UN Environment Observer Statement
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Nearly 15 years ago, the Arctic Council released the Arctic Climate Impact Assessment (ACIA, 2004). It sounded an alarm about the dramatic effects climate change was having on the region's ecosystems and people who rely on them. The ACIA was the world's first regional climate assessment and it was a call to action, drawing attention to a region that for many had seemed remote and largely disconnected . Among its key findings were that climate change would incur changes in vegetation and animal species shifts, increased coastal erosion and sea level rise, and negative effects on the lives and cultures of Arctic local and Indigenous Peoples.

The winter of 2016-2017 was the warmest ever for the Arctic, with sea ice hitting record lows for that time of year. Indeed, projected temperature changes for the Arctic follow a winter warming trend at a rate that is at least double the rate for the Northern Hemisphere predicted under either a medium or high emission scenario (AMAP, 2017). This means that even if countries manage to cut greenhouse gas (GHG) emissions based on the targets outlined in the 2015 Paris Agreement on Climate Change, winter temperatures in the Arctic would still be 3 to 5°C higher by 2050 and 5 to 9°C higher by 2080 relative to 1986-2005 levels.

There is therefore no doubt that the Arctic will be a very different place in the decades to come. This is the state change that the AMAP (2017) report referred to and it stresses the importance of urgent adaptation and mitigation actions. These must proceed in parallel, integrate and respect indigenous knowledge, and include socio-economic drivers.

Based on satellite monitoring from 1979 to the present, Arctic sea ice has declined in area by around 40% (Parkinson and DiGirolamo, 2016). Climate models predict that, at the current rate of rising atmospheric CO_2 concentration, Arctic summers will be ice-free by the 2030s, although considerable uncertainty on this exists (Jahn et al., 2016). Less Arctic sea ice could see the expansion of some economic activities such as new polar shipping routes, spread of fisheries, oil and gas exploration and mining (Harris et al., 2018).

New evidence suggests that permafrost is thawing much faster than first thought. This spells danger not just for the Arctic peoples and ecosystems, but for the entire planet. While the amount of greenhouse gas emissions attributed to permafrost has been relatively small over recent decades, increased thawing is expected to contribute significantly to carbon dioxide and methane emissions. Some of the coldest permafrost grounds have warmed by more than half a degree Celsius since 2007-2009 (AMAP, 2017). Thawing permafrost also leads to coastal erosion, threatens human settlements and infrastructure (Hovelsrud, 2011), and could release mercury stored in soil (Schuster, 2018).

Taking into account the uncertainties, the melting of the Greenland ice cap and the Arctic glaciers contribute to approximately one third of the current sea level rise (Bamber et al., 2018). Coastal communities, low-lying islands and ecosystems worldwide will be affected by the melting of Arctic glaciers and ice sheets and the increasing rate of global sea-level rise (Noël et al., 2017). Further impacts include coastal flooding, erosion, damage to buildings and infrastructure, and changes in ecosystems and seawater contamination of drinking water sources.

Climate-induced changes to habitats and wildlife together with other pressures mean Arctic peoples face increasing food insecurity. Other effects include increasingly difficult travel conditions limiting access to hunting areas. Besides threats to food sources, declines in some species will have cultural impacts. Within the Arctic, the integrity of ecosystems and the sustainability of communities are being challenged, affecting how people live and pursue their livelihoods.

Despite knowledge gaps, current findings and models underscore a high confidence that methane, tropospheric ozone and black carbon together play a significant role in Arctic climate change. Since much Arctic warming can be ascribed to Short Lived Climate Pollutants emissions from outside the Arctic, regional efforts to reduce SLCPs must be complimented by global emission reduction efforts.

In the Arctic, anthropogenic climate change is the most serious threat to the biodiversity and increases the pressure from all other threats (CAFF, 2013). Aichi target 11 states that 10% of marine and 17% of terrestrial areas should be protected by 2020 (UNEP & CBD, 2011). In the Arctic, protected areas cover just over 20% of terrestrial areas but less than 5% of marine areas.

Since a large part of the overall species biodiversity in the Arctic consists of migratory species, changes in their populations, distribution and migratory pathways heavily affect the whole Arctic ecosystems and the people that live there and rely on them. (CAFF, 2013). International coordination is key to successful conservation.

So far, the Arctic region has fewer recorded terrestrial and marine invasive species than areas further south, although monitoring has been limited (CAFF, 2013). Some of the most well-known invasive species include the American mink, introduced to Iceland and northern Scandinavia and the Pacific red king crab which was brought to the Barents Sea.

While still considered an invasive species, harvesting red king crab has become a profitable industry for Norway and Russia (Lorentzen et al. 2018). Climate change and increasing human activity both on land and at sea will increase the risk of invasive species finding a home in the Arctic. However, there is sufficient scientific understanding for proactive management and policy on invasive species, and a wealth of successful examples around the world to draw from. The Arctic has a unique opportunity to be proactive now and to limit the spread of invasives.

The effects of ocean acidification on Arctic ecosystems begin from the bottom of the food chain. Acidified waters are not suitable habitat for shelled pteropoda plankton species, whose ability to build shells declines when acidity increases (Comeau et al., 2009). Pteropoda are an important food source for animals such as kittiwakes, bowhead whales, salmon and herring (AMAP, 2013). Any decline in plankton populations may cause animals higher in the food web to either decrease in number or migrate towards more abundant foraging grounds. In the Arctic, these changes may affect the economy and livelihoods by impacting subsistence harvesting and tourism such as sport fishing and whale watching (Secretariat of the Convention on Biological Diversity, 2014; AMAP, 2013).

While some types of pollution affect people and environments close to the source, others are transported over great distances by air, rivers and ocean currents. In the Arctic, most pollutants originate from outside the region, and the geographical characteristics and cold climate make it a sink for many contaminants that are spread from around the globe (AMAP, 2009). Many pollutants, such as heavy metals and Persistent Organic Pollutants (POPs), remain in the region for long periods of time with the ability to accumulate in the food chain and threaten human health.

Mercury (Hg) contamination in the Arctic is a continuing concern, due to its documented uptake and biomagnification in Arctic biota, especially marine mammals and terrestrial predators (AMAP 2011). People living in the Arctic who consume a traditional diet high in whale and seal meat may be exposed to high concentrations of mercury (AMAP 2011). The Minamata Convention, combined with national climate policies that result in reduced coal burning, will lower global mercury emissions (Maas & Grennfelt, 2016). However, any gains may be offset by the release of legacy mercury stored in tundra soils and permafrost. If this mercury is released and enters the food web it could result in dangerous contamination levels in the main dietary protein sources, with a devastating impact on food security in the Arctic.

POPs include a number of pesticides and industrial chemicals and their by-products. Global efforts to regulate these substances include the Stockholm Convention and the UNECE Convention on Long Range Transboundary Air Pollution. Levels of contaminants have been monitored for decades in the Arctic through air- and biomonitoring of humans and animals tracking changes in contaminant concentration. New research shows that levels of some POPs regulated under the Stockholm Convention are decreasing in the Arctic (Rigét et al. 2018). As new chemical contaminants find their way to the Arctic, the need to strengthen existing international mechanisms to address this issue becomes more pressing. One substance showing similarities to POPs in terms of potential harmful effect, persistence and transportation ability are micro- and nano-plastics, small particles made up of organic polymers. Micro plastics are increasingly present in the world's oceans, either broken down from larger plastics or deliberately manufactured. Micro plastics can also act as a source of other chemical contaminants, either by leaching additives as they age or by absorbing chemicals in marine waters (AMAP, 2017).

Plastic makes up approximately three quarters of the marine litter found in the world's oceans (Bergmann et al., 2017a). It is one of the most pervasive transboundary pollution problems affecting marine and coastal environments, and it's a threat from which the Arctic is not immune. Arctic seafloor and shoreline studies indicate that sea-based sources of plastic in the Arctic region are more relevant than debris coming from the land as hinted by the predominance of plastic debris associated with fishing activities (Bergmann et al. 2017b, Buhl-Mortensen and Buhl-Mortensen, 2017; Nashoug 2017, Grøsvik et al., 2018). The potential local input related to poor waste management in Arctic coastal communities has also been highlighted (Strand et al., 2018). Marine plastic pollution in the Arctic is furthermore linked to debris arriving from other parts of the globe.

While greenhouse gas emissions and pollution mainly originate outside the polar region, they are projected to bring wide-ranging changes and impacts to the Arctic environment. These changes will, in turn, affect the planet´s health as a whole. For this reason, people inside and outside the Arctic share a common stake.

Improving the global understanding of the implications of Arctic change for the rest of the planet, in order to build resilience, is a major UN Environment policy goal. At the same time, UN Environment aims to transmit the knowledge of global environmental processes, changes and issues and their specific impacts on the Arctic to the attention of the policy- and decision-makers at global and regional levels. UN Environment recognizes that we collectively must strive to fill data gaps and continue to undertake credible, legitimate and relevant environmental assessments, involving all relevant stakeholders, in pursuit of this knowledge to support evidence based decision making that will put the world on track to achieve the Sustainable Development Goals and other critical international policy goals.