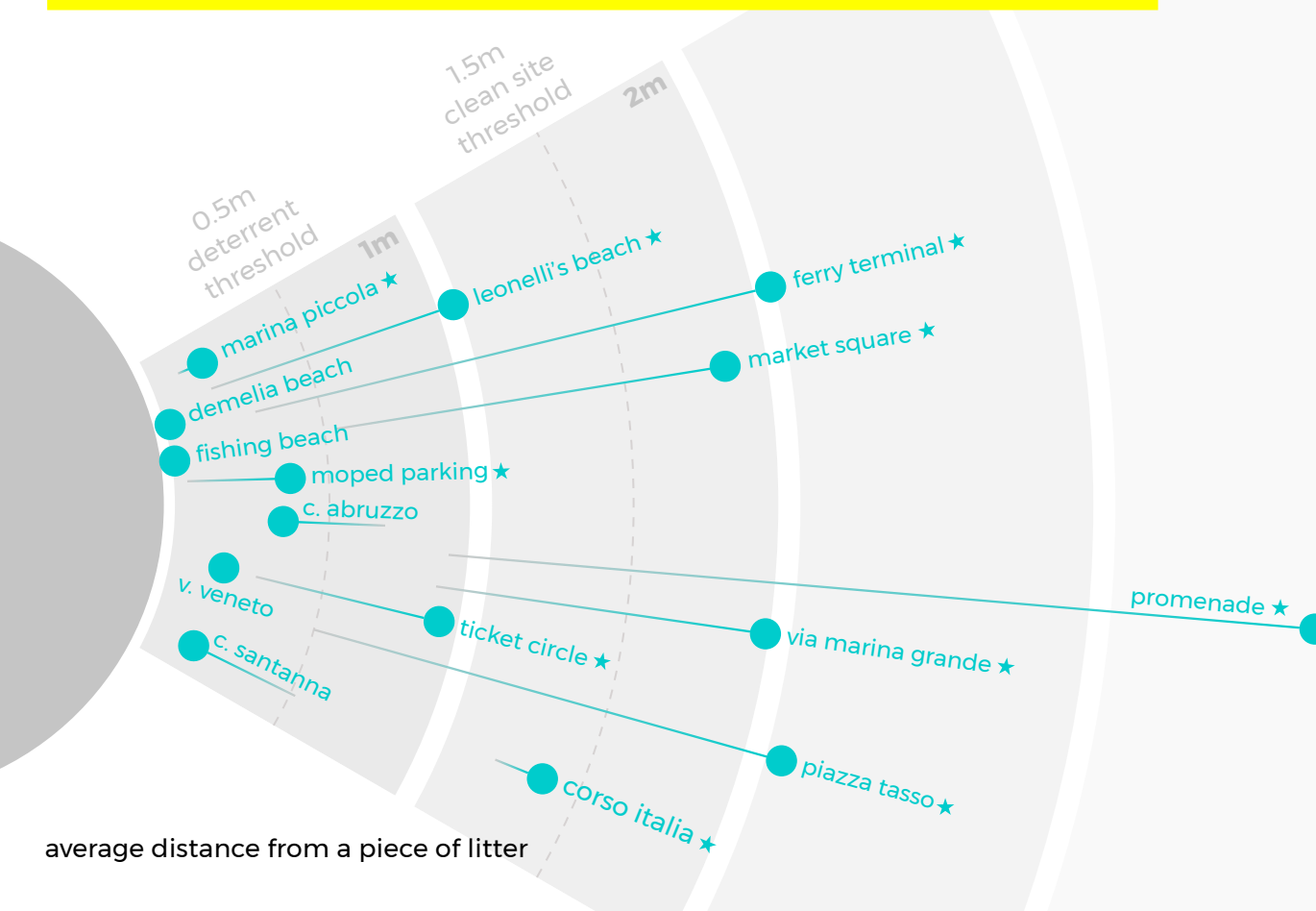
In addition, there are numerous qualitative benefits to a reduction in mismanaged urban waste, ranging from individual wellbeing to social health.

Increased pride in the city from its residents leads to greater buy-in and commitment to upholding behaviour standards, creating a citizenry of ambassadors even more dedicated to protecting their city, and holding accountable those who don't.

Individuals in cleaner communities live happier, healthier lives, and benefit from witnessing the positive impacts of their personal efforts to do better, act better and lead by example.

These benefits have the potential to last long beyond the end of any campaign, and also to spill over into additional areas. Improved environmental awareness among consumers can drive a decrease in demand for packaging within the food industry, for example, or an increased demand for plastic-free cigarette filters and biodegradable non-combustible tobacco alternatives. Consumer buy-in of these plastic-free products and biodegradable alternatives can boost these industries, make these products more widely accessible and affordable, and ultimately catalyse the shift to a culture free from the trappings of single-use plastic.

ellipsis clean index



beauty in the eye of the beachgoer

Communicating data around litter and mismanaged waste isn't always clear, with confusing metrics around density, volumes, quantities, and scales.

Ellipsis Earth has therefore devised its own 'clean index' which details, in any given location, how far away a person is from a piece of trash. For example, sitting on Demelia beach, you are never more than 5cm from a cigarette or piece of trash. If you were standing in the middle of Piazza Tasso, before the campaign you would have been just 53cm from a piece of trash; after the campaign this distance has increased to over 2m. These 'clean zones' can be mapped, as shown, with the aim for the clean zones of all sites to exceed the threshold at which a site becomes perceived as unacceptably 'dirty'. All participating sites had a wider clean zone post-campaign, with 5 newly exceeding the clean perception threshold.

Less trash, more cash

Co.Abruzzo and Co.Sant'anna have fallen below the deterrent line as tourist season peaks, meaning they now risk losing revenue, while Leonelli's increased cleaning has paid off with a better perceived beach attracting more visitors. Marina Piccola has made some progress but needs regular cleaning to permanently escape the deterrent zone. Visitors here would bring revenue to the surrounding shops, restaurants and parking, benefitting the entire Port site.

public beach★ not listed – average distance = 80m

recommendations

Our data is crucial for identifying specific problems, recommending how best to tackle them, and determining the relative progress of actions taken.

All of Ellipsis Earth's pre-campaign recommendations were undertaken and delivered during the campaign, leading to substantial progress in the city's fight against mismanaged waste.

From the post-campaign data, we can see which areas have worked best, which initiatives have had the most impact, and where further improvements are needed. For continued reduction in litter, we recommend the following actions for cleaning, placement of trash cans, and behaviour change.

Sweeping statements

We recommend the permanent inclusion of Marina Piccola in a minimum weekly cleaning schedule, to keep on top of regular littering, with daily cleaning of the Moped Parking site in line with the rest of the port. Co. Abruzzo and Co. Sant'anna need support to keep up with litter management during peak tourist season, and regular cleaning of Demelia and Fishing is desperately needed, potentially with a warning of sanctions



for not meeting city standards. Finally, we recommend jet-washing of Via Veneto to deep clean between the cobbles on this densely littered street.

To capture more litter, we recommend placement of further trash cans at the

entrance to Marina Piccola, along the length of Corso Italia and Via Marina Grande, and placement of dedicated ashtrays along the railings of the Promenade and near to/on trees on Corso Italia. We also recommend replacement or covering of tree grills here, which act as accumulators.

Culture shock

To further encourage behaviour change, we recommend concession owners e.g. ice cream stall holders, restaurants and cafe operators, provide mandatory ashtrays as well as being responsible for cleaning their outdoor seating areas or to contribute to municipal cleaning.

Furthermore, we would suggest continued use of the new littering fines as a deterrent, focusing monitoring during late night city centre periods, to establish a culture of not littering during this time, and encouraging bars and restaurants to supply additional ashtrays for outdoor use.

a new wave of innovation

In addition to the standard recommendations for cleaning, trash can placement, fines and education, we also recommend several initiatives specific to the current situation in Sorrento.

Firstly, we would recommend the extension of plastic-free beach rules to the entire city, including all cafes and restaurants to ban the use of plastic

bottles, straws and ice cream spoons and adopt biodegradable, wooden or similar alternatives. Following the footsteps of Pejo 3000, being Italy's first Plastic-Free City would secure Sorrento's reputation as a leading eco-friendly destination.

With substantial visitor numbers arriving by public transport, we also recommend announcements on all arriving ferries, trains and airport buses, that Sorrento is a Trash-Free city, bins and ashtrays must be used and there are fines for littering. A 'Keep Sorrento Beautiful' announcement campaign would ensure all incoming visitors would be aware of local expectations from the point of arrival.

Post covid-19, we encourage all points of sale to continue the use of contactless payment and encourage the transition to digital receipts, to reduce the significant quantities of paper littering across the city.

We also encourage stores to supply and sell cloth face masks to reduce the demand for disposable masks, given the likely longevity of this new hygiene and sanitation product.

Lastly, installation of ocean litter capture nets in Marina Piccola to capture suspended cigarettes and reduce tidal deposition would ensure this 'new' beach stays a precious and loved public site, as well as demonstrating the effectiveness of these technologies for use elsewhere on the coastline.

This data shows how to best drive the most sustainable solution - behaviour change

ELLIE MACKAY
ELLIPSIS EARTH

summary and evaluation

“

Campaigns like this work because everybody learns how we can work together – we all need to do more, we all need to learn more, for a better future

”

MARINA LEONELLI
LEONELLI'S BEACH

The delivery of a multi-faceted campaign which incorporated not only clean-up and reduction efforts but also behaviour-driven mitigation, along with division of responsibility between municipality, service providers, landowners and the public, were all key to the campaign's overall success.

Sorrento benefits from an extensive, well-staffed and well-trained municipal team who should be credited for their efforts to date, and a community of devoted residents and workers who want their city to be a source of pride, celebration and value.

Littering in Sorrento was not a case of the city letting down the public, but a case of the public unwittingly letting down the efforts of the city. Now, the city can encourage, direct and support the behaviour of its residents and visitors through these initiatives.

This is not an opportunity to place blame or unfair accountability on the material users themselves, who are not the sole root of the problem; observationally for example, it is clear that the majority of smokers are well-intentioned, and usually are trying to act responsibly, often walking significant and sometimes inconvenient distances to dispose of butts correctly. Where this does not occur, there is often a lack of awareness around the impacts of

cigarette butt littering. This campaign has helped to address both of these issues in tandem, providing the education to leave the user with no excuse, along with easier and more accessible ways for them to do the right thing. The frequency of use of the new ashtrays and trash cans demonstrates how much they were needed, and the impacts of this are clear from the increase in 'clean zone' distance across all sites with new trash can placement and a 70% reduction in litter within a 20m radius of all new bins.

Smoke and mirrors

It is easy to see that these short-term wins could create a false sense of wider success, and that the true benefits of these campaigns will only be felt if the recommended initiatives are integrated in a long-term, sustainable management plan. To support municipal and stakeholder efforts, continued and expanded public education must continue along with further resource provision, to uphold the commendable gains of the campaign and maintain new standards of cleanliness throughout the city. Without this, campaigns risk being a temporary fix, or at worst, vanity marketing to create the perception of improvement. To prevent a post-campaign rebound, it is important to incorporate long-term objectives, regular monitoring and accountability for future outcomes.

towards a better tomorrow

- The data collected from our surveys is scientifically robust, comparable, accurate and reliable, providing a trusted source for recommendations and impact measurement anywhere in the world
- Our detailed analysis of this data allows extensive insights into specific categories, timings, locations and behaviours, leading to the best possible understanding of both the problems and solutions
- Professional, objective and accessible communication of the positive impacts not only champions the efforts in Sorrento but also encourages other cities to take part, creating a national and eventually global benchmark for litter reduction

At Ellipsis Earth we are keen to use our technology to provide the best data to drive the most change. This campaign demonstrates the value and function of our complete ecosystem and we are proud to support Sorrento in this triumphant and rewarding campaign, placing Sorrento at the forefront of environmental stewardship, waste management revolution and responsible industry leadership.

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for more information
please contact

info@ellipsis.earth
www.ellipsis.earth



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