

Arctic Marine litter: Status and emerging trends





ARCTIC MARINE LITTER WORKSHOP 5-6 JUNE - AKUREYRI, ICELAND

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Desktop Study Section III: Literature Review

 Summer 2017: Initial literature compilation sorted following Driver – Source – State – Impact – Response • Sept. 2017: Participation in GoE on Marine Litter premeeting PAME-II-2017 (Helsinki) Discussion of Outline End 2018: Engagement in drafting Section III based on new compilation of references following agreed Outline



Desktop Study Section III: Literature Review

PAME Secretariat provided GRID-Arendal with a compilation of 65 references plus other reports

 GRID-Arendal compiled additional references aiming to complete provided dataset up to 288 references

Present version of desktop study cites 187 of these references

 The whole library will be made available to PAME as a reference list (included in draft) and as EndNote



I. Sources and Drivers Sea-based sources (beach & seafloor data) • Fisheries – major source overall • Aquaculture – important locally • Shipping – hard to differentiate Land-based sources (beach data) Waste management – important locally Transportation and logistics – road and harbour distribution • Extractive sector, construction and tourism









Kroodsma et al., 2018

Plastic input into the oceans



Plastic sources

- Fishing intensity
- Coastal* inputs
- Impervious surface in watersheds
- Shipping

*Includes mismanaged waste combined with population density Note: the map utilizes a dimensionless model source input binned on 5x5 degree bins. Circles are indicative of the amplitude of the phenomena and do not express quantitative information.



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Data courtesy of Laurent Lebreton/The Ocean Cleanup.

Sources: IPCC scenario SRES B2; Jambeck, J., R., et al., Plastic waste inputs from land into the ocean, Science, 2015; Watson, R. A., et al., Global marine yield halved as fishing intensity redoubles, 2013; Halpern, B. S., et al., A Global Map of Human Impact on Marine Ecosystems, 2008.



2. Pathways and Distribution
Pathways

 Riverine input - likely relevant due to size of watersheds and population density and economic activity compared to coastal Arctic

Atmospheric input - unknown

Oceanic input – likely relevant due to inflow from Atlantic
Sea-ice input – additional pathway



River input models















• 3. Interactions with biota and impacts Interactions with biota Ingestion not significant route of exposure Marine mammals – effects demonstrated at organism level Fish and vertebrates – mesopelagic fish role?



Seabirds - confirming trends identified on surface water samples &



• 3. Interactions with biota and impacts Entanglement • • Pinnipeds – Bering Sea populations under pressure due to fisheries – entanglement or prey competition? Cetaceans Crustacea and fish Terrestrial species Rafting of alien species Pathways for input/redistribution Ecological impacts? Impacts at the population level for fulmars and crayfish

Plasticized animal species - Entangled

Number of species with documented records of entanglement in marine debris

Whales Turtles Penguins Grebes Pelicans, gannets Eared seals and boobies ropicbirds Toothed whale (47.4%) Albatross and othe Procellariiformes Fish erns and auk

Source: Kühn, S., et al., Deleterious Effects of Litter on Marine Life, in Bergmann, M., et al., Marine Anthropogenic Litter, Springer, 201







• 3. Interactions with biota and impacts • Socioeconomic impacts – no Arctic specific data • Fisheries • Sealing by indigenous communities • Shipping – mechanical problems • Tourism • Public sector – costs of cleanups



• 4. Response and monitoring Actions and solutions – no systematic collection of information • Beach clean-ups • Fishing for litter Monitoring • OSPAR beaches Fulmar stomach content used across the Arctic by researchers No formal Arctic monitoring program for marine plastic pollution

Protecting and conserving the North-East Atlantic and its resources

Home | Beach map | Beach list | Survey data

Surveyed beach locations

• 5. Gap Analysis • Drivers • Pathways Distribution and trends Interactions with biota and derived eco- and socioeconomic impacts

Thanks for listening Feedback Questions

A Centre Collaborating with UNEP

Want to know more?

Marine Litter Vital Graphics

Procellariiformes

Marine Litter Vital Graphics

1 year ago

Every year, the sum of humanity's knowledge increases exponentially. And as we learn more, we also learn there is much we still don't know. Plastic litter in our oceans is one area where we need to learn more, and we need to learn it quickly but we already know enough to take action. It sounds like a contradiction, but it's not. As the Marine Litter Vital Graphics report explains, we need to act now if we want to avoid living in a sea of plastic by mid-century – even if we don't know everything about what it's doing to the health of people or the environment.

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