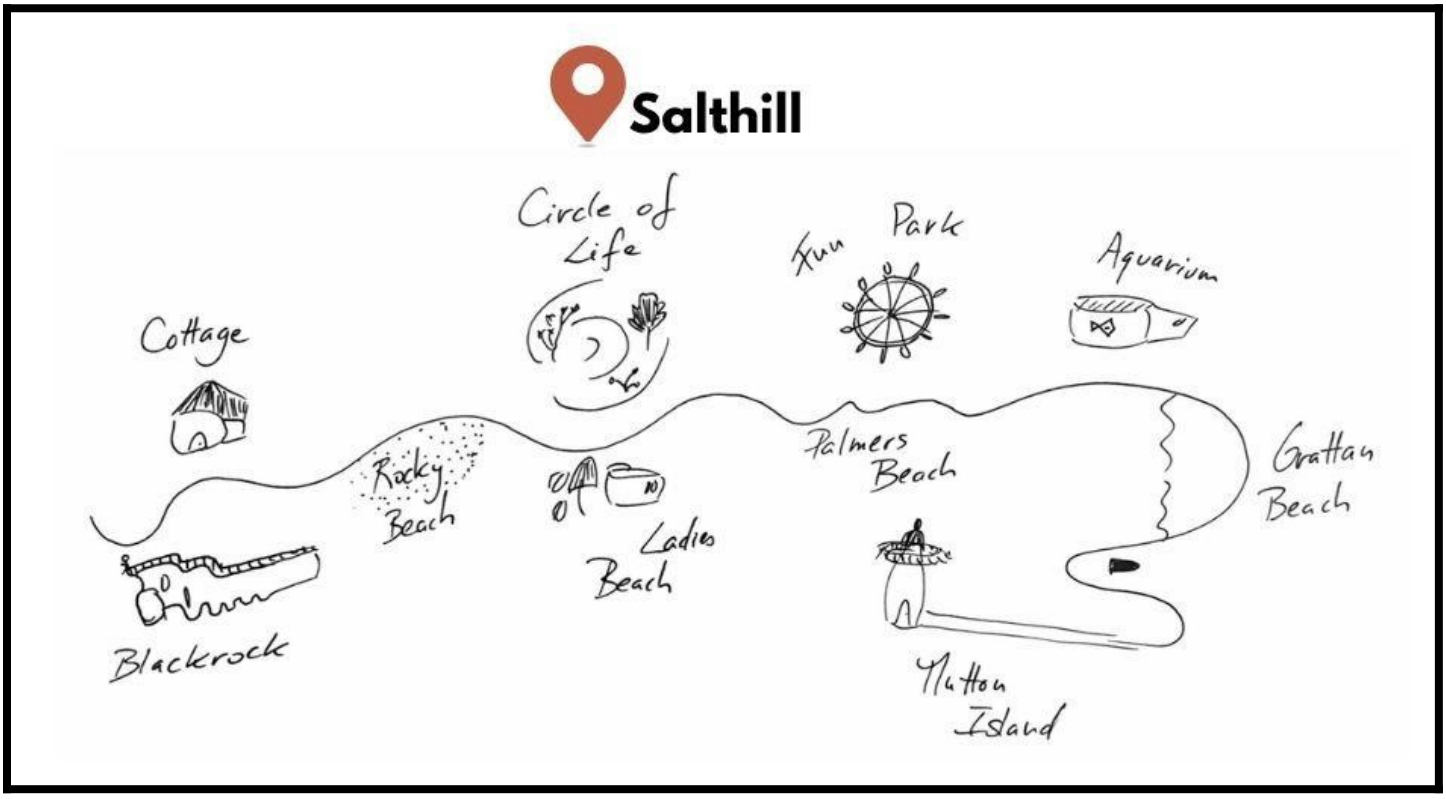
Report on Waste Management in Salthill During the Summer Months - Public Views on Temporary, Sustainable Solutions & Behavioural Insights



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Abstract

Coastal urban environments hold ecological, economic and social importance, which is why the spikes in littering and waste overflow are highly concerning as they negatively impact all three spheres. This study investigates the public perception, litter hotspots, and insights of waste generation in Salthill, Galway, during peak summer months, with a focus on temporary, innovative, and sustainable solutions implemented with the community. A mixed-methods approach was used, combining aerial drone surveys, GIS-based spatial analysis, with a large-scale public survey (N = 956) to gather data for this study

Results show that litter is a persistent and highly visible issue, with plastic bottles, food packaging, and cigarette butts making up the most abundantly found categories. Drone survey analysis revealed that litter was found in clusters around high-footfall areas, especially Palmers Beach. The public survey showcased the presence of ecological concern but notable gaps in knowledge surrounding microplastics and chemical pollution. A substantial group of potential volunteers and people interested in environmental education was also identified, highlighting untapped potential for community involvement.

This report includes the waste management context to evidence and solutions. It begins with an overview of SDGs that relate to this study and literature on waste as a global environmental challenge as well as sustainable-temporary solutions implemented across the world. This is followed by a methodology section outlining drone surveys and public survey. The results section is presented in three parts: (1) drone-mapped litter hotspots; (2) public preferences for temporary waste solutions; and (3) behavioural and awareness-related findings.

The findings of this study will help formulate recommendations for sustainable and temporary litter management solutions that can enhance environmental protection, strengthen community involvement, and support Galway City’s sustainability goals.

Introduction to CuriOcean

Luana Jungmann, is the CEO and director of CuriOcean CLG, a charity and company limited by Guarantee, created to raise awareness on marine conservation through education, community engagement and research (https://curiocean.com/). CuriOcean has three main spheres: workshops in schools based on scientific research, socio-environmental studies and community engagement events. CuriOcean workshops cover a wide range of topics from marine mammals conservation to marine litter and biodiversity and are based in local and international research. Currently, it has reached over 600 students in primary schools, and has had an impact on communities in Ireland. In 2021, a study was carried out on knowledge and behavioural change in Irish communities related to marine conservation topics. The study collected 1000 responses and allowed student Manon Desplechin to analyse people's views and understanding of marine conservation in Ireland. Results highlighted the need for more public information on these issues and the importance of education.

INDEX

Introduction

Salthill, known locally as "The Prom" or Bóthar na Trá (Road of the Strand) in Irish, is Galway City's seaside suburb. It is located on the northern part of Galway Bay. Salthill sees a significant increase in visitors during the summer. This seasonal influx, increases litter around the area and increases risks to coastal and marine biodiversity. The introduction outlines the context and importance of conserving coastal areas. It defines the study's scope, focusing on the European Union (EU) and specifically on Ireland, with attention to the challenges in coastal urban centers like Galway. Additionally, it emphasizes the study's connection to global sustainability goals, particularly the UN's Sustainable Development Goals (SDGs).

United Nations Sustainable Development Goals (SDGs)

Ireland, as a UN member, is dedicated to the 2030 Agenda for Sustainable Development. By integrating the Sustainable Development Goals (SDGs) into local policies, like those in Galway, local actions support both national and global sustainability efforts. This study focuses on waste management and coastal conservation, connecting with seven major SDGs:

• SDG 6: Clean Water & Sanitation aims to ensure the availability and sustainable management of water and sanitation for all. This study relates directly by addressing coastal pollution caused by excessive waste that is highly likely to enter water bodies.

• SDG 11: Sustainable Cities & Communities focuses on making cities and human settlements inclusive, safe, resilient, and sustainable. The study supports this goal by looking at sustainable waste management practices in the urban-coastal area of Salthill, Galway, working to improve the community's sustainability and resilience against environmental damage and encouraging community involvement in implementing solutions.

• SDG 12: Responsible Consumption & Production aims to ensure sustainable consumption and production patterns. The study aligns with this by examining seasonal changes in waste and offering solutions that promote reducing, reusing, and recycling materials, which fosters a more circular economy in the local area.

• SDG 13: Climate Action calls for immediate steps to tackle climate change and its effects. Waste, especially plastic, produces greenhouse gas emissions throughout its lifecycle, from production to disposal. By encouraging better waste management and circularity, this study helps mitigate climate-related environmental impacts in Salthill.

• SDG 14: Life Below Water aims to conserve and use the oceans, seas, and marine resources sustainably. This is the most relevant SDG, as the study primarily focuses on reducing marine litter and plastic pollution which will help protect and restore Galway Bay's marine ecosystems and biodiversity.

• SDG 15: Life On Land aims to protect, restore, and promote the sustainable use of land ecosystems. While focusing on coastal areas, this study addresses the source of much marine litter, which is land-based waste and encourages better care of the land environment near the coast, which is vital for overall ecosystem health. Because, "What we do on the land greatly impacts our waters"

• SDG 17: Partnership for the Goals stresses the importance of strengthening implementation methods and global partnerships for sustainable development. The success of this study relies on collaboration

among local government, community groups and businesses, highlighting the multi-stakeholder partnerships necessary to achieve the SDGs at the local level.

Waste: A Global Issue

An estimated 10 million tonnes of litter enter the world's oceans and seas each year (Clean Coasts, 2025). Plastics make up 85% of all marine litter, from surface waters to deep-sea sediments. It is crucial to note that only 15% of marine litter is found on our shores, while 70% sits on the seabed. This shows that beach clean-up data only represents a small part of the total issue (Clean Coasts, 2025).

The EU tracks coastline macro litter trends as an important environmental indicator. Between 2015 to 2016 and 2020 to 2021, the EU experienced an overall 29% reduction in the total amount of coastline macro litter, dropping from 287 items per 100 meters to 203 items. Single-use plastics saw a 40% decrease during the same time, likely due to new laws. However, litter levels in many European areas remain high. Certain regional seas, like the Mediterranean and the Black Sea, show much higher litter counts per 100 meters than the EU average (EEA, 2025).

In Ireland, an estimated two million disposable coffee cups are sent to landfills every day because their plastic polyethylene lining makes them non-recyclable in regular facilities (Clean Coasts, 2025). Surveys show that 40% of Irish coastal areas are littered poorly, with plastic bottles found at over 80% of the surveyed coastal sites (The Environmental Pillar, 2024).

These statistics highlight the need for targeted local initiatives like this study. Such efforts can support legal frameworks aimed at reducing plastic and other waste in the coastal environment, leading to a better environment and sustainable development in the area.

Seasonal Fluctuations in Waste Generation

Coastal areas like Galway often see major seasonal changes in waste generation. This happens mainly because of the large number of visitors during the summer months and public holidays. The sudden increase in population puts a lot of strain on the existing waste management system and public facilities (Climate Change Advisory Council, 2024).

The rise in waste, especially single-use plastics such as food packaging, bottles, and coffee cups linked to tourism and outdoor activities, poses a serious environmental risk. When waste overflows, wind or tides easily spread it into the environment. This worsens the issue of marine litter. The seasonal increase is a major reason for the high levels of plastic debris found on beaches. It would be a waste of resources to set up permanent structures to resolve seasonal problems.

Temporary and sustainable solutions are therefore a better option to tackle this problem as compared to, permanent, infrastructure-based solutions.

Effects of Coastal Waste Overflow

Plastic ingestion is a significant threat as marine animals often confuse plastics for food, resulting in internal injuries, intestinal blockages, and death. Entanglement in old fishing gear and other plastics causes harm and

drowning in various species, including seabirds and marine mammals. Additionally, marine debris can damage sensitive habitats like coral reefs and seagrass beds by crushing or breaking them. Microplastics can also enter the marine food web, posing potential risks to human health through seafood consumption (U.S. Department of the Interior, n.d.).

Litter greatly reduces the beauty of beaches, which can potentially discourage tourists and lead to economic loss for communities dependent on tourism and recreation. Damage from litter to fishing boats and gear, along with the costs of clean-up efforts, adds to these economic challenges. Research in other coastal areas shows that reducing marine debris can result in increased tourism revenue and job creation (NOAA, 2025).

Waste overflow negatively affects the quality of life for local residents as they have to deal with the visual and health impacts of a polluted environment. This situation also harms the cultural value of the coast since clean beaches are vital for community well-being, recreation, and cultural practices. (U.S. Department of the Interior, n.d.).

Temporary, Innovative and Sustainable Solutions

Temporary and innovative solutions can act as impactful ways to reduce waste during peak seasons. These initiatives let communities try out new ideas with low risk and high engagement. When the community gets involved in the design, operation, and promotion of these temporary solutions, it enhances local skills and fosters ownership. If residents and local businesses participate, they view the solution as a shared success rather than a directive from above. If successful, this increases the chances that the practices will be adopted long-term.

Following are examples of temporary solutions implemented in various locations around the world:

1. The Netherlands: Waste-to-Art Installations. Temporary public art installations made entirely from beach-collected plastic waste transform litter into engaging educational pieces. These installations raise awareness about plastic pollution and encourage a sense of shared responsibility.

Figure 1: Waste-to-art installation in the Netherlands

(Source: Utrecht, the Netherlands, plastic-waste whale, 11 meters high, consists of more than 5 tons of plastic waste that was fished off Hawaii, a memorial ag Stock Photo - Alamy)

2. Sweden: Repair and Re-use Pop-up Clinics. Temporary "Repair Cafés" or pop-up workshops are set up in public spaces. Volunteers assist the public in fixing broken items like small appliances and clothes. This promotes longer product lifespans and encourages a cultural shift from disposable to repairable.

3. United Kingdom (UK): Community Toy Libraries/Swap Shops. Temporary toy "libraries" operate in community centres or coastal areas. Visitors can borrow or swap items, which reduces new purchases and cuts waste, especially for single-use beach toys.

4. Portugal: Beach-Specific Mobile Recycling Hubs. During the summer, colourful and well-staffed mobile recycling units are placed at popular beaches. They offer clear multi-stream recycling and immediate rewards, such as discount vouchers, for proper disposal, which improves recycling quality and collection rates.

5. South Korea: Smart Waste Bins with Compaction and Real-Time Monitoring. Solar-powered bins with compactors and IoT sensors are set up in busy areas. They compress waste to hold more and notify collection services when full, which helps optimise collection routes and prevent overflow during busy times (Okon Recycling, 2025).

6. Australia: Educational Deposit Return Scheme (DRS) Kiosks. Temporary and user-friendly kiosks are placed at beach entrances during peak season for returning beverage containers. This connects a financial reward to responsible actions and helps collect high-quality recyclable materials.

7. Germany: Digital Platform for 'Waste Matching'. A temporary app or website is created for specific regions. It connects businesses with surplus materials to artists or community groups that can upcycle the waste. This turns potential litter into valuable resources and supports local recycling efforts.

Study Aim

The aim of this study is to analyse the perception of litter in Salthill and its severity during high peak season, gather behavioural insights and develop temporary, innovative and sustainable litter management solutions for implementation in collaboration with the public.

Study Area

Salthill, a coastal suburb on the western edge of Galway City, Ireland. It is a place of overlap between urban growth, tourism, and environmental protection. This section looks at the geography, history, ecological importance, socio-economic profile of Salthill.

Location and Access

Salthill is located on the northern shore of Galway Bay, about 3 km west of Galway City centre. The seafront stretches from Grattan Beach in the east to the Blackrock Diving Tower in the west. The area can be accessed by the road, which connects directly to the main route from the city centre via the R336. Public transport is provided by Bus Éireann services as well. Although there is no direct rail service, the area is easy to access by walking or cycling.

History

Salthill started as a small coastal village but with the rise of seaside resorts in Ireland during the 19th century, the creation of bathing facilities and hotels sped up its growth. In the 20th century, Salthill added leisure facilities like the Salthill Hotel and Leisureland, which made it an important site for entertainment and holidays.

Nature Conservation Protection

The Salthill coastline is part of an ecologically significant marine and coastal ecosystem, leading to several official nature conservation designations. Although Salthill is a part of an urban area, the nearby marine environment is protected by the European Natura 2000 network. Specifically, parts of Galway Bay are designated as both a Special Area of Conservation (SAC) and a Special Protection Area (SPA) (NPWS, 2013).

The SAC designation (Galway Bay Complex, Site Code 000268) protects various habitats, including intertidal mudflats and reefs. The SPA designation (Inner Galway Bay, Site Code 004031) is vital for supporting large populations of wintering waterbirds, such as waders and wildfowl. This ecological sensitivity highlights the need for effective waste management strategies in Salthill, as coastal runoff and litter directly threaten these internationally important protected habitats and species.

Waste Management in Salthill

The large number of visitors puts a strain on Salthill's waste management system. This threatens the ecological health of the nearby Natura 2000 sites as well. Despite efforts to manage this, recent surveys by Irish Business Against Litter (IBAL) found that Salthill's coastal area dropped to 'moderately littered' in 2025, down from 'clean to European Norms' in previous years (IBAL, 2025).

Litter analysis shows that the main causes of coastal pollution are behaviours/actions and tourist activities. Inspectors have reported "significant levels of cigarette butts," which are a major part of litter across the country. They also noted fast-food items like plastic and wooden utensils, candy wrappers, and drink containers, including cans and bottle caps buried in the sand. The problem is worsened by marine debris, such as fishing gear like lines,

nets, and ropes. In response, Galway City Council (GCC) has taken up initiatives with legislative efforts, like the national Deposit Return Scheme (DRS) and promotion of socio-environmental studies like this one.

Methodology

This research project featured two principal methodologies, a drone survey which features in Part 1 below and a face-to-face survey of the general public which is covered in Part 2.

Collection of Data

1.Drone surveys were carried out to capture aerial images of waste hotspots during peak times. Four drone surveys were carried out on the following dates:

- Drone survey 1: Low Peak Day (in terms of footfall) – 26th June 2025
- Drone Survey 2: High Peak Day (in terms of footfall) – 13th August 2025
- Drone Survey 3: Average intensity (before clean up) - 24th September 2025
- Drone Survey 4: Average intensity (post clean up) - 24th September 2025

2. A survey was conducted of the local public, both face-to-face in person and online. This survey was conducted over a period of two months in Summer 2025 and 956 responses were received.

Data Processing and Analysis

Arc GIS was used to identify waste hotspots captured in the drone survey and create a digital twin for easy analysis. QGIS version 3.16 Hannover was used to map out the results.

Results from the public survey were carefully studied and statistically analysed for correlations.

Results and Discussion

PART 1: Drone Survey (Litter Hotspots)

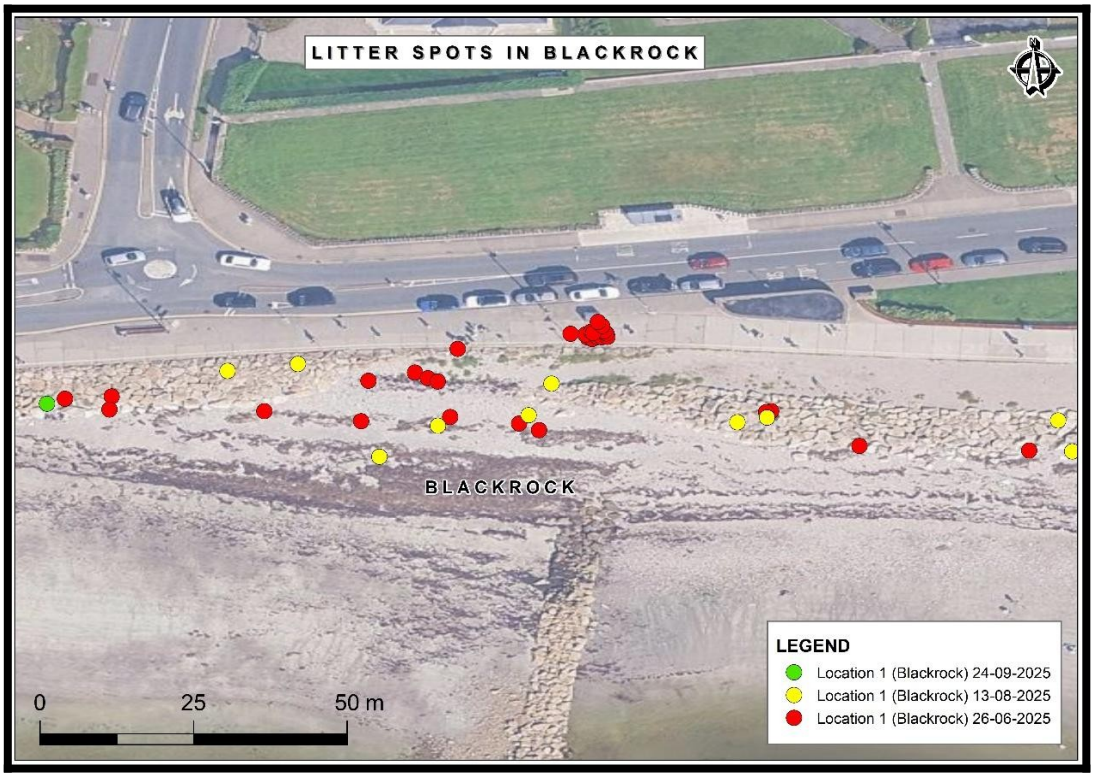


Figure 2: Litter Spots around Blackrock

In 'Figure 2, the colour red represents litter spotted during 'Drone Survey 1: Low Peak Day (in terms of footfall) – 26th June 2025', the colour yellow represents litter spotted during 'Drone Survey 2: High Peak Day (in terms of footfall) – 13th August 2025' and the colour green represents litter spotted during 'Drone Survey 3: Average intensity (before clean up) - 24th September 2025'.

The Blackrock map shows a linear concentration of litter along the rocky shoreline and immediately below the promenade.

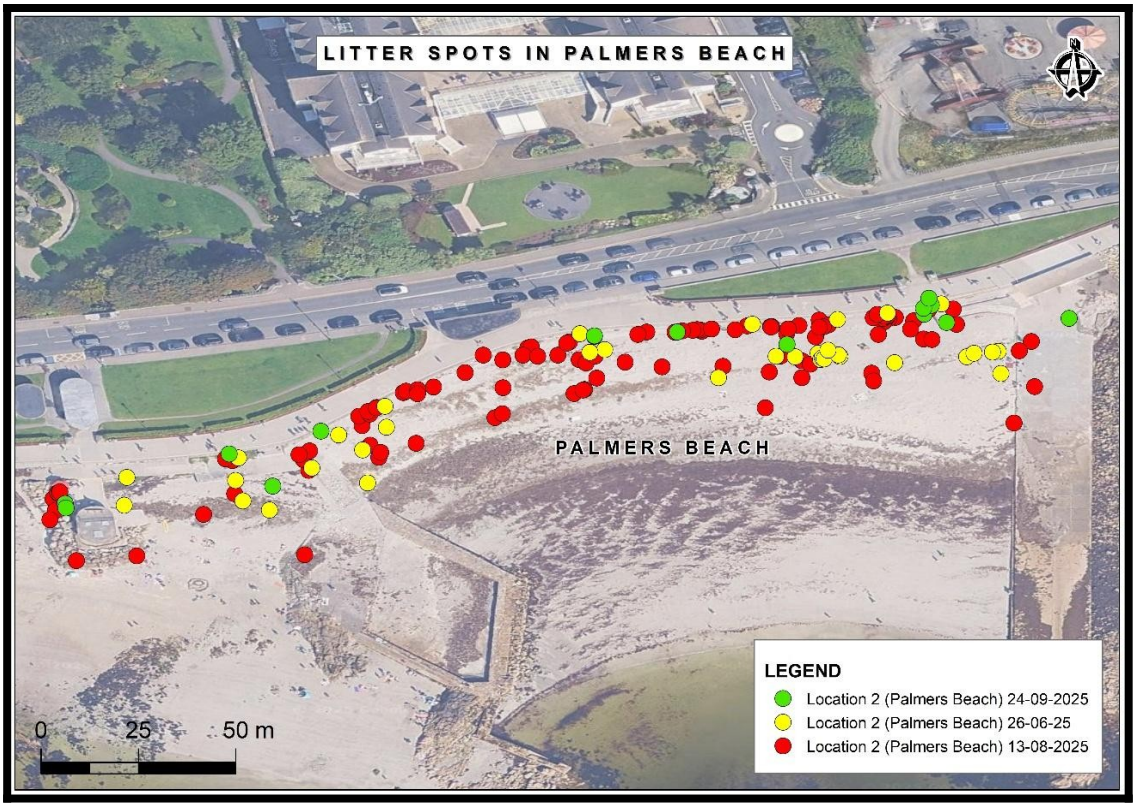


Figure 3: Litter Spots around Palmer's Beach

In 'Figure 3', the colour red represents litter spotted during 'Drone Survey 1: High Peak Day (in terms of footfall) – 13th August 2025', the colour yellow represents litter spotted during 'Drone Survey 2: Low Peak Day (in terms of footfall) – 26th June 2025' and the colour green represents litter spotted during 'Drone Survey 3: Average intensity (before clean up) - 24th September 2025'.

The Palmers Beach map showcases the highest overall density and spread of litter points, with clear clustering around beach entrance and sitting areas. Temporal layering of the data shows repeated accumulation in the same zones over time, suggesting that these locations are littering hotspots. This spatial pattern points to a strong relationship between human activity intensity and waste generation.

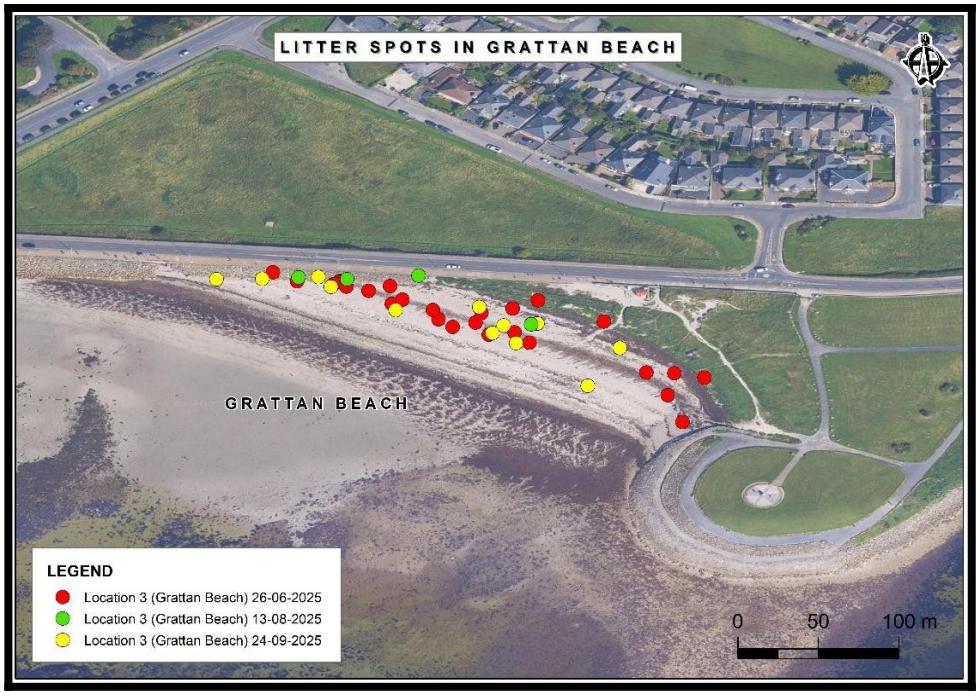


Figure 4: Litter Spots around Grattan Beach

In 'Figure 4', the colour red represents litter spotted during 'Drone Survey 1: Low Peak Day (in terms of footfall) – 26th June 2025', the colour yellow represents litter spotted during 'Drone Survey 2: High Peak Day (in terms of footfall) – 13th August 2025' and the colour green represents litter spotted during 'Drone Survey 3: Average intensity (before clean up) - 24th September 2025'.

This map illustrates a clustered distribution of litter hotspots along the upper strand of Grattan Beach, particularly close to access points and the promenade edge. The spatial pattern suggests that littering is strongly associated with high footfall zones.

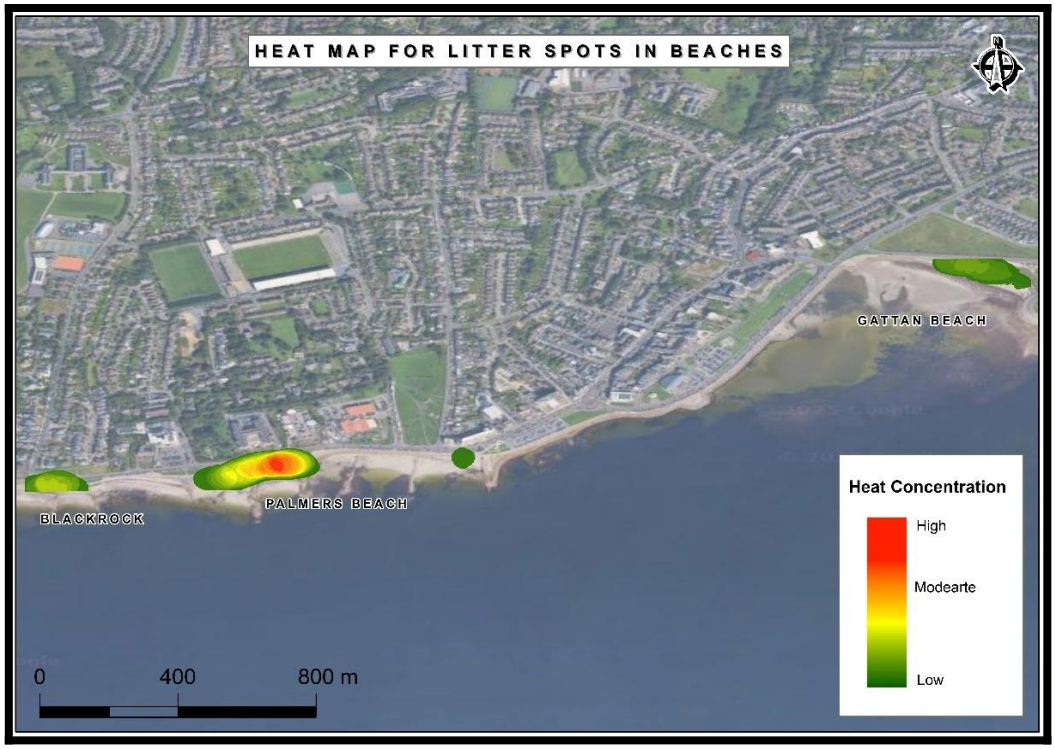


Figure 5: Heat Map of Litter Concentration Around Salthill

In 'Figure 5', the colour red signifies high concentration of litter, the colour yellow signifies moderate concentration of litter and the colour green signifies low concentration of litter.

The heat map clearly showcases that Palmer's Beach is the primary hotspot, with clustering also visible at Blackrock and Grattan Beach. Since it is evident that Palmers beach has an immense amount of litter and it would therefore be a good idea to implement temporary solutions in and around that area during the summer months.

The spatial gradient from low to high concentration highlights how litter is not evenly distributed but is instead concentrated in predictable, high-footfall zones.

PART 2: Survey Results

A public survey was carried out for 2 months from July to September 2025 in order to engage with people who live/visit Salthill to understand their waste disposal habits and awareness levels. Surveys were carried out in-person and online with 956 respondents. This survey asked about temporary solutions people would like to see implemented as well as KAP.

Knowledge, Attitude, and Perception (KAP) play a crucial role in the success of any community-based initiative. In the context of this waste management study;

- Knowledge (K) is the public's understanding of waste issues. This includes the environmental effects of litter, and the dangers of microplastics. For example, not knowing about the plastic in disposable coffee cups can hamper with recycling efforts.

- Attitude (A) refers to an individual's feelings, beliefs, and values about good waste management. A positive attitude can lead to more involvement in clean-ups or an increase in using reusable items. On the other hand, a negative or indifferent attitude may hinder it.

- Practice/Perception (P) deals with actual behaviours, such as littering, using reusable bottles, or joining a beach clean-up. Perception also includes how easy, fair, and effective people think the current waste infrastructure is.

Studies often show that while knowledge and attitudes about environmental issues may be high, actual practices still fall short (CORE, 2016). To improve waste management in Salthill, the study aims to not only raise environmental awareness (Knowledge) but also work on efforts that aid in improving the community's attitudes and make eco-friendly behaviours (Practice) easier and more acceptable.

The survey had the following structure:

1) Demographic questions: (Age, background, living area, etc..)

2) Assessment of the importance of the area to local people: (How often do they come to the area, how do they use the area, what is the importance of the area in a scale 1-10, do they participate/engage in any local events to preserve the area, etc...)

3) Waste perception and views on impact: (How often do they see waste, in what amounts, where, difference between summer and winter, how do they think it can impact coastal areas (biodiversity, marine environment) etc...)

4) Behavioural changes and temporary innovative solutions: (What do they do with their waste in busy days, in a scale how often would they leave their waste behind, why would they leave it, perception on awareness and getting involved, creative solutions they think could help manage those busy days)

Introduction

Survey Sample Size: 956 (N=956)

Respondents indicated a strong personal connection to the area, with an average importance rating of about 9 out of 10, 62.11% of respondents rated the importance of Salthill as over 9. This makes Salthill an area that is not only high in terms of ecological value but also social value.

The idea of a 'Third Space', popularised by sociologist Ray Oldenburg, is a public place distinct from home (First Space) and work (Second Space). It fosters community, social interaction, and civic involvement. These spaces are essential for a healthy social life. Salthill seems to be ideal Third Space, with its long promenade, beaches (Ladies Beach, Grattan Beach), the Blackrock Diving Tower, parks, etc. It is therefore important to ensure the coastal area is maintained in a pristine form.

Frequency of Seeing Litter

Litter is perceived as a significant and frequent issue. As per ‘Figure 6’, about 89.3% of the respondents reported observing litter either "Always", “every time in specific spots” or "Sometimes."

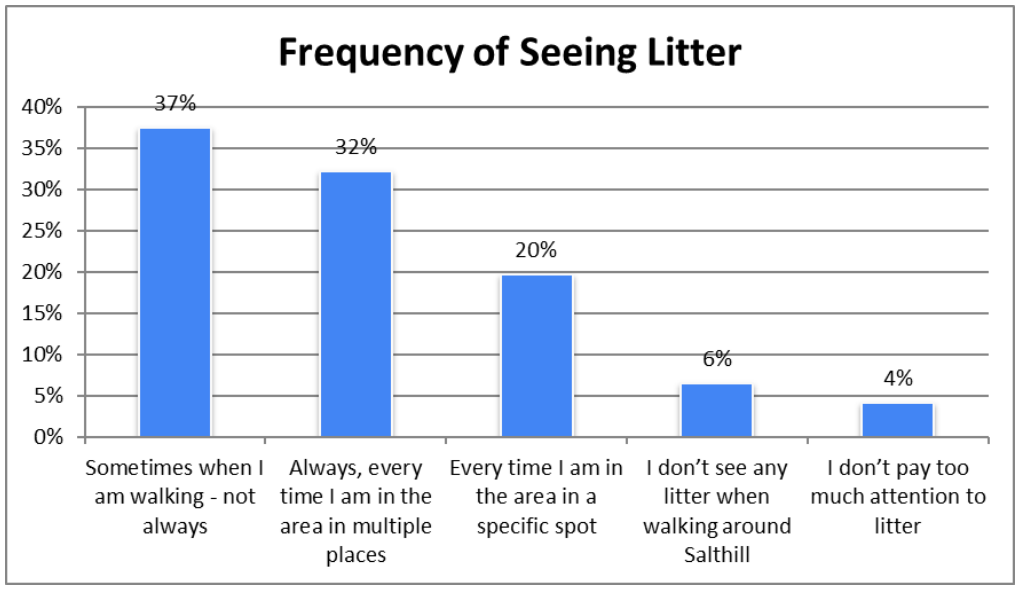


Figure 6: Litter Sighting in Salthill by Respondents

The most frequent responses were "Sometimes when I am walking" (n=358) and "Always/Every time" (n=308). Very few respondents reported never seeing litter. The majority, over 90% of respondents,people see litter when walking in Salthill. This suggests that littering is a persistent, daily issue around Salthill.

The intensity of this issue is influenced by seasonal factors and foot traffic. Seasonal Variation; a high proportion (57.6%) of participants noted an increase in waste levels during the summer months compared to the winter. However, 19.6% of the people did not know, this is an avenue for raising environmental awareness.

Seasonality of litter in Salthill

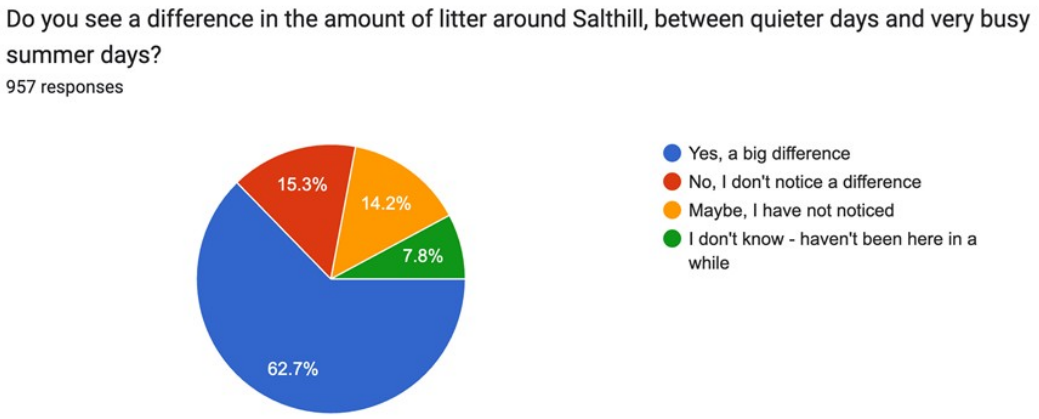
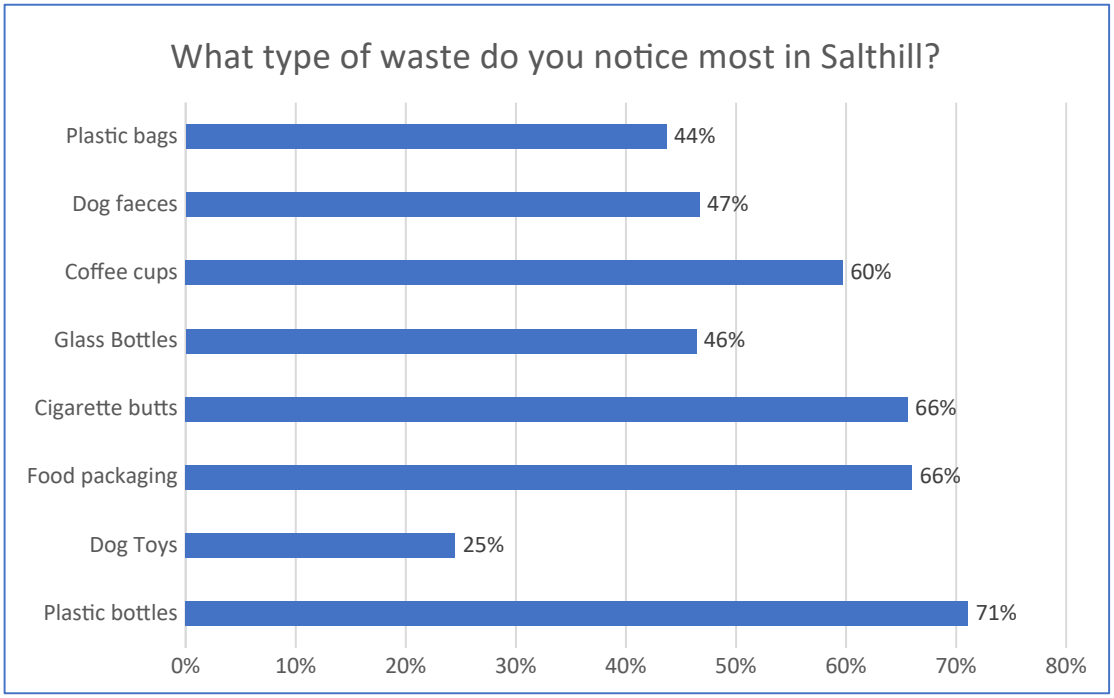


Figure 7: Seasonality of perceptions of litter

Figure 7 above illustrates respondent's perceptions of the litter levels in Salthill and how it varies from busy days to quitter days. Almost two thirds (62.7%) of respondents notice 'a big difference' in the amount of litter depending on the season and how busy Salthill is.

Types of Litter Found



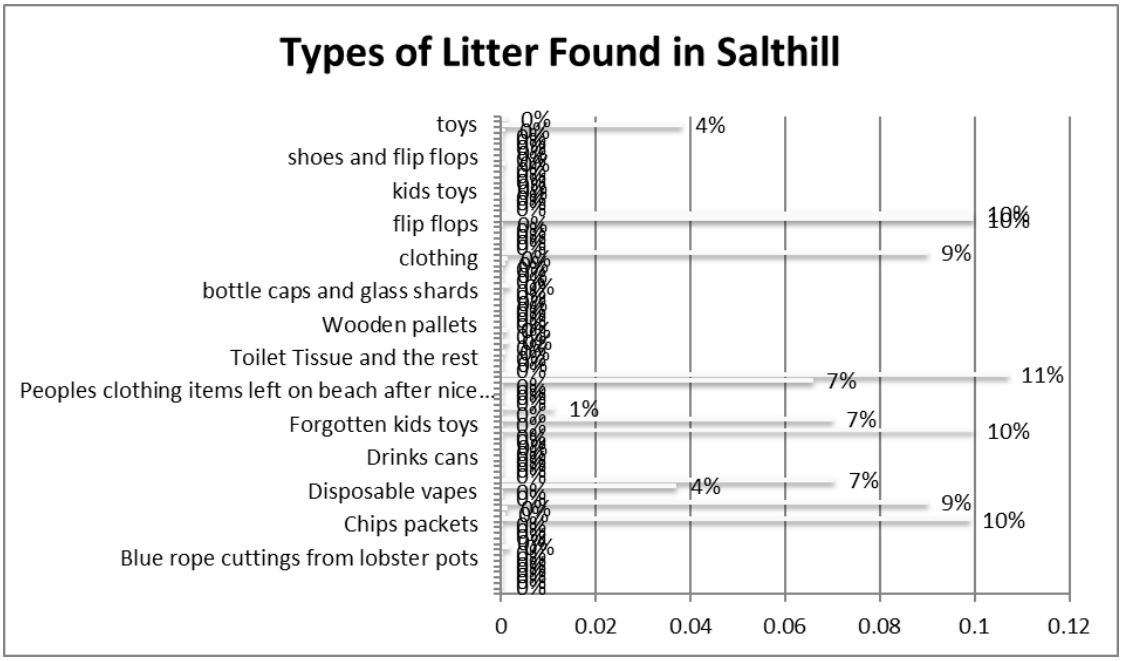
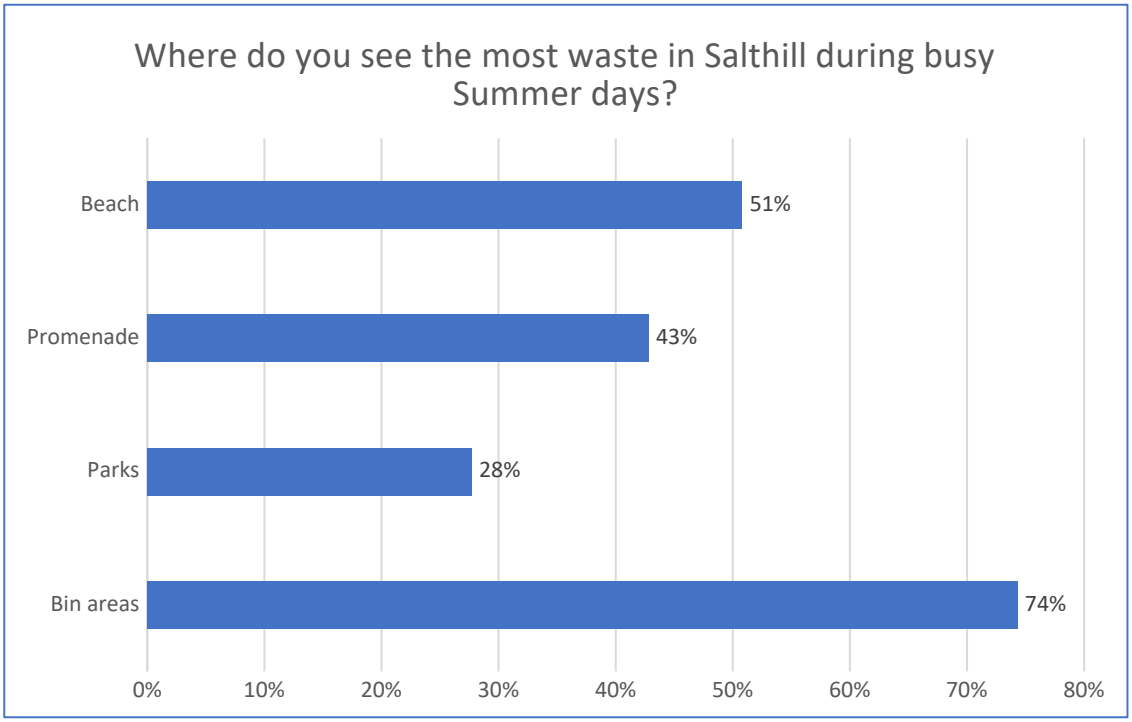


Figure 8: Types of Litter Found in Salthill

The top three waste categories are Plastic bottles (n=679), Food packaging (n=632), and Cigarette butts (n=627). This composition strongly points towards "on-the-go" consumption habits. The prevalence of cigarette butts suggests a need for specific receptacles (e.g., gum/butt bins), while plastics indicate a need for better recycling infrastructure.

Areas with the most litter



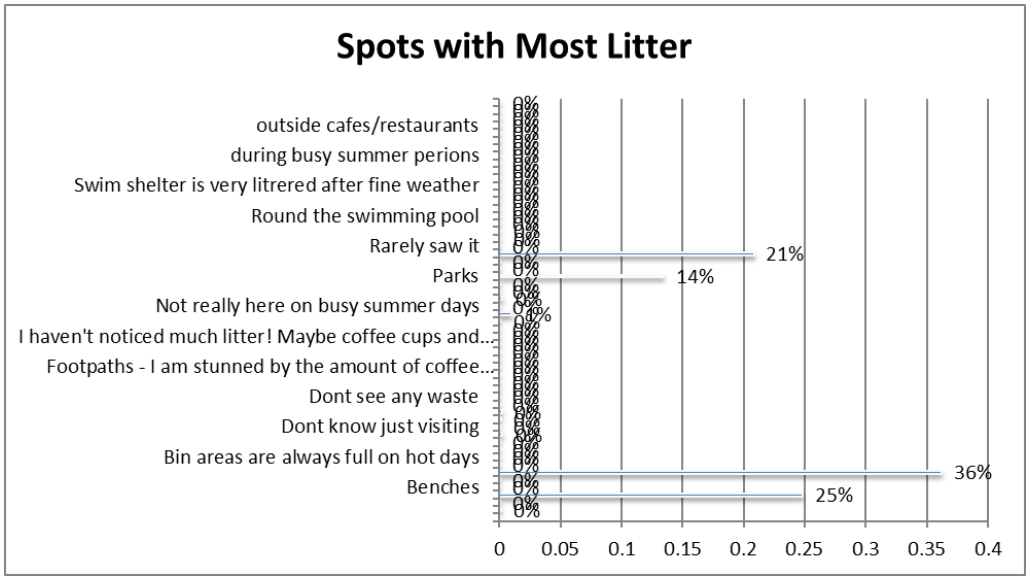


Figure 9: Spots With The Most Litter In Salthill

When asked to identify the primary locations for litter accumulation, the top 4 areas mentioned were:

1. The Bin Areas
2. The Beach Area
3. The Promenade
4. Parks

"Bin areas" (n=711) are ironically identified by respondents as the most littered spots. This suggests two possibilities:

(i) capacity failure (bins are overflowing)

(ii) behavioural issue (people leave littertrash near bins rather than inside)

Most Visited Beaches

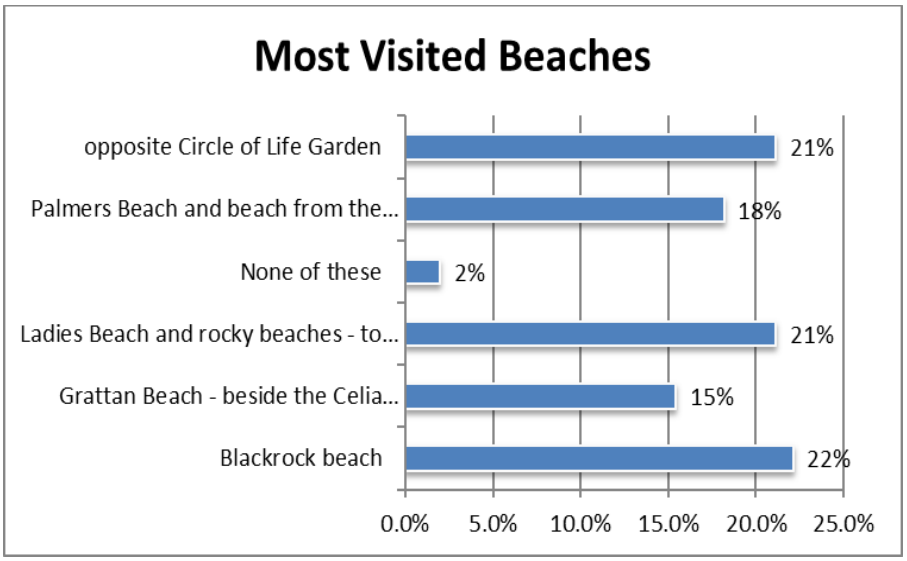


Figure 10: Most Visited Beaches By Respondents

BlackRock and Ladies Beach are the most visited beaches and therefore it is advised to focus on implementing the temporary solutions there especially as the high visitor volume would correlate to high potential of waste generation. Palmers beach, as identified in the drone survey in Part 1 of this report is also very busy on warm Summer days and this is another area worthy of consideration.

Where Signage Is Required

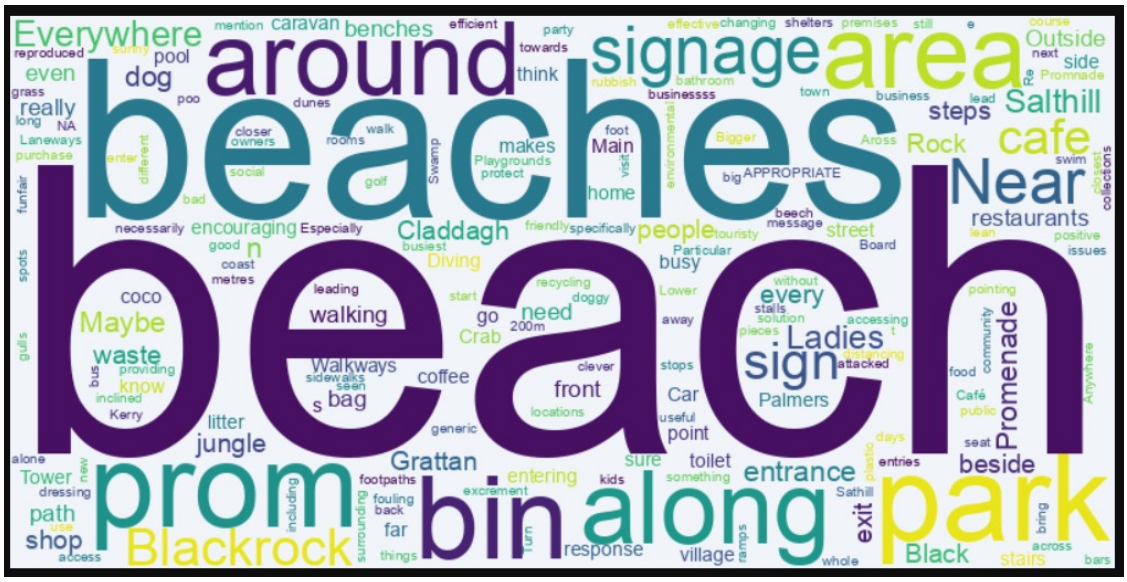


Figure 11: Word cloud depicting where respondents suggest signage is required

The Word Cloud above is a visual representation of the local publics' views of where more signage is required and where it will have the most impact.

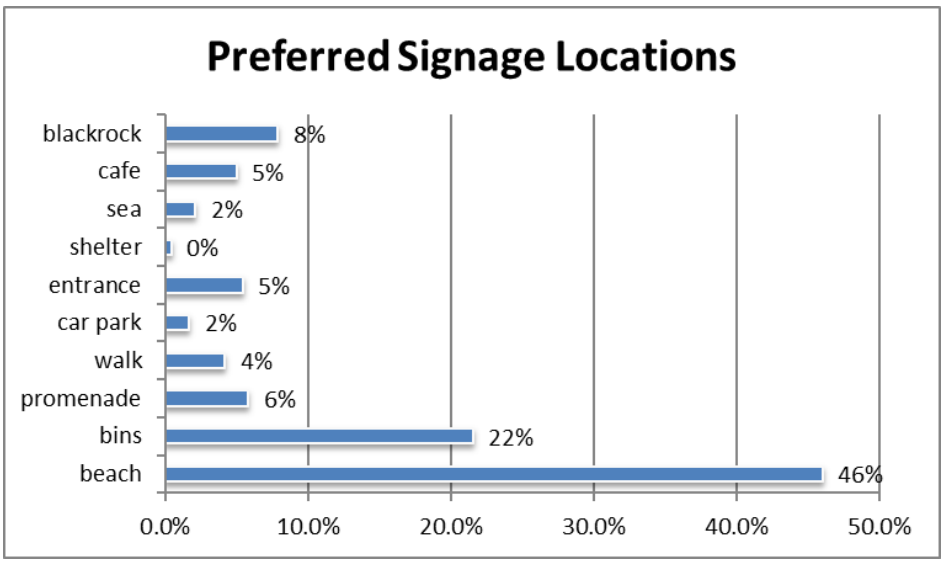


Figure 12: Preferred Signage Locations

Keyword analysis reveals that "Beach" (n=111) is the dominant location where people request more signage, followed distantly by "Bins" (n=52). This implies respondents believe signage is needed most around the beach areas, parking places, promenade, and around cafes and restaurants.

Observation of Temporary Solutions

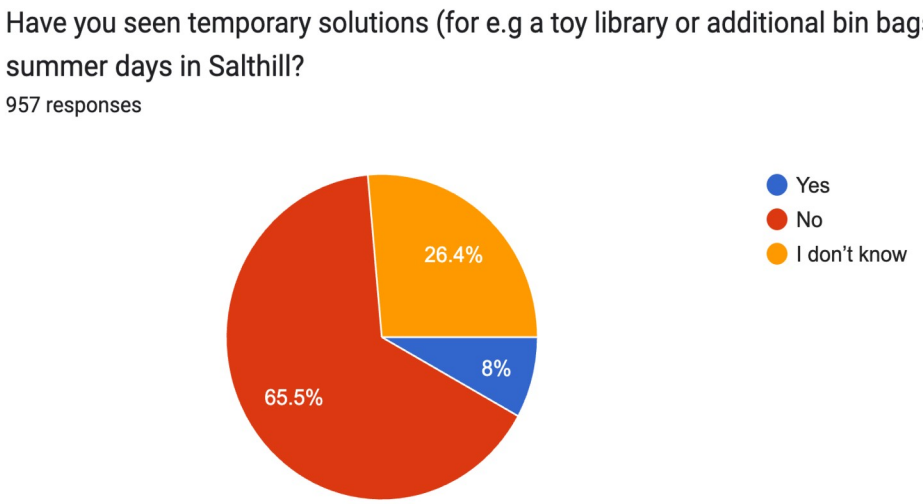


Figure 13: Observation of Temporary Solutions by Respondents

The majority (66%) responded "No" to seeing temporary solutions. This indicates suggests that there is a lack of temporary solutions being implemented or that the ones that are implemented are not visible enough to the public.

Preferred Initiatives for Salthill

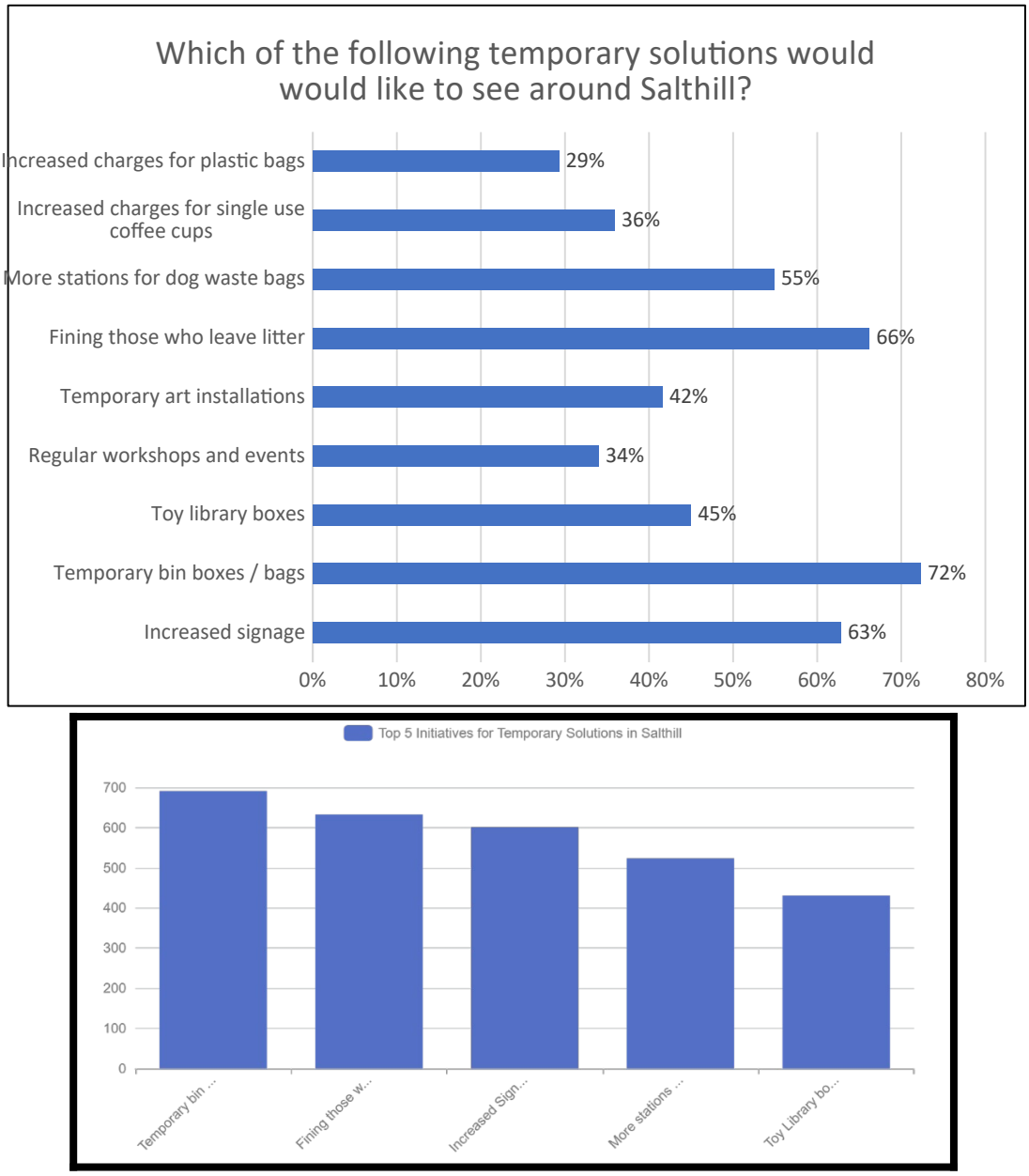


Figure 14: Top 5 Initiatives for Temporary Solutions in Salthill

Respondents favour practical infrastructure over punitive measures, though both are popular. "Temporary bin boxes" (n=691) is the top request, followed closely by "Fining those who leave litter" (n=633).

The top 5 preferred initiatives preferred by the respondents are as follows:

1. Temporary bin boxes to make waste collection easier
2. Fining those who leave litter
3. Increased Signage
4. More stations for dog waste bags
5. Toy Library boxes where people can dispose of toys

Followed by, ‘Art Installation made using collected waste’.This top 5 provides an indication of areas where local government could focus efforts with reassurance of public support.

PART 3: Behavioural Insights

Involvement in Environmental Events

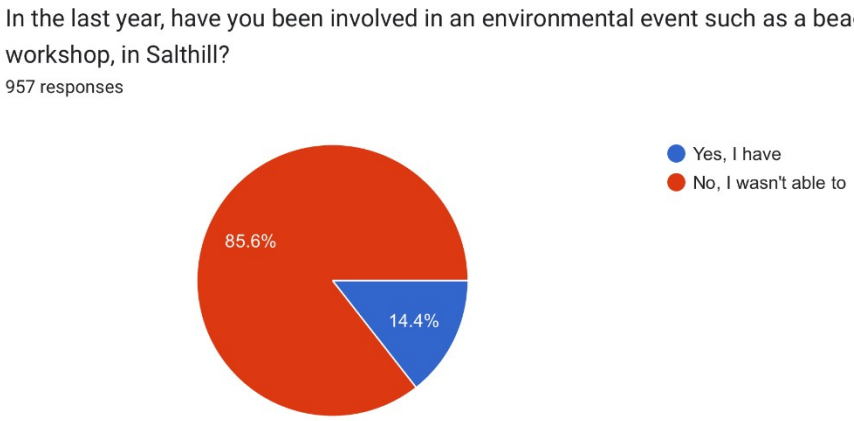


Figure 15: Involvement Of Respondents In Environmental Events Between July 24 - July 25

Despite the cleanliness of Salthill being of high importance to people, a discrepancy was observed in terms of social importance and active participation. Only 14.4% (N=138) of respondents confirmed they had been involved in an environmental event in Salthill, such as a beach clean-up or workshop, within the past year. This shows that there is scope of improvement and untapped potential in terms of community participation in environmental initiatives as the base of active participants is currently low relative to the total respondent pool.

Comparison of Likelihood of Leaving Waste (Self vs. Others)

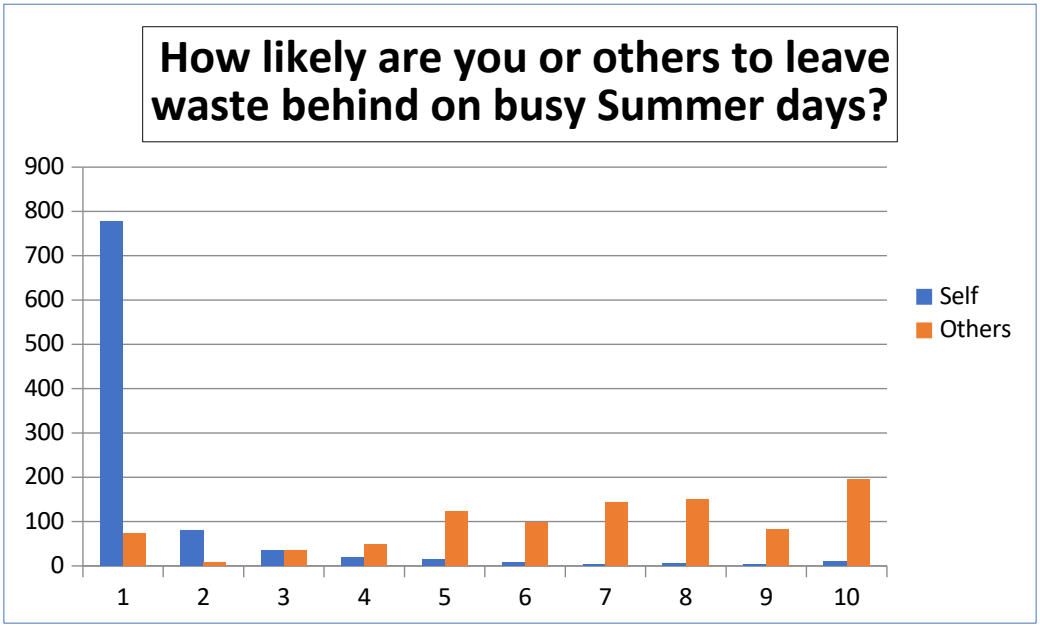


Figure 16: Comparison Of Likelihood Of Leaving Waste Behind By Self And Others

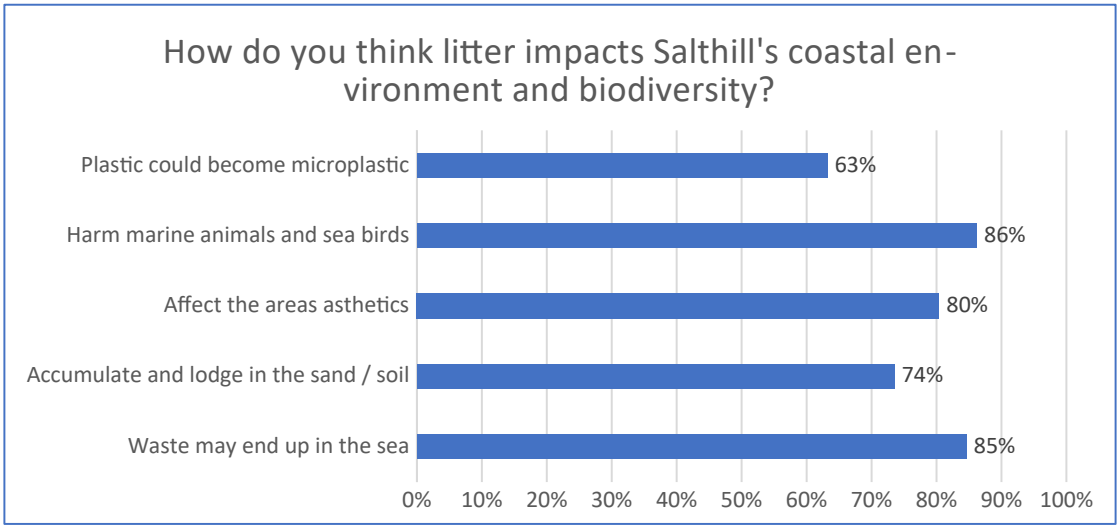
In the graph above, the numbers along the X-axis depict the scale from 1 to 10, describing how likely people are to leave waste behind during busy summer days and the numbers along the Y-axis depict the number of people that selected the option mentioned on the X-axis.

Respondents majorly feel that others are more likely to leave waste behind than them which demonstrates a "Self-Serving Bias".

- Self: The majority of respondents rated their own likelihood of leaving waste as 1/10 (Extremely Unlikely).
- Others: Respondents rated others' likelihood of leaving waste as 8, 9, or 10/10.

Statistically, it is impossible for the population to be entirely "clean" while simultaneously perceiving the average person as "likely to leave waste behind them". This discrepancy highlights that littering is viewed as an external problem caused by "others." Engaging the community in environmental workshops promoting collaboration can help form a positive image of not ourselves and others.

Impacts of Litter on the Environment



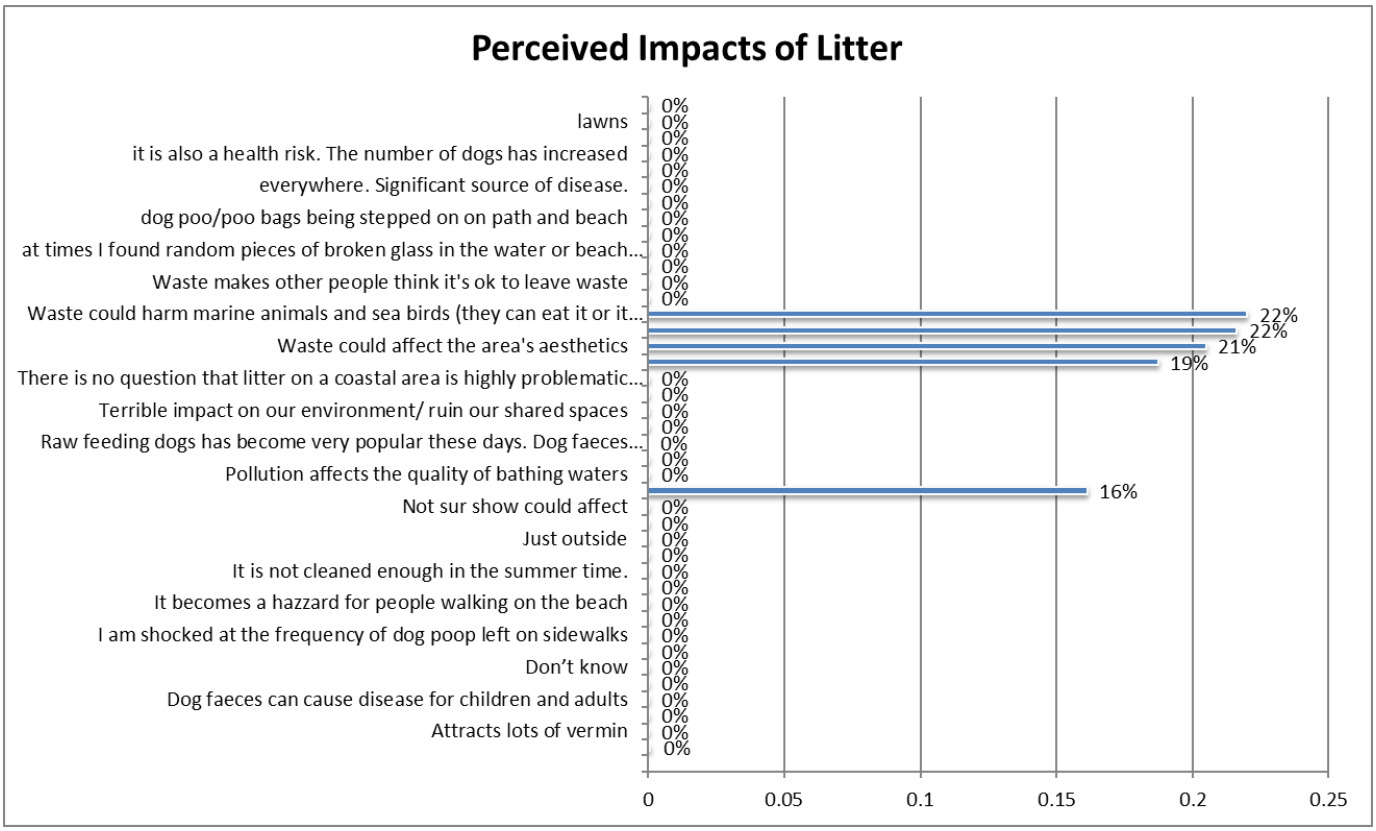


Figure 17: Perceived Impact of Litter, by the Respondents

The graph depicts the various responses of people when it comes to perceived impact of litter. The top concern is harm to marine animals (n=824), followed by waste entering the sea (n=810). Aesthetic concerns (n=768) are secondary to ecological concerns.

Body Care Products and Environmental Impact

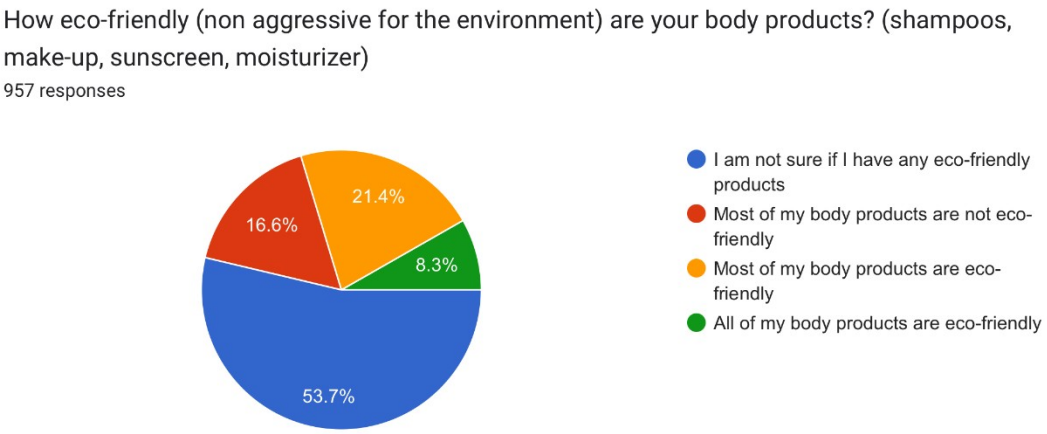


Figure 18: Use of Eco Friendly Body Products by Respondents

Over 50% of respondents (n=514) answered "I am not sure" regarding the eco-friendliness of their body products. This highlights a significant knowledge gap and an educational opportunity regarding the impact of chemicals (sunscreens, etc.) on marine life.

Environmental Awareness Levels

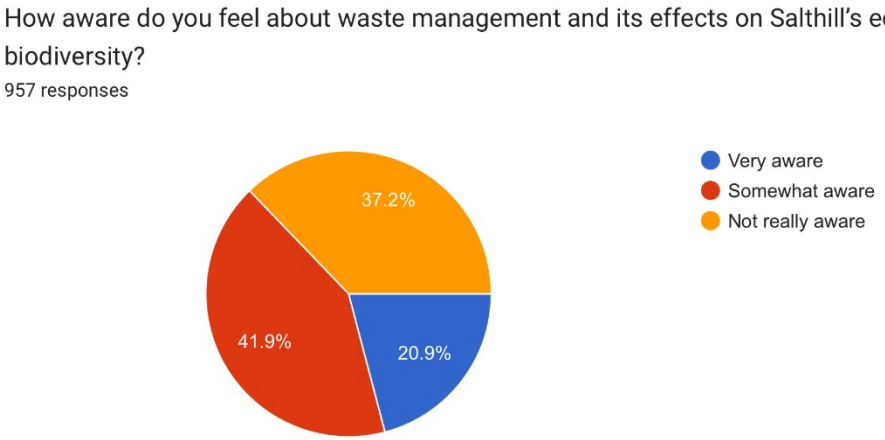
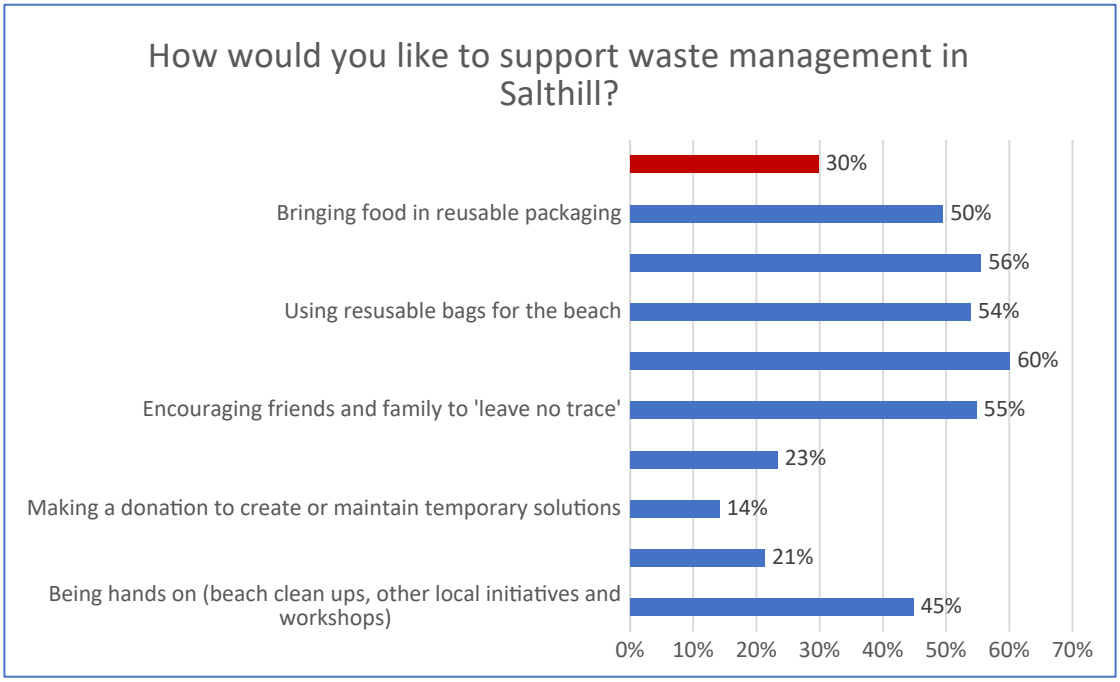


Figure 19: Environmental Awareness Levels

As per the graph in Fig. 19 above, a combined majority claims to be "Very" or "Somewhat" aware, while 37% of the respondents claim that they are "Not really aware." This shows us that there is a group of people that needs to be reached and there is a need for environmental education workshops and initiatives for the public.

Community Support for Waste Management



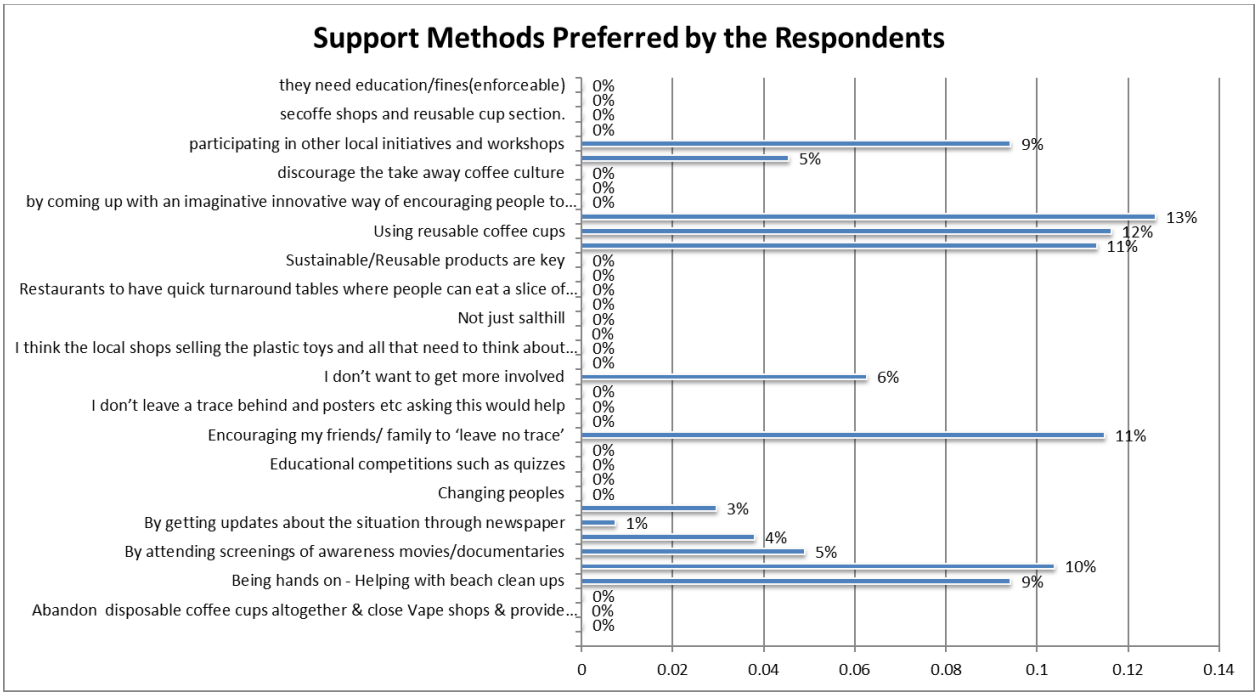


Figure 20: Community support for waste management

The community was asked which of the above options they would support to improve waste management in Salthill. As per the responses, personal behaviour change is the most popular method by which they would support waste reduction in Salthill: "Using reusable water bottles" (n=574) and "Using reusable coffee cups" (n=530). However, active participation ("Helping with beach clean ups") is also selected by 429 respondents, showing a solid volunteer base.

Statistical Correlations

1. Potential Volunteer Pool (Not Involved but Want Hands-On)

Category	Count
Not Involved & Wants Hands-On	326

There are 326 individuals out of the total respondents that have not attended an event in the past year but explicitly stated they want to support Salthill by "Being hands on." This represents a specific, actionable target group. Having these respondents actively take part in environmental initiatives and volunteering could triple the current active volunteer base.

2. Microplastics Belief vs. Awareness

Awareness Level	Avg Score
Not really aware	5.05
Somewhat aware	7.7
Very aware	9.24

There is a strong positive correlation between self-reported awareness and the perceived threat of microplastics. Those who feel "Not really aware" rate the danger of microplastics significantly lower (5.05/10) than those who are "Very aware" (9.24/10). This proves statistically that lack of awareness leads to underestimation of environmental threats.

3. Willingness to Act (Emails) vs. Awareness

Awareness Level	Emails Shared
Not really aware	49
Somewhat aware	104
Very aware	67

Interestingly, the "Somewhat Aware" group provided the highest number of email addresses (104). This suggests that the "somewhat aware" middle ground is the most eager to learn more or get involved, perhaps because they feel they should do more, whereas the "Very Aware" might already be engaged elsewhere.

4. Waste Observed vs. Signage Wanted

Location	Waste Observed	Signage Wanted
Beach	488	111
Promenade	409	14
Car Park	0	4
Entrance	0	13

A discrepancy exists on the Promenade. While 409 people identified it as a high-waste area, only 14 suggested signage for it. Conversely, the Beach has high waste (488) and high signage demand (111). This implies that respondents do not view signage as the solution for the Promenade—they likely prefer more bins (as seen in Graph) for that specific paved area.

5. Uncertainty on Eco-Products vs. Awareness

Awareness Level	Count
Not really aware	280
Somewhat aware	198
Very aware	36

The majority of those who answered "Not sure" about their body products fall into the "Not really aware" category (n=280). This confirms that the uncertainty about chemical pollution (sunscreens, etc.) is a symptom of general lack of environmental awareness, reinforcing the need for broad educational workshops.

6. **Age and Knowledge**

The Pearson correlation results are on a scale of -1 to 1, indicating the strength of the relationship between two variables. A statistical analysis was carried out to determine if there was a relationship between a respondent's age and the knowledge that they have regarding the environment.

The Pearson Correlation coefficient was calculated to be -0.113. As the result was close to 0, a very weak, non-significant relationship is indicated ($p > 0.05$) It is observed that as age group increases, there is a slight tendency for the level of waste management awareness to decrease. The strength of the relationship is weak, as the absolute value of the coefficient ($r = 0.113$) is close to 0.

But it may imply that the younger generation is more open to learning about the environment and taking more environmentally conscious actions as a result of that. An increase in environmental awareness education and awareness programmes targeted at the youth may have a role to play in this.

7. **Use of Eco-friendly products and impact of their products on the environment**

A moderate positive linear correlation (Pearson $r = 0.487$) was found between the eco-friendliness of body products used and the perceived impact of non-eco-friendly body products on the coastal environment. This suggests that individuals who use more eco-friendly body products tend to perceive a greater negative impact of non-eco-friendly products on the coastal environment.

This shows us the direct impact of knowledge on behaviour and practices. Making it important to incorporate environmental topics in education.

8. **Use of Eco-friendly products by the respondents, their awareness about waste management and its effects on Salthill's ecosystem**

The Pearson correlation coefficient between the eco-friendliness of body products and waste management awareness is approximately 0.431. Similar to the analysis above; A moderate positive linear relationship, suggesting that individuals who report higher awareness of waste management and its effects on the local ecosystem, use more eco-friendly body products as well.

This indicates a potential link between personal environmental choices and broader environmental awareness. It is important to make the most of this link and increase environmental awareness initiatives.

Limitations

This study lasted two months, showing only a snapshot of time. Long-term behavioural studies and impacts require monitoring over a longer time. Future studies can include a larger time-scale where surveys aren't just carried out but behaviours are observed as well.

The reliance on self-reported survey data may have a response bias, social desirability bias, where participants may over-report positive environmental behaviours and under-report negative ones. This was evident in the disparity between self-perceived and perceived public littering behaviours. While efforts were made to ensure a large and varied sample, there may be a potential participation bias, where there is a possibility that the percentage of people already interested in the environment, agreed to be part of the survey, and were slightly higher than those not as environmentally inclined.

Drone surveys, while valuable for spatial mapping, were limited by weather conditions, potentially resulting in under-representation of certain litter patterns.

Another study may be done in the future, that is long-term and observational in nature, with direct behavioural tracking.

Recommendations

- Promoting education and awareness programmes/workshops is crucial to foster a sense of environmental stewardship amongst the public. This is best targeted at the youth.
- Employing the seasonal, sustainable and temporary solutions during high peak season such as, temporary bin boxes, increased signage, toy collection boxes, etc… especially in litter hotspots such as beaches (Palmers beach), promenades, and high-traffic bin zones.
- Putting up signage that has a positive behavioural message and increases environmental awareness. (Hosting a workshop where the youth designs signage and those designs are put up around Salthill)
- Development of targeted environmental education campaigns addressing microplastics, personal care product pollution, and the hidden impacts of everyday consumer choices.

Conclusion

This study successfully analysed the perception of litter in Salthill and its severity during high peak season, gathered behavioural insights and developed temporary, innovative and sustainable litter management solutions for implementation in collaboration with the public.

The findings of this study showed that littering in Salthill is not random, but follows a pattern of clustering around access points, seating areas, and promenade edges. The Galway City council has kindly agreed to not only take into account recommendations from this study but implement the solutions on-ground, incorporating public participation. Additionally, the behavioural insights show us a promising future with promotion of environmental awareness and education.

In conclusion, effective litter management in coastal areas requires understanding people, places, and patterns. With the temporary-sustainable solutions recommended by the public and implemented with the public, we hope to see a cleaner Salthill in the coming summer.

Acknowledgement

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To my family and friends, thank you for your patience, belief in me, and the countless ways you've been there for me during this process.

I am grateful for this opportunity as it allowed me to combine my love for environment and research. The environment continues to inspire me with its complexity, resilience, and beauty. I hope this work contributes, in a meaningful way, to the care of the coast and nature I value so deeply.

I hope I can continue to invest my time and efforts in the field of environmental research, learning as I move forward and playing my part in promoting sustainability.

References

Clean Coasts. (2025). *Ocean Plastics*. Retrieved from [Source: Clean Coasts - Ocean Plastics]

Climate Change Advisory Council. (2024). *Coastal Community Recommendations to Build Resilience*. [Source: Climate Change Advisory Council - Coastal Community Recommendations]

CORE. (2016). *Knowledge, Attitudes, and Practices on Solid Waste Management among Undergraduate Students in a Philippine State University*. [Source: CORE - Knowledge, Attitudes, and Practices on Solid Waste Management]

EEA (European Environment Agency). (2025). *EU coastline macro litter trends (Indicator)*.[32] [Source: European Environment Agency - EU coastline macro litter trends]

European Commission. (n.d. a). *Waste Framework Directive*. [Source: European Commission - Waste Framework Directive]

European Commission. (2024). *The Environment: Ireland's Green Deal*. [Source: European Commission - The Environment: Ireland's Green Deal]

Fair Seas. (2025). *Ireland's Strategy strengthens commitment to Ocean Protection*.[33] [Source: Fair Seas - Ireland's Strategy strengthens commitment to Ocean Protection]

Galway Atlantaquaria. (2023). *The Beauty of Blue & Green Spaces*. [Source: Galway Atlantaquaria - The Beauty of Blue & Green Spaces]

Government of Ireland. (n.d.). *Water Framework Directive*. [Source: Government of Ireland - Water Framework Directive]

NOAA (National Oceanic and Atmospheric Administration). (2025). *The Economic Impacts of Marine Debris on Tourism-Dependent Communities*. [Source: NOAA - Economic Impacts of Marine Debris on Tourism-Dependent Communities]

Okon Recycling. (2025). *The Future of Waste Management: AI, IoT, and Circular Economy Solutions Explained*. [Source: Okon Recycling - Sustainable Waste Management Solutions]

The Environmental Pillar. (2024). *Urgent action needed to halt deluge of waste clogging our coast*.[34] [Source: The Environmental Pillar - Urgent action needed to halt deluge of waste]

UN DESA (United Nations Department of Economic and Social Affairs). (n.d. a). *Goal 14: Oceans*. Retrieved from [Source: UN DESA - Goal 14]

UN DESA (United Nations Department of Economic and Social Affairs). (n.d. b). *Goal 14 | Department of Economic and Social Affairs - Sustainable Development Goals*. Retrieved from [Source: UN DESA - Goal 14]

U.S. Department of the Interior. (n.d. a). *Marine Debris Impacts*. [Source: U.S. Department of the Interior - Marine Debris Impacts]

Amazon S3. (2011). *Waterfront, Salthill, Galway*. Retrieved from http://s3-eu-west-1.amazonaws.com/mediamaster-s3eu/9/c/9cde1039a0b4a73126986f5e782c34b8.pdf

Galway City Council. (2023). *Annual Report 2023*. Retrieved from https://www.galwaycity.ie/sites/default/files/2025-03/Galway%20City%20Council%20Annual%20Report%202023.pdf

Galway City Council. (2025). *Salthill Village and Seafront Framework Plan - Public Consultation Launch*. Retrieved from https://publicconsultation.ie/public-consultation-launch-salthill-village-and-seafront-framework-plan/

Galway City Community Network. (2015). *Socio-Economic Statement - Galway City Community Network*. Retrieved from https://galwaycitycommunitynetwork.ie/wp-content/uploads/2015/07/Socio-Economic-Statement-for-Galway-City.pdf

NPWS. (2013). Inner Galway Bay SPA (004031) Conservation objectives supporting document -