2-page proposal for Arctic Environment Ministers Meeting. Focus on Arctic Ocean Acidification

Summary of the main messages

Arctic marine waters are experiencing ocean acidification. The primary driver of ocean acidification is carbon dioxide emitted to the atmosphere by human activities with subsequent uptake by the oceans. Ecosystem changes associated with ocean acidification may affect the livelihoods of Arctic peoples. Joint efforts to reduce the emission of carbon dioxide, implement adaptation strategies and strengthen research and monitoring efforts to understand the mechanisms and impacts of ocean acidification should be strengthened.

Main environmental challenges and issues that require common solutions in the Arctic.

Increasing concentrations of carbon dioxide in the atmosphere has impact on the chemistry of the marine environment and results in marine acidification. Current rate of acidification is more than 10 times faster than at any time during at least the last 55 million years.

Organisms react differently to ocean acidification. Corals and shell builders are expected to generally decline, while seagrasses may increase. There is a potential decline in key commercial fish catches.

In 2013, the Arctic Council's Arctic Monitoring and Assessment Programme (AMAP) Working Group produced its first major Assessment on Arctic Ocean Acidification. The assessment presents a series of findings, including

- Arctic marine waters are experiencing widespread and rapid ocean acidification
- The Arctic Ocean is especially vulnerable to ocean acidification
- The primary driver of ocean acidification is uptake of carbon dioxide emitted to the atmosphere by human activities
- Ecosystem changes associated with ocean acidification may affect the livelihoods of Arctic peoples

The report also presents these recommendations

- Urge its Member States, Observer countries, and the global society to reduce the emission of carbon dioxide as a matter of urgency.
- Call for enhanced research and monitoring efforts that expand understanding of acidification processes and their effects on Arctic marine ecosystems and northern societies that depend on them.
- Urge its Member States to implement adaptation strategies that address all aspects of Arctic change, including ocean acidification, tailored to local and societal needs.

AMAP is currently updating the 2013 assessment with focus on societal impacts of ocean acidification. The assessment will (among other things) address these questions: 1) How will the ecological framework respond? 2) What are the socioeconomic and cultural

consequences? 3) Guidance for management of change, and 4) How will the Arctic impacts on global systems?

Ocean acidification is related to several of the overall Sustainable Development Goals (SDG), including Goals 2 ('End hunger, achieve food security and improved nutrition and promote sustainable agriculture'). More specifically, ocean acidification is related to Goal 13 ('Take urgent action to combat climate change and its impacts') and is particularly mentioned in Goal 14 ('Conserve and sustainably use the oceans, seas and marine resources'): "Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels" (14.3). The associated indicator is "Average marine acidity (pH) measured at agreed suite of representative sampling stations".

Ocean acidification was one of the themes at an Arctic science networking workshop held in September 2017 as part of the Finnish chairmanship of the Arctic Council. Under the heading "Arctic Ocean Safety, Security and Stewardship", the topic was a part of the US chairmanship of the Arctic Council: "Create a better understanding of Arctic Ocean acidification and its effects on Arctic organisms and the economies that rely on them."

At the Environment Ministers' meeting it would be relevant to discuss how to encourage efforts that reduce the emission of carbon dioxide. The meeting could make a statement on the need to develop tools and strategies that addresses all aspects of Arctic change, including ocean acidification.

Finally, the meeting could discuss research and monitoring efforts needed to expand understanding of acidification processes and their effects on Arctic marine ecosystems and northern societies that depend on them. It would be relevant to link such a discussion to similar discussions at the 2nd Arctic Science Ministerial in 2018.

The Arctic Monitoring and Assessment Programme (AMAP)

AMAP is the Arctic Council Working Group responsible for "providing reliable and sufficient information on the status of, and threats to, the Arctic environment, and providing scientific advice on actions to be taken in order to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants and adverse effects of climate change".

AMAP has produced several assessments of Arctic climate change and its impact (in 1998, 2005, 2011, and 2017), regional assessments of Adaptation Actions for a Changing Arctic, an assessment of ocean acidification (2013), and assessments of black carbon and methane (2015). Updates are currently being prepared for most of these assessments and an update of the 2013 assessment of ocean acidification is in its final phase. This work has focus on the societal impact of ocean acidification, but will also update the information on the chemistry and biological effects related to ocean acidification that was presented in the 2013 report.