

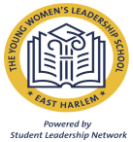
The
Pinkerton
Foundation

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE

HUDSON RIVER PK
RIVER PROJECT

The City College
of New York

INTREPID
SEA, AIR & SPACE MUSEUM COMPLEX



Students, mentors, and HRPT staff at Pier 57.

Science Leadership Program 2023

What is SLP?

The Science Leadership Program (SLP) is a paid summer research opportunity for high school aged, female-identifying students from underrepresented communities in STEM in New York City.

This program is a collaboration of STEM institutions in NYC

- Hudson River Park's River Project
- City College of New York (CCNY)
- Young Women's Leadership School (TYWLS)
- Pinkerton Foundation
- Intrepid Sea, Air, and Space Museum
- Lamont-Doherty Earth Observatory



Checking habitat mop at Pier 40.



Checking fish traps at Pier 26.

Goals of SLP:

Gain experience and confidence in STEM through authentic research, professional development workshops, and near-peer mentorship

Complete the summer program with a stronger scientific identity, a better understanding of STEM careers and opportunities, and greater exposure to scientific methods and techniques

Program Schedule

Mondays and Tuesdays are remote

- Workshops led by HRPT staff and Consortium partners
- Research on gull bolus research project

Wednesdays and Thursdays are in-person

- Hands-on research in Hudson River Park
- Field trips
- Presentation and public speaking practice
- Peer Chats

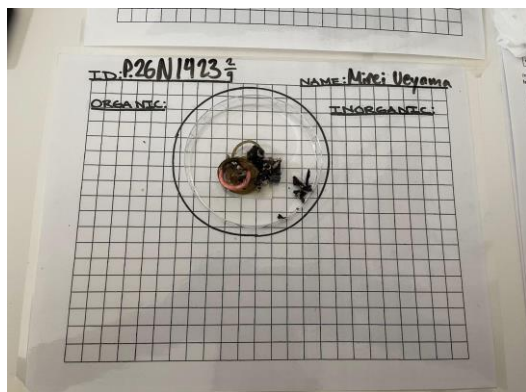


Interns at CCNY with Dr. Karin Block.



Interns performing water quality analysis at Pier 40.

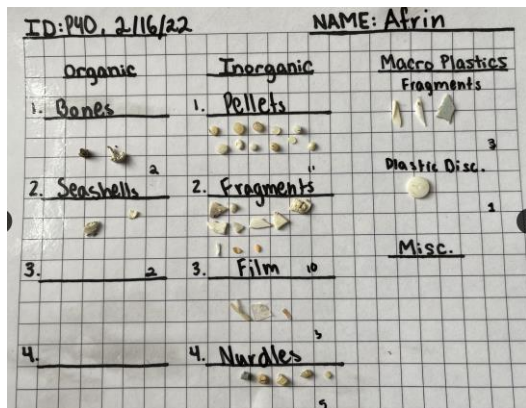
Gull Bolus Project



Gull bolus on dissection sheet.



Bolus separated into organic and inorganic categories.



Materials separated by type.



Inorganic and organic matter stored separately in glass vials.

Gull Bolus Poster Presentations

ANALYZING THE TOXICOLOGICAL EFFECTS OF INORGANIC MATERIALS IN RING-BILLED SEAGULLS AT HUDSON RIVER PARK

MIREI UEYAMA

BACKGROUND

Books are extremely vulnerable to changes in their environment, which make them a good species to study the impact of pollution (Wang, et al., 2021). Some seagull species regurgitate boluses that are composed of indigestible items, which is useful for obtaining data on plastic ingestion (Crawford, et al., 2020). Plastic ingestion in various species has been linked to negative health effects such as their toxicity and slowed growth expression (Bassano, et al., 2016). This experiment focuses on the Ring-billed gull, one of the most common seagulls around Hudson River Park. Through analysis of their boluses found along Hudson River Park, these gulls can give insight on the impact of plastic pollution on their diets and what that may include about their internal health.

RESULTS & DISCUSSION

According to Figure 3, approximately the number of inorganic materials were found in the 40 boluses dissected in regurgitated materials. Out of all the inorganic materials, plastic fragments composed 53.0% of that total, as shown in Figure 4. Therefore, it is reasonable to suggest that gulls are practicing protocontamination since inorganic materials like plastic trash are regurgitated, which would normally be more present in their diet. This conclusion is worsened, especially plastic is known to absorb chemical pollutants that can leach into animals that consume it (Floods, et al., 2019). When animals are exposed to specific pollutants, it can affect their behavior functions as well as their cholesterol levels and enzymes (Bachala, 2021). Prolonged exposure can also lead to malnutrition and body mass (Bachala, 2021).

CONCLUSION

This first diet trend continues, the Ring-billed gull at Hudson River Park may experience various negative side effects. However, more research is needed to make accurate predictions of the effect plastic consumption will have on the gulls in the future.

REFERENCES

Bachala, T. (2021, August 25). *The Effects of Plastic Pollution on Animals*. Retrieved from <https://www.researchgate.net/publication/355111111>

Bassano, J. P., & Bertone, S. (2016). *Plastic Ingestion in Marine Animals*. *Frontiers in Marine Science*, 3, 1-10. Retrieved from <https://www.frontiersin.org/journal/10.3389/fmars.2016.00003>

Crawford, J. L., & Bertone, S. (2020). *Plastic Ingestion in Marine Animals*. *Frontiers in Marine Science*, 7, 1-10. Retrieved from <https://www.frontiersin.org/journal/10.3389/fmars.2020.00003>

Floods, J. M., & Bertone, S. (2019). *Plastic Ingestion in Marine Animals*. *Frontiers in Marine Science*, 6, 1-10. Retrieved from <https://www.frontiersin.org/journal/10.3389/fmars.2019.00003>

Wang, Z., & Bertone, S. (2021). *Plastic Ingestion in Marine Animals*. *Frontiers in Marine Science*, 8, 1-10. Retrieved from <https://www.frontiersin.org/journal/10.3389/fmars.2021.00003>

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Mirei Ueyama's SLP scientific poster.

HUDSON RIVER PARK RIVER PROJECT

What color of inorganic materials are seagulls most likely to ingest?

By Lizbeth Flores

Background

Ring-billed gulls are opportunistic feeders (Fast, 2023). They eat whatever they see and eat just about anything. Sometimes that can be organic things like fish, insects but sometimes it can be inorganic materials like plastic because of the scent it lets out (Lissa, 2022). During the dissection of the seagull boluses there were many colorful inorganic materials. Which resulted in my curiosity regarding which colors were most ingested by the seagulls.

Methods

- Boluses were dissected thoroughly and organized into organic and inorganic piles while also taking note of the size, and the color.
- Inorganic materials were grouped and separated by the color.
- The number of each color were then calculated and charted.

Results/ Discussion

Out of all the colors, white was the color that seagulls ingested the most. This is known because the data (Figure #3) shows a higher amount of white articles extracted from the boluses but figures 4 shows a greater value of white in the boluses that were dissected. After finding out that white is the color seagulls ingest the most future research can be about why seagulls ingest more white.

Conclusion

What color of inorganic materials are seagulls most likely ingesting? A possible reasoning for this question is that blue could be ingested the most because it's the same color as water. But according to Figure #2 that would be incorrect. White is the color most ingested. Using the data that has been gathered, more work could be done to find out why white is most ingested. California State science created a scientific test where tubes of different colors were laid out. They then observed which color the seagulls had a preference for. They picked mainly the green liquid (Krausman, 2016), providing evidence for the notion that seagulls do have dietary biases for certain colors.

Lizbeth Flores' SLP scientific poster.

Organic vs Inorganic Material: A Look Into Implications and Health of Gulls in Hudson River Park

Zihan Wang, Hudson River Park Trust

Abstract

To determine the rates of organic to inorganic material found in regurgitated boluses, we dissected and analyzed 40 regurgitated boluses located at Pier 40 and Pier 26. We found a slightly higher organic to inorganic ratio of organic materials in Pier 40 compared to Pier 26. We provide more insight into the theory of why gulls eat what they eat and what their diet consists of.

Background

The Hudson River Park is an important part of the Hudson River Park Trust. The Hudson River Park Trust is a non-profit organization that manages and maintains the Hudson River Park. The Hudson River Park Trust is committed to providing a high-quality experience for all visitors. The Hudson River Park Trust is also committed to protecting the Hudson River Park's natural resources. The Hudson River Park Trust is committed to providing a high-quality experience for all visitors. The Hudson River Park Trust is also committed to protecting the Hudson River Park's natural resources.

Methods

Step #1: Boluses are collected from gulls at the Hudson River Park.

Step #2: Boluses are dissected by separating the bolus contents into organic and inorganic (Fig. 1).

Step #3: Boluses contents are compared and categorized, including inorganic materials in the boluses (Fig. 4).

Step #4: Boluses are then analyzed to see if there are differences in how people use the Hudson River Park.

References

Lissa Abreu, (2022, August 15). *Plastic Ingestion in Marine Animals*. Retrieved from <https://www.researchgate.net/publication/355111111>

Wang, Z., & Bertone, S. (2021). *Plastic Ingestion in Marine Animals*. *Frontiers in Marine Science*, 8, 1-10. Retrieved from <https://www.frontiersin.org/journal/10.3389/fmars.2021.00003>

Zihan Wang's SLP scientific poster.

HUDSON RIVER PARK RIVER PROJECT

Difference in Regurgitated Plastics Recovered from Gull Boluses at Piers 26 and 40 at Hudson River Park

Lissa Abreu

Background

All Hudson River Park we collected a total of 40 boluses sample from regurgitated boluses. We found that the boluses found at Pier 40 had a higher percentage of organic materials than the boluses found at Pier 26. This suggests that gulls at Pier 40 are ingesting more organic materials than gulls at Pier 26. This could be due to a variety of factors, including differences in the diet of the gulls at the two piers, differences in the amount of plastic pollution at the two piers, or differences in the way that the gulls at the two piers are regurgitating their boluses.

Methods

Step #1: We collected 40 regurgitated boluses from gulls at Piers 26 and 40.

Step #2: We dissected the boluses and separated the organic and inorganic materials.

Step #3: We compared the amount of organic and inorganic materials found in the boluses at the two piers.

Step #4: We analyzed the data to see if there were any significant differences between the two piers.

Results

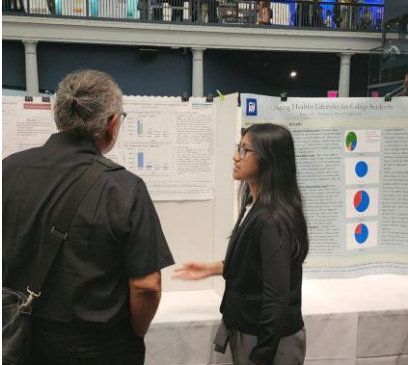
Figure 1: Inorganic materials found in P40 boluses. Figure 2: Inorganic materials found in P26 boluses.

Conclusion/Discussion

Seagulls are opportunistic feeders. This means that whatever they get the chance they will eat, because they are opportunistic feeders they will eat anything that is available and sometimes even poison. This can have negative effects on their health and even lead to their death. Seagulls are highly concentrated in toxic and, as well as being opportunistic feeders, they are also highly intelligent. This means that they are able to learn from their own experiences and make decisions based on what they have learned. This means that they are able to learn from their own experiences and make decisions based on what they have learned. This means that they are able to learn from their own experiences and make decisions based on what they have learned.

Lissa Abreu's SLP scientific poster.

Gull Bolus Presentations: AMNH



Evaluation Tools: Pre and Post Survey

- In collaboration with the Lamont Doherty Earth Observatory and Science Research Mentoring Consortium (NYCSRMC), we devised a well-rounded, in-depth **pre and post-survey**
 - Measured participants' interest and attitudes in pursuing STEM in future academic and professional settings
 - Evaluated interns' confidence in scientific skills including the utilization of lab equipment, conducting research, and presenting science topics to different audiences
 - Interns self-evaluated the development of a STEM identity and growth in confidence over the course of the six-week program

Mentors will share
some of those survey
results with you now!

**Thank you for your support!
Any questions?**

