Concluding Remarks

Grimstad, Siv Marina Flø; Ottosen, Lisbeth Mølgaard; James, Neil

Published in:
Marine Plastics

Link to article, DOI:
10.1007/978-3-031-31058-4_15

Publication date:
2023

Document Version
Publisher's PDF, also known as Version of record

Chapter 15
Concluding Remarks

Siv Marina Flø Grimstad, Lisbeth Mølgaard Ottosen, and Neil A. James

It is clear that there is an urgent need for coordinated and considered efforts to mitigate the impact of end-of-life (EOL) and derelict fishing nets and associated gear. Over the last decade, there has been a significant increase in awareness of the impact of discarded fishing nets, which cause negative impacts on marine life, ecosystems, human health, and the economy. Despite the increased awareness there remain multiple and significant knowledge and data gaps. Collectively, we are still missing vital information on the source, distribution and fate of marine plastics, and their impact on species, particularly at a population level. There are numerous reports of individuals becoming entangled or ingesting plastics, causing injury or mortality (e.g. see Chap. 1). However, a comprehensive understanding of the scale of the impact of marine plastics, put into context with other threats and pressures faced by marine species, and how this is changing over time, currently eludes us. There are several approaches which can help inform and fill these gaps. For instance, the use of citizen science (see Chaps. 1 and 8) is proving invaluable in providing data on the distribution and type of plastics in the environment particular, whilst remote sensing (mentioned in Chap. 1) has the potential to significantly increase the ability to identify environmental plastics hotspots. Both citizen science and remote sensing are likely to be increasingly important approaches in the future, with the potential to help locate and target cleanup operations and enable the return of a great deal more plastics to the economy.

S. M. F. Grimstad (✉)
NTNU (Norwegian University of Science and Technology), Ålesund, Norway
e-mail: sika@ntnu.no

L. M. Ottosen
Technical University of Denmark, Lyngby, Denmark

N. A. James
Environmental Research Institute, UHI North Highland, University of the Highlands and Islands, Inverness, Scotland, UK

S. M. F. Grimstad et al. (eds.), *Marine Plastics: Innovative Solutions to Tackling Waste*,
https://doi.org/10.1007/978-3-031-31058-4_15

An additional issue with fishing nets is that they are a vector for micropollutants. Fishing nets are primarily made of plastics, which have been shown to absorb micropollutants, including metals (Chap. 11). Measuring the concentration of metals on used fishing nets is important in understanding the pathway into the marine food web, with potential implications for human health. The level of metals accumulated on fishing nets also has consequences for the reuse, recycling, and upcycling of this material and could be a prohibitive barrier in certain circumstances. However, at present the fishing nets in Greenland have metal content at acceptable levels, potentially allowing reuse as a low-cost water treatment and in building materials (Chap. 12).

Identifying existing and emerging hotspots of marine plastic can assist the accumulation of material with a view to material being recycled or otherwise used or processed. This material could be used in addition to end-of-life fishing nets at known locations, for example at port facilities, or in established collection streams. Understanding the amount and type of material that is available for recycling, and the rate at which fishing nets reach end-of-life, is vital to enable and inform the development of sustainable business models. The Drivers, Pressures, States, Impacts, and Responses framework for abandoned, lost, or otherwise derelict fishing gear (DAPSIR-ALDFG) outlined in Chap. 2 provides a model allowing a better understanding of how aquaculture and commercial fishing industries in Norway impact. This model could be used by policy makers to inform and prioritise actions and circular economy tools to reduce negative impacts and enable sustainable business models. The model can also be tailored and implemented in other countries and regions.

In addition to the need to further identify the presence and impact of marine plastics, there is a pressing need to increase sustainability of fishing gear and develop end-of-life and second life solutions. In many instances, sustainability can be achieved through the movement towards a more circular economy and the formation and the implementation of sustainable business models. Chapter 4 provides insights on the level of circularity of SMEs within the marine plastic recycling value chain in the north-western part of Norway. Advancing fishing gear sustainability and implementing circular economy tools is particularly important for regions such as the Northern Periphery and Arctic region (Chap. 3), which has vast coastlines, important fishing industries, few large urban areas, and is predominantly composed of remote regions. Developing sustainable business models and a circular economy for fishing nets for such reasons is particularly challenging, as there are often large distances from the sources of disposed and/or end-of-life material, and recycling facilities and business infrastructure. To enable circularity, the value chains need to become more mature and reliable, and there is a problem as discovered in Chap. 6 that the current regional cluster for fishing nets in Norway is at an early stage and suffers from the deficiency imposed by insufficient reverse-chain relations. There is a need to identify best practice of collecting and handling EOL fishing gear, ghost gear and beach debris, and Sotenäs Marine Recycling Centre (SMRC), in Sweden seems to be just such a case. The marine recycling centre is seen as a pioneer on its field in the Nordic Countries, and the centre has a lot of expertise regarding collection,

sorting and recycling of fishing gear since their start-up in 2018. Sotenäs operations are described in Chap. 10.

However, remote and rural regions also represent opportunities, with residents often invested and active in the protection and clean-up of their home region. This is exemplified in Chap. 9 where the findings revealed that value chain collaboration between SMEs and NGOs stimulate innovation in the local environment and within the industry and thus enhances recycling of marine plastics. For entrepreneurs and SMEs to enter the recycled fishing gear industry, there needs to be a viable business opportunity, in other words there must be a large enough target customer group for these products who are willing to pay the price for more sustainable products. Chapter 13 studies the purchase intentions for consumers for greener products. If the appropriate steps can be made concerning the implementation of business models, with supporting policy and initiatives, the NPA-region could become a flagship for a circular economy surrounding fishing gear. In particular, Norway appears to be leading the way in several areas. One of these is in the reporting of lost fishing gear. Another is in the engagement of stakeholders in developing a strategy for fishing gear resource management (Chap. 14). National Circular Economy policy developments are on the increase in Europe, and these are likely to present significant challenges for the sector, but may also highlight new opportunities for the development of new circular business models for fishing gear across its life cycle (Chap. 5). Opportunities continue to present themselves for the further development of products reusing fishing gear and using recycled polymers from waste and end-of-life fishing gear in new applications within or outside of fishing sector. Recycling opens up the possibility to add a positive value to the plastic waste and can thus be a key to avoiding discharge in the environment. It is important, however, to understand the environmental impacts of recycling processes to avoid problem shifting, and with life cycle assessment as tool it was found that production of recycled PP/PE granulate compares favorably with the production of virgin PP and PE (Chap. 7). Another option other than producing granulates for valorizing the discarded nets, can be to use shredded nets as fibre reinforcements in construction materials, e.g. for reinforcement of earth-based adobe bricks (Chap. 12). The encouraging results point at the potential to be explored in the use of fishing nets for reinforcement of, or in, other types of (construction) materials. The work in the chapters originates from the Circular Ocean and Blue Circular Economy projects, and a holistic approach (as in these projects) is necessary to find solutions to the on-going challenge of discarded fishing gear. This book is thus a contribution to the understanding of the current practice for collecting and handling EOL fishing gear in the NPA area, whilst demonstrating a future need for more elaborate practices of such collection and handling. It is therefore both apparent and imperative that relevant stakeholders are prepared and ready when legislative changes (such as extended producer responsibility and EU port reception facilities directives) come into force.