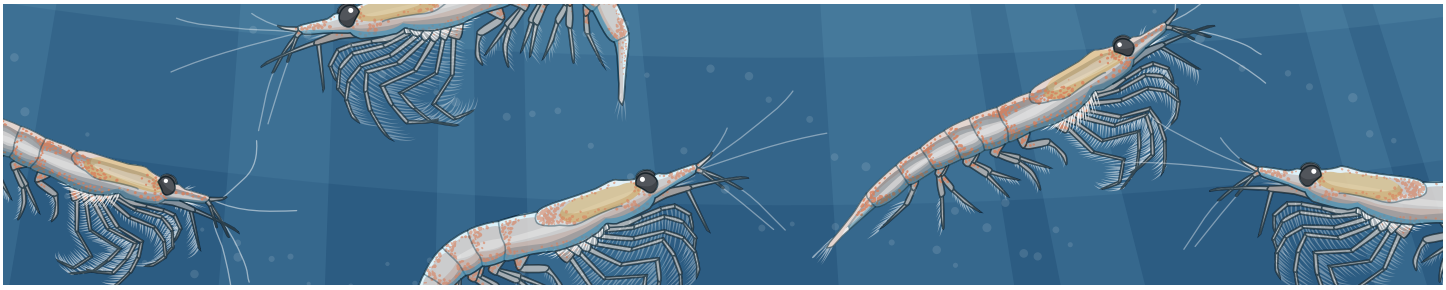
A fact sheet from THE PEW CHARITABLE TRUSTS | Oct 2014



Protecting Antarctic Krill

The key to a healthy Southern Ocean

Overview

Antarctic krill (*Euphausia superba*) are 2½-inch-long zooplankton that form huge swarms in the waters surrounding Antarctica. Although they are tiny, krill play a vital role in supporting the Southern Ocean ecosystem by forming the base of the food web.

Krill are plentiful. In fact, scientists believe the total weight of all Antarctic krill is greater than the cumulative weight of any other animal species on the planet. However, the combined effect of concentrated fishing and climate change on krill—especially near the coast of the Antarctic Peninsula—is reducing the availability of krill in the foraging area of species such as chinstrap and Adélie penguins,[1] and creating a ripple effect throughout the Antarctic food web.[2]

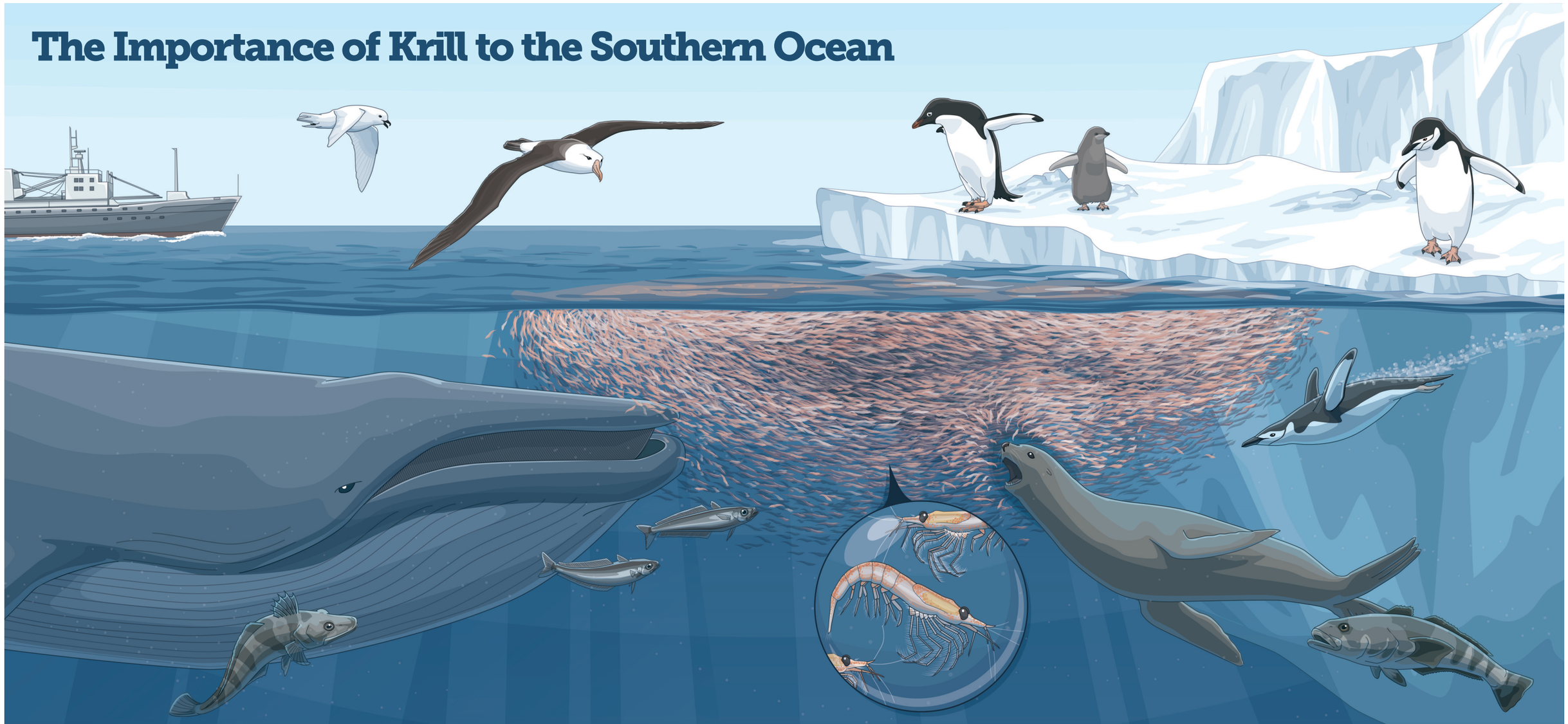
Krill are caught by industrial fishing vessels, the most advanced of which vacuum up and process them on board, allowing for a large catch in a short period of time. Krill are used as an ingredient in animal feed for industrial farming and aquaculture, bait for fishing and omega-3 diet supplements for human consumption.

Temperatures around the Antarctic Peninsula are rising faster than anywhere on Earth. That is causing a massive reduction in the sea ice that krill cling to and the sea ice algae they feed on. Krill abundance correlates closely with the extent of sea ice coverage from the previous year.

The availability of krill during the Antarctic summer is critical to the reproductive success of a wide range of species, including several species of penguins, whales, seals, and other seabirds. However, industrial krill fishing has increased in the waters of Antarctica, and vessels often use foraging penguins and other predators to locate krill hot spots.

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was established in 1982 in response to the growing fleet of krill vessels around the Antarctic Peninsula. Today, CCAMLR manages the krill fishery in these waters by imposing catch limits that are allocated across subareas of the Southern Ocean. These management measures have been effective in regulating krill catches but have not adequately accounted for the foraging needs of penguins and other predators. CCAMLR has a mandate to protect all biodiversity within these waters. The commission must protect the Southern Ocean by protecting the base of its food web—krill.

The Importance of Krill to the Southern Ocean



1. Antarctic krill rely on sea ice for reproduction. Their larvae and juveniles swim close to the bottom of the sea ice, where they feed on algae in the winter.[3]

2. Temperatures around the Antarctic Peninsula are rising faster than anywhere else on Earth, leading to drastic reductions in sea ice, and subsequent declines in the abundance of krill.[4]

3. Scientists believe that the loss of sea ice along the Antarctic Peninsula is contributing to smaller populations of emperor, Adélie, and chinstrap penguins, in part because some penguin species rely on the ice for breeding and rearing their chicks[5] and because the loss of sea ice is reducing the abundance of their favorite food—krill.[6]

4. Antarctic krill are a keystone species, serving as a major food source for more than 25 percent of the species in the Antarctic food web.[7] Krill are the prey of choice for penguins, seals, whales, and many fish species. They provide over 96 percent of the caloric needs of Antarctic seabirds and marine mammals.[8]

5. Penguins make up 90 percent of all seabird mass in the Antarctic Peninsula and Scotia Sea.[9] As sentinels of ocean health, they help scientists understand how other predators will react to changes in ecosystems and prey availability.

6. Krill trawling vessels concentrate fishing activity near coastal areas where penguin and seal populations congregate to breed. This reduces local krill abundance near penguin colonies and can be detrimental to penguin survival.[10]

7. Because of declines in krill, penguins must swim farther offshore for food, decreasing their success in breeding and rearing their chicks.[11]

8. Increased krill fishing and a decline in krill abundance increases competition for food between predator species.[12]

9. Krill is used to make animal feed for industrial farms and aquaculture and is also made into omega-3 supplements.

Conclusion

Antarctic krill form the base of the Southern Ocean food web. Ecosystem-based management of the krill fishery is essential to sustaining the interdependent relationships between this forage species and its predators, especially penguins around the Antarctic Peninsula.

The fishery management plan should move krill fishing out of breeding penguins' foraging areas and require 100 percent observer coverage on krill vessels.

Endnotes

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6 Wayne Z. Trivelpiece et al., "Variability in Krill Biomass Links Harvesting and Climate Warming to Penguin Population Changes in Antarctica," *Proceedings of the National Academy of Sciences of the United States of America* 108 (2011): 7625–28, doi:10.1073/pnas.1016560108.

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