

# Marine litter ID cards

SVVALBARD REGION



Photo credit: Zet Freiburghaus



Association of  
Arctic Expedition Cruise  
Operators **AECO** 

Part of the Marine Litter Toolkit by AECO, Eelco Leemans & mountain2ocean



# Introduction

## Marine litter in Svalbard

In our current times, the topic of environmental pollution, especially concerning marine and beach litter, is of increasing importance. Through the transport of ocean currents, waste originating from other parts of the world can end up in Svalbard. There are also activities in or near Svalbard that could account for regional source of litter. From previous cleanup events in Svalbard, we know that the relative contribution of plastic to overall litter is over 80% on many beaches, where most of it originated from the fishing industry. Since hundreds or even thousands of years are required for plastic to degrade, the amount of plastic in the region is accumulating rapidly and could pose a serious threat to wildlife and local communities.

## AECO's Clean Seas project

For over two decades, members of AECO have been engaged in cleanup activities in the Arctic and witnessed the growing amount of garbage that floats ashore on these beaches. This fostered a discussion on how the industry as a whole could contribute more. In 2018, AECO decided to step up the association's efforts to combat marine plastic pollution by launching AECO's Clean Seas Project. AECO joined the #CleanSeas campaign, a UN-led campaign to combat marine plastic pollution. To combat marine litter and single-use plastic, AECO has developed guidelines for cleanup activities as well as consumption (or use) of single-use plastics on board for their members to follow<sup>1</sup>.

<sup>1</sup>Melanie Bergmann, Birgit Lutz, Mine B. Tekman, Lars Gutow (2017). Citizen scientists reveal: Marine litter pollutes Arctic beaches and affects wild life. Published by Elsevier Ltd, Marine Pollution Bulletin.



## Important role of Expedition Guides

When Expedition Guides bring passengers ashore, they have an opportunity to make a difference by engaging passengers in beach cleanups. AECO member vessels visit remote beaches that can be difficult to access otherwise. Therefore, expedition cruise vessels and the guides on these vessels have a prime opportunity to clean these isolated shorelines and educate tourists on the problem of marine litter.

## How to use the Marine Litter ID cards

When taking passengers ashore, Expedition Guides can encourage guests to pick up marine litter ad hoc during other shore activities or they can organize a dedicated cleanup activity in a specific area. Guides and passengers will likely find different types of litter in varying amounts and may wonder where certain items come from. The aim of these ID cards is to help inform where different items originate from, what the intended use of these items is, how they likely ended up in the ocean and what possible consequences they could have on the wildlife in Svalbard.

The ID cards can be used to learn about the types of marine litter either during a cleanup or marine litter can be collected and analyzed later, either on land or on the vessel. Guides should also report cleanup activities using the Clean Up Svalbard Report Form (found on AECO's website) to the Governor of Svalbard and AECO.

Passengers seeking guidance on how to reduce their single-use waste footprint can be directed to AECO's *Clean Seas Guidelines for Visitors to the Arctic*, where tourists can learn about ways to avoid the use of single-use plastic and about possible alternatives.

# Plastic types

During the degradation process, plastic can decay into tiny fragments of itself. That is when micro- (0.3 - 1 mm), and nano (<1  $\mu\text{m}$ ) plastic emerge. In these sizes, plastic can seem like it's gone or not dangerous anymore, when in reality this is not the case. Through the small size, the plastic is more likely to end up in nature, can easier be picked up by wildlife and its access into food chains is more simple.

Plastic types	Floats / Sinks?	Types of items and materials	Degradation
<b>PET</b> (Polyethylenterephtalat)	Sinks	Water-/ drinking bottles, clothes, and textiles	After approx. 450 years <sup>2</sup> , resistant to decomposition <sup>1</sup>
<b>HDPE</b> (High-density Polyethylen)	Sinks	Cleaners (cleaning bottles, cleaning cloths, etc.)	After approx. 450 years <sup>3</sup>
<b>PVC</b> (Polyvinylchlorid)	Sinks	Used in different sectors (building & construction, health care, electronics, automobile, etc.) i.e., pipes, cables, windows, etc. <sup>4</sup>	After approx. 450 years or more <sup>3</sup>
<b>LDPE</b> (Low-density Polyethylen)	Floats	Used for thin and flexible products, i.e., plastic bags for different things (bread, frozen foods etc.), stretching film,   domestics, furniture <sup>5</sup>	Approx. 2 to 20 years <sup>3</sup>
<b>PP</b> (Polypropylen)	Floats	Food products (caps, cups), cleaning products, sanitary products <sup>6</sup>	Approx. 200 to 450 years as straws, 1 million years or more in combination with aluminum <sup>3</sup>
<b>PS</b> (Polystyrene)	Floats	Styrofoam, food packaging <sup>7</sup>	Approx. 500 to 1 million years <sup>3</sup>
<b>PE</b> (Polyethylen)	Floats	Fishing nets, fishing boxes, ropes, plastic sheeting	Approx. 450 years

<https://www.oceanblogs.org/mikroplastik54n/2018/09/17/mega-makro-meso-mikro-und-nano-das-who-is-who-beim-plastikmuell>

<sup>1</sup><https://microbiologysociety.org/blog/breaking-bottles-microbial-degradation-and-remediation-of-pet-plastic.html>

<sup>2</sup><https://chariotenergy.com/blog/how-long-until-plastic-decomposes/>

<sup>3</sup><https://maesindopaperpackaging.com/does-plastic-decompose-how-long-does-it-take/>

<sup>4</sup><https://www.chemicalsafetyfacts.org/polyvinyl-chloride/>

<sup>5</sup><https://sciencing.com/ldpe-plastic-6001216.html>

<sup>6</sup><https://adrecoplastics.co.uk/polypropylene-uses/>

<sup>7</sup><https://www.britannica.com/science/polystyrene>

# Ropes



Photocredit: 2018 Deep Dive waste workshop - Sarah

## Where does the litter come from?

- larger fishing vessels



## How is it used?

- maintenances of nets, tying new fishing gear

## How does it get into the ocean?

- Some ropes and even entire trawls are lost during operations, others are discarded

## What are the possible negative effects on wildlife?

- entanglement (wounded/death)

# Fishing net cut-offs



## Where does the litter come from?

- larger fishing vessels
- from shrimp- / or cod- trawls



## How is it used?

- when the ropes are being used, the ends are often cut off

## How does it get into the ocean?

- when trawls are damaged and require repair, the end of the rope is cut-off and falls on deck or back onto the trawl
- when cut-offs are not picked up and the trawl is put back into the ocean, the cut-offs enter the ocean
- when the cut-offs are laying on a ship's deck, they can be washed or blown into the sea
- might be discarded sometimes

## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking the digestive tract, possibly causing starvation)

# Fishing nets



## Where does the litter come from?

- fishing vessels, 90% from whitefish bottom-, cod-, shrimp-trawls
- originate mostly from Norwegian and Russian vessels from the Barents Sea, but are also used by vessels from other nations

## How is it used?

- used to catch fish



## How does it get into the ocean?

- most of them discarded, especially cut out parts (parts of it are cut out if the net is damaged and requires repair)
- whole nets are probably lost by accident

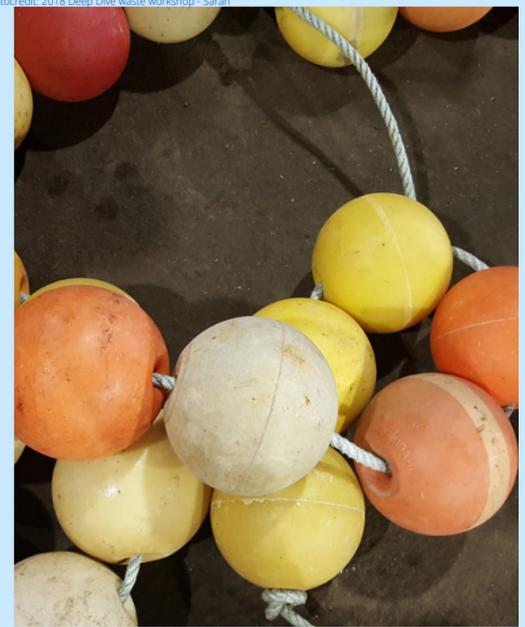
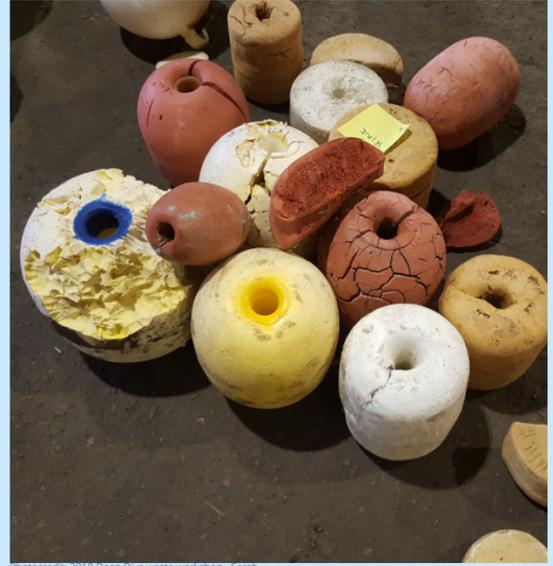
## What are the possible negative effects on wildlife?

- entanglement (wounded/death)
- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)



# Trawl floats

Can be made of plastic, metal or glass



## Where does the litter come from?

- likely from shrimp and pelagic fishing vessels



## How is it used?

- attached to the fishing net, to help keep the net at a certain depth, obtaining the net's shape, and maintain the opening of the net
- trawl floats are mainly used for deep water fishing since they can handle high pressure (because of the material)

## How does it get into the ocean?

- damaged floats are often being smashed open. These are typically discarded, will sink and might not be found
- intact floats are valuable and useful, could be lost

## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)



# Fish boxes



Photocredit: Julia Hager



Photocredit: Natural World Safaris, Mats Forsberg



Photocredits: Rolf Stange

## Where does the litter come from?

- fishing vessels
- North Sea fisheries
- many are of a Norwegian origin (can be identified by company labels)



## How is it used?

- to store fresh fish on ice, used on deck and under deck

## How does it get into the ocean?

- because of its use on deck: high possibility of getting washed into the sea if not secured
- when being used under deck while processing the fish, high chance of being discarded

## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)



# Strapping bands

bundles, short bits



## Where does the litter come from?

- used in lots of industries (including on fishing vessels below deck)

## How is it used?

- mostly to unitise or bundle any kind of product together
- on fishing vessels for the processing of the fish, bundles are used in machines to pack fish, shorter bits could be from processes below deck

## How does it get into the ocean?

- bundles: probably discarded, can get unusable when they're stored for too long (get humid)
- shorter bits: probably discarded as well, since they're probably from activities below deck

## What are the possible negative effects on wildlife?

- entanglement (wounded/death)
- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)

# Parts of conveyor belts



## Where does the litter come from?

- used in lots of different industries (including on fishing vessels below deck)

## How is it used?

- to transport products / items in a line to make processing steps more efficient
- on fishing vessels: transporting the catch to different processing steps



## How does it get into the ocean?

- when the conveyor belt is damaged, likely discarded

## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)

# Tubes for plastic foil



## Where does the litter come from?

- used in lots of industries (including on fishing vessels below deck)

## How is it used?

- hold rolls of thin plastic film
- on fishing vessels: sheeting used for wrapping frozen fish below deck

## How does it get into the ocean?

- no proper disposal
- on fishing vessels: since they are being used below deck, it is likely discarded when not used anymore / plastic sheeting is empty

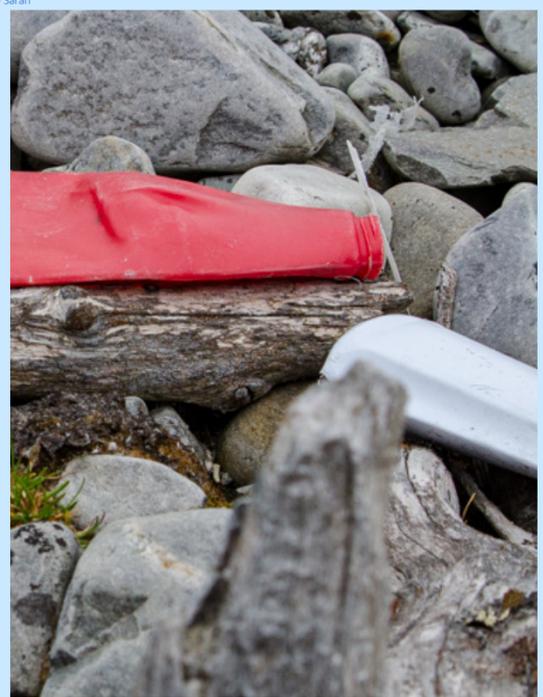
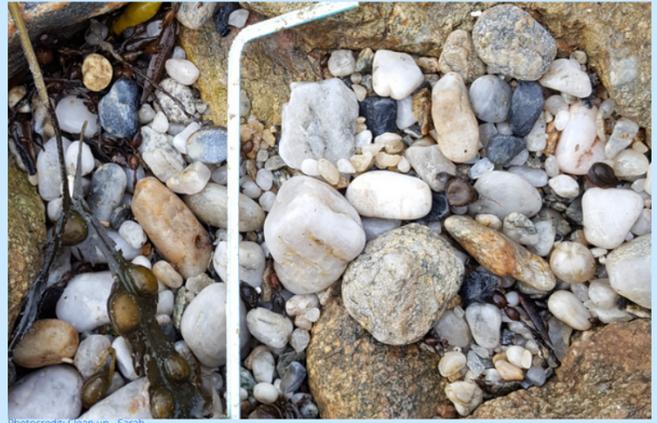


## What are the possible negative effects on wildlife?

- entanglement (wounded/death)
- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)

# Food-related items

Drinking bottles, food wrapping, lids, caps



## Where does the litter come from?

- large portion of drinking bottles are of Norwegian origin
- the origin can often not be identified (can't be done by looking at the label of the bottle)

## How does it get into the ocean?

- through wrong disposal or discard by people on vessels or land
- could be lost accidentally (blown away by the wind etc.)

## What are the possible negative effects on wildlife?

- entanglement (wounded/death)
- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)
- wildlife could try to ingest toxic/not digestible substances inside of the item (causing: poisoning, diseases, death)



# Cleaning products

cleaning bottles, cleaning cloth, etc.



## Where does the litter come from?

- difficult to identify the origin
- majority from after the 90's

## How does it get into the ocean?

- most commonly discarded



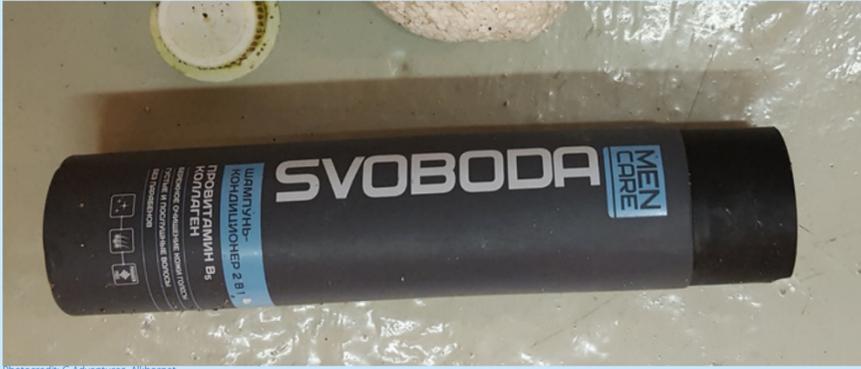
## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)
- wildlife could try to ingest toxic/not digestible substances inside of the item (causing: poisoning, diseases, death)



# Sanitary products

shampoo bottles, shaving cream, deodorant, aftershave, etc.



Photocredit: G Adventures, Alkhorhet



Photocredit: Julia Hager



Photocredits: Julia Hager

## Where does the litter come from?

- brand names are often unclear and hard to identify
- often from Norway or Russia
- most commonly from male consumption, might sometimes be linked to fisheries because of predominant male crews on board



## How does it get into the ocean?

- no proper disposal
- on fishing vessels: high chance of being discarded since items are typically used below deck

## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)
- wildlife could try to ingest toxic/not digestible substances inside of the item (causing: poisoning, diseases, death)



# Domestic waste

working boots, leisure shoes, plastic gloves, hard hats, etc.



Photocredit: Quark Expeditions, Bamsebu



Photocredit: Julia Hager



Photocredit: Julia Hager



Photocredit: Meissa Nacke and Troes Jacobsen

## Where does the litter come from?

- used in many industries (including on fishing vessels by the crew)

## How does it get into the ocean?

- shoes and hard hats are sometimes lost but could also be discarded (e.g. when broken)
- plastic gloves are probably discarded

## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)



# Industrial waste

containers (blue, white), styrofoam



Photocredit: Hiorthanna, Adventalen



Photocredit: Julia Hager



Photocredits: Cheesemans, Scott Davis



Photocredit: Julia Hager

## Where does the litter come from?

- industrial origin (e.g., from factories on land or vessels)
- blue Styrofoam might be linked to insulation pipes

## How does it get into the ocean?

- likely discard
- uncertain if items are crushed by people or degraded (decomposed) in the environment



## What are the possible negative effects on wildlife?

- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)
- wildlife could try to ingest toxic/not digestible substances inside of the item (causing: poisoning, diseases, death)



# Plastic pieces and sheeting

thin white, blue or transparent sheets



Photocredit: Julia Hager



Photocredit: Natural World Safaris, Mats Forsberg



Photocredit: Julia Hager



Photocredit: Julia Hager

## Where does the litter come from?

- origin is difficult to identify
- cannot travel very far so likely from a local source
- sheeting is used in many industries (including on fishing vessels below deck)

## How is it used?

- transparent and blue sheets are used for all kinds of processing steps under deck
- black sheets could be from garbage bags, larger pieces of plastic could originate from the construction (building) industry

## How does it get into the ocean?

- difficult to identify
- on fishing vessels: likely discarded since fish are wrapped below deck

## What are the possible negative effects on wildlife?

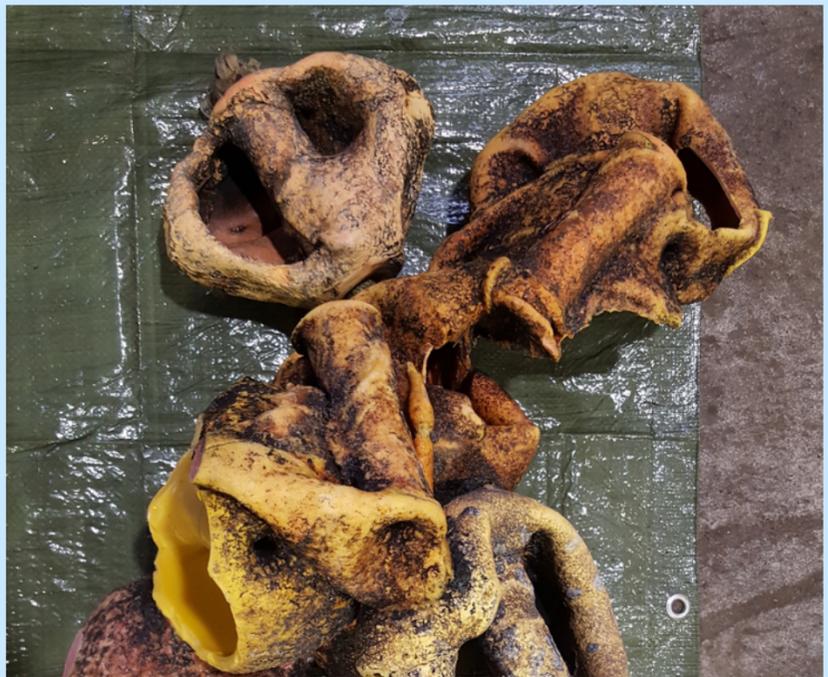
- entanglement (wounded/death)
- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)



# Burned plastic



Photocredit: 2018 Deep Dive waste workshop - Sarah



Photocredit: 2018 Deep Dive waste workshop - Sarah



Photocredit: Julia Hager

## Where does the litter come from?

- plastic on beaches that is burned (originating from plastic pieces and sheeting)
- age often unidentifiable so it's unclear if the burning happened recently or many years ago

## How does it get into the ocean?

- possibly burned by people trying to get rid of it
- May or may not be discarded (difficult to identify the origin)



## What are the possible negative effects on wildlife?

- Could release toxic evaporations when burned (wildlife could inhale this, possibly causing disease and/or death)
- wildlife could eat pieces of the item (hurting/blocking of the digestive tract, possibly causing starvation)



# References

Jannike Falk-Andersson, Wouter Jan Strietman (2019). Svalbard Beach Litter Deep Dive. SALT report no 1033.

Melanie Bergmann, Birgit Lutz, Mine B. Tekman, Lars Gutow (2017). Citizen scientists reveal: Marine litter pollutes Arctic beaches and affects wild life. Published by Elsevier Ltd, Marine Pollution Bulletin.

Jannike Falk-Andersson, Boris Woody Berkhout, Tenaw Gedefaw Abate (2018). Citizen science for better management: Lessons learned from three Norwegian beach litter data sets. Published by Elsevier Ltd, Marine Pollution Bulletin.