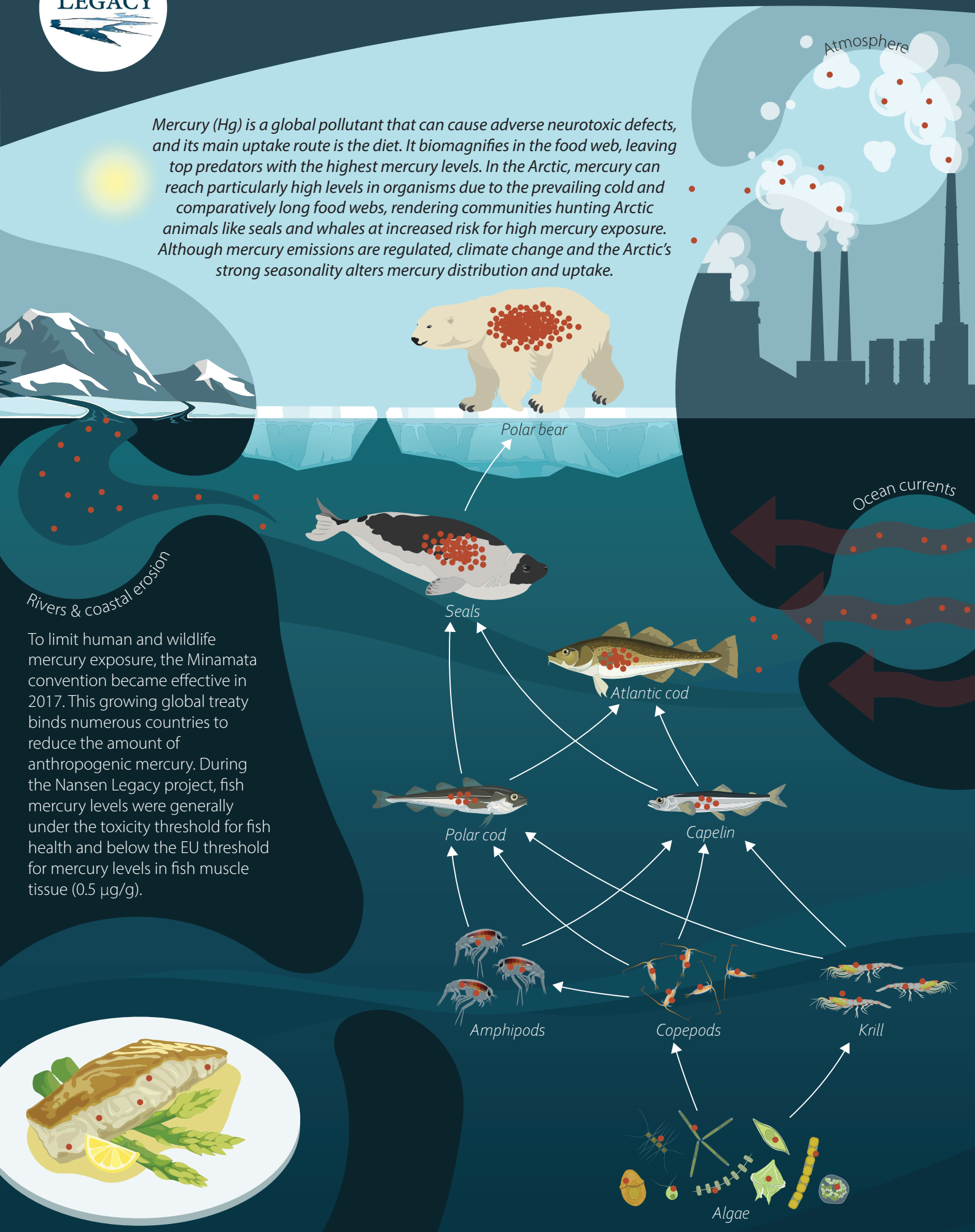
Mercury

Mercury (Hg) is a global pollutant that can cause adverse neurotoxic defects, and its main uptake route is the diet. It biomagnifies in the food web, leaving top predators with the highest mercury levels. In the Arctic, mercury can reach particularly high levels in organisms due to the prevailing cold and comparatively long food webs, rendering communities hunting Arctic animals like seals and whales at increased risk for high mercury exposure. Although mercury emissions are regulated, climate change and the Arctic's strong seasonality alters mercury distribution and uptake.

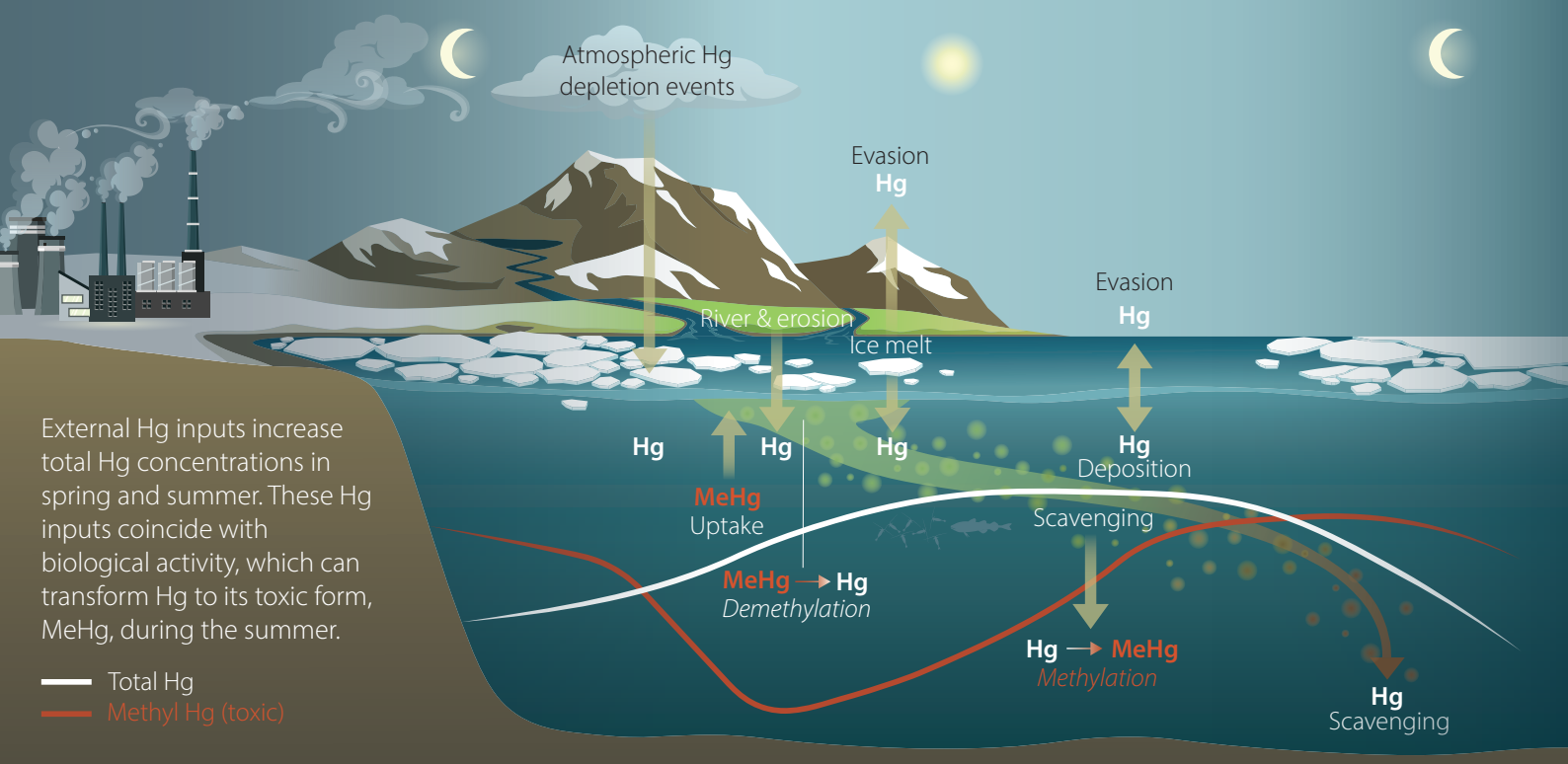


To limit human and wildlife mercury exposure, the Minamata convention became effective in 2017. This growing global treaty binds numerous countries to reduce the amount of anthropogenic mercury. During the Nansen Legacy project, fish mercury levels were generally under the toxicity threshold for fish health and below the EU threshold for mercury levels in fish muscle tissue (0.5 µg/g).

Biomagnification of mercury in the food web

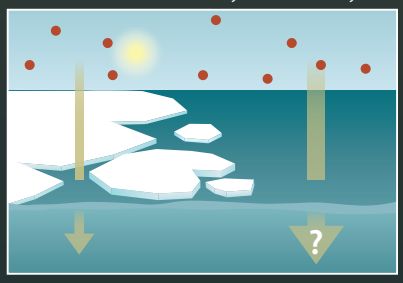
Seasonal cycle of mercury (Hg)

Physical environment



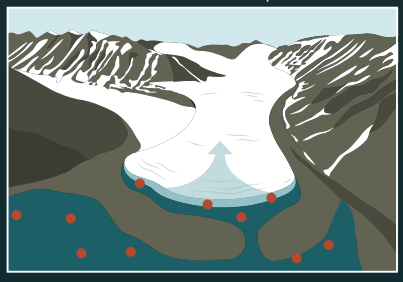
RISK FACTORS

Loss of sea ice & altered mercury chemistry



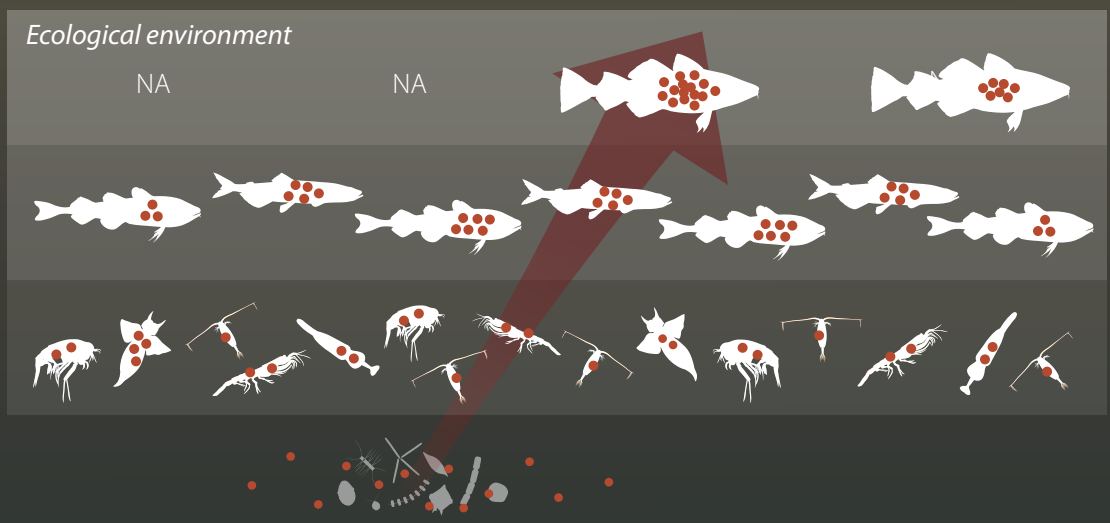
Northward migration patterns & changing food web structures

Input from glacial melt & terrestrial input



Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

Ecological environment



Early results indicate that mercury biomagnifies in the food web with minimal seasonal variations in concentrations within organisms. Mercury levels in Barents Sea fish and zooplankton were detectable, but low compared to other Arctic regions.

RECOMMENDATIONS

The Nansen Legacy project provided valuable information towards maintaining sustainable levels of mercury in the Barents Sea. Although mercury levels are generally low, the potential of mercury to biomagnify in the food web leaves top predators at increased risk for high exposure. Additionally, climate change could alter mercury transport, uptake, and fate into the water column and food web. Therefore, it is important to:

- Continue monitoring mercury in water, sediment, and selected species (both for food-web relevant Arctic and boreal species).
- Extend research to mercury speciation and transformations in the water column.
- Further study bioaccumulation of mercury in the Barents Sea food web – including primary producers and water mercury levels.

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