

Response to industrial plastic pellets pollution

State of knowledge and international actions



Microplastics workshop

The International Scheldt Commission

Maastricht, 28th November 2023

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Cedre, international experts in spill preparedness and response

Spill risks
Spills



France
International



Seas and oceans
Inland waters



Oil
Chemicals
Aquatic litter



1 site in Brest
in Brittany

55 people
in our team

2.5 ha
of technical facilities

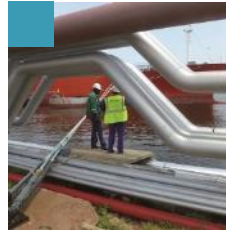
€5,5 million
budget

24/7
emergency hotline

Cedre activities



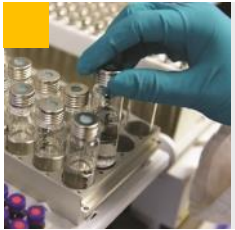
Response
assistance



Contingency
planning



Training



Analysis and
testing



Research



Aquatic litter



Documentary resource centre

Cedre activities on aquatic litter (chronic and accidental pollutions)



Support for the implementation of public policies relating to aquatic litter reduction

- Coordination of 3 national monitoring networks (shoreline and estuaries)
- Support for the Marine Environment Strategy Framework Directive, OSPAR and Barcelona Conventions, zero plastic litter at sea action plan

Contribution to knowledge acquisition

- Fate and impacts
- Prevention and recovery solutions

Development of methodologies to characterise the presence of litter in aquatic environments

Awareness-raising and public communication actions

Cedre original facilities and tools



- Laboratory
- Outdoor basin
- Artificial beach
- Various experimentation tools

Training

- Practical exercises
- Equipment deployment

Experimental study on the behaviour of oil, chemicals, litter, microplastics...

- At sea, on the shoreline, in specific environments...

Equipment performance assessment

- Booms, pumps, skimmers, sensors and detection systems...

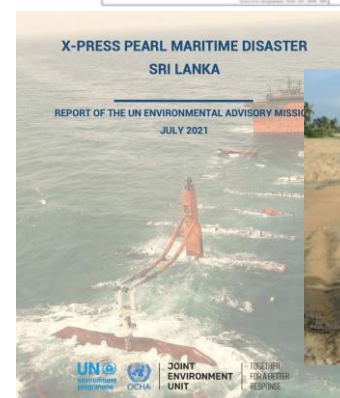
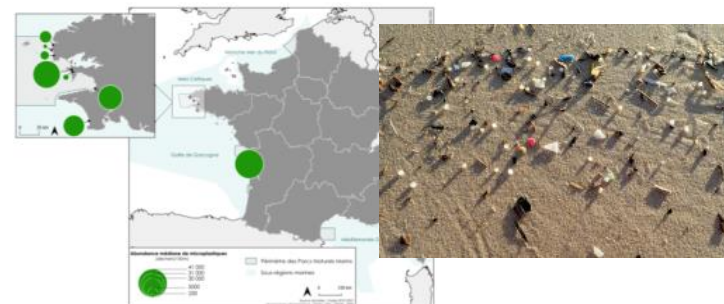
Evaluation and improvement of response strategies and techniques

- Modelling of drift and weathering (surface, 3D), remote sensing (radar, FLIR...), response techniques.

⇒ **In 2023, adaptation of our facilities to work on plastic pellets**
(incl. appropriate internal procedures for zero pellet loss)

Cedre experience on plastic pellets

- Since 2016: in charge of the development of a national monitoring program for microplastics (including pellets) on the French coastline + leading the development of a European protocole to monitor chronic pollution of pellets on beaches
- 2021: involvement as expert in a UN mission following the X-Press Pearl incident in Sri Lanka
- 2022: state of knowledge on pollution by plastic pellets
 - characteristics, existing response techniques, lessons learnt from past accidents
- 2022/2023: pellets arrivals from an unknown source on the French coastline: provision of technical support to authorities
- 2023: Contribution to OSPAR and IMO work
 - Chair of the IMO Correspondence Group on pellet clean-up



On-going projects on plastic pellets



2023: Experimental study on plastic pellets

- Chemical composition and behaviour
- Test of clean-up techniques in our facilities
 - Water surface
 - Sandy beach

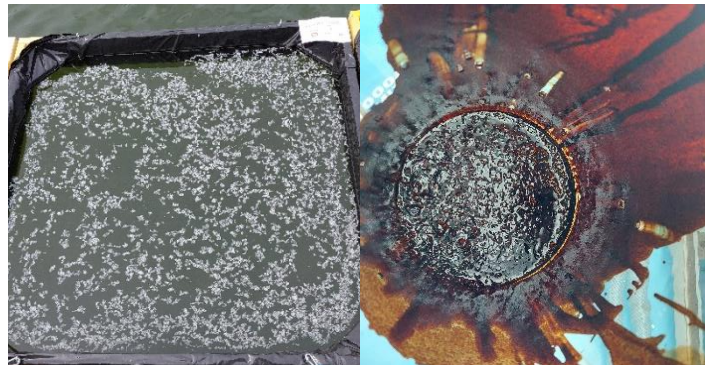


2023/2025: PLASTOIL project (ITOPF R&D Award 2023): Response to a concomitant maritime spill of plastic pellets and oil

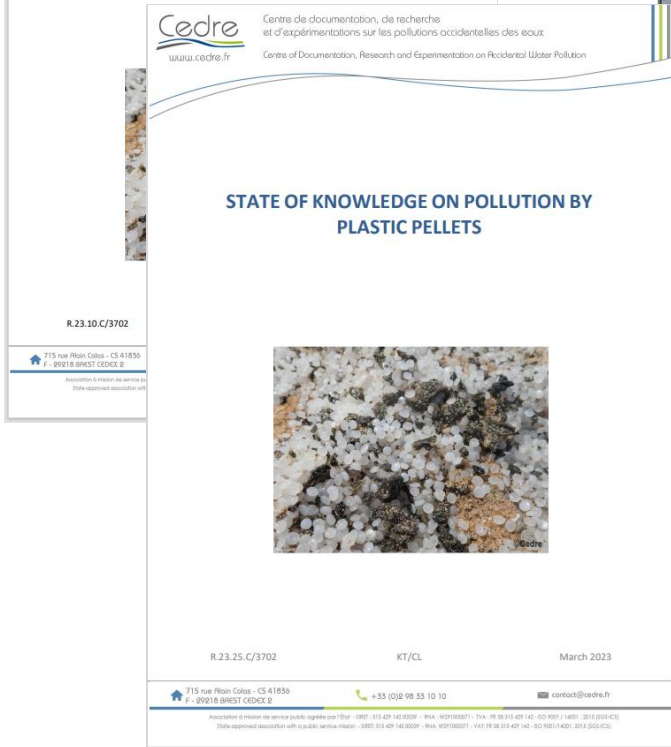
- Behaviour of a mixture of plastic pellets and oil
- Test of clean-up techniques in our facilities
- Waste treatment



2024: Study of spill response and prevention of pellet loss on industrial sites (operational guide)



Our reports/publications (available in both French and English)



www.cedre.fr

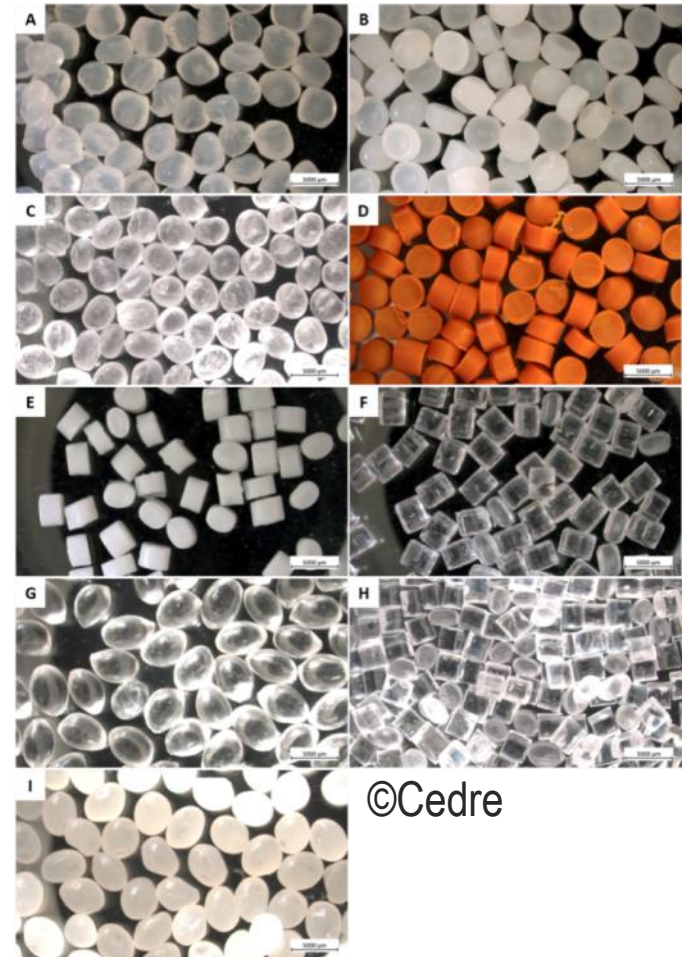


What do we know about plastic pellets?

Plastic pellets: definition and composition

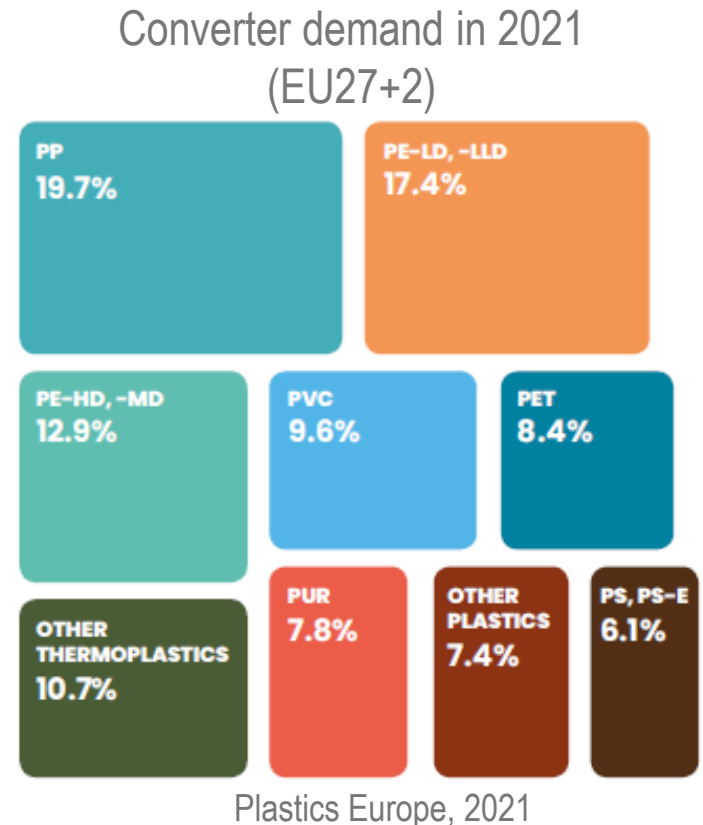
- ISO 472:2013 definition: "small preformed masses of moulding material, having relatively uniform dimensions in a given batch, used as raw material in moulding and extrusion operations".
- External dimensions between 0.01 mm -1 cm.
- 3 forms: granules, powders, and flakes.
- Large majority of granules (1 - 5mm).

➔ In this presentation, focus on granules



Plastic pellets: composition

- Plastic pellet = polymeric matrix + additives
- 6 main polymers, accounting for more than 80% of the world's pellets production:
 - Low density polyethylene (LDPE)
 - High density polyethylene (HDPE)
 - Polypropylene (PP)
 - Polyethylene terephthalate (PET)
 - Polystyrene (PS)
 - Polyvinyl-chloride (PVC)



Plastic pellets: a complex supply chain!

- Supply chain main steps:
 - (1) pellet production
 - (2) intermediaries (e.g. masterbatchers/compounders that mix pure plastic with additives or repackagers/fillers)
 - (3) logistics/transport
 - (4) converting of pellets to make a plastic product
 - (5) management of waste from production plants, secondary infrastructures and transformers
 - (7) recycling processes

- Transport on land (by road or rail), by river and sea

- Packaging



Bags (25 kg)
1500 kg per pallet



« Octabins »
(500-1300 kg)



« Big bags »
(500-1000 kg)

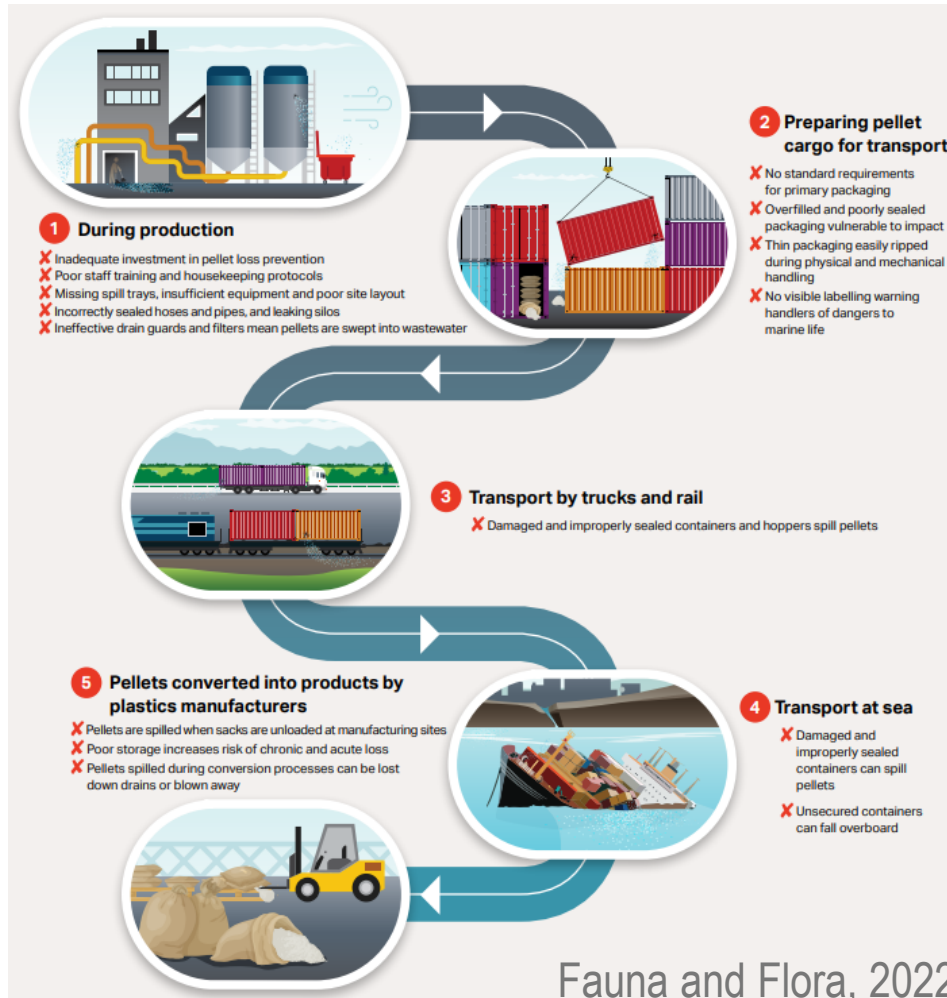


Bulk
(up to 35 t)

OCS, 2017

Plastic pellets: 2 types of discharges in the environment

1) Operational losses along the supply chain (chronic discharges)



In 2019, it is estimated that 52 140 – 184 290 tonnes of pellets were lost in Europe along the whole supply chain

Plastic pellets: 2 types of discharges in the environment

2) Accidental spills (on land, in river and at sea): occasional but can be particularly significant

MSC Susannah



South Africa – 2017
→ 49,5 tonnes

Trans Carrier



North Sea – 2020
→ 13,2 tonnes

MV X-Press Pearl

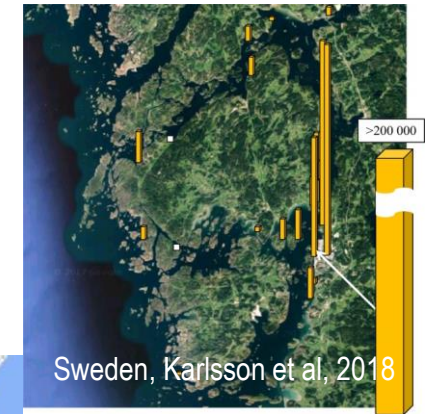


Sri Lanka – 2021
→ 11 000 tonnes



Plastic pellets: background contamination

- Chronic operational losses of pellets cause a background contamination of aquatic ecosystems
- Pellets are ubiquitous in coastal areas and in rivers near industrial sites using pellets



Plastic pellets collected on the coastline



Background chronic contamination



Arrival issued from a point source pollution



What are the lessons learnt from past accidents?

Plastic pellets: behaviour in water



Plastic pellets: behaviour on land

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Plastic pellets: existing response techniques

- On the shoreline:
 - Manual recovery
 - Collection by vacuuming



Plastic pellets: existing response techniques

- On the shoreline:
 - Manual recovery
 - Collection by vacuuming
 - **Screening**



Plastic pellets: existing response techniques

- On the shoreline:
 - Manual recovery
 - Collection by vacuuming
 - Screening
 - **Sink-float separation**



Storage and waste treatment

- Risk of secondary pollution



- Absence of recommendations/regulations for the management of plastic pellets collected during cleaning operations

Impacts of plastic pellets

- Environmental impacts still unknown
 - No acute effects evidenced in the field:
 - Effects too subtle to be evidenced in the field?
 - Contribution to the global plastic pollution generating pressure on biodiversity and ecosystems
 - Ethical and aesthetic obligation to clean-up as reasonably as possible
 - Potential impacts identified:
 - Physical effects on habitats
 - Physiological and ecotoxicological effects on ecosystems
 - Risk of colonisation and transport of species
- Important to consider impact of the clean-up!
- Several potential socio-economical effects identified:
 - economic impacts on local activities (e.g. beach and fisheries closures, disruption of aquaculture and sea salt production activities)
 - well-being impacts associated with the visual degradation of habitats



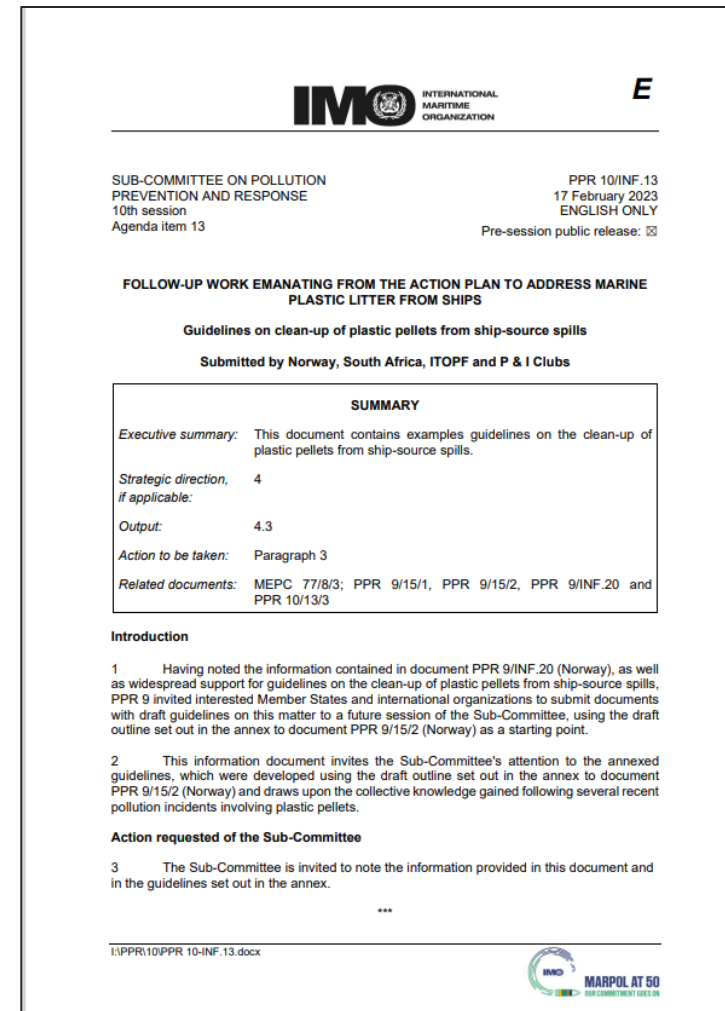
van Franeker et al. (2022)





International actions targeting plastic pellets pollution

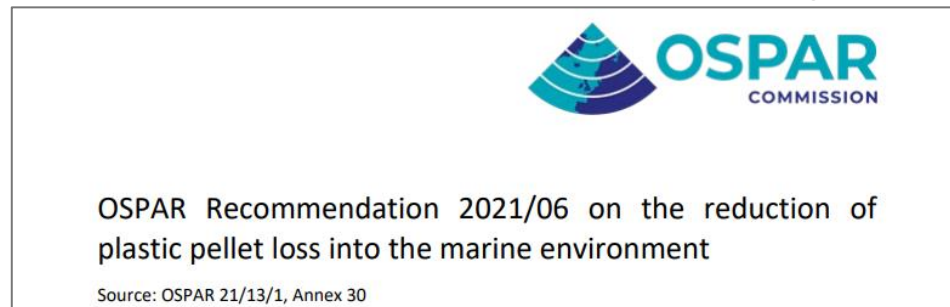
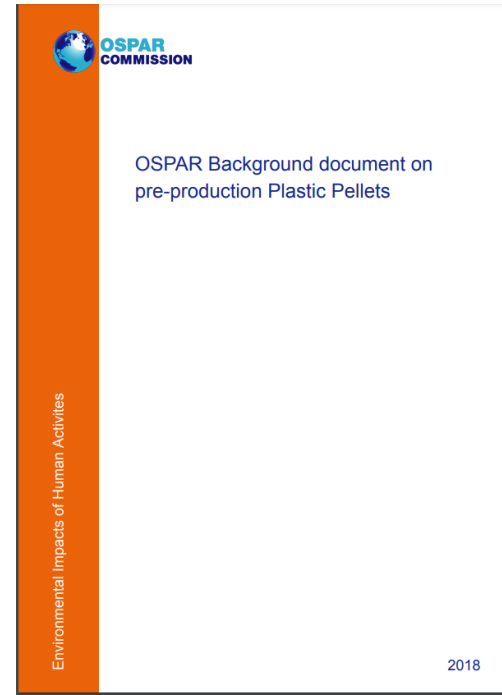
- IMO has adopted an Action Plan to address marine plastic litter from ships (resolution MEPC.310(73)).
- PPR9 Sub-Committee discussed the impacts of the MV X-PRESS PEARL spill of 11,000 tonnes of plastic pellets in Sri Lanka in May 2021 (document MEPC 77/8/3)
 - Invitation to submit documents with draft guidelines on the clean-up of plastic pellets from ship-source spills
- IMO is now addressing the issue of plastic pellets
 - On-going discussions regarding packaging, labelling and stowage on container ships
 - Sharing of experience and good practices regarding clean-up
- In April 2023, PPR 10 established a **Correspondence Group on Pollution Response**, under the coordination of France (Cedre) to draft a **guide on clean-up of plastic pellets from ship-source spills to submit to PPR11**



- **Regional action plan on Marine Litter 1:**

<https://www.ospar.org/work-areas/eiha/marine-litter/regional-action-plan/product-packaging-use-and-design/zero-pellet-loss-in-the-manufacturing-chain>

- ⇒ Adoption of a **Recommendation to reduce plastic pellet loss to the environment:** development and implementation of pellet loss prevention standards, and certification schemes for the entire supply chain, including businesses of all sizes.
- ⇒ Close collaboration between Contracting Parties, NGOs and Industry Representatives.
- ⇒ Supported by a set of guidelines for Contracting Parties and Industry members:
 - ⇒ requirements for pellet handling and management standards
 - ⇒ a phased development of a certification scheme based on independent auditing



- Regional action plan on Marine Litter 2:

RAP Action C.1.1: Prevent microplastic pollution resulting from plastic pellet, powder and flake loss

<https://www.ospar.org/work-areas/eiha/marine-litter/regional-action-plan/rap2-cross-cutting-land-and-sea/c.1.1-plastic-pellet-powder-and-flake-loss>

- a) Monitoring and reviewing the development and implementation of the OSPAR recommendation 2021/6 to prevent pellet loss by the industry (non-binding)
- b) Developing guidance to support clean-ups after accidental losses of plastic pellets from both off and on shore sources.
=> This task is paused pending the publication of the IMO document

- **Bonn Agreement** (Cooperation mechanism on pollution of the North Sea by oil and other harmful substances)
 - Forum of discussions on the management of maritime spills of pellets



Bonn Agreement
Accord de Bonn

- **European Union**
 - A protocol for monitoring pellets on beaches has been proposed in the updated document of the Guidance on Marine Litter Monitoring elaborated in the context of the Marine Strategy Framework Directive (MSFD) implementation
 - October 2023: Proposal of the European Parliament and of the Council on **Preventing plastic pellet losses to reduce microplastic pollution**



Take home message

- Both chronic and accidental discharge
- Hot topic (high press coverage, high on the political agenda)
- Different perceptions from authorities
- Important to engage with all stakeholders
- Need to improve handling practices and better prepare and respond to spills
 - In 2024, Cedre will work on an operational guide for preventing environmental discharges on industrial site (in both French and English)
- Still an emerging topic with knowledge to develop
- Without forgetting related topics :
 - Terrestrial spill
 - Accumulation areas and historical pollutions
 - Mixture with other pollutants
 - Flakes and powders

Pollution aux microbilles plastique : « Un scandale écologique » pour le ministre présent à Quimper

Le secrétaire d'État à la mer, Hervé Berville, est en visite à Quimper (Finistère), ce vendredi 27 janvier 2023. Il a évoqué la question de la pollution aux microbilles de plastique, qui a particulièrement touché des plages de la côte atlantique, ces dernières semaines.

● Ouest-France

Actualité

LES SABLES - VENDÉE JOURNAL
RÉSERVÉ 26 JANVIER 2023
actu.fr le journal des sables 10

PLASTIQUE. La pollution des larmes de sirènes, un « cauchemar » pour le littoral





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Thank you for your attention

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Complementary information for France

- French Decree no. 2021-461 of 16 April 2021 on preventing the loss of industrial plastic granules into the environment
 - Public concerned: operators of sites producing, handling and transporting industrial plastic granules, certification bodies accredited by the French Accreditation Committee.
 - Entry into force: the decree enters into force on 1 January 2022, with the exception of the provisions set out in article D. 541-361, which apply from 1 January 2023 to sites producing, handling and transporting industrial plastic granules that began operating before 1 January 2021.
 - The law of 10 February 2020 on the fight against waste and the circular economy **stipulates that production, handling** (industrial sites using plastic granules in their production processes) **and transport** (logistics platforms, sea and river ports) **sites for industrial plastic granules must be equipped with equipment and procedures to prevent losses and leaks of industrial plastic granules**, which represent some of the microplastics likely to end up in the environment. It also provides for regular inspections by independent certified bodies. This decree sets out the procedures for implementing this provision