

Original Research

Plastic in gull pellets

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Summary

Our project aimed to investigate the presence and types of plastic in gull pellets collected from two sites, Site A and Site B. We conducted regular visits to these locations, carefully collecting gull pellets found in areas where gulls roosted or fed. The pellets were then transported to our laboratory for analysis.

Through our research, we confirmed the hypothesis that gulls in both Site A and Site B were ingesting plastic. The majority of the plastic identified in the pellets was found to be polyethylene, commonly used in agricultural bale wrap and rubbish bags. This suggests that agricultural and household waste may be significant sources of plastic pollution in the gulls' feeding environment.

Our findings contribute to the understanding of the prevalence and types of plastic pollution in gull populations, highlighting the need for effective waste management practices and initiatives to mitigate the impact of plastic on gulls and their ecosystems.

By examining gull pellets from multiple sites, our project provided insights into potential variations in plastic ingestion patterns, aiding in the development of targeted conservation strategies. Overall, our research contributes to the growing body of knowledge on plastic pollution and its impact on marine bird species, emphasizing the importance of addressing this global environmental concern.

Introduction

What are seagull pellets?

Sea gull pellets much like owl pellets are the waste food that seagulls can't digest like bones and scales (from fish). So we thought how about plastic?

We know that our bodies absorb small amounts of plastics it to our bloodstream through are small intestine which in high quantity can disrupt our hormones but sadly seagulls sadly unlike us can't pick out plastic from there food as they don't have hands and are incapable of knowing the dangers..

Why care about seagulls?

When you think seagull your mind is instantly taken to birds that steal your chips. But just like all life are key for keeping balance the very threatened coastal ecosystem which without the blackback seagull which is the native apex predator of the UK coasts. We would see change is the numbers and species that inhabit and feed off our coasts and surrounding seas.

What could this cause?

And although this sounds good as we would becoming more varied sadly it is not as simple as that as a loss the apex predator will cause an increase of the animals that the predator ate which will then cause a decrease in the animals that they eat and on and on right down to the producers.

It could also cause a non native bird like to stay longer in to the year to take advantage of the increased amount of food



Seagull pellet

A seagull pellet is a mass of undigested material that seagulls regurgitate. It is typically composed of the remains of their prey, such as fish bones, crustacean exoskeletons, and other indigestible parts. The appearance and composition of seagull pellets can vary depending on the seagull's diet.

Research aims

Our research aims were:

1. **Quantification:** Determine the quantity and types of plastics present in gull pellets, assessing the extent of plastic ingestion by gulls.
2. **Source identification:** Identify the sources of plastic pollution in gull habitats, such as marine debris, microplastics, or specific anthropogenic activities.
3. **Ecological impact:** Investigate the potential ecological consequences of plastic ingestion by gulls, including effects on their health, reproduction, and overall population dynamics.
4. **Trophic transfer:** Explore the potential transfer of plastic contaminants from gulls to higher trophic levels in the food chain, assessing the broader implications for ecosystem health.
5. **Mitigation strategies:** Develop effective mitigation strategies to reduce plastic pollution in gull habitats, aiming to minimize plastic ingestion and its associated ecological impacts.
6. **Public awareness:** Increase public awareness about the issue of plastic pollution and its effects on gulls and ecosystems, promoting behavioral changes and responsible waste management practices.

By addressing these research aims, scientists can gain a better understanding of the impact of plastics on gulls and their ecosystem and contribute to mitigating plastic pollution.

Experimental Method

To collect gull pellets for our research, we utilized two different sites, referred to as Site A and Site B. Here is an overview of our collection method: We carefully chose Site A and Site B based on their suitability for studying gull populations and their access to potential sources of plastic pollution. We conducted regular visits to both sites to collect gull pellets. These visits were scheduled at consistent intervals to ensure a systematic collection process. During each visit, we scanned the area for gull pellets, focusing on areas where gulls were known to roost or feed. We collected pellets found on the ground, rocks, or other suitable surfaces. It was essential to handle the pellets with care to avoid contamination. We recorded relevant data during each collection, including the date, site location, and any notable observations or environmental factors that could potentially influence the presence of plastic in the pellets. After collection, we carefully transported the pellets to our laboratory to prevent damage or loss. Proper storage conditions were maintained to preserve the integrity of the samples until further analysis. By employing this collection method at both Site A and Site B, we aimed to obtain a comprehensive understanding of plastic ingestion in gulls from different locations. This approach allowed us to assess potential variations in plastic prevalence and types between the two sites, contributing to a more comprehensive analysis of the issue.

To examine the gull pellets and collect data, we initially conducted test runs to determine the most effective methods. We chose Coverack Beach as our research site. Every week, our team member named Harvey collected gull pellets for us to dissect. After a few weeks, we made an exciting discovery—the presence of plastic in the pellets, confirming our hypothesis. Motivated by this finding, we continued collecting and dissecting gull pellets for a couple of months. However, as our research progressed, we realized the need for a proper laboratory setup. With the assistance of our teacher, Dr. Royle, we reached out to a biological professor at the University of Exeter. Fortunately, the professor granted us access to their laboratory for our research. In the laboratory, we analyzed the collected pellets and found that the majority of the plastic we encountered was identified as polyethylene. This particular plastic is commonly used for agricultural bale wrap and rubbish bags.



Site A
Near the Harbor



Site B
On the residential side of the Beach

Results

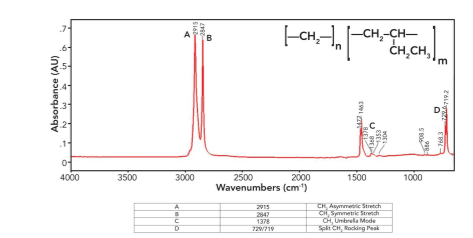
The majority of the plastic found in the gull pellets was identified as polyethylene. Polyethylene is commonly used in agricultural bale wrap and rubbish bags, suggesting that these may be significant sources of plastic pollution in the gull's feeding environment. Over the course of several months of dissecting gull pellets, plastic was consistently found in the samples. This confirmed the hypothesis that gulls in the Coverack Beach area were ingesting plastic. Although polyethylene was the predominant plastic type found, there may have been other types of plastics present as well. Further analysis or characterization of the plastic fragments could provide more detailed information on the types and sources of plastic pollution.

These results provide valuable insights into the types of plastic present in gull pellets from Coverack Beach. The prevalence of polyethylene suggests that efforts to reduce plastic pollution from agricultural and household waste, such as improving waste management practices or implementing recycling programs, could help mitigate the impact of plastics on gulls and their environment.



Polyethylene

Polyethylene is one of the most widely produced plastics in the world, with tens of millions of tons produced worldwide each year.



Example of a Fourier transform infrared (FTIR) spectrophotograph for polyethylene

The preferred method of infrared spectroscopy. It is when IR radiation is passed through a sample, some radiation is absorbed by the sample and some passes through (is transmitted).

Analysis & conclusions

The conclusion of finding polyethylene in seagull pellets is that these pellets are likely to have originated from plastic waste that has ended up in the ocean. Polyethylene is a common type of plastic that is used in many products, including plastic bags, packaging materials, and bottles. Unfortunately, much of this plastic waste ends up in the ocean, where it can harm marine life and ecosystems.

Seagulls are known to ingest plastic pellets, mistaking them for food. When these pellets accumulate in their stomachs, they can cause blockages and other health issues. The presence of polyethylene in seagull pellets is a strong indication that plastic pollution is a serious problem that needs to be addressed.

To reduce the amount of plastic waste that ends up in the ocean, it is essential to improve waste management practices, reduce our reliance on single-use plastics, and promote the use of more sustainable materials. We must all take responsibility for reducing our plastic consumption and properly disposing of plastic waste to protect our oceans and the creatures that depend on them.

