The intentional release of balloons and confetti in the Baltic Sea Area

Scoping Study: A collection of existing information, regulation and best practices

Baltic Marine Environment Protection Commission

Marine litter

Baltic Sea Environment Proceedings n°195

Published by:

Helsinki Commission – HELCOM
Katajanokanlaituri 6 B
00160 Helsinki, Finland

www.helcom.fi

For bibliographic purposes this document should be cited as: "The intentional release of balloons and confetti in the Baltic Sea Area. Scoping Study: A collection of existing information, regulation and best practices. Baltic Sea Environment Proceedings No. 195. HELCOM (2023)"

Authors: Ryan Metcalfe[1] with co-author Pernille Helsinghoff.

Partners: Marta Ruiz (HELCOM Secretariat) Frank Jensen, (Miljøministeriet, Denmark), Helén Klint, (Naturvardsverket, Sweden), Arabelle Bentley (KIMO International).

1) National Coordinator for KIMO Denmark

KIMO is an international network of local governments, working together for healthy seas, clean beaches, and thriving coastal communities. With over 80 member municipalities in eight countries, we represent more than five million citizens in Europe.

Layout: Laura Ramos Tirado

ISSN: 0357-2994

KIMO International
c/o Shetland Islands Council
8 North Ness Business Park
Lerwick, Shetland
ZE1 0LZ. UK
E-mail: info@kimo.shetland.org
www.kimointernational.org
Facebook: KIMO International

Sponsored by

Swedish Agency for Marine and Water Management

Executive Summary

This report presents an overview of the issue of litter from balloon releases and the use of plastic confetti and focuses on information gathered from the HELCOM area. If used irresponsibly during celebrations or events, these items become litter and eventually turn into a source of marine pollution. Many balloon and confetti items are commonly sold through retail, specialty stores and internet stores. Helium balloons are carried long distances when released to the air. Littered materials enter the marine environment mainly via surface water runoff to waterways. Wind, waves and ocean currents transport the materials long distances. Their presence in the environment can cause harm to wildlife through ingestion and entanglement. Plastics used, such as PVC (polyvinyl chloride) release chemical substances and additives. The products are often single-use and made of materials that do not readily biodegrade. Market restrictions in EU countries through the Single-Use Plastic Directive (Directive (EU) 2019/904) only regulate balloon sticks. Within the Directive, extended producer responsibility will require that the balloon industry creates awareness about balloon pollution and covers costs of cleaning litter.

Based on extrapolated data from Denmark, over 460.000 balloons could be released from the HELCOM region annually. Beach litter data shows that balloon litter is widely distributed on beaches around the Baltic Sea, although not in large numbers. However, the data is both inconsistent and limited, due to different methodologies used in HELCOM countries. It was not possible to estimate the potential amount of confetti litter entering the HELCOM basin.

Awareness about littered balloon products and confetti as a source of marine litter is growing. Many examples were found of countries, regions and local authorities outside the HELCOM area that are restricting or regulating the use of these products or practices. HELCOM countries responded to a survey that collected information about the state of play and regulation regarding balloon releases and the use of plastic confetti. No HELCOM countries have direct legislative bans targeting the release of balloons. In some countries, such as Germany and Sweden, balloon releases require permission from aviation authorities; however, this is due to concerns for air traffic. Denmark has limited the release of balloons through a statutory order from the Ministry of the Environment. Finish waste legislation prohibits littering. Balloon releases and plastic confetti may be considered littering and these traditions are therefore uncommon in Finland. Litter laws could provide a basis for national restrictions to reduce litter from these products. Only Sweden has a national regulation for the use of plastic confetti. Some cities in HELCOM countries have taken the initiative to ban the use of plastic confetti. Local initiatives could have an effect, albeit limited since the issue is transboundary. Eliminating this source of pollution requires a unified effort.

Many less impactful alternatives to celebrate without balloons or plastic confetti exist and they are listed in this report. Recognizing the growing awareness of plastic litter, the European Balloon and Party Council has addressed the environmental issue that it faces and now recommends using its products responsibly. It has made a code of practice and does not support balloon releases. It recommends cleanup and disposing of materials responsibly. Sustainable

alternatives to plastic confetti are available on the market and alternatives to balloon releases, such as balloon displays create new economic opportunities for this industry.

HELCOM countries are becoming more aware of this issue and will consider phasing out the intentional release of inflated balloons and address confetti released outdoors via actions in the 2021 Regional Action Plan on Marine Litter. Other organizations within and outside of HELCOM, such as OSPAR and The Baltic Assembly have also agreed on common approaches to address litter from activities that use single-use party items.

This study proposes that HECOM takes the initiative to address the issue of balloon releases and the use of plastic confetti by creating a discussion forum and by unifying relevant stakeholders such as OSPAR (regional seas convention) and the European Balloon and Party Council. The goal would be to raise awareness and set targets to phase-out balloon releases on a wider geographic scale. HELCOM countries could also individually strengthen their litter regulations to target single-use party items and to consider the use of environmentally harmful items outdoors as littering. Steps to make plastic confetti an item that requires extended producer responsibility is also recommended. Producers must consider the circular design of party products, so that they can be reused or easily recycled. Product packaging could also clearly signal to consumers that consideration must be taken when using these products. Restrictions of the use of plastic confetti for large gatherings such as concerts and street parties need to be considered.

There is a need to improve monitoring of balloon litter items on HELCOM beaches, so that an assessment of the status of the Baltic Sea in relation to these litter items can be improved, and so that mitigation measures may be implemented, both nationally and regionally. There is a knowledge gap in the information available for the use of plastic confetti, and research on the impact of balloon litter on the biota in the Baltic Sea area is mostly absent. It is also relevant to follow up the restrictions imposed in other countries outside the Baltic, to determine their effectiveness and if and how they could be extrapolated to the HELCOM area.

Contents

1. Introduction

Littering of products that contain plastics can cause environmental harm. However, not all single-use plastic products that become litter are strictly regulated by the EU Single-Use Plastics Directive. Party items such as balloons (excluding balloon sticks) are one such product and plastic confetti is another. Mass releases of balloons send materials into the air, only to end up as litter in the environment. Balloons are common litter objects highlighted as particularly harmful to wildlife (SOU, 2018). If confetti is used outdoors, it will also end up in nature and can find its way to the oceans. There are many more sustainable alternatives to both latex balloons and plastic confetti already available that could be promoted and brought into common usage. This report compiles information gained from published reports, information supplied by HELCOM countries and data from additional sources to provide an overview of the current situation. Knowledge gaps are highlighted with suggestions for further study. The report concludes with recommendations that HELCOM Contracting Parties could consider to support the implementation of related actions in the HELCOM Regional Action Plan on Marine Litter (HELCOM, 2021).

1.1 Background, scope and purpose of this study

Background

The Regional Action Plan on Marine Litter (RAP ML) is the main regional tool for working towards achievement of the marine litter ecological and management objectives in the Baltic Sea Action Plan (BSAP). It ensures that there are measures in place to address the most common and harmful litter items found in the Baltic Sea. One of the actions in the RAP ML (action RL13) concerns the phasing out of intentional release of inflated balloons. Part of action RL14 addresses plastic confetti released outdoors. This study aims to draw together data that can form the basis for the joint action of Contracting Parties to the Helsinki Commission.

Geographical scope

The project describes the situation in the HELCOM countries regarding intentional releases of balloons as well as releases of confetti outdoors and their impacts on the marine environment. The report's focus is on the Baltic Sea area; however, there are examples of initiatives collected from around the world. The work will support all Contracting Parties to the Helsinki Convention (Denmark, Estonia, EU, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden) to work strategically and collaboratively on both of these issues.

Project Goals

The project findings and recommendations are presented in this report together with an associated visual media resource that can be used to promote raising awareness of these issues as well as working towards its minimisation in the marine environment. The report includes:

- An investigation of the numbers of mass balloon releases through the provision of national permits, and further extrapolated to estimate the amount of balloons released from HELCOM countries.
- A description of the impact of balloons on the marine environment.
- A description of national regulatory measures as well as possible voluntary measures taken in HELCOM countries addressing the matter;
- Recommendations/guidance on possible ways to phase out intentional releases of balloons as well as proposals on measures to address littering of confetti outdoors.

1.2 Methodology

Approach

This study collected existing information and resources, current best practices and alternatives and initiatives. A survey of national experts was conducted to consult and gain information about the situation in HELCOM countries. Contact details of national experts were provided by HELCOM countries and this was integral to achieve the project outcomes. Experts were asked to help translate information to and from English and dialogue meetings were held to follow up when necessary. Market research was conducted to collect product information and product composition. The following actions were undertaken:

- A desk based study of existing data and information on impacts of balloons and confetti on the marine environment, existing best practices; the extent of regulations on balloons and confetti and alternatives;
- Creation of a survey subsequently circulated among national experts;
- Additional collection of information from HELCOM countries to document the extent of balloon releases, use of confetti as well as current practices, regulatory measures and best practices;
- Contact with producers of balloons and confetti for more information on products and volumes produced as well as other relevant actors;
- Collation, translation and analysis of available information;
- Authoring of this project report with recommendations;
- The creation of communication resources.

1.3 Marine litter in the Baltic Sea

Litter on beaches in the Baltic Sea is widespread and plastic is the material that is collected most often through beach cleaning activities (HELCOM, 2018a). HELCOM has stated in this second holistic assessment of the State of the Baltic Sea, that 70 % of the marine litter found in the Baltic Sea is made of plastic.

Litter collection in the Baltic Area began in 1994 with a study of 15 beaches in Finland. This study found on average 260 litter pieces per 100 m coastline (HELCOM, 2009 and Tuomisto, 1994). In the years after this, other organisations undertook monitoring activities. Ocean Conservancy registered litter through International coastal clean-up campaigns in 2004 and 2005 (Ocean Conservancy 2004, 2005). The Naturewatch Baltic network collected data on Finish and Estonian coasts from 1998 to 2005 by activating school classes (HELCOM, 2009). HELCOM used data from these sources to make the first qualitative description of the problem of marine litter in the Baltic Sea (HELCOM, 2010).

The MARLIN project (2012 -2013) was the first effort to gather data systematically from monitoring of beaches in several countries with coasts on the Baltic Sea. Project partners from Estonia, Finland, Latvia and Sweden surveyed 23 urban, rural and peri-urban beaches. An average number of 236.6 litter items/100 m was found on urban beaches. 75.7 litter items/100 m were collected from rural beaches. Litter originating from visitors to these areas and litter from nearby cities were considered to be the most common sources of marine litter. Over 50 % of the items found were single-use plastics (MARLIN, 2013).

HELCOM's holistic assessments (HOLAS) give a comprehensive overview of the ecosystem health of the Baltic Sea. They present the most recent knowledge and environmental status of the sea to help politicians and managers make decisions. HOLAS II provided information about the most frequently found beach litter items based on data from the fifteen sub-basins. The report found that food wrappings, bottles or lids, plastic pieces of different sizes, sheeting, strapping bands, cigarette butts and masking tape were commonly found on beaches in the Baltic Sea area. Balloons or balloon-related items were found among the top ten items in nine of the fifteen sub-basins (HELCOM, 2018a). There was no litter indicator operational at the time of HOLAS II and thus, it was not possible to provide a quantitative assessment of the status of this descriptor. Reporting of data, however, provided an idea of the distribution of beach litter in the various sub-basins along the Baltic Sea coastlines. Monitoring data from 2012-2016 demonstrated that differences among the sub-basins can be attributed to the level of local human activities as well as geographical factors such as the shape of coastline and wind and water currents. The largest quantity of beach litter items (averages per 100 m) was found in the Gulf of Finland, followed by the Bothnian Sea and Northern Baltic Proper. The Gdansk Basin seems to collect the least amount of beach litter (HELCOM, 2018a).

Monitoring of litter on Baltic Sea beaches is currently ongoing in some HELCOM countries. HELCOM has developed a monitoring programme for beach litter (HELCOM, 2020) with monitoring guidelines (HELCOM, 2018b, revised in 2021). As of HOLAS II, HELCOM has been working on the further development of core indicators for the assessment of marine litter. HELCOM upgraded the status of the beach litter indicator from pre-core to core indicator in 2021, with the adoption of the threshold value on beach litter of 20 litter items per 100 metres of coastline (median without fragments < 2.5 cm and chemicals like paraffin, wax, oil and other pollutants). This is in line with the threshold value unanimously agreed to by EU member states in 2020 (European Commission, 2020). The third holistic assessment (HOLAS III) of the Baltic Sea, covering the period 2016-2021 was finalized in May 2023. Results for beach litter show that 11 out of the 16 sub-basins are above 20 litter items per 100 m beach (HELCOM, 2023). The prevalence of balloon materials are not mentioned or analyzed in the current beach litter assessment and they do not appear in the list of top ten items.

1.4 HELCOM marine litter objectives

Since 2008, HELCOM has agreed to a number of measures to reduce amounts of marine litter in the Baltic Sea Region. Recommendation 29/2 contained guidelines on sampling and reporting of beach litter. HELCOM Recommendation 36/1 subsequently superseded this. The 2013 HELCOM Ministerial Declaration contains a regional commitment to achieve a significant quantitative reduction of marine litter by 2025 (compared to 2015) and to prevent harm to the coastal and marine environment. (HELCOM, 2013). At the ministerial meeting in 2018, the ministers re-committed to prevent and reduce marine litter from land and sea-based sources and to achieve a significant quantitative reduction by 2025 (HELCOM, 2018). HELCOM is committed to reduce beach litter by 30 % by 2025 and 50 % by 2030. This is based on a baseline (2015-2016) of 40 litter items per 100 m of beach for the Baltic Sea (excluding Kattegat) (HELCOM, 2021b).

The first HELCOM Regional Action Plan on Marine Litter was based on the available knowledge at that time and was adopted in 2015. It set out a series of actions for contracting parties to implement in order to achieve these reduction goals. There were no actions or measures in this RAP ML to address litter from balloons or confetti. The focus of this regional action plan were items such as sewage related litter, plastic bags, bottles/containers and cigarette butts (HELCOM, 2015).

At the Helsinki Commission (HELCOM) Ministerial Meeting in October 2021, HELCOM adopted a revised Baltic Sea Action Plan (BSAP) and an updated Regional Action Plan on Marine Litter (RAP ML). RAP ML action RL13 concerns the phasing out of intentional release of inflated balloons and part of action 14 addresses confetti released outdoors (HELCOM, 2021).

1.5 Single use plastic items as a key source of marine litter

Single-Use plastic items (SUP) are commonly defined as disposable packaging and other items designed to be used only once and then discarded. These items are often designed to be used by a consumer rather quickly before being thrown out as waste. They are more prone than other plastic products to end up as litter in the natural environment including the sea. Examples of common single-use items are food (including fast food) packaging, cutlery, straws, plates, cups, bottles, caps and lids and bags. Examples of sewage and health related single use items are cotton bud sticks, tampon applicators and toothpicks.

In 2018, the Ocean Conservancy reported that the ten most common types of beach litter were all plastic items. This was the first time in the 30 year history of the International Coastal Cleanup that this was the case. The Coastal Cleanup is a one-day campaign, when volunteers around the world report on items found washed up on beaches. All items in this top 10 list were single use items. 789.138 people collected over 2 million cigarette butts and over 1 million of each of the following categories, food wrappers, beverage bottles and bottle caps. Other top ten items collected were bags, straws and stirrers, take away containers and lids (Ocean Conservancy 2018).

A report on macro-litter monitoring on 35 southern Baltic beaches over 2-5 years showed that plastic is the dominant material found. Out of the top ten most common items, eight were made of plastic. Five single use item categories; caps/lids, crisp and sweet packaging, cigarette butts, small bags and drink bottles were found as some of the most prevalent items (Schernewski *et al*., 2018).

The European Union recognised that single-use plastic pollution is a major contributor to marine litter. Single-use items commonly found on reference beaches through the collection of beach litter data have been targeted by legislation. The Directive on single-use plastics (2021) is designed to reduce the volume and therefore pollution from a selection of products commonly found during beach monitoring. One measure in the directive is market restrictions. Certain single-use plastic products cannot be placed on the markets of EU Member States when sustainable alternatives are easily available and affordable. Cotton bud sticks, cutlery, plates, straws, stirrers, and sticks for balloons as well as cups, food and beverage containers made of expanded polystyrene, as well as all products made of oxo-degradable plastic are included in these restrictions. Oxo-degradable plastics are only degradable and not biodegradable. Plastics still remain in the environment once the bio-additive is degraded. Other specific measures such as consumption reduction, compulsory marking, extended producer responsibility, and separate collection and design requirements for SUP bottles were introduced to reduce the use of certain single use products. Latex, polyethylene-terephthalate (PET) such as the tradename “Mylar” and foil balloons intended for domestic use are considered to be single-use items and are addressed in Articles 8 (Extended Producer Responsibility) and 10 (Awareness Raising Measures) of the Directive. Balloon sticks are items subject to market restrictions in accordance with Article 5 (EU, 2021).

1.6 Littering through celebratory practices – balloons and confetti

People have gathered to celebrate festive events throughout human history. Colourful clothing and decorations are pleasing to the eye and help to create a festive atmosphere. Up until the use of rubber in 1824 and the invention of plastics in 1907, natural materials such as plants and flowers, dyed paper, cloth flags and banners or even colourful glass ornaments were used as decorations during celebrations and carnivals.

Balloons have existed for centuries. They have had various uses. Aztecs used inflated animal innards to sculpt animals that they subsequently sacrificed to their gods. Galileo experimented with an inflated pig's bladder to measure the weight of air. Children in indigenous cultures also used inflated animal bladders and bladders from sea animals as toys.

In 1824, Michael Faraday created balloons capable of lifting off the ground by filling elastic sheets of rubber with hydrogen gas. By the end of the 19th century, gas-filled spheres were widely used during celebrations. In 1907, the first latex balloon was manufactured. Authorities in the USA banned the practice of using hydrogen gas in balloons, due to injuries caused by an explosion in New York in 1922. This led manufactures to begin using helium gas, which is inflammable. Durable, colourful balloons became very popular in the 20th century. Since the 1920s, they have been widely sold at events and to consumers through balloon suppliers. Millions of balloons are manufactured and sold daily and they are used in celebrations worldwide.

In the 1920s, Helen Warny founded The Toy Balloon Company in New York. She used balloons for creative advertising with window displays and parade floats covered with balloons. She was one of the first people to release large numbers of balloons into the air. She released 50,000 helium-filled balloons printed with an advertiser's name. Attached was a tag that offered a prize to the finder. Balloon races also became popular in the 1920s. Balloons launched in Chicago had returns from as far away as North Carolina and Virginia. One of the balloons from the race travelled 600 miles in less than twelve hours (Grummer, A. E., 1987).

Releases of balloons mark a festive event with many bright colours rising quickly into the sky and disappearing into the distance. Widely used, balloon releases have grown in popularity during the last century. According to a report by the Dutch Organisation for Applied Scientific Research (TNO) in 2015, over 2 million balloons were released yearly from the Netherlands. They roughly estimate that this causes 300.000 latex balloons and 75.000 foil balloons floating out at sea each year (Kaarsemaker, 2015).

Throwing objects in celebration originates from northern Italy in the 14th century. Participants who could afford it would throw objects such as candies, sugar-coated nuts and seeds, flowers and eggshells filled with scented perfumes at the crowd during parades. Those with fewer means threw a more affordable substitute, chalk pellets, at celebrations.

In 1875, Enrico Mangili collected the punched paper disks from the holed sheets used as cage bedding by silkworm breeders. He sold this left over waste material as confetti. Customers used this confetti at the carnival parade in Milan. The use of colourful shredded paper confetti spread from there and quickly became a popular custom, which by the 1900s was commonly used in celebrations in Europe.

Traditionally, confetti has been used at weddings and thrown over the bride and groom as a symbol of fertility. Today confetti is made of both paper and plastic. It is purchased in bags that contain a variety of shapes and sizes. Confetti canons that shoot confetti into the air are also popular. They have become popular at private celebrations, school graduations, street parades or concerts.

Confetti is sometimes inside balloons adding to the decoration and surprise when the balloon bursts. Balloons and confetti used outdoors, not promptly cleaned up after use or if they are let go, become litter.

1.7 Types of balloon and confetti products sold in HELCOM countries

Balloon and confetti products are widespread in HELCOM countries and can be bought at specialised party stores, department stores and through online merchants.

Packages of multiple balloons (for example bags of 100 or 500) are relatively inexpensive. Balloons are manufactured in various colours, shapes and sizes. They can also be bought individually resembling, for example, letters of the alphabet, numbers or pop culture characters. Modern balloons are made from materials such as rubber, latex, polychloroprene, metalized plastic or nylon fabric. The three most common types of commercially sold balloon materials are latex, Mylar (PET) and vinyl.

Balloons can also be bought inflated as bouquets or as uninflated balloon packages with helium tanks. Helium tanks can be purchased with different volumes of gas. The largest have enough helium to inflate hundreds of balloons. Some companies also create special balloon displays for use at celebrations using either helium or air.

Balloons can be ordered with messages and holiday themes. Some balloons are also sold with confetti or LED lights on the inside. Companies, organisations and political parties can order special balloons with their logo printed on them as advertising material. Balloons sold with message cards are meant to be sent into the air.

Companies advertising help for balloon releases and balloon races are found easily by searching the internet, even in countries that limit balloon releases.

Accessories to help with releases of balloons are also available for sale on the internet. A giant balloon release container is an inflatable that can hold up to 800 balloons. The container contains the helium-filled balloons until the time to open it and send them into the sky.

Balloon weights and can be ordered to tether helium balloons to the ground. Companies are also now producing and selling reusable balloons or balloons with pole kits for outdoor use.

Major manufacturers of balloons in Europe include: Amscan International Ltd., Amscan Europe GmbH, Belbal, Gemar, Pioneer Europe Ltd., Sempertex Europe and Zibi Balloon Accessories.

Confetti is often made of small pieces or streamers of paper, Mylar (PET), PVC or metallic material or a combination of these. Confetti is sold by weight in bags in stores and online. These bags can contain several kilograms of product. Companies produce confetti in various shapes such as circles, hearts, strips and flags.

Handheld confetti cannons use compressed air. When the tube is twisted, confetti explodes out of the end sending confetti over several metres. Larger reusable confetti canons are used at events to send confetti material over the crowd.

Biodegradable confetti, made from flower petals is becoming more common. Other natural products are a mix of water-soluble bits, mica, and/or herbs. The bits are made from blown cornstarch, a non-toxic, and biodegradable material that breaks down quickly when exposed to moisture. The dye used to colour the confetti is similar to food colouring. It is vibrant, biodegradable and non-toxic.

There are numerous worldwide producers of confetti selling on markets in HELCOM countries. The majority of producers are from Italy and China; however, there are also producers in Germany, India, Poland, Romania and Turkey.

1.8 Relevant Legislation and other regulations

Relevant international regulations and resolutions on a global scale regarding, directly or indirectly, marine litter are:

- The London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter in 1972 and its 1996 Protocol
- The International Convention for the Prevention of Pollution from Ships 1973 (modified in 1978) (MARPOL) Annex V
- The United Nations Convention on the Law of the Sea in 1982 (UNCLOS)
- The 2016 UN Sustainable Development Goal 14, Life Below Water
- The Action Plan to Address Marine Plastic Litter from Ships (Resolution MEPC. 310(73), 2018)

- UNEA has passed five resolutions on marine litter (UNEA Resolution 1/6 (2014) UNEA Resolution 2/11 (2016), UNEA Resolution 3/7 (2017), UNEA Resolution 4/6 (2019) and UNEA Resolution 5/14 (2022)

The European Marine Strategy Framework Directive (MSFD) is one of the main legislative drivers to protect the marine environment in European waters. Member States are required to assess the state of their environment and work toward Good Environmental Status (GES) through targets, monitoring programmes and measures. The MSFD details 11 descriptors to determine if GES is being achieved. According to descriptor 10, the properties and quantities of litter must not be at levels that cause harm to the marine environment or adversely affect the health of marine life through ingestion or entanglement etc. The MSFD has direct policy relevance for HELCOM's work on preventing marine litter for those HELCOM countries that are also EU Member States. The EU adopted the single-use plastic (SUP) directive (Directive (EU) 2019/904) on the reduction of the impact of certain plastic products on the environment in 2019. The directive creates a legal framework for Member States to reduce the negative impact of single-use plastic items with the highest potential of impact on the marine environment and human health. The legislation targets some of the most common items found on beaches in the European Union. Another objective of the SUP Directive is the transition to a circular economy. Member States had two years to integrate the Directive into national law, thus the implementation of the legislation should be ongoing in the EU member states.

Balloons and parts of balloons that are made of a plastic material, designed for single use or intended for domestic use (not industrial or other professional uses and applications that are not distributed to consumers) are included in the scope of the SUP Directive. Specifically, these are: 1 - single-use latex balloons for domestic use or application, 2 - single-use Mylar or foil balloons for domestic use or application and 3 - single-use plastic balloon sticks for domestic use.

Only balloon sticks are subject to market restrictions under Article 5 of the SUP Directive. Sticks that can be attached to and support balloons, including the mechanisms of such sticks were banned for sale in the European market since July 2021.

Balloons are addressed in Articles 8(3) and 10 of the SUP Directive, by extended producer responsibility and awareness raising measures respectively. Specifically, Member States are required to ensure that producers of balloons cover at least the costs of awareness raising measures regarding their products, cleaning up litter resulting from their products and the associated transport and treatment of the litter, as well as costs of data gathering and reporting under the Waste Framework Directive (2008/98/EC).

The Waste Framework Directive creates a structure for European Union countries to manage their waste. The directive sets out a waste hierarchy, where prevention of waste is the preferred option. This directive also includes the "polluter pays principle" and "extended producer responsibility".

Each country has its own national legislation regulating littering in public places and in nature. Littering is illegal under nature protection laws or waste acts in HELCOM countries. Fines can be issued for breaking the law. Litter laws are difficult to enforce and in some countries, few people are prosecuted for littering. As an example, the Latvian respondent to the balloon survey noted the Latvian Law on Pollution, which states that an individual can get a warning or a fine 14-1470 EUR for littering or polluting the environment. A Russian respondent provided another example. Russia banned the release of sky lanterns in 2014 and has laws against littering the roadside from vehicles. However, there is no penalty for the use of confetti or balloons in Latvia or Russia under these laws.

The standardized common rules of the air (SERA), (EU no. 923/2021 - Appendix 2) regulates unmanned free balloons. National aviation or transportation authorities administer the rules for releases of large numbers of helium filled "toy" balloons. Helium balloons are considered to be light, as they have a combined mass of less than 4 kg. As such, they are only regulated by the following general operating rules:

1. *An unmanned free balloon shall not be operated without authorisation from the State from which the launch is made.*
2. *An unmanned free balloon shall be operated in accordance with conditions specified by the State of Registry and the State(s) expected to be overflown.*
3. *An unmanned free balloon shall not be operated in such a manner that impact of the balloon, or any part thereof, including its payload, with the surface of the earth, creates a hazard to persons or property.*

Authorities in different countries interpret and administer the operating rules for releasing large numbers of helium balloons differently. Some countries require formal permission and others do not. Section 2.5 of this report describes information received from HELCOM countries and their aviation authorities concerning national regulations.

2. Balloons as a source of marine litter in the HELCOM Area

Foil or latex are the two most common types of balloons produced for domestic use. Aluminum foil balloons are made from flattened thin refined aluminum film. Mylar is commonly used as a balloon material. “Mylar” is a brand name owned by Dupont Tejjin Films. These types of foil balloons are made without metal using a petroleum-derived, polyester film called biaxially-oriented polyethylene terephalate (boPET). Surface foil is added to the plastic to provide a shiny surface.

The environmental impact of latex balloons is a topic of controversy. Some balloon manufacturers claim that natural latex balloons made from liquid rubber are biodegradable. References to a non-peer reviewed study carried out by The National Association of Balloon Artists in 1989 is used to support this claim (Burchette, 1989). Latex balloons may however take many years to break down. A peer-reviewed scientific study of materials also in 1989 demonstrated that, in general, balloon materials were still elastic after a year of study. Plastic materials tested tended to weather at a slower rate when exposed in seawater compared to air (Pegram *et al*., 1989). A mixture of chemical additives in latex balloons such as plasticizers, accelerators, colorants and antioxidants can delay the biodegradation process. An experiment from the University of Tasmania showed no meaningful degradation in saltwater, in freshwater or after being left to compost over a 16-week period (Gilmour *et al*., 2021).

Some types of latex balloons contain synthetic materials. They are made of a petroleum derivative called neoprene. This is the material also used to manufacture scuba diving wetsuits. Neoprene will break down into smaller and smaller plastic pieces over time and persist in the environment.

2.1 Sources and pathways

Balloons are traditionally used to celebrate a special occasion or to mark an event. Examples of this are children’s birthday parties, large gatherings such as sporting events and weddings. Mass releases of balloons are a colourful and festive sight and the activity commemorates an occasion or celebrates a success. They can also be used to raise awareness or for fundraising purposes.

Some people release balloons in memory of a loved one who has died. Releasing balloons is used as a ritual either to let go of someone who has passed or to send them a personal message. Symbolically or literally, the balloons rise up to a loved one in heaven.

Companies, restaurants and even political parties distribute balloons as a means of promotion and advertising. Promotional events are often held outdoors where many people gather and

walk by. Balloons are often filled with helium and attached to strings or plastic sticks. They can also be filled with air or just distributed to be inflated and enjoyed later.

Some organisations have chosen specific colours and they use this colour of balloon as a symbol at their events. Well meaning, the balloons are often released into the sky. Cancer associations traditionally used yellow balloons released by people fighting the disease. In the USA, black balloons are used to represent people who have died as a result of an addiction to opioids and purple balloons represent people recovering from this addiction.

BICE (Bureau International Catholique de l'Enfance) announced with excitement on their homepage that "Thousands of balloons released worldwide!" in 17 countries including Russia and Lithuania on the 20th of November 2011 to mark Universal Children's Day and to express their hopes and dreams for the future.

Another potential source of balloon litter in the Baltic Sea area could be from celebrations on board cruise ships. Thousands of tourists visit the Baltic region via cruises each year and there is the potential for loss of celebratory items overboard, through entertainment events and balloon drops. Cruise Lines International Association (CLIA), the world's largest trade association for the cruise industry has a sustainability policy (#SailingSustainably); however, this does not mention waste management policies, celebrations, or the use of balloons or confetti. A representative from CLIA answered an enquiry regarding their policy for on-board celebrations:

> "We do not have any specific policies or procedures related balloons/confetti, etc. I am not aware of anything specific that individual lines may have in place for celebrations on board, however, as you know, ships are governed by the requirements of the MARPOL Convention and its annexes related to prevention of overboard discharges – e.g., MARPOL Annex V (Garbage)."

There are numerous companies such as Costa, MSC and Norwegian Getaway with cruise ships or cruise lines operating in the Baltic Area. A survey of cruise ships and their environmental policies towards celebrations on board was not in the scope of this study. Such a study could provide more information to confirm or deny if this was a possible source of pollution. If it is, there is an opportunity to focus on initiatives to limit litter from on-board celebrations.

It is difficult to determine exactly where all the balloons that end up in the sea originally come from. When people release balloons into the environment, they can travel hundreds or thousands of kilometres, carried by wind or water currents. As an example, according to an article in the Lancashire Telegraph from April 2003, one of the 122 balloons released during a fundraising activity in Whalley, England ended up in Danish waters in the Baltic Sea between Denmark and Germany.

In the atmosphere, balloons eventually explode or deflate, fall back to earth and lie on the ground where they have landed. Balloons also become "litter" when improperly discarded, abandoned, or accidentally lost in private or public spaces. Pieces of balloons, strings, ribbons

and plastic pins journey via surface water runoff and outflow to streams and rivers, ending on riverbanks or entering the oceans where they sink to the bottom, float on or in the sea or wash up on coastlines.

2.2 Potential harm/impacts of balloons as marine litter

Balloons and attached strings, ribbons or plastic holders can cause harm to fish, birds, marine mammals and especially sea turtles through ingestion or entanglement. Ingestion of pieces of balloon and/or associated plastic materials end up in an organism's digestive system causing suffocation, starvation and internal injuries. Entanglement occurs when an object such as string or ribbon wraps and tightens around a living organism causing lacerations, infections and suffocation.

UNESCO estimates that persistent plastic waste in the marine environment kills up to 1 million sea birds, 100,000 sea mammals, marine turtles and countless fish each year. Marine debris has caused harm in more than 800 species. Ingestion of marine litter has affected 40 per cent of marine mammals and 44 per cent of seabird species (UNESCO, 2017).

No concrete scientific studies of balloon litter affecting organisms in the Baltic area were found in this research. There is a large amount of global photographic evidence available online of especially birds and turtles and the effects of ingestion of or entanglement in balloon litter. Most studies of the impact of ingestion or entanglement from balloons is from research conducted by universities in Australia.

Balloons, mistaken for food and ingested cause blockage of the digestive system and can lead to insufficient uptake of food. Marine organisms mistakenly believe they are satiated and stop eating because their stomachs are full. Lack of real nourishment limits growth and they can suffer from health problems. In some cases, this leads to death due to starvation.

The study, *To Eat or Not to Eat? Debris Selectivity by Marine Turtles* from the University of Queensland, Australia concluded that sea turtles ate balloons pieces because they resembled jellyfish. Jellyfish are a common food item for turtles. They found balloon pieces as 78 % of the plastic ingested in the 115 sea turtles stranded in Queensland between 2006 and 2011 (Schuyler *et al*., 2012). When a balloon bursts in the air, the form it takes resembles a small body with tentacles, which can be confused with the turtle's natural prey. Another reason for digestion could be that algae and other marine microbes that cover plastic materials in the ocean produce a chemical scent that marine life associate with food. A turtle that has eaten a balloon will have difficulty to pass such materiel through their digestive system and it will often become stuck, undigested in their stomachs or intestines.

A second Australian study examining 1733 seabirds found that the leading cause of death is from blockage of the gastro-intestinal tract. The risk of ingestion of debris causing death from a single item is 20.4 % and this rises to 100 % after consuming 93 items. They found that seabirds are 32

times more likely to die from ingestion of balloon pieces than from hard plastic making it a high-risk litter item for seabirds (Roman *et al*., 2019).

Research on plastics in the stomachs of northern fulmars demonstrated that at least 2 % have remains of balloons in their stomachs (Van Franeker, 2015). The study stated that it was impossible to provide figures to answer the question of how many animals die due to entanglement or ingestion of balloon remains. They occasionally found wildlife, where they could conclude that entanglement or a blocked digestive system due to balloons was the cause of death.

Other species are at risk. Many internet posts report that dolphins, whales and other marine species, as well as terrestrial animals such as cows and sheep are hurt or killed through ingestion of or entanglement in balloon materials.

The marine conservation group OCEANA surveyed government agencies, organizations and institutions in the USA and found records between 2009 and 2019 of almost 1,800 animals from 40 different species of marine mammals and turtles swallowing plastic or becoming entangled. Bags, balloons, recreational fishing line, sheeting and food wrappers were the most common types of identifiable plastics consumed by these animals. Plastic packing straps, bags and balloons with strings were the most common items entangling the animals (Warner *et al*., 2020).

In a survey of experts in 2016, balloons were found to pose considerable entanglement risk to marine life. They ranked third after fishing gear and plastic bags as a main item considered to be most deadly to wildlife. The study noted that while balloons are small compared to plastic bags, they are often associated with a length of twine that likely poses the greatest entanglement threat. Strings from balloons can wrap around animals' bodies, which leads to asphyxiation (strangling due to lack of oxygen), that often ends up in unconsciousness or death (Wilcox *et al*., 2017).

Animals can become entangled in balloon strings and cord and prevent the animal's normal foraging activities. They can also prevent the animal's ability to grow normally, survive and reproduce. A balloon string caught in trees and bushes is also a danger. Birds become tangled if they fly into the string or use the string as nesting. In the nest, it can tangle around growing hatchlings. Some injuries from balloons observed on birds include malformations, open wounds or mobility restriction by legs, wings, or bill entanglements (Wilcox, C., 2016).

Mylar or foil balloons entangled in power lines can also cause power outages.

2.3 Estimates of balloon litter in the HELCOM area through balloon releases via permits

HELCOM countries were surveyed to collect data on permissions given in accordance with operating rules for the release of unmanned balloons through SERA, (the standardized common rules of the air).

Up until 2020, the Danish civil aviation and Railway Authority (Trafikstyrelsen) gave official permission for the release of over 50 balloons at a single event. In 2020 The Danish Ministry of the Environment requested that the aviation authority stop issuing permissions for releases over 50 balloons,5 mylar balloons or balloons containing electronics as well as lanterns. The practice was deemed to be littering under Danish law.

The Transport Board (Aviation Board) of Estonia can approve or deny launches of "classic" or commonly used balloons of different sizes. The approval only takes into account the point of view of flight safety especially if the location of the balloon launch is located in take-off or landing sectors for aircraft or the immediate vicinity of an airfield. They following approvals were located in the agency's search. The Transport Board approved the release of ca. 500 balloons in 2017. There were ca. 55 balloons (over half with LED lights) in 2018, none registered in 2019, and approximately 70 approved in 2020. There were no applications submitted in 2021. For one application in 2017 for between 20 to 80 balloons the agency recommended to release as few balloons as possible.

Traficom in Finland issues all permissions given to balloons that are expected to rise up to the stratosphere, carrying some kind of payload, sensors, cameras etc. According to the Finnish law, even latex balloons should have a permission. Traficom, however, has no knowledge of applications for permission to release balloons and has no information on numbers released.

The German air traffic control (DFS Deutsche Flugsicherung GmbH) has an online application for releases of balloons near airports/airfields or for the release of more than 500 balloons. They could however not provide any records of numbers of balloons released.

Latvia, Poland and Russia answered that they do not have a ban, restriction or regulations for mass balloon releases. No permission is required from an authority, and they do not have data on the number of balloons released. Latvia noted that several schools celebrated the beginning of the school year by releasing helium balloons, but they do not collect information on these numbers either.

No information was received from Lithuania.

The Swedish transportation authority's regulations have not forbidden the release of latex balloons. No permission needs to be granted. The following rules must however be followed. A maximum number of 1.000 balloons may be released at the same time, and they must not be

tied together. Balloons must not contain metal foil or hard materials and strings must be only long enough to tie the balloon. If an airport lies within 10 kilometres radius from the release site, it must be contacted.

Danish authorities provided the information contained in the table below.

Year	Number of balloon releases from applications	Number of balloons released	Estimated number/lowest possible number of balloons released
2013	198		49.500/9.900
2016	274		68.500/13.700
2018	129	38.590	
2019	64	16.245	
2020*	<10		2.500/500
2021	0	0	

* To the best knowledge (possibly reduced due to Covid-19 restrictions)

Table 1:Balloons released based on permits in Denmark and estimated numbers.

For 2013 and 2016, there are no exact numbers of released balloons, only permissions. The numbers are therefore estimated from the figures from 2018/19 (where the average number of balloons is 250-300 per release) 250 balloons is used for this estimation. As the applications cover at least 50 balloons, this number represents the absolute minimum (which Danish authorities believe to be underestimated). There was no data recorded for 2017, except one of the granted applications, which covered more than 6.500 balloons.

Using the Danish data from 2013 (29.700), 2016 (41.100), 2018 (38.590) and 2019 (16.245), the average number of balloons released is 31.409 per year.

An estimate for the HELCOM area is calculated based on the Danish population of 5.794.000 inhabitants (2018). The number of people within the watershed of the Baltic Sea is estimated to be 85 million (HELCOM, 2018a).

Extrapolating this information, 460.780 balloons would be an approximate number released by the population size of the HELCOM basin per year. Using this data, an estimated range of between 287.700 and 633.900 balloons could be released per year. This estimation does not consider any regional or cultural differences between countries. The limited amount of data available creates much uncertainty in the data and should only be used to illustrate the possible magnitude of the problem and for further discussion.

2.4 Beach litter data for balloons and balloon materials

HELCOM does not have a dedicated centralized database for collecting beach litter monitoring data. It was agreed for HOLAS III (2016-2021) that countries would upload data to the European Marine Observation and Data Network (EMODnet) and that these will be subsequently extracted and assessed. Monitoring data for this report was collected from national agencies and organisations, the European Environmental Agency's Marine Litter Watch and from EMODnet. Data from OSPAR's database is used for the purpose of comparison.

Keep Estonia Tidy reported that all 11 Estonian beaches registered findings from 2012 to 2021, however these are registered as balloons, balls and toys and thus may not exclusively be balloon litter. During this period, 125 items were registered. No entry exceeded 5 items per survey. Viimsi (24 items) and Növa (21 items) were the areas that registered the highest numbers of items during these years.

Data supplied by the Finnish Environment Institute show 180 finds of balloons, balls and toys in monitoring data from 2012 to 2022. Unfortunately, balloons are recorded in the same category as rubber balls and toys and cannot be separated to reflect only balloons. The records show that 12 out of the 16 beaches recorded these items, showing that they are found on the majority of Finnish shores. One beach (Jussarö) on the Gulf of Finland reported 37 findings of these items in 3 surveys of the period 2014-2015.

Data collected through The Keep Sweden Tidy Foundation (Håll Sverige Rent) shows an average of about 16 balloons found per year (2020-2021) in total in all surveys of reference beaches. Only 3 out of the 10 beaches monitored reported findings of balloons during these two years. Rullsand, which is located in the southern part of the Gulf of Bothnia (11), Mälarhusen in southern Sweden (8), and Tofta on an island in the middle of the Baltic Sea (8). All ten beaches registered findings of balloons for the period 2015 -2019 (an average of 15 pieces per year in total). Balloons however, were categorized together with findings of other toys during those years.

A Russian expert responded that they do not collect data from national beach monitoring.

Data from the European Environment Agency's Marine Litter Watch shows that balloons were observed in 39 of 74 Danish surveys (52 % of monitoring and volunteer clean-ups) from 2013-2021. 94 findings of balloons were reported.
For the Baltic Sea Area, observations in Marine Litter Watch were also made from Russia in clean-ups from 2016 to 2019. 42 balloons were found in 6 out of the 9 reports (66 %). 10 clean up reports were entered into the Marine Litter Watch from Latvia in 2021, but there is no record of findings of balloons.

Latvian experts in a response to the survey, noted that data before 2021 shows that the general number of balloons was small (<1 % of total number of pieces of litter), but their distribution was quite high (~60 % of monitoring sites).

Data from SeaDataNet (EMODnet) from Baltic Sea survey areas was downloaded and some of the data could be analysed. There were 378 surveys entered for German Baltic Sea beaches. Of these, 156 (41 %) noted findings of balloons, including plastic valves, ribbons, strings etc. according to the OSPAR protocol. 320 balloon pieces were found. The majority, 24 out of 26 survey areas, reported findings of balloon or pieces of balloons. The majority of surveys that find these items reported under 5 pieces of balloons per survey. Only 6 surveys noted between 6 and 10 balloon items per survey. Two beaches, Mukran (46 items) and Bug (38 items), recorded the highest number of balloon pieces.

Surveys from Lithuania indicate, that they have used the OSPAR litter category 'Balloons, including plastic valves, ribbons, strings etc.'. Of the 32 surveys in the database, 53 % (17 surveys) have reports of finding pieces of balloons. Balloon pieces were found on all 4 survey beaches and all surveys with balloons reported no more than 5 balloons per survey.

EMODnet data from surveys in Poland show no data for finds of balloons and balloon sticks. It is not known if the litter category for balloons is recorded.

Country	Data collected as	Years surveyed	Occurrence (% of beaches)	Occurrence (% of surveys)	Average number (peices/year)
Denmark (1)	balloon pieces	2013-2021	/	52%	12
Estonia (2)	balloons and toys	2012-2021	100%	53%	14
Finland (3)	balloons and toys	2012-2020	75%	/	18
Germany (4)	balloon pieces	2012-2017	92%	41%	53
Latvia (5)		not supplied	60%	/	*
Lithuania (4)	balloon pieces	2012-2013	100%	53%	17
Poland (5)	No significant data		/	/	/
Russia (1)	balloon pieces	2016-2019	/	66%	11
Sweden (6)	balloons and toys	2015-2019	100%	31%	15
Sweden (6)	balloon pieces	2020-2021	30%	41%	16

*< 1% of total litter items

Sources: 1: Marine Litter Watch (Incl. National Monitoring Data in DK), 2: Keep Estonia Tidy, 3:National Monitoring data 4: SeaDataNet (EMODnet) 5: National expert 6: Keep Sweeden Tidy

Table 2: Summary of balloon litter data for the HELCOM area.

OSPAR produced a quality status report for beach litter in a 3 year period from 2018 – 2020. A compilation of data found that there were on average 2 balloon items per 100 m shoreline. 6.359 items were collected from 33 sites and 326 surveys during this period. This included the plastic valves, ribbons, strings as well as balloon materials. The OSPAR assessment also included

a trend analysis, which shows a significant decrease in the number of balloon pieces from 2015 to 2020 by -1 item per 100 meter beach (OSPAR, 2022).

In conclusion, balloon litter is a commonly found item on beaches in Europe. The limited data from HELCOM countries indicate that it is found on many beaches in the Baltic Sea area, but not in large amounts. Its wide geographical presence on coastlines makes balloon litter a specific item of concern. It was not possible to gather enough data to estimate how many balloons are being found in the entire Baltic area. Countries using the OSPAR protocol show that balloons are found on about half or less than half of the beaches. Compared to the OSPAR average of two balloons per 100-meter reference beach (2018-2020), balloons may therefore be slightly less prevalent on Baltic coastlines.

More studies would be needed to get an accurate picture of balloon litter in the HELCOM area. National monitoring data in EMODnet could be a potential place to start accessing and analysing future data from HELCOM countries that monitor beach litter. Historic data may however be misleading since registering balloons seems to have been carried out differently in surveys in several countries, where they have been categorized together with balls and toys. Standardizing monitoring with the collection and categorization of balloon data in HELCOM countries needs to be addressed.

2.5 Regulatory measures in the HELCOM area

HELCOM countries were asked the question “Does your country have a ban or restriction on mass balloon releases?” via an online survey. All countries with the exception of Lithuania answered this question. Only Denmark reported having introduced deliberate steps nationally to limit mass balloon releases because of environmental concerns. Finland noted that existing environmental legislation should be enough to limit balloon releases. Germany and Sweden have regulations about balloon releases via their national transportation agencies; however, this concerns flight safety and not environmental issues. Sweden has set a national target saying that littering from balloons shall be negligible by 2030. The goal will be followed up through annual litter measurements. As a means to reach the target, Sweden has introduced an EPR scheme that oblige balloon producers to effectively contribute to achieving the goal. If it appears from the litter measurements that there is a risk that the target will not be achieved in time, further measures may be necessary.

The rules for issuing balloon permits through the Swedish Transport Agency (Transportstyrelsen) and the national Environmental Code may be contradictory. Chapter 15 § 30 of the Swedish Environmental Code states that it is forbidden to litter outdoors in a place to which the public has access or that is visible to the public. Fines and prison sentences can be issued according to the seriousness of the littering.

The Swedish Transport Agency informed that they are currently producing an information document in cooperation with The Swedish Environmental Protection Agency (Naturvårdsverket) that will explain the government's wish to reduce/minimize the amount of releases of latex balloons, due to environmental concerns.

HECLOM country	Prohibited	Considered littering - restricted	Restrictions due to aviation	Local Initiatives	No known initiatives
Denmark		x		x	
Estonia					x
Finland		x			
Germany			x	x	
Latvia				x	
Lithuania					x
Poland					x
Russia					x
Sweden		(x)	x		

( ) = could be restricted via Litter Legislation but not enforced

Table 3: Status of regulation of balloon releases in HELCOM countries

The German air traffic control (DFS Deutsche Flugsicherung GmbH) issues official permissions, which are required for the release of balloons near airports/airfields or for the release of more than 500 balloons.

In Denmark, before the year 2020, the Ministry of Transport (Transportministeriet) was the government agency responsible for issuing official permissions for the release of over 50 balloons.

In order to stop the mass release of balloons, the Danish Ministry of the Environment (Miljøministeriet) considered deliberate releases of balloons to be littering, which is in general prohibited. In 2019, the ministry requested that the Danish Transport Agency cease granting permissions for the deliberate mass launch of balloons (>50 balloons, 5 foil balloons and balloons containing electronics or candles, also called lanterns). This effectively stopped the mass release of balloons in Denmark.

According to the respondent from Finland, mass balloon releases and confetti was not commonly used. Therefore, they argued that a separate ban was not necessary. This type of event could be prohibited under the national Waste Act.

The Finnish Waste Act (Nr. 646 of 2011 (updated nr. 852 of 2022 - Chapter 8) prohibits littering, which means that both mass balloon releases and the use of plastic confetti can be considered to be against the law. In addition, the Waste Act and Municipal environmental protection regulations lay down a cleaning obligation for each event organiser. For example, the City of Helsinki informs event organisers of restrictions and necessary permissions.

2.6 Voluntary measures in the HELCOM area

In 2015, members of KIMO (Kommunernes Internationale Miljøorganisation) adopted a resolution calling on national governments and the European Union to recognise balloon releases as a form of littering. Since then, KIMO has continued to call for legislation to reduce the number of balloons released into the environment and for national bans on all outdoor releases of balloons.

Because of this resolution, KIMO in Denmark lobbied local authorities in member municipalities to address this issue. A number of local authorities either passed bylaws or included policy concerning the use of balloons from public agencies and institutions into their plastic reduction plans. After political debate, six municipalities passed resolutions to stop balloon releases from public institutions and an additional five municipalities included policy and guidelines for the use of balloons in their plastic strategy or action plans.

The Danish Environmental Protection Agency noted that some companies promote alternatives such as blowing (soap) bubbles, "planting a tree/flower", "dancing inflatables", banners and pinwheels instead of balloon releases.

Estonia does not currently report having any other measures to limit the amount of balloon releases. The respondents were not aware of any agencies, local governments, organization that promote the use of alternatives to balloon releases at celebrations or festive events.

German authorities noted that municipalities have restrictions for municipal events and specific permit conditions for using municipal areas. The national "Marine Litter Roundtable" researches and propagates alternatives and best practices via online brochures, presentations, and workshops. There were, however, no resources found on the roundtable's website that deal with awareness about balloon litter.

Latvian contacts responded that the release of balloons is not forbidden or restricted. In 2019, members of the Latvian Event Forum (the largest event organizers in the country) signed a memorandum of understanding to stop releasing helium balloons and other uncontrollable flying objects into the environment. They invited all event organizers in Latvia to follow this example. They proposed using environmentally friendly methods of celebratory rituals that replace the traditional balloon releases. Examples of these include tree or plant planting, light and fountain show, singing, dancing or other performances, human-made figures and aerial photos, blowing bubbles, controlled kite releases and flag raising.

Poland noted that local restrictions at municipal level are possible to implement, without giving specific examples or numbers of these. The respondent was not aware of any agencies, local governments or organizations that promote the use of alternatives to balloon releases at celebrations or festive events.

Russia does not have any regulatory restrictions on the release of balloons; however, they noted that balloon releases are very popular among schools, to celebrate the end of the academic year. The respondent noted that multiuse banners are used as an alternative to balloon releases in some of these cases.

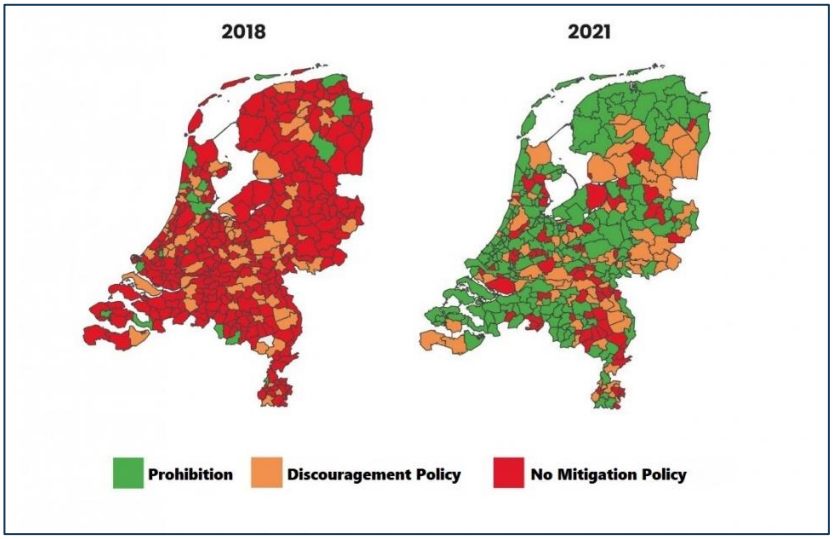
In Sweden, the organization Keep Sweden Tidy has information on their homepage about balloons with the recommendations to only use balloons indoors, and consider using other decorations and not intentionally let go of balloons when outdoors.

2.7 Examples of initiatives in countries and cities outside the HELCOM area and from the balloon industry

The following are a collection of examples from countries, cities and territories that have passed regulations to limit balloon releases. This information was available on the internet. It is meant for inspiration and to demonstrate that there is a growing interest in limiting this practice due to environmental concerns around plastic pollution.

In 1992, Gibraltar celebrated the 25th anniversary of its referendum by releasing 30.000 balloons as a symbol of passion for each of its citizens. This became a tradition and a number of balloons equal to the population of the city were released in September each year on the territory´s national day. The organisers of this event decided to cancel it the practice 2016. In 2019, Gibraltar passed a law to ban balloon releases.

Dutch municipalities balloon release policy[1]



[1] https://www.noordzee.nl/ballonnen-oplaten-is-passe-80-van-de-gemeenten-verbiedt-of-ontmoedigt-ballonoplatingen/

In the Netherlands, it was a tradition to release balloons in celebration of the King's Day. Amsterdam was the first Dutch municipality to ban the release of balloons in 2015. The NGO North Sea Foundation has since 2018 monitored the number of municipalities passing policies against the release of balloons. In 2018, only 5 % of municipalities had a ban on balloon releases. In 2021, 56 % of municipalities has such a ban. In addition, 24 % of the municipalities have a discouragement policy. In total, 80 % of Dutch municipalities are taking action against balloon pollution.

The Marine Conservation Society in the United Kingdom reported that to date, 58 English local authorities (of 333), 13 Scottish councils (of 32), 11 Welsh councils (of 22) and 6 local authorities from Northern Ireland (of 11) have a policy document or ban on the release of balloons.

The Isle of Man banned sky lanterns and releases of helium balloons in 2021 with fines of up to 500 pounds for not respecting this bylaw.

A growing movement across the United States is calling for more policies and laws restricting or eliminating single-use plastics, including balloons. The states of California, Connecticut, Delaware, Florida, Hawaii, Maine, Maryland, Rhode Island, Tennessee and Virginia have all passed laws prohibiting the deliberate release of balloons. Several US cities such as San Francisco, Cleveland and Atlantic City have restricted this practice.

The Canadian government no longer allows the mass release of balloons in Ottawa to celebrate Canada Day (Canada's national day) on the 1st of July.

Several Norwegian cities have banned the use of helium balloons during their national day celebrations on the 17th of May.

The Northern Territory was the first territory in Australia to ban helium balloons in 2022. New South Wales, Sunshine Coast in Queensland, Victoria and Western Australia are examples of other places that have followed with balloon restrictions.

The Balloon and Party Industry Alliance (BAPIA) officially announced in 2018 that it does not support balloon releases. A survey of their members showed that only 37% supported balloon releases and 70 % agreed that this practice creates litter.

The European Balloon and Party Council (EBPC) was created in 2001. It is a group of balloon manufacturers, who collaborate and discuss health, safety and environmental issues. They assist members in understanding the broad range of safety issues and work to change standards in the balloon and party industry, lobby and manage PR at the European level and to the public. Attempts to contact this council did not result in a response. The council has a section on best practices on their web page. "Partysafe" is an initiative to educate and promote the use of balloons & party products safely and ethically.

Under their code of practice to enjoy balloons responsibly, they recommend the following:

1. *"Don't let go! Please don't release helium balloons outdoors.*
   Tie each one individually to a weight.
2. *Always dispose of balloons responsibly.*
   When done, please pop your balloons and put them in the bin."

The EBPC and the Pro Environment Balloon Alliance in Australia have taken similar positions as those by BAPIA. These are efforts to set environmentally responsible standards and protect the balloon industry from total bans on balloon products.

3. Confetti as a source of marine litter in the HELCOM area

Confetti is small pieces of paper, polyvinyl chloride (PVC) and other plastics or organic materials which are thrown or shot up into the air at parades, events, or celebrations such as a wedding or birthday. Throwing confetti is an active way to participate in a celebration. It adds to the festive atmosphere. The sight of colourful material filling the air and then slowly raining down creates joyful feelings. This celebratory practice can be a part of a tradition or used to add symbolic meaning to a wedding, representing the hope of fertility in a marriage. Coloured confetti is used as a substitute for the more traditional rice or grain. Confetti can also be used to decorate tables or place settings at parties.

3.1 Sources and pathways

Respondents to the survey noted that confetti is widely used in the following celebrations in HELCOM countries.

School graduations: Denmark, Russia, Sweden

Birthdays: Estonia, Latvia, Russia

Festivals/events (including New Year's Eve, Sports events, concerts): Denmark Estonia, Germany, Latvia, Russia, Sweden

Weddings: Denmark, Estonia, Germany, Poland, Russia

Bachelor parties (other private parties): Denmark

There was no response from Lithuania.

The respondent from Finland answered that confetti was not commonly used in their country.

If small plastic pieces are thoughtlessly used outdoors and not cleaned up after use, they enter the environment and can easily be carried by wind or washed away by rain and end up through surface water runoff entering lakes and rivers and from there led out to sea.

Accidental spillage from production and transport of confetti products could be another source of pollution. However, this would be relatively small in comparison to the use of confetti outdoors.

3.2 Potential harm/ impacts of confetti as marine litter

Essentially, confetti is beautiful to look at and its use creates festive moments. It is for the most part, single use and often made of multiple small pieces of non-biodegradable materials such as Polyvinyl Chloride (PVC) and other types of plastic. No studies were found with concrete examples of pollution from plastic confetti. The following are ways plastic confetti may harm the environment and human health.

The main problem with plastics such as PVC in the environment is that they take an extremely long time to break down. Plastic is not completely decomposed in nature because it is not an organic compound. PVC plastic is resistant to chemical breakdown and to oxidation. Only under certain conditions using a certain type of fungus or through thermal degradation, can it biodegrade after more than 450 years. Over time, plastics become more brittle mostly due to ultraviolet radiation, but also due to mechanical movement (for example by wind and waves). They eventually fragment into smaller pieces becoming microplastics. Microplastics have been found in shellfish and commercial fish and are a risk to human health through food consumption.

Additives contained in plastics can be harmful to the environment. For example, PVC consists mainly of chlorine-based chemicals, stabilisers and softening agents. PVC is the plastic that requires the highest use of additives. 80 % of the final product may be added plasticizers such as phthalates (Endocrine Society, 2020) These additives are not bonded strongly to the plastic polymers. When released, the additives can lead to reduced water quality and potential risk for human health and detrimental effects on the environment. (European Commission, 2022) Some of these additives have endocrine-disrupting chemicals, which can cause a wide range of health problems for humans.

In the wider environment, the many small pieces of bright and shiny plastic can attract fish, birds and wildlife and be ingested. As stated earlier, ingestion of anthropogenic materials can lead to harm, starvation and death. Because they persist in the environment for a long time, they can cause harm to organisms many years after they were first released.

3.3 Estimate of amounts of plastic confetti released outdoors

An attempt was made to estimate the amounts of plastic confetti released outdoors in the HELCOM area. An extensive search for marketing information about product sales on the internet was conducted. It was found that this information was not publically available. Several companies were found on the internet that sell market reports. An example of this is from the Digital Journal “Confetti Market 2022 Upcoming Trends, Size, Growth Factors, Top Key Companies, Segmentation, Share and Forecast to 2029”. Due to the relatively high costs of ordering such a report, which was not in the project budget, and the uncertainty that the data would be specific enough to lead to any conclusions, this avenue of research was not pursued.

Organisations such as the Balloon and Party Council were contacted, however they did not respond to enquiries about market information.

Internet resources recommend that the amount of confetti for a celebration is 1 litre for every 10 guests. This is equal to 10 handfuls (or 10 portions) of confetti. A handful can hold hundreds of single pieces of confetti. A wedding with one hundred guests could use over a thousand confetti pieces.

Unfortunately, we do not have sufficient data to give a confident extrapolation of the amount of plastic confetti used outdoors in the HELCOM area and recommend that this could be a project of study of its own.

3.4 Regulatory measures in the HELCOM area

HELCOM countries were surveyed and asked if the use of plastic confetti outdoors required special permission. The issue of plastic confetti as a pollutant does not seem to be a significant issue for respondent countries, as there is little targeted legislation to prevent this.

According to § 28 in the Danish law on the protection of nature, throwing litter (or other items) outside of your own property without the owner's permission is considered littering and therefore not allowed. This can result in a fine. However, the law has not been used in the case of throwing plastic confetti. The SUP Directive was implemented in the Danish Environmental Protection Act in 2021. There is however no mention of plastic confetti.

Respondents from Estonia, Latvia and Russia indicated that there are no special permission or regulations limiting the use of plastic confetti outdoors. There was no response from Lithuania.

The survey respondent from Finland noted that the use of confetti is not common in that country and that such activities could be prohibited under the national Waste Act. Chapter 8 of the Waste Act prohibits littering and the use of plastic confetti outdoors, which could be considered to be against this Waste Act. In addition, the Waste Act and Municipal environmental protection regulations lay down an obligation for event organisers to clean up after celebrating.

Section 9 (6) of the Finnish Waste Act deals with the obligation of the product manufacturer, market supplier and distributor to exercise caution by ensuring that: "the product, as waste, does not constitute a hazard or cause harm to human health or the environment, or littering, nor cause considerable harm or complications to the organisation of waste management." According to this legislation, products can be prohibited, restricted or subject to preconditions.

Finland also has created a national plastics roadmap that sets out measures to reduce littering and avoid unnecessary consumption. This will be implemented through awareness-raising campaigns and by challenging cities and municipalities, event organisers and other agents to

introduce solutions that reduce littering and unnecessary consumption. In Finland, the transposition of the SUP directive is moving forward and the government amended the waste act in November 2022.

Status of Plastic Confetti regulation in HELCOM countries				
HELCOM country	**Prohibited**	**Restricted by litter legislation**	**Local Initiatives**	**No known initiatives**
Denmark		(x)		
Estonia				x
Finland		x		
Germany			x	
Latvia				x
Lithuania				x
Poland			x	
Russia				x
Sweden	x			

() = could be restricted via litter legislation but not enforced

Table 4: Status of plastic confetti regulation in HELCOM countries

In Germany, some cities completely ban the use of plastic confetti. Others demand immediate removal. The German regulation on Single-Use Plastics (*Einwegkunststoffverbotsverordnung*), implementing the SUP Directive, was adopted and entered into force on July 3rd 2021. The regulation does not go further than the directive and so balloons or plastic confetti are not regulated more strictly. In the future, certain additional SUP products for which environmentally friendly alternatives already exist are expected to be banned.

In Poland, there are municipal restrictions for the use of confetti and restrictions in national parks. Legislative work on a law implementing the provisions of the SUP Directive is ongoing. A significant change in producer-responsibility regulations is planned. Proposed provisions include a ban on the placing on the market of disposable plastic products and products made of oxo-degradable plastics.

Sweden is the only HELCOM country presently with a national restriction specifically for the use of confetti outdoors and has this written into a national law. In November 2021, the Swedish Government adopted a regulation on disposable products following the implementation of the European SUP Directive. Regulation (2021: 996) on single use products contains a ban on various disposable plastic products. Plastic as a material must also be phased out in several products. According to § 16 in the Swedish regulation, there is now a ban on the use of plastic confetti outdoors. This ban came into effect on April 30th 2022. Previously, plastic confetti was widely used at school graduations. Sweden is addressing this issue through awareness campaigns for alternatives to the plastic confetti tradition.

The three Baltic countries (Estonia, Latvia and Lithuania) are currently transposing and implementing the SUP Directive. There was, however, no information received to indicate that plastic confetti would be included in national legislations.

3.5 Voluntary measures in the HELCOM area

The Baltic Assembly is a regional organisation that promotes intergovernmental cooperation between Estonia, Latvia, and Lithuania. At the 41st session of the Baltic Assembly held in 2022, the Baltic States resolved to help minimise their environmental footprint by agreeing "on a common approach of the Baltic States regarding moving towards the rejection of fireworks, balloons, plastic confetti and other environmentally harmful activities".

None of the HELCOM countries indicated being aware of any agencies, local governments nor organization that promote alternatives to the use of plastic confetti at celebrations or festive events. Denmark noted that companies have begun to promote environmental alternatives.

Recognising the growing awareness about the impacts of plastic pollution, the balloon and party industry and its member companies are setting guidelines that proposing alternatives to plastic confetti.

The European Balloon and Party Council's "partysafe" initiative for confetti states that:

- *"Sustainable alternatives are increasingly popular.*
- *Bear in mind that not all confetti biodegrades – and when it comes to paper confetti, in particular, you should always consider the type and treatment of the material(s) used.*
- *When used in an irresponsible way, confetti may go straight into your local river and out into the ocean, only aggravating the problem with microplastics.*
- *If you plan to use the confetti outside, then be sure to choose a paper confetti or any other biodegradable type."*

3.6 Examples of initiatives in countries and cities outside the HELCOM area

The following is a list of selected examples found on the internet of countries and cities outside of the HELCOM area with initiatives to reduce plastic confetti. This is not an exhaustive list but it aims to serve as inspiration.

In 2022, Christine Hölzmann from Germany, on behalf of CleanUp Brühl, petitioned the European Parliament to ban plastic confetti as persistent pollutants in the environment. The Commission noted that several Member States had already imposed a ban (Belgium (2018), France and Sweden) and that "in the future review of the SUP Directive in 2027, it may consider if it is appropriate to include plastic confetti in the scope of the Directive."

France has banned the sale of plastic confetti among other single-use items since January 2021 as a provision in the country's Anti-Wastage & Circular Economy Law.

On the Island of Malta, thirty-nine local councils agreed in 2019 to stop using balloons and plastic confetti during organised events. A National ban was put in place at public events in Malta in 2020.

The government of Monaco has agreed to phase out single-use plastics by 2024. Plastic confetti has not been allowed in Monaco since June 2021.

In July 2022, the city of Milan restricted the use of plastic confetti for parties, demonstrations, and events such as the Carnival celebration. This ban includes an information and awareness campaign. Matera in Italy has also banned confetti, proposing fines for litterers.

In 2019, the Caribbean Island of Aruba banned plastic and polystyrene single-use products. The ban included the use of plastic bags and the release into the air of balloons and plastic confetti.

In 2020, the Island Council of Saba in the Caribbean approved an ordinance to ban single-use plastic including plastic confetti.

As of 2022, there were 26 municipalities in the state of Florida, USA, which had banned balloons, confetti and plastic foam containers at parks and other city properties.

South Australia is phasing out plastics. Confetti will be banned by 2024.

4. Recommendations to reduce the amount of balloon and confetti litter in the marine environment

4.1 Best Practices and alternatives to balloon releases and plastic confetti

Many online resources present alternatives to using plastic confetti and releases of multiple helium balloons. The following short list of suggestions can inspire HELCOM countries when promoting more sustainable alternatives to balloon releases and the use of plastic confetti. By using sustainable practices for celebration, no animals on land, in the air or at sea are harmed because of a festive event.

Alternatives to balloons for festive celebrations

Blowing bubbles made from soap is an activity that creates light and floaty spheres. Similar to balloons, many can be quickly produced in a variety of sized and they can be carried away by wind. Instead of lasting in nature for a very long time they will pop and disappear without harming the environment. Catching and popping the soap bubbles adds to the entertainment. Making and sending giant bubbles into the air is a variation of this activity.

Reusable products such as kites, windsocks, flags, banners and even inflatables can be used to mark an occasion. They are eye-catching, especially if multiple colours are used. The materials should be grounded (attached to a pole etc.), but are still able to fly or wave in the air. Planted multiple reusable garden spinners or pinwheels create colourful movement when they catch the wind. The products must be removed from the ground after use.

Alternatives to balloons for funerals or remembrance of a loved one

Planting a native tree, flowers or an entire garden in honour of a loved one is a way to create a memorable activity and a lasting memorial that can be visited repeatedly. Trees and perennial flowers will also embellish the landscape and provide food and shelter for birds and insects and other wildlife. Trees can also capture carbon for years to come.

Using candles and luminaries (such as a glass jar containing a light) to remember a passed friend or relative can be used especially at night. Many candles or lights create a special serene atmosphere. They can be used repeatedly and mark an anniversary without creating litter.

Placing a natural or painted rock memorial, somewhere meaningful is also a good alternative. Painted rocks could also be kept as a memory for mourners after a funeral ceremony.

Alternatives to using plastic or metallic confetti

Instead of plastic/metallic confetti, there are many biodegradable alternatives. Birdseed or native flower seeds can for example be used. Birds may gather, adding to the experience. The seeds will be eaten, develop into new flowers or degrade naturally.

Throwing colourful flower petals is a creative way to celebrate. Flower petals resemble traditional confetti because of the variety of colours. They can match the chosen colour of an event or be mixed together and create a festive colour palate.

Fresh or dried leaves can create a confetti effect when tossed at celebrations. Using fresh leaves such as eucalyptus and olive can activate the senses, as such leaves have a pleasant smell. Dried or freshly fallen leaves in autumn colours can add variety. Leaves can also be cut or punched into smaller pieces or shapes creating a material that more closely resembles traditional confetti.

Eco-friendly confetti from natural sources such as plants and flowers is presently widely available commercially.

Using powder cannons with different colours can be just as festive as confetti. Some events such as colour runs also use coloured powders that are thrown on participants and up into the air. Organisers should however ensure that these powders are non-toxic and do not harm the environment.

4.2 Phasing out intentional releases of balloons

To date there are no HELCOM contracting parties that have passed legislation that specifically forbid the mass release of balloons. Finland, Denmark and Sweden have existing laws targeting littering, which may consider mass releases of balloons as litter. In HELCOM countries where balloon releases are considered litter under existing legislation, permission to send balloons into the air is not granted, limiting this practice. This, however, has its shortcomings, as balloons may still be sent into the air, and simply not be reported to authorities. Some contracting parties have legislation that prevent mass releases of balloons due to air traffic safety, but exemptions can be granted. Enforcement of laws that limit balloon litter is certainly a challenge and may need to be strengthened. Littering laws could also more clearly target the mass release of balloons and other items prone to become litter.

There is growing awareness about balloon pollution and there are initiatives in several countries, states and territories to ban or limit balloon releases. Municipalities in some European countries inside and outside HELCOM have prohibited the release of balloons at celebrations or events. The initiatives target either the wider community or more simply releases from municipal institutions such as schools. Initiatives to reduce the amount of balloons becoming litter in the HELCOM area through awareness and restrictions are at the moment piecemeal. These initiatives may therefore have limited effect.

Once balloons are released, they can travel long distances by wind and water currents. In order to make a difference in the entire HELCOM area, a united initiative to address this issue over a wide geographic area would be more efficient than individual efforts. Clear national or international regulation prohibiting balloon releases would be most effective.

Action RL 12 of the RAP ML aims at phasing out the intentional release of inflated balloons. The Baltic States have also agreed on a common approach to move towards the rejection of these environmentally harmful activities.

In the OSPAR area, the second OSPAR Regional Action Plan on Marine Litter (RAP ML 2) contains action A.4.1 (S4.03.T3) that aims to "Define measures and strategies for the phasing out or restriction of use of single use plastics prone to become marine litter in complement to the EU SUP Directive. Support the progressive phasing-out or restriction of use of single-use plastics that are not included in the EU SUP Directive or insufficiently covered to date. Such items are not collected in an efficient way and are prone to become marine litter (for instance balloon releases, shotgun wads and cartridges, fireworks, etc.)."

The European Balloon and Party Council is also aware that the release of balloons is problematic for their image and for the environment. They address this issue through "party safe" awareness and promote the responsible use of balloons. The problem is not seen as balloons as such, but their misuse outdoors when they are prone to become litter.

Considering all of these present initiatives, there is therefore already a good foundation in place to phase-out balloon releases. The challenge is to find common ground and phase-out practices that have become accepted joyful traditions. This study proposes the following actions.

1. That HELCOM takes the initiative in cooperation with OSPAR to set up a discussion forum that includes representatives from the European Union, HELCOM and OSPAR and the European Balloon and Party Council as well as other relevant/interested stakeholders.

2. The discussion forum meets to define the scope of their work and determine the most effective way to phase out mass balloon releases. Topics that could be discussed include:
    a. Strengthening of EU legislation
    b. Possible collaborations between EU and non-EU countries on the specific issue.
    c. Voluntary actions by countries, for example by strengthening their litter regulations.
    d. A plan for a wide reaching awareness campaign involving all parties. This could be a way to implement this in the framework of the SUP Directive and extended producer responsibility.
    e. Set a year that balloon releases will finally be phased-out in HELCOM countries. The phase-out could for example be before 2027, when the implementation of the RAP ML is envisaged to be assessed.

4.3 Measures to address littering of confetti outdoors

Sweden is the first HELCOM country to address this issue by implementing a national ban on using plastic confetti outdoors. They have done this through the national implementation of the SUP Directive. The Swedish regulation expands the ban on various disposable plastic products to include the use of plastic confetti outdoors. This approach could be followed by other countries by amending national legislation to include restrictions on the use of plastic confetti.

There needs to be regulation or restriction of products that have the potential to send hundreds or thousands of non-biodegradable materials into the environment. Plastic confetti tubes and plastic confetti in cannons at concerts and festivals are such products of concern. Where possible, a ban on the outdoor use of plastic confetti would reduce the amount of this type of litter from entering the environment.

The topic of plastic confetti could be included in the mandate of the discussion forum on phasing-out balloons proposed in the last chapter. Thus, countries could use it to address both issues and the overall issue of the use of non-biodegradable items used in celebrations outdoors.

Alternatively, but perhaps less effective, would be voluntary or legally required extended producer responsibility schemes for plastic confetti products. Producers would incur the costs for awareness campaigns and remediation for public clean-up efforts.

Awareness campaigns are also essential supplements to inform the public as to why these traditionally joyful products and practices are being restricted.

4.4 Product design and producer responsibility

Both helium balloons and plastic confetti are non-circular products. They are designed as single use products to be used and enjoyed for a short period. Producers should think more about the design and marketing of these products and how they could be reused at future events. Some companies are already creating inflatable balloon products made of more durable material, that can be re-used or used for longer periods of time. These balloons can be fastened to sticks in clusters. They are an alternative to helium balloons, as they look the same. They can mark a festive event but do not use helium and cannot rise up and float away.

As a product design change, it could be made mandatory for all helium balloons sold or given away to have a weighted base, so that they do not easily fly away.

Biodegradable alternatives to plastic confetti such as flower petals or FSC-certified paper (paper products from sustainably managed forests) and recycled paper, with non-toxic inks and additives exist and are marketed in the European Union. These could be better promoted through labelling as outdoor friendly products. The European Commission has the EU

environmental label, Ecolabel, which helps consumers choose environmentally friendly products and services. Alternatives such as water soluble pieces of paper, lavender buds, mica flakes and crushed flower petals are examples of confetti products designed to be used outdoors that could be considered. The Ecolabel could also be used to evaluate the claim of biodegradable or eco-friendly balloons.

Products sold that could be used outdoors with materials that are non-biodegradable or very slow to degrade could be labelled stating that they are for indoor use only. The marking would send a signal to consumers that consideration needs to be taken or to consider other alternatives if their intention is for outdoor use. The European Balloon and Party Council could voluntarily create or include these types of labelling for their members as part of the "partysafe" initiative. Voluntary measures would however be much less effective than previously discussed actions, which limit or ban the uses of these products outdoors.

Article 8 in the SUP Directive establishes several measures on Extended Producer Responsibility schemes, including covering the costs of clean-up litter and awareness raising measures for balloons by end of 2024. HELCOM should continue gathering data about numbers of balloons on their beaches to be able to qualify the discussions and offer advice on these issues and how measures could be used most effectively to prevent balloon litter.

4.5 Knowledge gaps and recommendations for further research

- The extent of the use of confetti and amount that reaches the environment is not known. Unfortunately, market information and forecasting is not readily available. Some information can be purchased and such a study requires more resources. A detailed study could be undertaken to analyse this and better understand the extent of pollution from plastic confetti.
- Beach litter data for pieces of balloons are not collected uniformly among HELCOM countries. In the upcoming Marine Litter Assessment, balloons are placed under an aggregated category (R28: Other rubber items). To more accurately assess balloon litter in the HELCOM Area and be able to note the effectiveness of RAP actions, this item would need to have its own litter category. HELCOM countries would have to standardize this using the J list code number 125 for "rubber balloons". All balloon litter needs to be collect and categorized as noted in the J list: "within this category, balloon ribbons, strings, plastic valves and balloon sticks that are on or were attached are included."
- There are no studies found describing the impacts of balloons on species in the Baltic Sea Area. Current and future research projects should consider collecting evidence of harm from balloons through ingestion and/or entanglement.
- A scientific study on how much entanglement could be attributed to balloon ribbon and string could provide valuable information.
- Developing a monitoring scheme to assess the effectiveness of initiatives such as limiting balloon releases in Denmark or banning the use of confetti in Sweden would provide valuable information to other HELCOM countries.

- Analyses of the effectiveness of recent bans of balloons and confetti in other countries such as Malta should be undertaken.
- More research needs to be done on how to best regulate or restrict products such as plastic confetti tubes and uses of plastic confetti in cannons at concerts and festivals.

References

Baltic Marine Litter Project MARLIN (2013) Litter Monitoring and Raising Awareness 2011-2013 Final Report (Stockholm, 2013)

Burshette, D. K (1989). A study of the effect of balloon releases on the environment. visited online (25/11/2022) [https://www.balloonhq.com/faq/deco_releases/release_study.html]

Endocrine Society (2020) Plastics, EDCs and Health – A Guide for public interest organizations and policy-makers on endocrine disrupting chemicals and plastics. 92 p. online [https://www.endocrine.org/news-and-advocacy/news-room/2020/plastics-pose-threat-to-human-health] visited online (21/11/2022)

European Commission (2019) Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment (Text with EEA relevance) [https://eur-lex.europa.eu/eli/dir/2019/904/oj] visited online (13/9/2022)

European Commission (2020) A European Threshold Value and Assessment Method for Macro Litter on Coastlines-JRC Technical Reports [https://mcc.jrc.ec.europa.eu/documents/202009185110.pdf] visited online (13/9/2022)

European Commission (2021a) Commission guidelines on single-use plastic products in accordance with Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment [https://www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/temas/prevencion-y-gestion-residuos/c20213762finalguidelines_single-use_plastics_products_tcm30-527113.pdf] visited online (13/9/2022)

European Commission (2021b) Questions & Answers - Guidance on the application of Single-Use Plastic rules [https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_2709] visited online (13/9/2022)

European Commission (2022), The use of PVC (poly vinyl chloride) in the context of a non-toxic environment 329 p-online (20/10/2022) [https://op.europa.eu/en/publication-detail/-/publication/e9e7684a-906b-11ec-b4e4-01aa75ed71a1] visited online (21/11/2022)

Fleet, D., Vlachogianni, Th. and Hanke, G., 2021. A Joint List of Litter Categories for Marine Macrolitter Monitoring. EUR 30348 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-21445-8, doi:10.2760/127473, JRC121708 [https://mcc.jrc.ec.europa.eu/documents/202103260511.pdf] visited online (7/12/2022)

Gilmour, Morgan E. and Lavers, Jennifer L. (2021) Latex balloons do not degrade uniformly in freshwater, marine and composting environments, Journal of Hazardous Materials Volume 403, Article 123629 visited online (25/11/2022)

Grummer, Arnold E., (1987) Great Balloon Game Book and More Balloon Activities, Publisher: Greg Markim, Inc, Appelton, WIsconsin,

HELCOM (2008). Recommendation 29/2 concerning marine litter within the Baltic Sea Region.) [https://helcom.fi/wp-content/uploads/2013/09/Rec-29-2-1.pdf] visited online (12/9/2022

HELCOM (2009). Marine Litter in the Baltic Sea Region: Assessment and priorities for response. Helsinki, Finland. visited online (9/5/2022)

HELCOM, (2010) Ecosystem Health of the Baltic Sea 2003–2007: HELCOM Initial Holistic Assessment. Balt. Sea Environ. Proc. No. 122. visited online (9/5/2022)

HELCOM (2013) HELCOM Copenhagen Declaration "Taking Further Action to Implement the Baltic Sea Action Plan - Reaching Good Environmental Status for a healthy Baltic Sea". online (12/9/2022)

[http://www.helcom.fi/Documents/Ministerial2013/Ministerial%20declaration/2013%20Copenhagen%20Ministerial%20Declaration%20w%20cover.pdf] visited online (9/5/2022)

HELCOM (2015). HELCOM Recommendation 36/1. Regional Action Plan on Marine Litter. Online (12/9/2022) [https://helcom.fi/wp-content/uploads/2015/03/Rec-36-1_with-RAP-ML-Annex.pdf] visited online (9/5/2022)

HELCOM (2018) Ministerial Declaration Brussels 6 March, 2018. Online [https://helcom.fi/wp-content/uploads/2019/06/HELCOM-Brussels-Ministerial-Declaration.pdf] visited online (9/5/2022)

HELCOM (2018a): State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155. visited online (9/5/2022)

HELCOM (2018b). HELCOM Guidelines for monitoring beach litter. [https://helcom.fi/wp-content/uploads/2021/03/HELCOM-guidelines-for-monitoring-beach-litter.pdf] visited online (3/11/2022)

HELCOM (2020). HELCOM Monitoring Programme on beach litter. [https://helcom.fi/wp-content/uploads/2020/10/MM_Beach-litter.pdf] visited online (3/11/2022)

HELCOM (2021a) HELCOM Recommendation 42-43/3 on the Regional Action Plan on Marine Litter. Available at: [https://helcom.fi/wp-content/uploads/2021/10/Rec-42-43-3.pdf] visited online (3/11/2022)

HELCOM (2021b) Baltic Sea Action Plan. [https://helcom.fi/media/publications/Baltic-Sea-Action-Plan-2021-update.pdf] visited online (9/5/2022)

HELCOM (2023) Hazardous Substances, Marine litter, Underwater noise, Non-indigenous species, Thematic assessment 2016-2021[HELCOM-Thematic-assessment-of-hazardous-substances-marine-litter-underwater-noise-and-non-indigenous-species-2016-2021.pdf] visited online (17/8/2023)

Kaarsemaker, S,. Lichte Bries, (2015) Balloons in the marine environment (Ballonnen in het mariene milieu) (in Dutch) Arnhem, Holland 60.pp online [https://www.plasticsoupfoundation.org/wp-content/uploads/2015/12/Onderzoek-ballonoplatingen-nov-2015.pdf] visited online (18/10/2022)

Ocean Conservancy (2004): International Coastal Cleanup 2004 [https://oceanconservancy.org/wp-content/uploads/2017/04/2004-Ocean-Conservancy-ICC-Report.pdf] visited online online (15/9/2022)

Ocean Conservancy (2005): International Coastal Cleanup Report 2004 [https://oceanconservancy.org/wp-content/uploads/2017/04/2005-Ocean-Conservancy-ICC-Report.pdf] visited online online (15/9/2022)

Ocean Conservancy (2011): Tracking Trash 25 years of Action for the Ocean [https://oceanconservancy.org/wp-content/uploads/2017/04/2011-Ocean-Conservancy-ICC-Report.pdf] visited online online (15/9/2022)

Ocean Conservancy (2018): Building a Clean Swell 2018 Report [https://oceanconservancy.org/wp-content/uploads/2018/07/Building-A-Clean-Swell.pdf] visited online online (15/9/2022)

OSPAR (2022) CEDRE, Quality Status Report for Beach Litter from 2018 – 2020

Schernewski, G., Balciunas, A., Gräwe, D. et al. Beach macro-litter monitoring on southern Baltic beaches: results, experiences and recommendations. J Coast Conserv 22, 5–25 (2018). [https://doi.org/10.1007/s11852-016-0489-x] visited online (13/9/2022)

Pegram, Jan E., Andrady, Anthony L. (1989), Outdoor weathering of selected polymeric materials under marine exposure conditions, Polymeer Degredation and Stability, Volume 26, Issue 4 pp 333-345 [https://www.sciencedirect.com/science/article/pii/0141391089901122] visited online (25/11/2022)

Promemoria Miljödepartementet, Genomförande av EU:s engångsplastdirektiv

Roman, L., Hardesty, B.D., Hindell, M.A. et al. (2019) A quantitative analysis linking seabird mortality and marine debris ingestion. Sci Rep vol. 9, 3202. [https://doi.org/10.1038/s41598-018-36585-9] visited online (31/10/2022)

Schernewski, G., Balciunas, A., Gräwe, D. et al. (2018) Beach macro-litter monitoring on southern Baltic beaches: results, experiences and recommendations. J Coast Conserv 22, 5–25 [https://doi.org/10.1007/s11852-016-0489-x] visited online (31.10.2022)

Schuyler Q, Hardesty BD, Wilcox C, Townsend K (2012) To Eat or Not to Eat? Debris Selectivity by Marine Turtles. PLoS ONE 7(7): e40884. [https://doi.org/10.1371/journal.pone.0040884] visited online (31/10/2022)

Statens Offentliga Udredningar (SOU) (2018): Det går om vi vill Förslag till en hållbar plastanvändning. Nr. 84, Stockholm, Sweden, December 2018 - Appendix 4, P. 54.

The Ocean Conference (2017)
[https://sustainabledevelopment.un.org/content/documents/Ocean_Factsheet_Pollution.pdf] visited online (18/10/2022)

Tuomisto, P. (1994). The effects of marine litter on marine species and litter in the Finnish sea areas. Graduate study, Helsinki University, Laboratory of Hydrobiology (in Finnish).
UNESCO (2022) Facts & Figures on Marine Pollution [https://oceanliteracy.unesco.org/plastic-pollution-ocean/] visited online 31/10/2022

Van Franeker, J.A. (2015) Five Small facts about balloon litter. Message of 20 April 2015 on IMARES Dossier "Plastic Waste and Marine Wildlife" [https://www.wur.nl/en/research-results/research-institutes/marine-research/projects-and-publications/dossiers/5-facts-about-balloon-debris-1.htm] visited online (31.10.2022)

Warner, K., Linske, E., Mustain, P., Valliant., M and Leavitt. C., OCEANA (2020), Chocked, Strangled, Drowned: The Plastics Crisis Unfolding In Our Oceans. 64p. [https://usa.oceana.org/wp-content/uploads/sites/4/2020/11/25/report_single_pagesdoi_choked_strangled_drowned_final.pdf] visited online (31.10.2022)

Wilcox, C., Mallos, N.J., Leaonard, G.H., Rodriguez, A., Hardesty, B.D., (2016) Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife. Marine Policy 65, 107-114
[https://www.researchgate.net/publication/290244739_Using_expert_elicitation_to_estimate_the_impacts_of_plastic_pollution_on_marine_wildlife] visited online (31.10.2022)

Background Internet resources

D10 Marine litter
[https://mcc.jrc.ec.europa.eu/main/dev.py?N=28&O=223&titre_chap=D10%20Marine%20litter] visited online (12.9.2022)

Single Use Plastics: Overview [https://environment.ec.europa.eu/topics/plastics/single-use-plastics_en] visited online (13/9/2022)

A Brief History of Party Balloons [https://balloons.online/blog/a-brief-history-of-party-balloons/] visited online (17/10/2022)

Wikipedia: Confetti [https://en.wikipedia.org/wiki/Confetti] visited online (17/10/2022)

Before paper confetti was invented, people threw candied nuts and plaster
[https://www.splendidtable.org/story/2015/07/30/before-paper-confetti-was-invented-people-threw-candied-nuts-and-plaster] visited online (17/10/2022)

The History of Balloons [https://www.balloonhq.com/faq/history.html] visited online (17/10/2022)

History of Balloons [https://www.partystoresystems.com/history-of-balloons] visited online (17/10/2022)

Ultimate Guide to Types of Balloons [https://www.balloonin.com/blogs/news/ultimate-guide-to-types-of-balloons] visited online (10/11/2022)

Balloon Basics: Your guide to all things Balloons [https://www.partycity.com/balloon-basics-ideas] visited online (10/11/2022)

Manufacturer: Producer Confetti
[https://www.europages.co.uk/companies/manufacturer%20producer/confetti.html] visited online (10/11/2022)

Confetti market 2022 upcoming trends size growth factors top key companies segmentation share and forecast to 2029. [https://www.digitaljournal.com/pr/confetti-market-2022-upcoming-trends-size-growth-factors-top-key-companies-segmentation-share-and-forecast-to-2029] visited online (10/11/2022)

How much confetti do I need for my wedding? [https://www.shropshirepetals.com/blog/how-much-confetti-do-i-need-for-my-wedding/] visited online (10/11/2022)

Confetti FAQs [https://www.confettidirect.co.uk/faqs/] visited online (10/11/2022)

Easy Access Rules for Standardised European Rules of the Air (SERA)
[https://www.easa.europa.eu/en/downloads/68174/en] visited online (13/9/2022)

Balloon Debris Survey: The Issue [https://balloondebris.weebly.com/the-issue.html] visited online (14/9/2022)

The Conversation: We composted 'biodegradable' balloons. Here's what we found after 16 weeks
[https://theconversation.com/we-composted-biodegradable-balloons-heres-what-we-found-after-16-weeks-138731] visited online (25/11/2022)

Outdoor weathering of selected polymeric materials under marine exposure conditions
[https://www.sciencedirect.com/science/article/pii/0141391089901122] visited online (25/11/2022)

Etsy Search: Balloon Release [https://www.etsy.com/uk/market/balloon_release] visited online (15/06/2022)

Giant Balloon Release Orange [https://www.jb-inflatables.eu/inflatable-giant-balloon-release] visited online (15/06/2022)

Balloon Releases and Races [https://www.partystoresystems.com/balloon-releases-races] visited online (15/06/2022)

KIMO International: Balloon Releases [https://www.kimointernational.org/action-areas/plastic-pollution-and-marine-litter/balloon-releases/] visited online (15/06/2022)

Rituals and traditions that help us heal [https://www.funeralbasics.org/rituals-and-traditions-that-help-us-heal/] visited online (26.10.2022)

Educating and partying safely [https://www.ebpcouncil.eu/partysafe] visited online (15/06/2022)

5 simple steps to handle balloons safely and responsibly [https://www.partysafe.eu/how-to-handle-balloons] visited online (15/06/2022)

Thousands of balloons released worldwide! [https://bice.org/en/thousands-of-balloons-released-worldwide/]
[https://bice.org/fr/des-milliers-de-ballons-laches-aux-quatre-coins-du-monde/] visited online (23.08.2022)

We Are #SailingSustainably [https://cruising.org/en-gb/environmental-sustainability] visited online (21.09.2022)

Krydstogter til Baltikum [https://www.osterlindet.dk/krydstogter/krydstogter-baltikum] visited online (26.10.22)

The Conversation: Balloon releases have deadly consequences – we're helping citizen scientists map them [https://theconversation.com/balloon-releases-have-deadly-consequences-were-helping-citizen-scientists-map-them-129321] visited online (31.10.22)

Balloons Blow: The Ugly Truth [https://balloonsblow.org/the-ugly-truth/] visited online (31.10.22)

The Daily Mail: Marks and Spenser ban ad balloons after one strangles lamb [https://www.dailymail.co.uk/news/article-1011521/Marks-Spencer-ban-ad-balloons-strangles-lamb.html] visited online (31.10.22)

The Telegraph: Farmer wins compensaton after Red Nose Day balloon kills cow [https://www.telegraph.co.uk/news/earth/agriculture/farming/8494881/Farmer-wins-compensation-after-Red-Nose-Day-balloon-kills-cow.html] visited online (31.10.22)

Sea Turtle Image Library [http://www.seaturtle.org/imagelib/?cat=500&si=balloon&stype=1&thumb=1] visited online (31.10.2022)

U.S. Fish and Wildlife Service: Balloons and Wildlife: Please Don't Release Your Balloons [https://www.fws.gov/story/2015-08/balloons-and-wildlife-please-dont-release-your-balloons] visited online (31.10.2022)

Single Use Plastic directive:[https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0904&from=EN] visited online (31.10.2022)

Copenhagen Post: Danes want stiffer fines for littering [https://cphpost.dk/?p=65556] visited online (31.10.2022)

Lancaster Telegraph: Balloons Baltic Journey [https://www.lancashiretelegraph.co.uk/news/5904836.balloons-baltic-journey/] visited online (1.11.2022)

Plastic Pollution Coalition: Health and Environmental Impacts of Single-Use Plastic [https://www.plasticpollutioncoalition.org/guides/singleuseplastics/healthimpacts] visited online (31.10.22)

Eco Watch: 10 Most Common Types of Beach Litter Are All Plastic [https://www.ecowatch.com/beach-litter-plastics-ocean-conservancy-2581760475.html] visited online (20/10/2022)

The Environmental Impact of Confetti – Plus Sustainable Alternatives to Try [https://brightly.eco/blog/eco-friendly-confetti] visited online (20/10/2022)

Does Plastic Decompose? How Long Does It Take? [https://maesindopaperpackaging.com/does-plastic-decompose-how-long-does-it-take/] visited online (20/10/2022)

Plastic Waste: For greater responsibility in dealing with plastics [https://www.oeko.de/en/research-consultancy/issues/consumption-and-enterprises/plastic-waste-for-greater-responsibility-in-dealing-with-plastics] visited online (20/10/2022)

Plastics and Packaging Laws in Poland [https://cms.law/en/int/expert-guides/plastics-and-packaging-laws/poland] visited online (7/11/2022)

Plastics and Packaging Laws in Germany [https://cms.law/en/int/expert-guides/plastics-and-packaging-laws/germany] visited online (7/11/2022)

Reduce and Refuse, Recycle and Replace: A Plastics Roadmap For Finland [https://muovitiekartta.fi/userassets/uploads/2019/03/Reduce-and-refuse-recycle-and-replace.-A-Plastics-Roadmap-for-Finland.pdf] visited online (7/11/2022)

Plastics, EDCs and Health: A Guide for Public Interest Organizations and Policy-Makers on Endocrine Disrupting Chemicals and Plastics [https://www.endocrine.org/-/media/endocrine/files/topics/edc_guide_2020_v1_6chqennew-version.pdf] visited online (31/10/2022)

Resolution of the 41th Session of the Baltic Assembly [https://www.baltasam.org/uploads/Resolution.pdf] visited online (7/11/2022)

Seas at Risk: Single Use Plastics Directive – Implementation [https://seas-at-risk.org/publications/single-use-plastics-directive-implementation-assessment-report/] visited online (7/11/2022)

Combating Plastic: What the Anti-Wastage and Circular Economy Law Says [https://cms.law/en/fra/news-information/combating-plastic-what-the-anti-wastage-circular-economy-law-says] visited online (7/11/2022)

Connexion: France tightens Plastics ban [https://www.connexionfrance.com/article/Practical/Environment/France-tightens-plastics-ban] visited online (7/11/2022)

The Mayor: Milan says no to plastic confetti [https://www.themayor.eu/en/a/view/milan-says-no-to-plastic-confetti-10712] visited online (31/10/2022)

Curacao Chronicle: Island Council of Saba approves ordinance to ban single-ues plastic [https://www.curacaochronicle.com/post/local/island-council-of-saba-approves-ordinance-to-ban-single-use-plastic/] visited online (31/10/2022)

Palm Beach Post: Why you'll see fewer balloons and confetti in Boca Raton's outdoor spaces [https://eu.palmbeachpost.com/story/news/local/boca/2021/06/22/why-you-will-see-fewer-balloons-and-confetti-in-boca-ratons-outdoor-spaces/7717085002/] visited online (31/10/2022)

Tangaora Blue: NT bans helium balloons in Australian first [https://www.tangaroablue.org/nt-bans-helium-balloons-in-australian-first/] visited online (31/10/2022)

Government of Newfoundland and Labrador Department of Environment: Guidance Document Helium Balloon Releases [https://www.gov.nl.ca/ecc/files/env-protection-waste-guidancedocs-helium-balloon-release.pdf] visited online (31/10/2022)

BBC News: Isle of Man bans sky lanterns and helium balloons [https://www.bbc.com/news/world-europe-isle-of-man-58171438] visited online (31/10/2022)

European Parliament Petition no 0007/2021on banning plastic confetti [https://www.europarl.europa.eu/doceo/document/PETI-CM-719880_EN.pdf] visited online (1/11/2022)

Marine Conservation Society: Don't Let Go – List of Councils [https://www.mcsuk.org/what-you-can-do/ocean-friendly-living/reducing-your-plastic-footprint/dontletgo/dontletgo-councils/] visited online (1/11/2022)

Aruba: Select plastic laws [https://www.elaw.org/plastic/AW_PlasticLaws] visited online (1/11/2022)

Monaco Tribune: Single-use plastic waste banned in 2024 [https://www.monaco-tribune.com/en/2021/10/single-use-plastic-waste-banned-in-2024/] visited online (1/11/2022)

7 News Austratia: Plastic plates, confetti, fruit stickers among single-use plastics set til be banned [https://www.youtube.com/watch?v=9tr4UJqSKZY] visited online (1/11/2022)

Times Malta: 39 councils agree to ban balloons and plastic confetti [https://timesofmalta.com/articles/view/39-councils-agree-to-ban-balloons-and-plastic-confetti.718366] visited online (1/11/2022)

Malta today: Balloons will be banned from public events in strategy to eliminate single-use plastic [https://www.maltatoday.com.mt/environment/nature/94888/watch_balloons_will_be_banned_from_public_events_in_strategy_to_eliminate_singleuse_plastic#.Y20K-XbMLIU¨] visited online (1/11/2022)

NL Times: Number of Dutch municipalities with balloon ban tripled in one year [https://nltimes.nl/2019/03/11/number-dutch-municipalities-balloon-ban-tripled-one-year] visited online (1/11/2022)

The New York Times: Gibraltar Bans Releasing of Helium Filled Balloons to Protect Marine Wildlife [https://www.nytimes.com/2019/03/26/world/europe/gibraltar-ban-balloons.html] visited online (1/11/2022)

Balloon Innovations: Ballon Cluster Kits [https://www.balloonin.com/collections/cluster-pole-kits] visited online (3/11/2022)

Balloon Debris Survey: A Citizen Science Study [https://balloondebris.weebly.com/] visited online (20/10/2022)

Partysafe: Confetti and Party Poppers [https://www.partysafe.eu/confetti-and-party-poppers] visited online (20/10/2022)

The Local: Norwegian cities to deflate helium balloon sales on May 17th [https://www.thelocal.com/20180418/norwegian-cities-ban-helium-balloons-on-may-17th/] visited online (31/10/2022)

BAPIA Gives Balloon Releases the Shove [https://partyworldwide.net/bapia-gives-balloon-releases-the-shove/] visited online (1/11/2022)

[https://portal.helcom.fi/meetings/PRESSURE%2013-2020-796/MeetingDocuments/3-11%20Ban%20on%20giving%20away%20inflated%20balloons%20free%20of%20charge%20(synopsis).pdf] visited online (20/10/2022)

Mylar Vs. Foil Baby Balloons: Which One is Preferred? [https:// balloons.online/blog/mylar-vs-foil-baby-balloons-which-one-is-preferred/] visited online (5/12/2022)

What is Mylar? [https://www.sorbentsystems.com/mylarinfo.html] visited online (5/12/2022)

KIMO International: Confetti we know what it is, but what is it made of? **[**https://www.kimointernational.org/news/confetti-we-know-what-it-is-but-what-is-it-made-of/**]** visited online (5/12/2022)

Blue Standard By Oceanic Global, Confetti: [https://bluestandard.com/guides/music-guide/plastic-checklist/music-industry-specific-items/confetti/] visited online (1/11/2022)

Mylar balloons should spark celebrations not power outages: [https://www.csrwire.com/press_releases/744881-mylar-balloons-should-spark-celebrations-not-power-outages] visited online (1/11/2022)

THE INTENTIONAL OUTDOOR RELEASE OF BALLOONS AND CHINESE/SKY LANTERNS POLLUTION POLICY AND POSITION STATEMENT – Marine Conservation Society 2014 [https://www.pla.co.uk/assets/mcsballoonsandchineselanternspolicy.pdf] visited online (10/11/2022)

Ballonnen oplaten is passé: 80% van de gemeenten verbiedt of ontmoedigt ballonoplatingen – Stichting De Noordzee [https://www.noordzee.nl/ballonnen-oplaten-is-passe-80-van-de-gemeenten-verbiedt-of-ontmoedigt-ballonoplatingen/] visited online (10/11/2022)

Data were also provided through SeaDataNet Pan-European infrastructure for ocean and marine data management (https://www.seadatanet.org)