



Plastic nurdles

Bethanie Carney Almroth

Prof Ecotoxicology

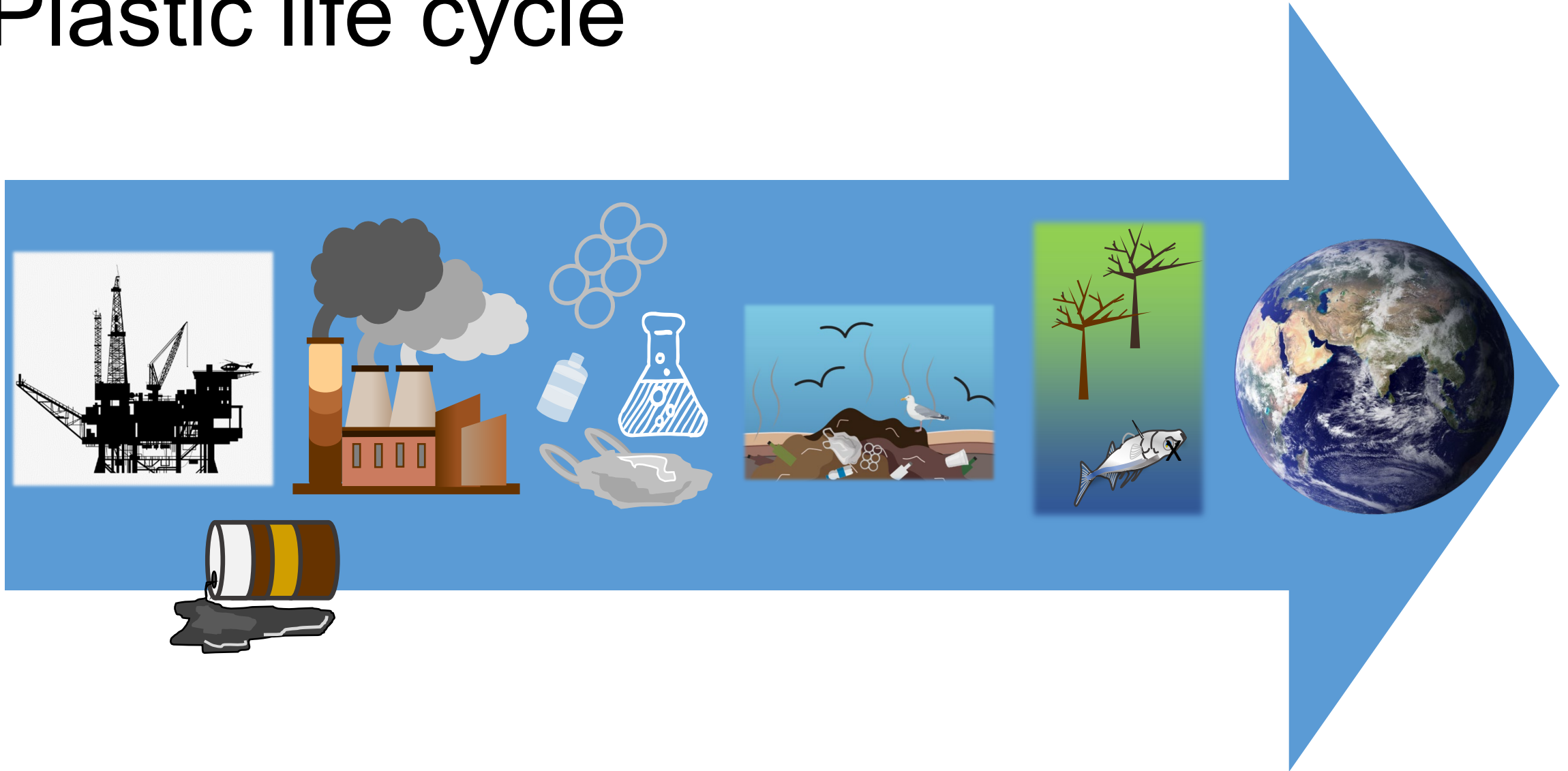
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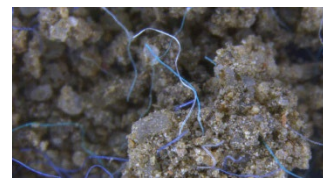
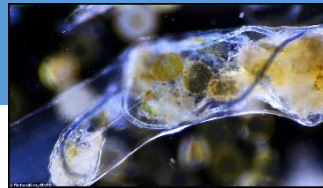
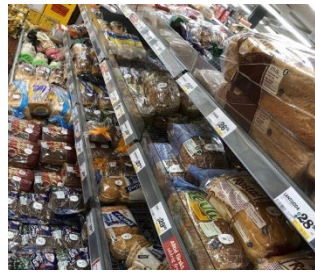
Martin Hassellöv

Prof Marine Chemistry

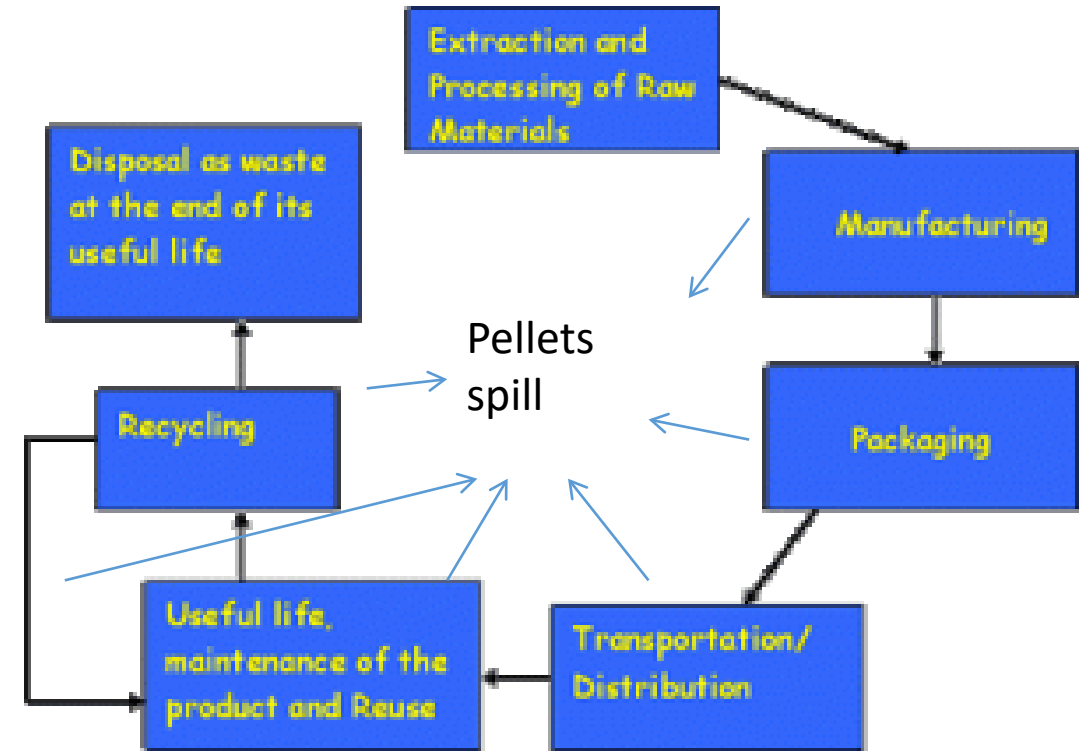
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Plastic life cycle



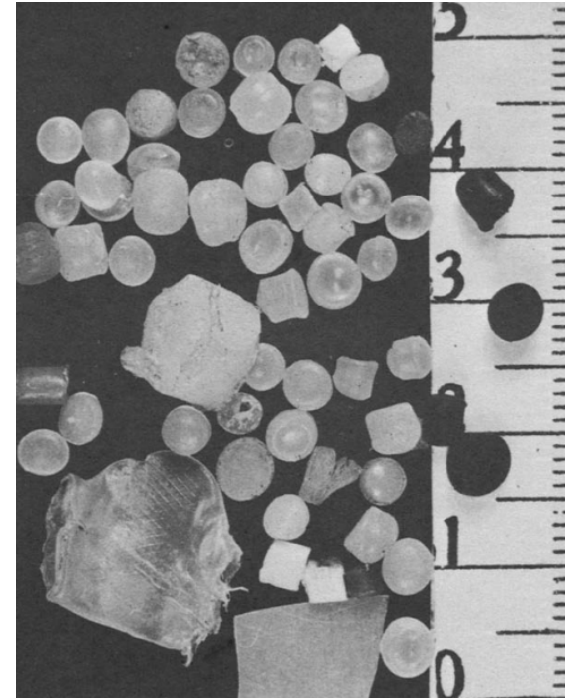


Nurdles spills from plastic life cycle



Nurdles in the marine environment

- 230,000 tons of pellets pollute the marine environment (Eunomia 2016)
- First scientific reports were published in the 1970s.
- sea water, beaches, fish guts
(Carpenter et al. 1972, Colton 1974, Gregory 1978)
- stomachs of sea birds
(Baltz and Morejohn 1977, Day 1980)



Release from industrial production sites

- 4086 pellets >2mm /hr (during normal rain event), app 98 000 /day
- >500 000 particles >0.3mm



Figure S9: Handling and spill of fluff material at transportsite 4 (T4).

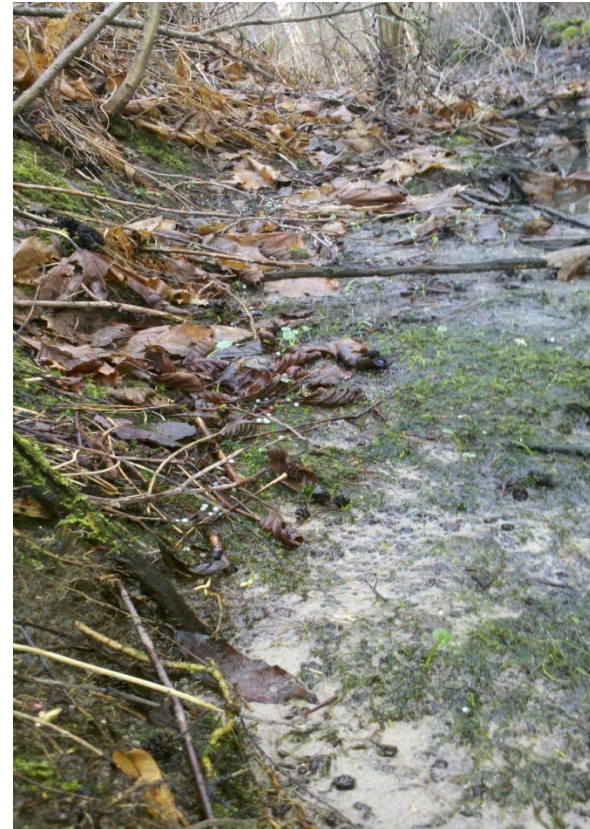
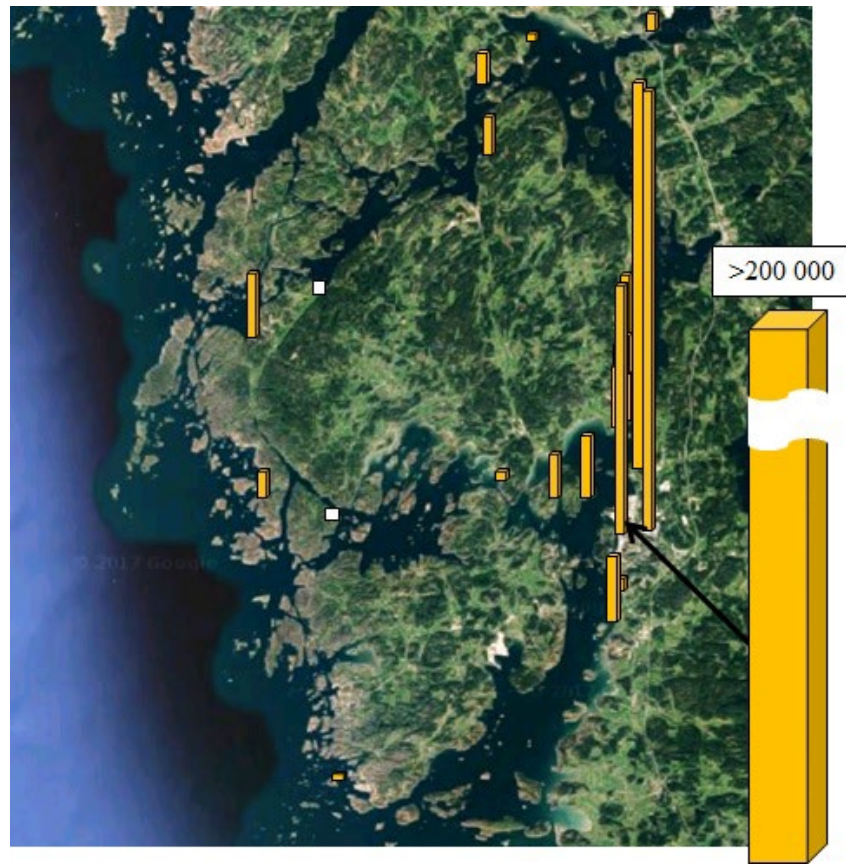


Figure S12: Trail of pellets in a stormwater inflow to the creek Norums å from the handling and transport site at Munkerod.



(Karlsson et al 2018)



Results from measurements of pellets on beaches in the area. The height of the yellow bars are relative to the number of pellets found per hour and person. White squares show examined sites where no pellets were found (Map adapted from Googlemaps).

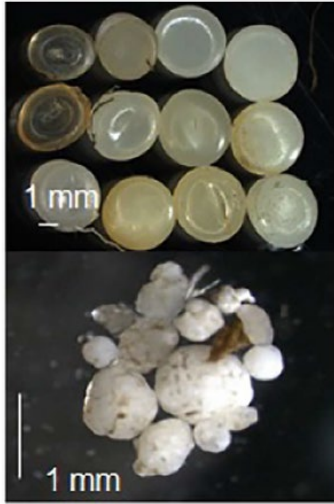


Fig. 3. Typical particles found in the runoff from the production plant. The upper image shows translucent pellets and the lower image shows fluff and fragment found in the lower size-fractions.

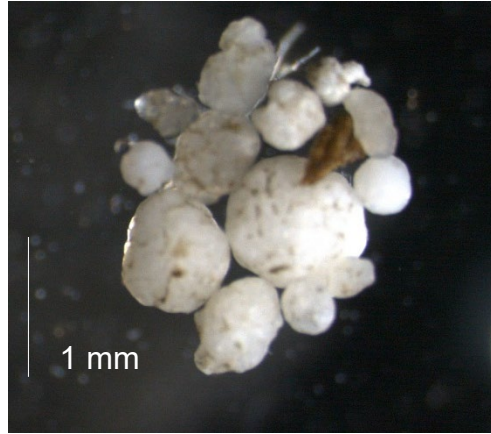


Figure ? Translucent-white fluff found in the 0.3-1 mm size fraction



Outcome

- Top politicians expressed strong opinions about the issue
- Industries are working more actively on reducing spills
- Authorities are stricter on the inspections
- OSPAR is working towards a supply chain certification model

Release from shipping

2 billion pellets lost, spread to 2000 km of coastline



Durban, SA



X-Press Pearl Mega-disaster

(slides courtesy of Tony Andrady (NCSU))

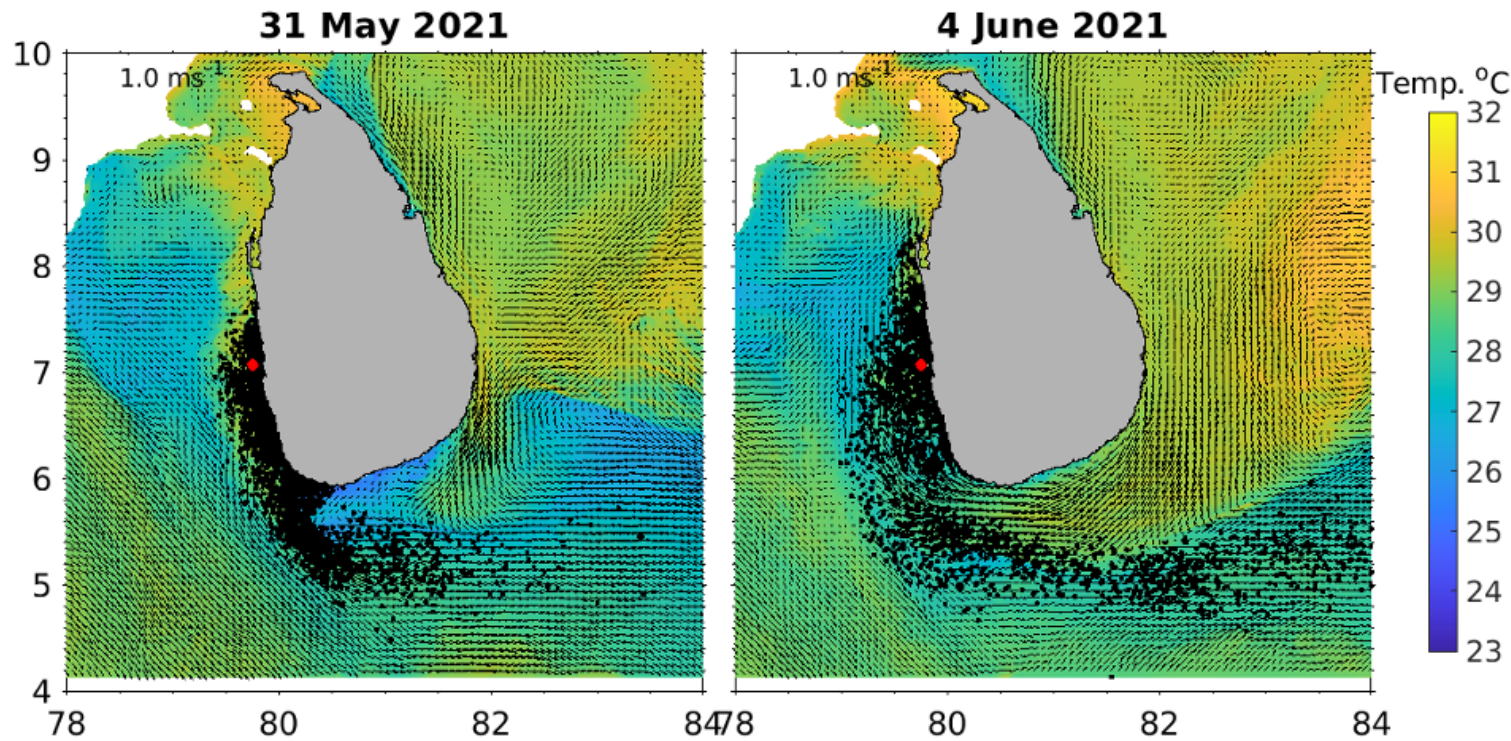


May 26-27

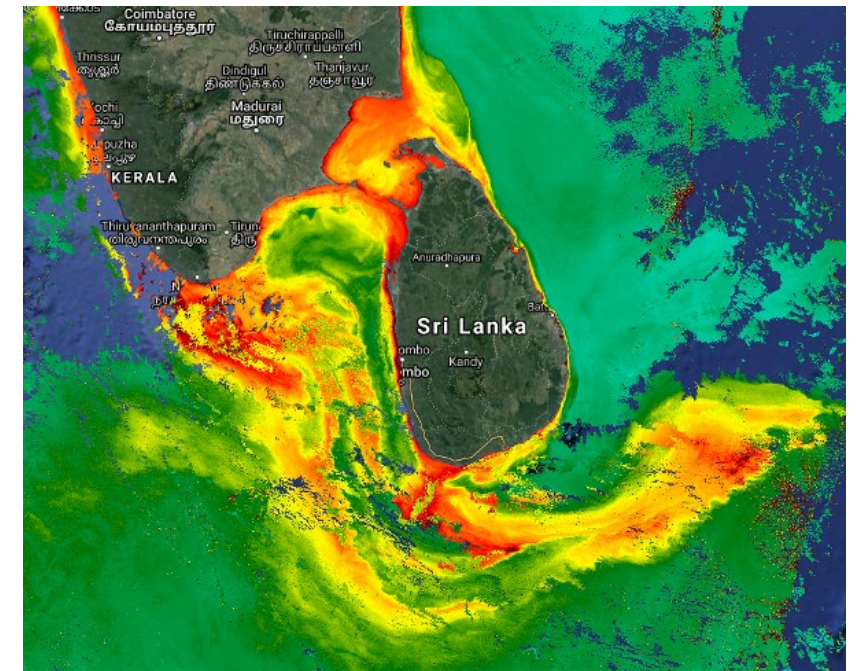




Movement of Plastic Nurdles



Predicted surface currents, sea surface temperature and locations of nurdles (black dots) on 31 May (left) and 4 June (right).



Surface chlorophyll concentrations around Sri Lanka obtained from the Sentinel-3 satellite on 2 June 2021. [Pattiaartchi & Wijeratna 2021 Univ, Western Australia]



MV Trans Carrier
10 tonnes of plastic pellets spilled in the
German Bight

Disasters are rare but devastating

- Over 200 million containers are shipped annually worldwide but only about 1400 are reported lost. {World Shipping Council}
 Nearly 1400 containers lost in the single X-Press Pearl incident.
- ~10,000 tons plastics enter the ocean annually by this route.

Efforts to reduce pellet loss

- Reductions in production of virgin plastic
- Increased oversight
- Increased accountability (EPR, PPP)
- Best practices at production sites (Zero pellet loss)
- Citizen science



Fish in Sri Lanka, The Guardian



OSPAR
COMMISSION

OSPAR Background document on pre-production Plastic Pellets



OSPAR
COMMISSION

OSPAR Recommendation 2021/06 on the reduction of
plastic pellet loss into the marine environment

Source: OSPAR 21/13/1, Annex 30

OSPAR Recommendation 2021/06 on the reduction of plastic pellet loss into the marine environment

- **Prevention** – aim to keep all pellets within the primary containment;
- **Mitigation** – in case a spill cannot be avoided mitigating measures shall be applied (for example catch trays, filter baskets, etc.);
- **Cleaning** – appropriate tools, such as street sweepers, vacuums, shovel and broom, to be readily available to immediately remove spillages; and
- **Reporting** – regular and transparent reporting of quantities of pellets released to the environment and results from third-party audits assessing the adequacy of implemented measures.

The certification schemes should:

- Be based on standards developed by an internationally recognised standards body and reflecting broader consensus, such as the European Standardisation Committee (CEN);
- Be consistently based on compatible or standardised industry-wide pellet loss prevention best practices, taking account of relevant OSPAR guidelines;
- Facilitate a chain of custody for pellets, allowing companies to check that compliance with best practices is maintained from pellet production to the sale of plastic products, giving all parts of the supply chain the assurance that pellets have been handled responsibly;
- Include the creation and publication of internal procedures to achieve zero pellet loss goals;
- Include a regular ‘pellet pollution risk mapping’ exercise and corresponding ‘risk management assessments’ across all company sites;
- Include employee training for spill prevention, containment, clean-up and disposal practices;
- Be accredited by a recognized public accreditation body or an independent accreditation body assigned the responsibility by the competent or designated authority;
- Require regular auditing of procedures and performance by independent and accredited external bodies or equivalent control by public authorities;
- Require that certificates should be made publicly available. Regular reports should be available to public authorities and should include information on quantities of pellets released to the environment, on prevention measures and their effectiveness, and on pellet losses from incidents;
- Include the development of a compliance register/public register for companies who have received the certification;
- Comply with and support all applicable local, national and international regulations governing pellet containment and reporting;
- Require that certificate holders should encourage partners throughout the supply chain to pursue the same objectives;
- Apply to organisations of all sizes, with no exemptions.

Thank you!

bethanie.carney@bioenv.gu.se
Martin.hasselov@marine.gu.se

@BCarneyAlmroth
@CeCAR_UGOT
@FRAM_UGOT

Foto: Annelie Pompe

