A deep dive into our **plastic ocean**

Knowledge is the key to understanding all **the ways plastics end up in the ocean**, and what **we can do to prevent it** from happening.

mepex

NORWEGIAN ENVIRONMENT AGENCY

HOLD NORGE RENT

The team outside our workshop in Slemmestad

Exciting project **collaborations**

Together with Keep Norway Beautiful, Asker kommune, Orkla, Infinitum and artist Pippip Ferner, Mepex received funds from the Norwegian Environment Agency to provide more knowledge on marine litter.

We have developed a method for marine litter analysis in our workshop which we have used to register close to 10 tonnes of marine litter from 50 different beaches along Norway's coastline. We have also created a simplified method for field analyses and taken sediment samples from 5 beaches to investigate the presence microplastics.

Seeking help from experts

We have sorted the waste into 140 different categories and registered product types, weight, and number of units. In addition to this, the source, age, geographical origin and material type were also catalogued. Every registration was photographed for visual documentation. Our database consists of over 120 000 units that have been analysed and catalogued.

In order to categorize as many products as possible, we sought help from experts in different fields. Together with Keep Norway Beautiful, we invited representatives from the different industries to expert panels. At these meetings, experts shared their knowledge of products and emission sources.

The outcome of our analyses, together with these discussions, is a comprehensive database. We have published a digital map online where results from each beach clean-up are available. We have also completed 3 video stories that are available on our web page and through social media.

Quick facts on **"A Deep Dive into our Plastic Ocean"**

- 1 + 2-year project funded by the Norwegian Environment Agency
- Analysed marine litter from 50 beaches in Norway
- Registered 10 tonnes of beach litter in total
- Registered over 120 000 units
- A project in collaboration with Keep Norway Beautiful, Asker kommune, Orkla, Infinitum and Pippip Ferner

RESULTS

Weight and unit registrations provide **new knowledge**

A deep dive into the results shows that the majority of the marine litter is plastic. From a weight-based perspective, 73,5 % of the waste is plastic, and that number increases to 91,5 % from a unit-based perspective.

Data from beach clean-ups registered in Keep Norway Beautiful's online portal, do not include weight measurements at the item level. This addition to our database provides another way of viewing the data and yields new and important knowledge.

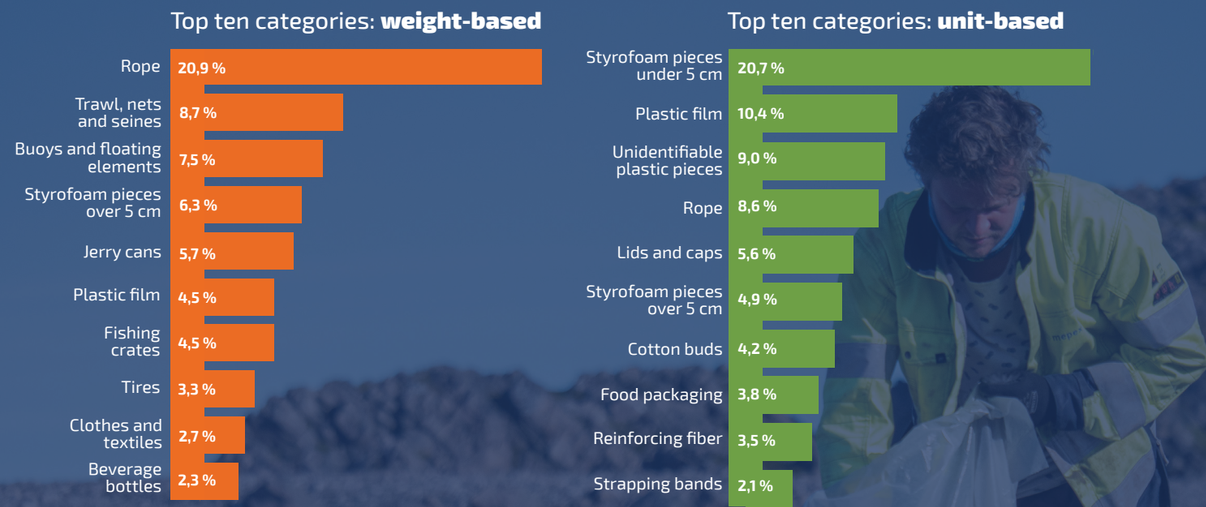
Vast amounts of EPS and items from the fishing and aquaculture industries

Expanded polystyrene, EPS, is the most common product based on the number of units found.

Consumer-related products constitute other common units on the same list. By extracting the total weight of the items found, equipment and products used in the fishing and aquaculture industries constitute a major part of the results. Consumer-related products are less prominent on this list.

Coincides with data from volunteers

If we compare our results with the volunteer data registered in the online portal, there are similarities between the most common products found.



NB! It is important to highlight that the results presented here are based on the marine litter analysed from the locations in this project.

RESULTS

What does the marine litter **consist of?**

Large regional differences

We have divided the country into four zones and compiled tables and statistics of the sources of marine litter. The results display large regional differences. Products from the fishing and aquaculture industries comprise large shares of the marine litter along the coast, while products from personal consumption constitute the largest share in locations near densely populated areas.

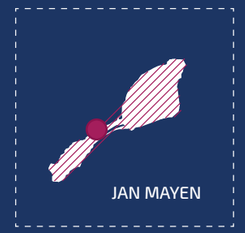
The team has analysed and registered waste from each location separately. This provides results for each individual beach clean-up, but also collective results from all the locations combined.

Personal use

Fishing and aquaculture

Other industry

Unkown origin



Troms and Finnmark

Weight		Quantity	
20,8 %	Rope	1	Styrofoam pieces under 5 cm 22,4 %
12,5 %	Buoys and floating elements	2	Rope 14,8 %
9,9 %	Trawl, ropes and nets	3	Unidentifiable plastic pieces 9,4 %
6,0 %	Fishin crate	4	Lids and caps 5,7 %
5,7 %	Jerry cans	5	Plastic film 4,7 %
3,2 %	Styrofoam pieces over 5 cm	6	Strapping bands 4,3 %

Sources weight-based

56,3 % | 24,8 % | 13,5 % | 5,2 %

Central Norway

Weight		Quantity	
25,7 %	Rope	1	Styrofoam pieces under 5 cm 30,6 %
12,3 %	Styrofoam pieces over 5 cm	2	Plastic film 12,1 %
7,2 %	Buoys and floating elements	3	Styrofoam pieces over 5 cm 10,5 %
6,8 %	Trawl ropes and nets	4	Rope 8,2 %
5,7 %	Tires	5	Lids and caps 6,8 %
5,4 %	Fishing crate	6	Unidentifiable plastic pieces 6,5 %

Sources weight-based

47,1 % | 31,6 % | 15,9 % | 5,3 %

Western Norway

Weight		Quantity	
22,1 %	Rope	1	Styrofoam pieces under 5 cm 29,6 %
10,7 %	Trawl, ropes and nets	2	Plastic film 10,9 %
7,9 %	Styrofoam pieces over 5 cm	3	Rope 8,7 %
6,1 %	Jerry cans	4	Unidentifiable plastic pieces 7,5 %
4,5 %	Plastic film	5	Styrofoam pieces over 5 cm 6,1 %
3,9 %	Metal pieces	6	Food packaging 3,6 %

Sources weight-based

42,2 % | 36,3 % | 12,0 % | 9,4 %

Eastern Norway

Weight		Quantity	
11,7 %	Rope	1	Plastic film 13,2 %
10,4 %	Glass	2	Cotton buds 11,4 %
6,0 %	Clothes and textiles	3	Unidentifiable plastic pieces 11,2 %
5,4 %	Jerry cans	4	Reinforcing fiber 10,8 %
5,2 %	Metal pieces	5	Styrofoam pieces under 5 cm 9,1 %
3,8 %	Pressure treated wood	6	Lids and caps 7,5 %

Sources weight-based

46,2 % | 29,7 % | 17,0 % | 7,2 %

NB!

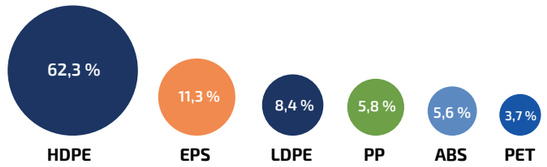
To assure a high level of credibility to our results, many identifiable products have been registered with an 'unknown' source if we were unable to determine their source of origin with a large degree of certainty. This increases the accuracy and reliability of the other sources of origin.

RESULTS

Plastic soup

The marine litter consists of large amounts of plastics, where a major share is ropes, fishing nets, trawls, and seines, often made of nylon.

For other plastic products, PE (HDPE and LDPE) and EPS are the predominant plastic types.

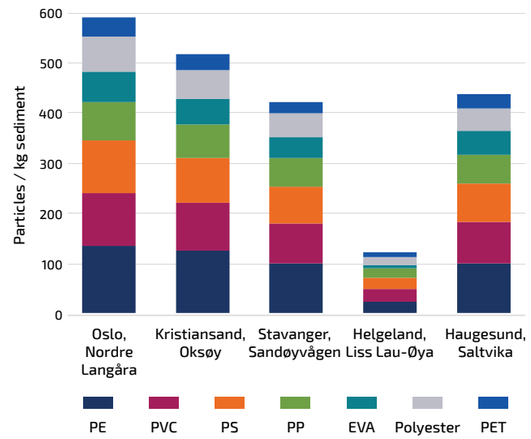


The 6 key plastic types forund on the beaches (weight based)

Microplastics in beach sediments

Sediment samples from five beaches were analysed for the presence of microplastics (sized 20–100 µm). The findings correlate with macroplastics collected on the same beaches. The results display a high concentration of microplastics in locations near densely populated areas.

Concentration of various microplastic particles



Age identification

We were able to identify the age of 5 % of the products found in the waste we analysed. We are still cleaning up old sins, as 16 % of the identified products are over 15 years old, but a large part of the waste is younger.

Products that are easily identifiable by age are especially food packaging and household bottles that are marked with a production date or expiration date. The results show that over 60 % of the beverage containers are more than 5 years old.

Geographical origin

We were able to identify the geographical origin of 10 % of the products found. 23 % of the identified products come from other countries, mainly from Great Britain, Denmark and Sweden.

Products from Russia are more pronounced along the northern coastline than in the south. Products from Sweden are more common in the south and west coast of Norway.

New and improved **knowledge**

Diving deep into marine litter provides new knowledge that can assist in the implementation of measures to prevent plastic from leaking into our oceans.

By registering the weight and number of units for each product category we can obtain a more in-depth picture of what products comprise marine litter. Large regional differences can for instance be visualized both in terms of emission source and geographical origin of the waste. This knowledge can assist us in implementing targeted measures against various industries and groups of people in different parts of the country.

Further classification of the personal use items found in our analyses of marine litter

Analysis in the field

Through participation in field work together with 'In the Same Boat', we were able to test a new method for registering marine litter to be used by professional beach cleaners in the field.

The simplified method is based on the same categories used in the analysis, though many of the categories have been merged to simplify the registration. The method has worked well, and we hope our experiences can assist in the development of creating a uniform and holistic way of registering marine litter.

The way forward

The project has shown how important it is to register the weight and number of units for each product category, but also to photograph each registration. Based on this method, we have obtained a dynamic data and knowledge base that can be continuously improved.

Our recommendation is to continue to develop the database, and use it to prioritise, target and measure the efforts against marine litter. The extensive picture database provides visual evidence of which products constitute the largest offenders. By working with producers and retailers and raising their awareness of commonly littered products, we can implement measures to prevent littering.

OUR OVERALL RESULTS

Overall results from the project

WEIGHT

Top 5 weight-based

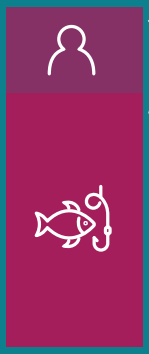
- 20,9 % Rope
- 8,7 % Trawls, nets and seines
- 7,5 % Buoyes and floating elements
- 6,2 % Styrofoam pieces over 5 cm
- 5,7 % Jerry cans

UNITS

Top 5 unit-based

- 20,7 % Styrofoam pieces under 5 cm
- 10,4 % Plastic film
- 9,0 % Unidentifiable plastic pieces
- 8,6 % Rope
- 5,6 % Lids and caps

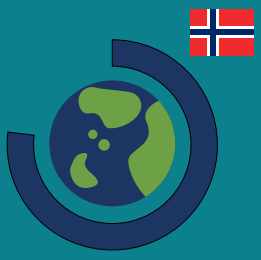
SOURCE



Weight-based

Most of the marine litter originates from fishing and aquaculture, and personal use products.

ORIGIN



77 % of the geographical-identified products are Norwegian.

PLASTIC

The amount of plastic in the marine litter, based on weight and units.

BOTTLES

60 % of plastic bottles are more than 5 years old. **35 %** of all plastic bottles are Norwegian.

PLASTIC TYPE

PE and EPS are the most common plastic materials.

AGE

49 % of the age-identified products are under 5 years old.

PACKAGING

52 % of the personal use litter is food packaging, based on units.

mepex · HOLD NORGE RENT · Asker kommune · Orkla · INFINITUM · pippip ferner · Norwegian Environment Agency