



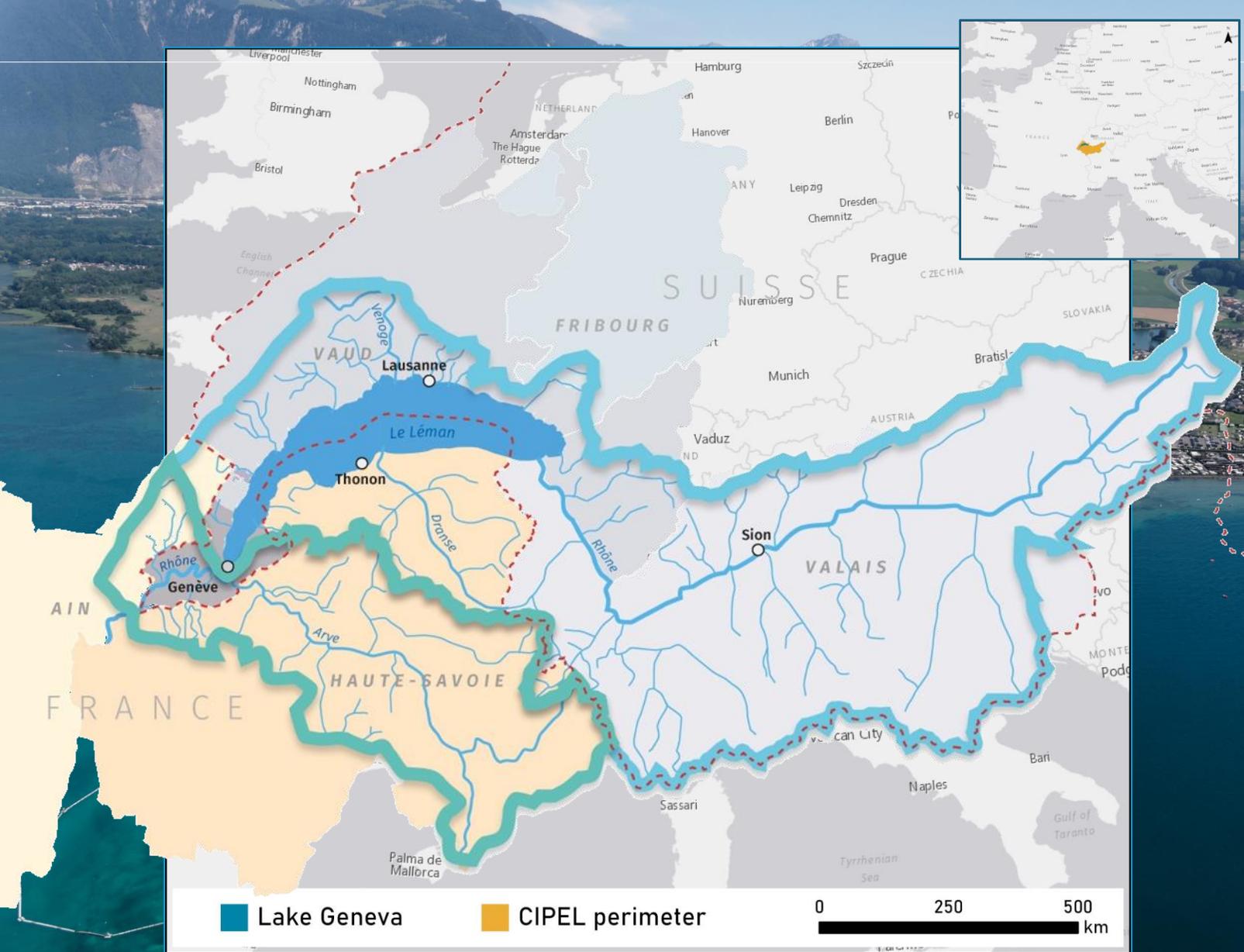
Studies and management of microplastics The case of Lake Geneva

Workshop Microplastics in the River Rhine :
Methods, Occurrence and Effects

Dr Nicole Gallina - General secretary

Bonn - December, 11-12th, 2024





LAKE GENEVA

Area lake: **580 km²**
 Volume: **89 billion m³** - Depth: **309m**
 Main tributary: **Rhône river**
 Flow rate: **182 m³/s**

TERRITORY SHARED



by **Switzerland and France**

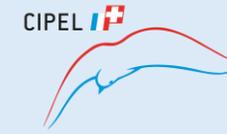
- 2 countries
- 2 french departments: Ain, Haute-Savoie
- 3 swiss cantons: Geneva, Vaud, Valais
- 554 municipalities**

CATCHMENT AREA

Surface area: **10 000 km²**
 Population: **2.3 million**
 Drinking water supply: **1 mio habitants**

LOCATION AND TERRITORY

ACTION PLAN 2021 - 2030



COMMISSION
INTERNATIONALE
POUR LA PROTECTION
DES EAUX DU LÉMAN

Microplastics management

Objectives:

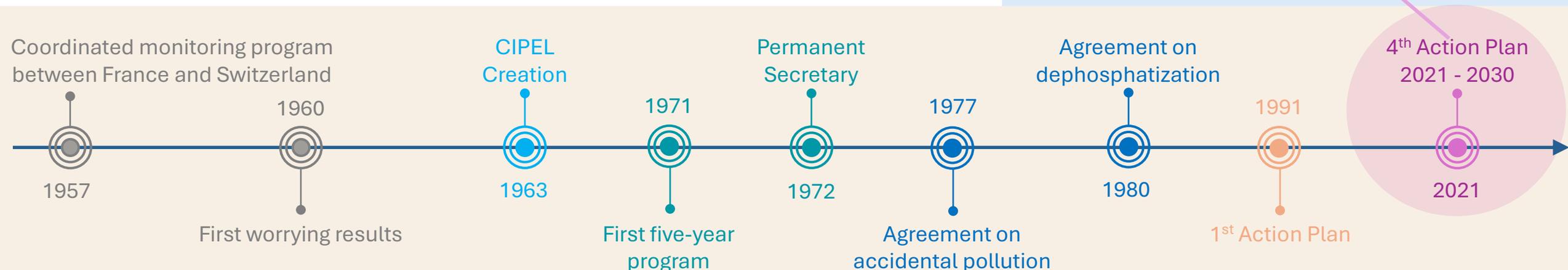
- Quantify the **presence of microplastics** in Lake Geneva and **identify their sources**
- Define a **coordinated monitoring strategy** at watershed level including potential impacts

Actions :

- Identification and categorization of pollution sources
- Monitoring the most significant sources
- Analysis of water column contamination
- Overall diagnosis
- Scientific watch and communication

About the CIPEL

Objectives: Maintain or restore the ecological quality of water and aquatic environments



OVERVIEW OF MICROPLASTIC STUDIES IN LAKE GENEVA

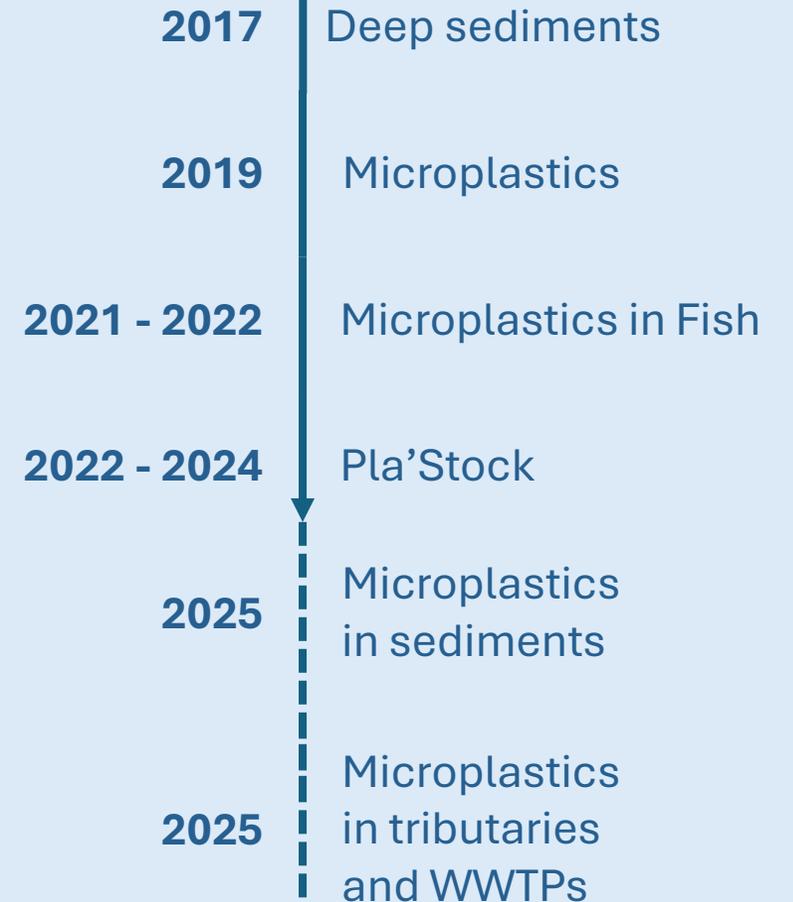
Completed studies

- ✓ Report on **Deep Lake Geneva Sediment** (2017)
- ✓ Report on **Microplastics** in Lake Geneva (2019)
- ✓ Study on **Microplastics in Fish** (2021-2022)
- ✓ Study Pla'Stock : **Microplastics** on Lake Geneva **beaches** (2022 - 2024)



Upcoming studies

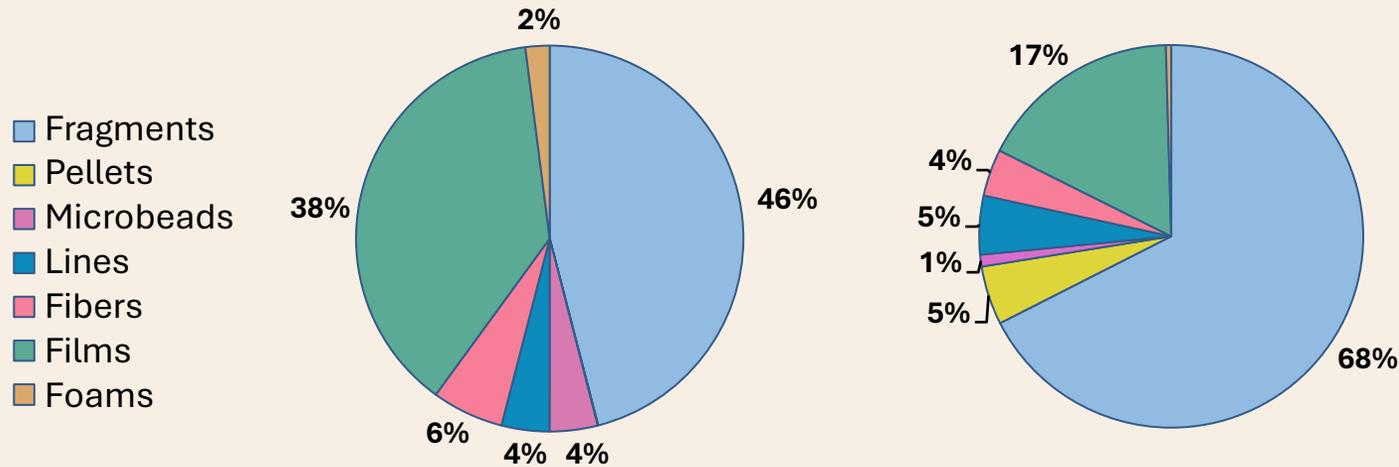
- Microplastics in sediments
- Microplastics in tributaries and WWTPs



COMPLETED AND UPCOMING STUDIES

MICROPLASTICS IN DEEP SEDIMENTS (2017)

Objective: Identify the presence of microplastics in deep sediment



Proportion of plastic types, by counts (left) and mass (right)

Methodology

- **Visual identification** of particles, extraction, count and weigh.
- **Chemical analysis** by infrared spectroscopy (FT-IR ATR) to identify particle composition.

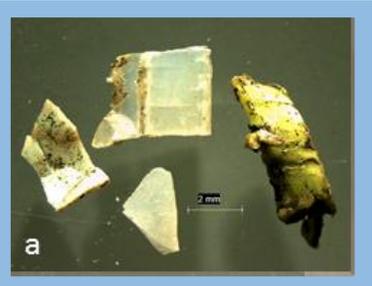
Results

- **Plastic particles were detected in all sediment samples**
- Particles **originated from the degradation of plastic objects** (plastic bags and packaging).
- Main polymers identified: **PET** (polyethylene terephthalate), **PE** (polyethylene) and **PVC** (polyvinyl chloride).

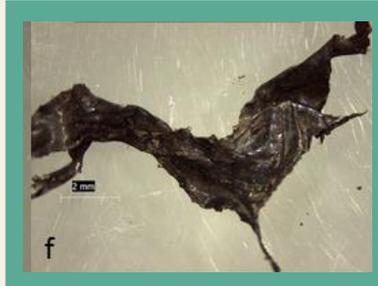
Conclusions

- **Widespread contamination of sediments** by microplastics
- Further research needed on larger-scale samples and **analysis of smaller particles**

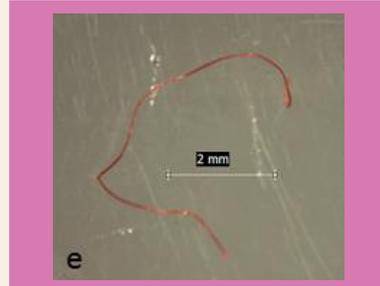
What is the potential impact of this pollution on the lake's ecosystem?



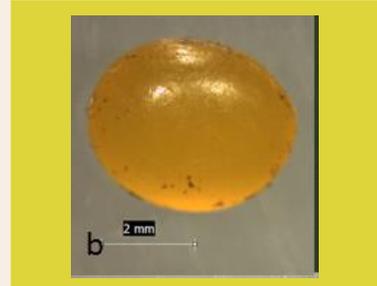
Fragments



Film



Fiber



Pellet



COMPLETED STUDIES

MICROPLASTICS IN LAKE GENEVA (2019)

Objective:

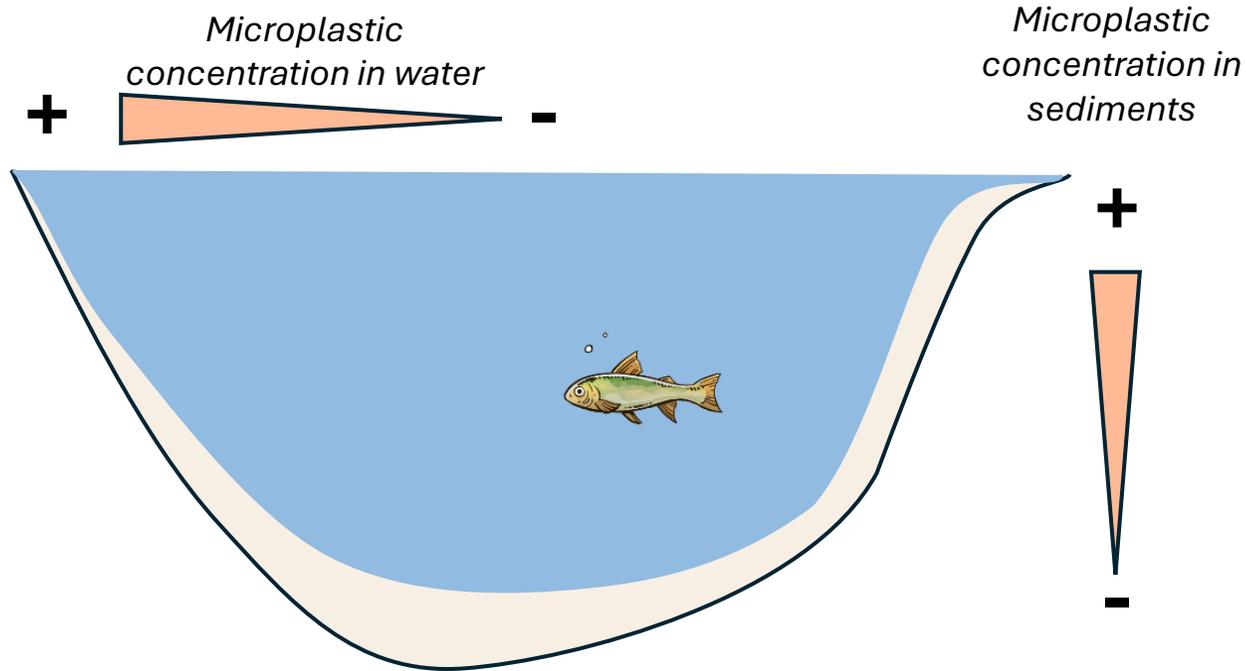
Explore the presence and distribution of microplastics in the waters and sediments



River mouth



Towns



Methodology

- Water and sediment samples were taken from various areas of Lake Geneva.
- Microplastics were isolated by sieving and filtration.
- Analysis of chemical composition by infrared spectroscopy.

Results

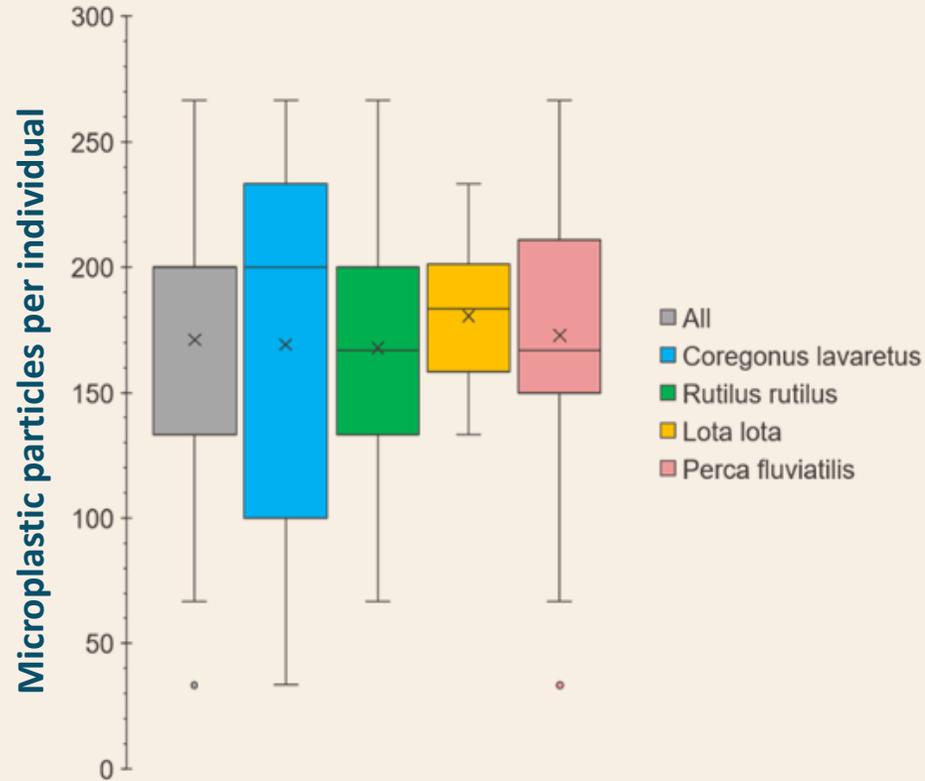
- **Wide distribution of microplastics in the lake**
- **High concentration** in areas close to towns and river mouths
- Main polymers identified : **PET, PE and PP** (polypropylene)
- Microplastics are most **abundant at the surface and in shallow sediments**

Conclusions

- **Significant microplastic pollution in Lake Geneva**
- Measures needed to **limit the input**
- Special attention and **improve preventive action**

MICROPLASTICS IN FISH (2021-2022)

Objective: Study microplastic ingestion by fish



Variability in the number of microplastic particles per fish species

Methodology

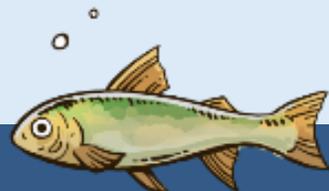
- 89 fish digestive tracts
- Analysis using direct laser infrared imaging (LDIR)

Results

- **Microplastics detected in 100% of the fish**
- **100 - 200 particles** per individual
- Size particle : **12 - 100 μm**
- Main polymers: **polyamide, polycarbonate, PET** and **polyurethane**.

Conclusions

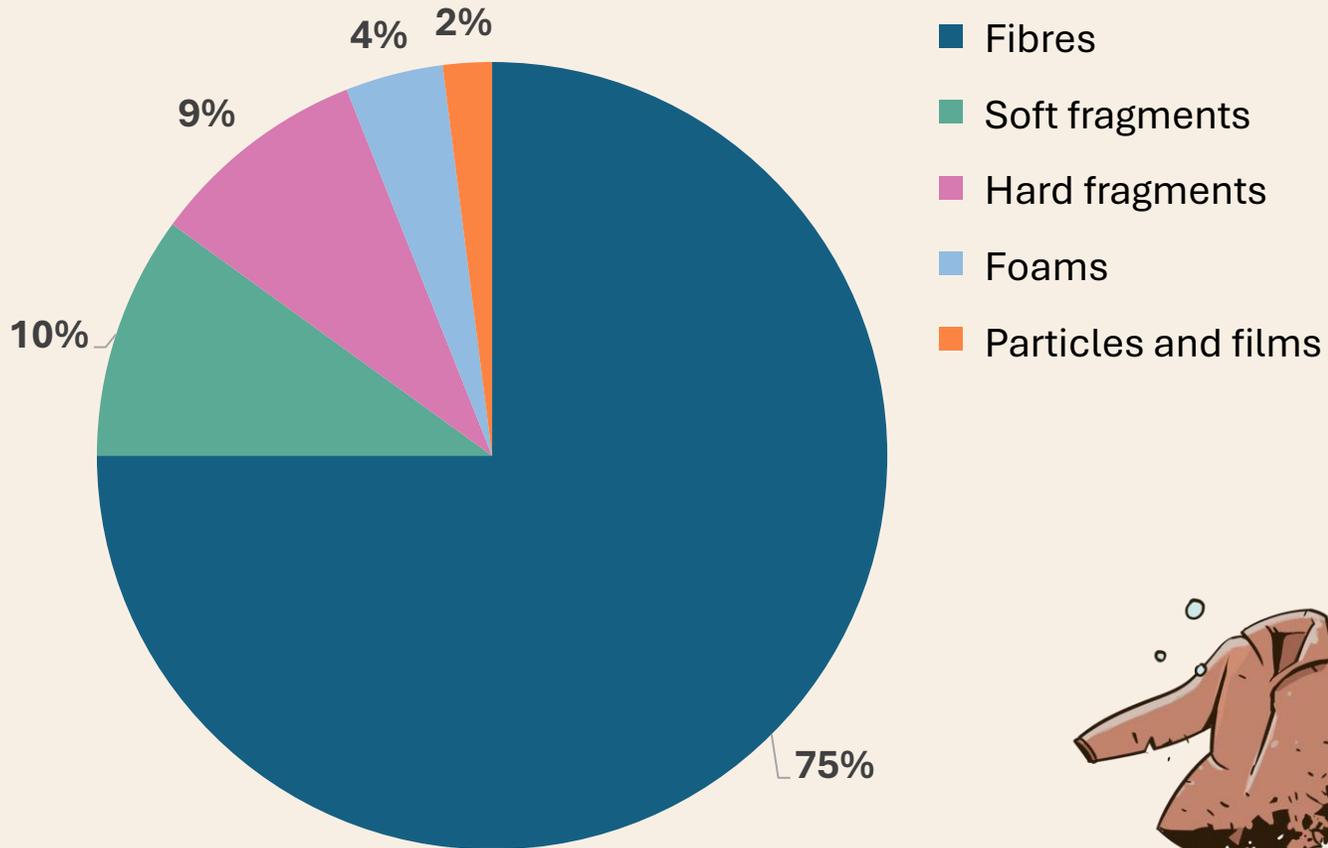
- **Widespread exposure of fish to microplastics**
- **Potential health risks** due to the physical and chemical effects of these particles.



COMPLETED STUDIES

PLA'STOCK : MICROPLASTIC ON LAKE GENEVA BEACHES (2022-2024)

Objective: Quantify plastic pollution on Lake Geneva beaches



Methods

- 25 Swiss and French beaches sampled

Results

- Microplastics: **7'600 particles / m²** (60% textile fibres)
- Macroplastics: **packaging, cigarette ends, pellets**
- **Communication to municipalities** in the Lake Geneva catchment area

Conclusions

- **Widespread pollution on beaches**
- **Preventive measures needed** to limit plastic input



COMPLETED STUDIES

Communication to municipalites – 500 letters sent

1. Strengthen Public Policies:

- Implement stricter regulations to reduce plastic pollution.

2. Lead by Example:

- Adopt exemplary practices in public institutions.

3. Train Local Teams:

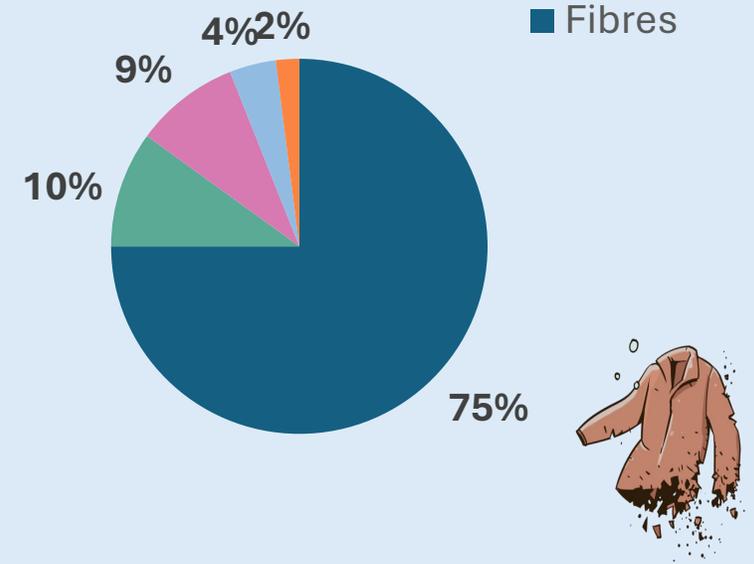
- Educate road maintenance teams on managing plastic waste on municipal worksites.

4. Promote Responsible Practices:

- Recommend the use of reusable containers during events.
- Encourage local businesses to prevent leaks of industrial pellets and plastic fibers.

5. Inform and Raise Citizen Awareness:

- Promote responsible behavior: avoid littering in nature, on beaches, roads, sidewalks, or in toilets.
- Raise awareness about plastics in clothing and promote the use of microfiber-catching laundry bags.



RECOMMENDATIONS AND FUTUR CHALLENGES



➔ Reduce microplastic pollution and protect the lake ecosystem

FUTURE STUDIES AND RESEARCH

2025 { Microplastics in sediments
Microplastics in tributaries
and WWTPs



CIPEL 

INTERNATIONAL COMMISSION FOR
THE PROTECTION OF LAKE GENEVA

Thank you for your attention

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