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History of litter sampling Le Léman

Four campaigns:

- 2015 - 2016: Montreux clean beach project
- 2017 - 2018: Swiss litter report
- 2020 - 2021: IQAASL
- 2022 : Plastock

How do we know if there is more or less litter in a given period?

Le Léman has been sampled every year since 2015.

History of litter sampling Le Léman

Including the interim data from Plastock there are 319 samples. This data concerns 25 different municipalities and all three cantons. Each sample contains the quantities of 230 different *object types*. These *object types* represent groups of items found at the beach, for example snack wrappers or bottle tops.

In 2021 Lac Léman had higher than the national median for many common object types. The results from Plastock suggest that the number may be lower for certain objects. However, past experiences show that sampling groups will get different results, there are many reasons for this. The most important reason is the resources allotted to the collection of data.

The responsibility of maintaining the data fell upon hammerdirt staff by default.

Technology

During this time frame (2015 - 2023) there has also been profound changes in the domain of data science and application development. We have tried to keep pace with both.

We accomplish most tasks on the server or local machine with Python. On remote devices we use JavaScript. We define two technology use cases: i. data collection and display, ii. data-science.

Data collection and display: is the process of taking in data and returning an agreed upon product from that data. For data collection we write our own front-end applications in JavaScript (React) that are hosted on local servers. The operations on the server have an intermediate Python layer (Django/flask) that handles traffic to and from the database (MySQL). The intermediate layer responds to requests from remote clients.

Data science is concerned with tuning existing models and trying out new ones. This includes integrating new random variables or alternate data sources. For this we use Python and whole the suite of data-science tools (Scipy/scikit-learn/Sphinx/PyMC) that are available. The cantonal reports is one example of the basic data-science work environment. If a model is succesfull it will be integrated into data collection and display.

Cantonal Report

The cantonal report was initiated by the maintainer of the IQAASL repository at the request of a representative from Valais.

This creates a unique opportunities for regional stakeholders:

1. Identify common priorities
2. Revisit baseline calculations and key indicators
3. Identify locations of interest for sampling
4. Define research questions specific to the region

The cantonal report is the best place to identify areas of improvement in sampling and analysis. **Cantonal actors can shape the report to their needs.** This may require changes to future reporting requirements at the federal level.

We hope that regional actors can find consensus about the interpretation and application of the survey results in reference to reducing trash in the environment and the regional action plan.

Other considerations

A sampling campaign for 2024 should be organized. This would include proposed changes from regional stakeholders. The sampling locations could be chosen with more respect to geographic and administrative borders. Increasing the variety of survey locations on the basis of land-use may be another way of choosing locations.

The intended use of the data is consistent with the way it is collected. The data was collected to reply to one question: What will we find at the beach today? *We can make a good estimate of the answer. However we can not tell you how much there is, only how much you are likely to find given the environmental conditions.*

Where along the Rhône and the shoreline of Le Léman do cantonal hydrologists think trash will accumulate? How does this compare to current survey results?

For a complete analysis we need to quantify the prevention and mitigation vectors (the survey results are the pollution vector) that are in place. What are the methods for quantifying the magnitude of a regions prevention vector?

Next steps

Cantonal report:

1. Develop a cantonal report with collaboration from Valais and Genève
2. Using the federal report and cantonal report create a report for the CIPEL

Improving operations in the region

1. Define regional priorities
2. Collect research questions from stakeholders
3. Establish a data pipeline from survey to report
4. Engage local NGOs to manage data and collection
5. Allocate resources for data collection
6. Establish an education or training regimen for NGOs that wish to collect data

Once there is a consensus among regional stakeholders the reporting process is almost automatic. This allows a greater share of resources to be allotted to data collection.

Questions

Thank you!