

Deep-Sea Plastics and Human Rights

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The deep sea is remote, but not removed from human society. As such it is impacted by plastic pollution and this pollutant has direct and indirect consequences on the deep sea, its life and processes.

Introduction

Although vast and distant from much of society, the deep ocean provides vital services to the entire planet and all humankind (Armstrong et al. 2012). The ocean connects us all, and our actions have consequences on the ocean that are felt by others globally. The services provided by the deep ocean include fish stocks, bioactive pharmaceutical compounds, oil, gas and minerals. It also contributes to critical processes such as climate regulation, CO₂ storage, and nutrient cycling, and hosts intrinsic cultural value as a place of wonder, learning and natural appreciation (Ottaviani 2020, Thurber et al. 2014). Alongside these services, the deep-ocean experiences many stressors and is the ultimate sink for human-derived pollutants.

Studies from across the globe have documented many types of plastic items present in the deep sea (e.g. Chiba et al. 2018; Ramirez-Llodra et al. 2011; Pham et al. 2013) as pollution. These span the deepest ocean trenches (Fischer et al. 2015) to polar waters (Hallanger and Gabrielsen 2018; Cunningham et al. 2020) and productive fishing grounds (Baechler et al. 2019). Impacts from this pollutant include entanglement, ingestion and chemical toxicity (Napper & Thomson 2020) and magnification of other challenges such as climate change (Cornejo-D'Ottone et al. 2020). Plastic pollution can also result in negative economic and social consequences (Abalansa et al. 2020). The documented cases that follow show a clear impact on current and future human rights, as plastic pollution eliminates the opportunity for a clean environment. Although sources of this pollution cannot be directly traced, observation and correlative studies suggest it mainly originates from land, with lesser contributions from vessels and offshore installations (Jambeck et al. 2020).

Points for consideration

Ghost fishing gear

Fishing gear is predominantly plastic and a particularly problematic pollutant. The deep sea is a stable environment and consequently items do not degrade at the same rates as they do at the sea surface or in other settings (Andrady 2015). Lost or abandoned fishing gear therefore persists, continuing to catch life that is no-longer harvested, 'ghost fishing'. With deep-sea fish maturing at a late age (e.g. orange roughy, Minto & Nolan 2006), it is particularly damaging when they are caught before they

reach sexual maturity. Ghost fishing has been observed across the globe (e.g. Isla del Coco National Park, Costa Rica; Naranjo-Elzondo & Cortes 2018). This pollution impacts commercially valuable fish stocks as well as critically endangered marine wildlife, including multiple species of whales, sea turtles, and sharks (Matsuoka et al. 2005). The risk of entanglement of the plastic around deep-sea equipment, also impacts the rights of seafarers to work in a safe environment.

Arctic waters: A cause for concern now and in the future

The deep waters of the Arctic contain levels of plastic greater than some areas near the coasts of mainland Europe (Oliveira et al. 2015) with both large items and microplastics being observed (Halsband & Herzke 2019). One study made at 2 500 m depth, found 0.2-0.9 pieces of plastic per kilometre (Galgani & Lecornu 2004). These numbers are expected to increase in the future (Bergmann & Klages 2012). It has been suggested that plastics accumulate in major surface and sub-surface currents heading north along the European mainland. This results in the Arctic being a sink for this litter. Plastic that becomes trapped in the pack ice (Obbard et al. 2014) and released at later dates is a source of pollution for years to come, affecting the rights of future generations to a clean environment.

Plastic pollution as a vector for additives and contaminants

Plastic fragments are a vector of metal and persistent organic pollutants (POPs) (Martins et al. 2020; Pannetier et al., 2019; Ashton et al., 2010) which constitutes an additional environmental risk and subsequent violation of human rights. There is evidence of deep-sea plastics harbouring organic pollutants (e.g. South China Sea; Dasgupta et al. 2020). These toxic contaminants could be bioavailable and readily ingested by animals interacting with the plastics, and subsequently bioaccumulate through the food chain. The increased consumption of demersal species and the reported presence of microplastics in edible tissues (Barboza et al., 2020; Chae et al, 2019) has raised concerns about the consequent hazard of seafood consumption to human health. The risk assessment and mitigating strategies of plastic pollution is therefore particularly timely (Gallo et al., 2018; Prinz and Korez, 2020). Since seafood consumption is one of the main routes of human exposure to plastic pollution, it is urgent to take actions to understand the interactions between microplastic ingestion and consumers' health.

Plastics debris including industrial fishing gear as vectors for alien invasive species.

A fouling community is known to exist on plastic debris at the ocean surface (e.g. Rech et al. 2021) and at depth (Woodall et al. 2015); this biofouling is also thought to change how these items move in the water column (Kooi et al. 2017). The transfer of organisms to new locations can result in the introduction of non-native species, which can turn into invasive species when their biological characteristics and environmental conditions align so that they rapidly spread (e.g. by out-competing native organisms). In this way plastic debris can act as a vector for invasive species which, by altering marine communities, can modify trophic interactions and affect ecosystem services (Katsanevaskis et al. 2014).

Indigenous rights

The pollution of the deep sea with plastic could be considered an invasion of land tenure rights. For example, Tongareva Atoll, Cook Islands rises as an isolated feature from the deep ocean. The 200 inhabitants live a subsistence lifestyle gathering fish and shellfish, but the beaches and lagoon are filled with oceanic plastics and industrial fishing gear. Debris comes from across the globe with single-use plastic water bottles appearing to have come from at least 12 nations (White 2014). With tuna being caught from 600 m depth, plastic pollution in the deep sea is equally as problematic. Therefore

plastic in the deep sea is in direct contravention to the United Nations Declaration on the Rights of Indigenous Peoples (61/295).

A contributor to poor mental health and well-being

Deep-sea plastic pollution creates a mental health burden to many (Jambeck 2020). By simply knowing that a remote location that no human has even seen, is already polluted, is disempowering and is associated with the phenomena known as 'ecological grief' (Cunsolo & Ellis 2018). This pollution is considered a risk to well-being and a threat to the economic, social and cultural benefits communities receive from the ocean (Gollan et al. 2019). The connection between well-being and mental health with blue space is still being investigated, and future studies will provide clarity on this.

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