

LICENCE TO KRILL: THE LITTLE-KNOWN WORLD OF ANTARCTIC FISHING



GREENPEACE
PROTECT THE
ANTARCTIC



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EXECUTIVE SUMMARY

GREENPEACE INVESTIGATIONS REVEAL HOW KRILL-FISHING COMPANIES ARE EXPANDING OPERATIONS IN THE FRAGILE ANTARCTIC OCEAN, PUTTING AN ENTIRE FOOD WEB AT RISK. WHAT'S MORE, THEY ARE OFTEN INVOLVED IN FISHING PRACTICES THAT COULD DAMAGE WILDLIFE AND PROTECTED OCEAN AREAS.

Penguins, whales, seals and more all depend on krill for their survival. But these small, shrimp-like crustaceans are threatened by both climate change and the growth in krill fishing, which has been driven in part by an increased demand for the krill oil found in some health supplements.

Since 2010, the krill-fishing industry has grown steadily, with the entry of Norwegian companies and fishing boats, increased catches by South Korean vessels, and the emergence of the Chinese krill-fishing fleet.

Fishing for Antarctic krill is permitted in the Antarctic Ocean under the management of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). The fishery is often referred to as the best-managed in the world, and is focused on the northern tip of the Antarctic Peninsula, the South Orkneys and the Bransfield Strait. This closely follows the main krill-foraging areas for penguins, seals and whales.

Despite the industry's attempts to portray itself as one of the world's most sustainable fisheries, evidence collected by Greenpeace demonstrates a pattern of fishing activity increasingly close to shore and in the

immediate vicinity of penguin colonies and whale feeding grounds.

Crucially, krill fishing is taking place in areas which have been put forward as ocean sanctuaries. Such protected areas will help these marine ecosystems to build resilience to the combined impacts of climate change, pollution and fishing.

As well as robbing marine animals of a vital food supply, industrial krill fishing in such pristine waters carries huge environmental risks. Groundings, oil spills and ship accidents such as fires all threaten the wildlife and fragile habitats of the Antarctic Ocean.

Greenpeace's investigation also exposes the regular use of transshipping, when a catch is transferred from one vessel to another. Our tracking of krill-fishing vessels shows that they have anchored in protected waters, despite the recommendation that anchoring should be avoided as it can damage animals and structures on the seabed.

For these reasons, Greenpeace is calling for krill-fishing companies to restrict all fishing activity in areas under consideration as ocean sanctuaries. We are also calling on krill-buying companies to stop sourcing from vessels that continue to fish in these same areas.

Ultimately, we are calling for international collaboration between governments, companies and civil society to create a large-scale network of ocean sanctuaries, including in the Antarctic Ocean, to protect at least 30% of the world's oceans by 2030.



INTRODUCTION

SITTING AT THE END OF THE WORLD, THE ANTARCTIC OCEAN IS HOME TO A BROAD DIVERSITY OF LIFE: COLONIES OF EMPEROR AND ADÉLIE PENGUINS, THE INCREDIBLE COLOSSAL SQUID, AND THE LARGEST ANIMAL ON THE PLANET, THE BLUE WHALE. THE ECOLOGY IN THE ANTARCTIC OCEAN HELPS TO REGULATE OUR CLIMATE, AND ITS PRESERVATION COULD BE VITAL TO BUFFER THE WORST EFFECTS OF CLIMATE CHANGE. INCREDIBLY, IT'S ONE OF THE FEW MAJOR ECOSYSTEMS STILL RELATIVELY UNDISTURBED BY HUMAN ACTIVITY.

Despite this, the Antarctic is already experiencing the impacts of climate change at one of the fastest rates on the planet. Western Antarctica, for example, is one of the fastest-warming areas in the world, and the Antarctic Peninsula has experienced a temperature rise of about 3°C during the past 50 years. What's more, the creeping expansion of industrial fishing is targeting the

one species on which practically every animal there relies: krill.

Krill are small, shrimp-like crustaceans which form the basis of the entire Antarctic food web. The main fishing grounds for krill vessels are found around the northern tip of the Antarctic Peninsula, the South Orkneys and the Bransfield Strait and closely follow the main krill foraging areas for penguins, seals and whales. These iconic species are already facing multiple threats from a changing ocean; they do not need an additional strain on their food supply from fishing vessels.

This expansion of krill fishing is being driven in part by an increased demand for the krill oil found in some health supplements. Fishing for Antarctic krill is still permitted in the Antarctic Ocean, which is not protected by the Environmental Protocol to the Antarctic Treaty covering the Antarctic landmass but is managed under the Commission for the Conservation of Antarctic Marine Living

Resources (CCAMLR). Creating a network of well-managed Antarctic ocean sanctuaries would be the first step to protecting krill, the wildlife that depend on krill, our oceans, and our planet.

As might be expected, there is a clear overlap between the countries most strongly opposed to marine protection and those with an active fishing industry in the region. As the largest fishery in the Antarctic Ocean, the krill industry represents a significant lobby capable of transforming or opposing efforts to create an ocean sanctuary. It has a strong presence on CCAMLR, and is also able to exert influence through trade bodies such as the Association of Responsible Krill harvesting companies.

This report both exposes current bad fishing practice in ecologically sensitive waters, and sets out why the industry should voluntarily halt fishing in areas under consideration as ocean sanctuaries.

CREATING AN OCEAN SANCTUARY IN THE ANTARCTIC

OCEAN SANCTUARIES ALLOW WILDLIFE AND ECOSYSTEMS TO RECOVER FROM THE COMBINED IMPACTS OF CLIMATE CHANGE, POLLUTION AND OVERFISHING. HEALTHY OCEANS PLAY A VITAL ROLE IN TRANSFORMING CO2 FROM THE ATMOSPHERE INTO WHAT IS KNOWN AS BLUE CARBON AND HELPING US TO AVOID THE WORST EFFECTS OF CLIMATE CHANGE. WHEN OUR OCEANS ARE PROPERLY PROTECTED WE ALSO SEE MORE DIVERSITY OF LIFE, AND MORE AND BIGGER FISH.

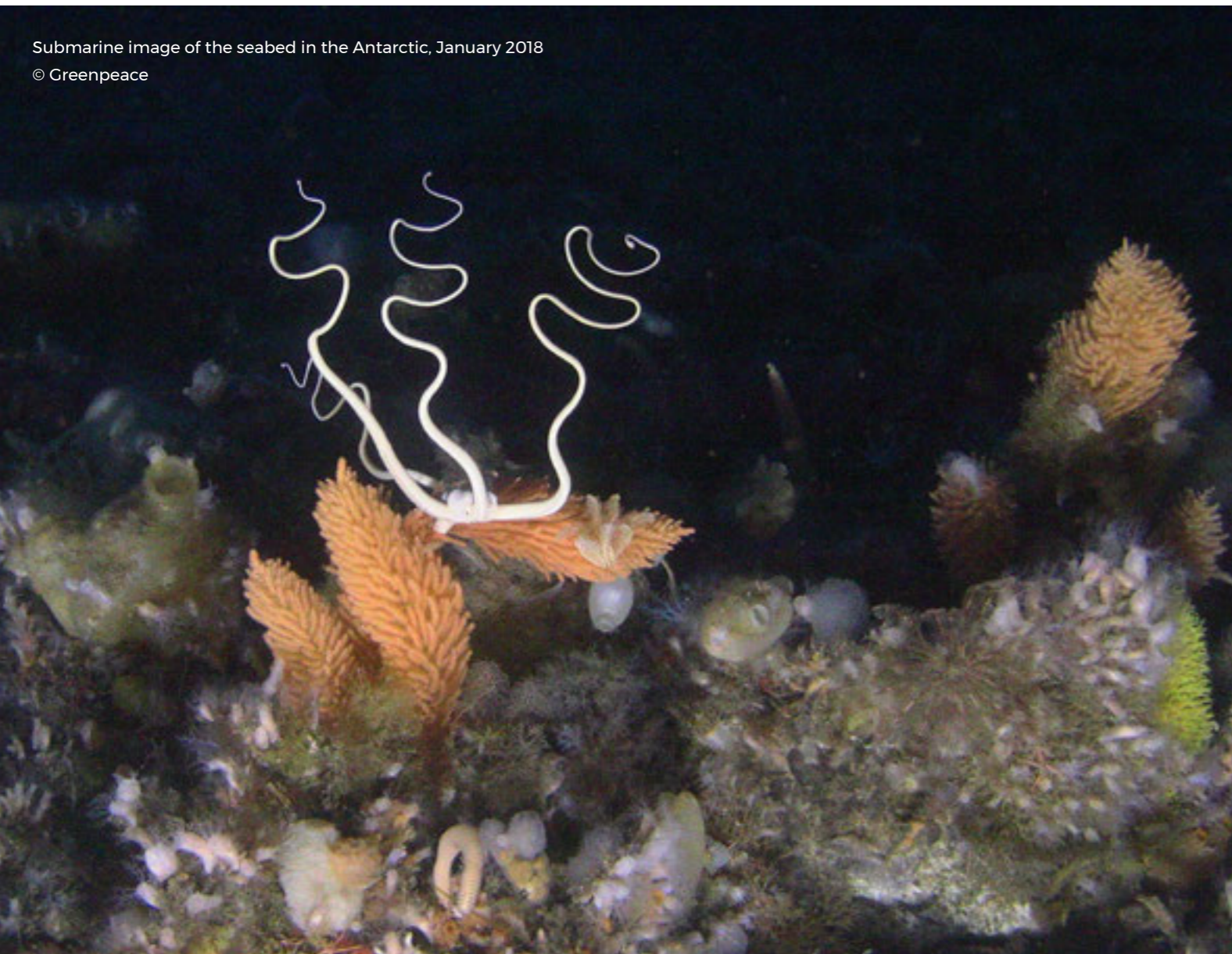
For these reasons, scientists say we need to protect 30% or more of the world's oceans by 2030 through a global network of ocean sanctuaries.¹ However, only around 5% of the world's oceans are currently protected.² As the UN Oceans Assessment points out: "urgent action on a global scale is needed to protect the world's oceans from the many pressures they face".³

Governments have already committed to protect 10% of coastal waters and marine areas by 2020, and negotiations begin in September 2018 for a new UN Oceans Treaty that would enable the protection of biodiversity in areas beyond national jurisdiction.

However, the Antarctic Ocean is different. After long negotiations over the course of the second half of the 20th century, there are already international agreements for how the seas around Antarctica should be managed. In 2002, CCAMLR committed to establish a network of sanctuaries in the Antarctic Ocean and then in 2011 agreed a framework through which to create it. So unlike the majority of international waters, we don't need to wait for a new UN Oceans Treaty. If we want to protect a third of the world's oceans, we must seize this opportunity to create a large-scale network of ocean sanctuaries in the Antarctic Ocean.

Submarine image of the seabed in the Antarctic, January 2018

© Greenpeace





There is growing political momentum behind the creation of sanctuaries in the Antarctic. CCAMLR has a mandate to protect marine life in the Antarctic Ocean and in October 2016 created the world's largest ocean sanctuary in the Antarctic's Ross Sea.⁴ The Commission's member states have proposed additional sanctuaries in East Antarctica, the Weddell Sea and around the Antarctic Peninsula. Greenpeace is calling for fishing, except for scientific purposes, to be tightly restricted in these areas as a precautionary measure.

Sadly, governments were unable to reach consensus on an East Antarctic sanctuary

at a meeting of CCAMLR in October 2017, and pushed the proposal back for further negotiations.

While this is still under consideration there are two more plans being put forward to the Commission: the EU proposal to protect the Weddell Sea,⁵ and the Chilean and Argentine proposal for the Western Antarctic Peninsula⁶ (see Figure 2). These form our next big opportunities to restrict fishing in sensitive areas and protect marine life in the Antarctic.



Figure 1: Seas and oceans around Antarctica

THE WEDDELL SEA OCEAN SANCTUARY PROPOSAL

THE WEDDELL SEA IS ONE OF THE LAST PRISTINE AREAS IN THE ANTARCTIC, NOT LEAST BECAUSE IT HAS SO FAR BEEN SPARED BY THE INDUSTRIAL FISHING FLEET. ICONIC ANIMALS THAT CALL IT HOME INCLUDE EMPEROR PENGUINS, ANTARCTIC PETRELS AND TWELVE SPECIES OF WHALE.⁷ THE HIGH SEA-ICE COVERAGE MEANS IT IS ONE OF THE MOST EXTREME HABITATS ON THE PLANET, AND AN ESSENTIAL SPAWNING GROUND FOR KRILL. AS THE COLDEST SEA ON EARTH, IT HAS THE POTENTIAL TO WITHSTAND SOME OF THE WORST EFFECTS OF CLIMATE CHANGE, AND AS OUR PLANET WARMS IT COULD ACT AS A REFUGE FOR SPECIES THAT DEPEND ON KRILL.

THE PENINSULA OCEAN SANCTUARY PROPOSAL

THE PENINSULA PROPOSAL WILL HELP PROTECT AREAS VITAL FOR FAMOUS ANTARCTIC SPECIES INCLUDING EMPEROR AND ADÉLIE PENGUINS AND KILLER WHALES. IT FOCUSES ON AREAS OF HIGH BIODIVERSITY, WITH LARGE POPULATIONS OF BREEDING AND NON-BREEDING BIRDS AND MAMMALS. AS WELL AS IMPORTANT SEABED PROTECTION MEASURES, THE PROPOSAL ALSO COVERS ESSENTIAL ANTARCTIC KRILL NURSERIES WHICH UNDERPIN THE ENTIRE ECOSYSTEM. CENTRAL TO THE PLAN IS A 30KM BUFFER ZONE FROM THE COAST WHICH WILL "PROTECT THE FORAGING AREAS OF PREDATORS DURING THE SUMMER... (AND) THE EARLY STAGES OF FISH (LARVAE/ YOUNG JUVENILES) THAT MAY BE TAKEN AS BYCATCH BY KRILL TRAWLERS".⁸



Figure 2: Proposed and Agreed Marine Protected Areas in the Antarctic



WHAT ARE KRILL AND WHY DO THEY MATTER?

KRILL ARE FREE-SWIMMING, SHRIMP-LIKE CRUSTACEANS, WHICH FLOAT AND DRIFT WITH OCEAN CURRENTS IN LARGE NUMBERS AND ARE HIGHLY IMPORTANT IN SOME MARINE ECOSYSTEMS. IN THE WORLD'S OCEANS THERE ARE MORE THAN 80 SPECIES OF KRILL, HOWEVER IN THE ANTARCTIC THERE IS ONE PRINCIPAL SPECIES, THE ANTARCTIC KRILL (*EUPHAUSIA SUPERBA*), WHICH IS THE BASIS FOR THE ENTIRE FOOD WEB OF THE ANTARCTIC OCEAN. THIS REPORT REFERS TO ANTARCTIC KRILL.

Krill are found throughout the Antarctic Ocean in a range of habitats, and often form dense “swarms” that can extend for tens of kilometres. The largest concentrations of krill are east of the Antarctic Peninsula (sector 0°-90°W) where there is a greater abundance of food, mostly phytoplankton (microscopic plants).⁹ During the winter, adult krill and larvae feed on algae which grow under the sea ice.

Krill live near the ocean surface, in mid-water and near the ocean floor, and can migrate through the water column daily. Estimates of the biomass of krill in the Antarctic Ocean range between 60m and 420m tonnes,¹⁰ with a current best estimate of 379m tonnes.¹¹ Though abundant, precise estimates are impossible; there are great differences in krill numbers at different times of the year and also great differences between years.

We also know that just because animals are abundant, it doesn't mean they can't be overfished or overhunted. The passenger pigeon, for example, used to be the most abundant bird on earth, with an estimated population of 5 billion – it's now extinct due to overhunting. Similarly, Newfoundland cod were once so numerous that fishermen claimed you could walk on their backs and not get your feet wet – due to overfishing this stock is a fraction of what it was 200 years ago. Many fisheries around the world share this fate and have collapsed or disappeared due to overfishing.

Which Antarctic animals depend on krill?

KRILL ARE A KEYSTONE SPECIES AND EFFECTIVELY UNDERPIN THE ANTARCTIC OCEAN FOOD WEB, WHICH IS NOT AS COMPLEX AS IN OTHER ECOSYSTEMS.

Many species of seals (fur, crabeater, Weddell, elephant) feed extensively on krill, as do a variety of albatrosses and seabirds including Adélie, chinstrap, macaroni, gentoo, emperor, king and rockhopper penguins.

The five species of baleen whale found in the Antarctic Ocean (blue, fin, sei, southern minke and humpback) all feed almost exclusively on Antarctic krill.¹²

Finally, krill are an important part of the diet of various fish species such as Antarctic icefish and invertebrates like squid. Krill also support the populations of other species higher up the chain, such as leopard seals, that hunt krill predators such as penguins.

ANTARCTIC FOOD WEB

Without krill, most life forms in the Antarctic would vanish.

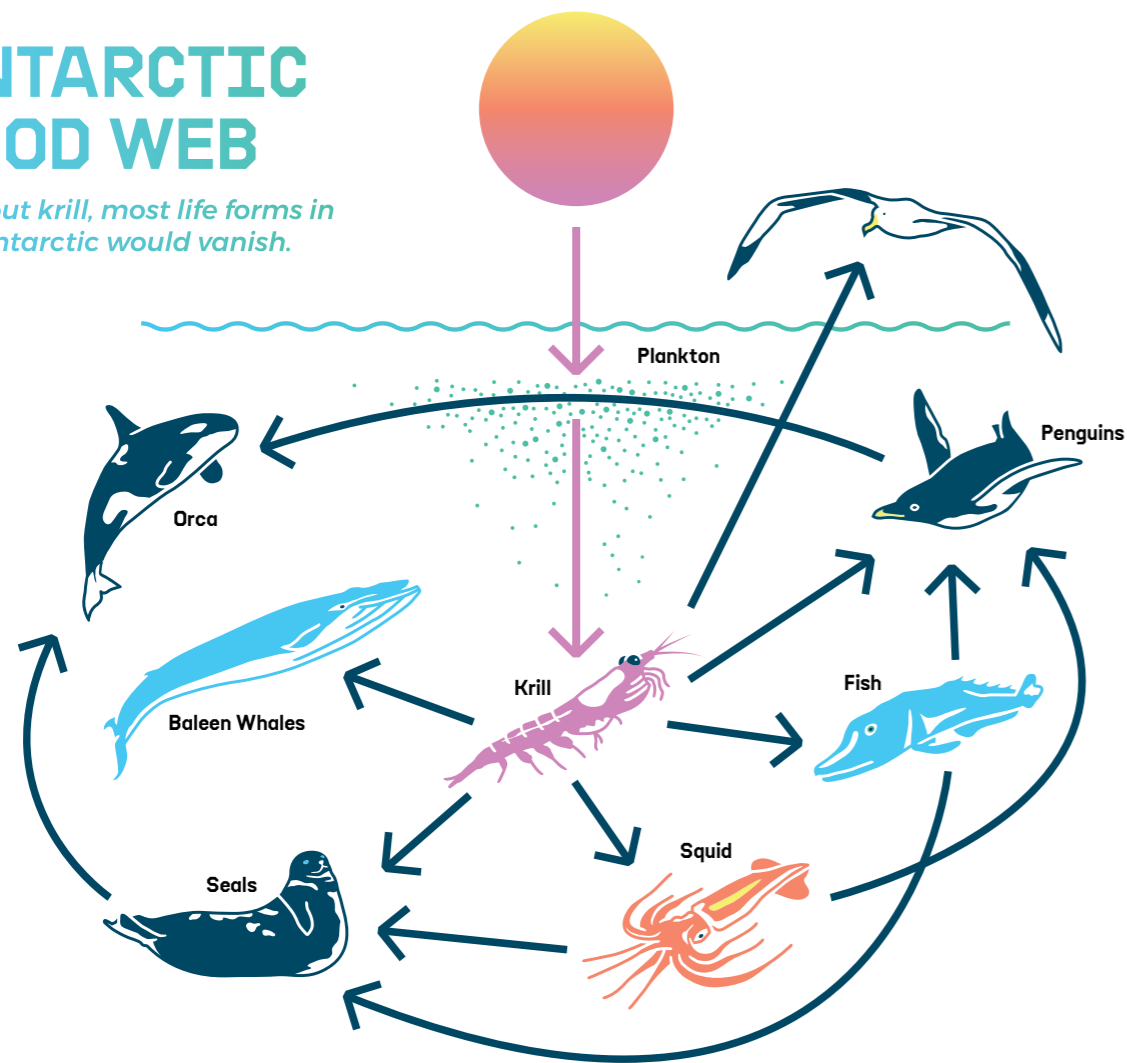


Figure 3: The Antarctic food web

How will climate change affect krill?

IN A CHANGING CLIMATE, KRILL ARE ALREADY FACING AN UNCERTAIN FUTURE, AND THEIR SURVIVAL DEPENDS IN PART ON THE PROTECTION OF THEIR WINTER SEA ICE HABITAT.¹³

Any reduction in the extent and duration of winter sea ice will mean that juvenile krill have less phytoplankton to feed on. This will affect krill's ability to breed and survive, and have possible cascading effects on the whole of the Antarctic food web and beyond.

If the current trends of increasing CO₂ and warming continue, Antarctic krill could lose between 20% and 55% of their habitat by the end of the century.¹⁴ One study found that the habitat suitable for young krill could be reduced by up to 80%. The biggest reductions in sea ice are likely to be in the area where most krill are currently found.¹⁵

High concentrations of CO₂ can also interfere with the metabolism of krill by upsetting their internal pH balance. This can lead to additional stress that may hamper growth and reproduction and could cause a reduction in their numbers.¹⁶

Krill may also be important for the regulation of CO₂ in the atmosphere. Scientists have suggested that krill play an important role in global carbon cycling, as their waste products move carbon into deep waters where it may remain over long periods.¹⁷ Up to 23m tonnes of carbon, more than Bolivia's entire annual CO₂ emissions, could be put out of circulation every year through this process. Though carbon cycling is not yet fully understood, it could be undermined by the threat to krill's survival from climate change.



Antarctic krill (*Euphausia superba*)
© Justin Hofman / Alamy Stock Photo



What is driving demand for krill?

THERE IS A LARGE AND GROWING MARKET FOR KRILL OIL, WITH A GLOBAL VALUE IN 2015 OF USD 204.4M.

Dietary supplements containing ingredients such as omega-3 fatty acids and their metabolites form the largest part of the market (60% in 2015), followed by food for fish farming and pets, and pharmaceuticals. Significant growth is expected due to increased awareness of the health benefits of fish oils, and global revenues are expected to nearly double by 2021.¹⁸ Changing health and wellness trends in China and Japan mean that Asia Pacific is likely to be the fastest-growing market up to 2025.

US AUTHORITIES BAN KRILL FISHING.

IN 2006, THE PACIFIC FISHERY MANAGEMENT COUNCIL IN CALIFORNIA VOTED FOR A COMPLETE BAN ON COMMERCIAL KRILL FISHING OFF THE WEST COAST OF THE USA. THEY CITED THE "IMPORTANCE OF KRILL TO THE MARINE FOOD CHAIN" AND THEIR CENTRALITY TO THE ECOSYSTEM AS THE CHIEF REASONS FOR THE BAN.¹⁹

DO WE NEED KRILL TO BE HEALTHY?

THE NEED FOR OMEGA-3 FATTY ACIDS AND METABOLITES IN OUR DIETS IS WELL ESTABLISHED, AS THEY ARE CRUCIAL FOR A RANGE OF FUNCTIONS INCLUDING BRAIN, HEART AND EYE HEALTH, PARTICULARLY IN PRECONCEPTION, PREGNANCY AND CHILDHOOD YEARS.²⁰ HOWEVER, CONTINUING TO EXPAND A FISHERY IN ONE OF THE MOST REMOTE AND ECOLOGICALLY SENSITIVE AREAS OF THE WORLD IS NOT THE MOST LOGICAL OR SUSTAINABLE WAY TO MEET THIS NEED; PARTICULARLY WHEN THERE ARE SO MANY UNKNOWN THREATENING THE SURVIVAL OF KRILL AND THE ANTARCTIC ECOSYSTEM THAT DEPENDS ON THEM.

OMEGA 3 IS PRESENT IN OUR DIETS, WHETHER THESE ARE VEGETARIAN OR

VEGAN OR INCLUDE MEAT AND FISH, BUT SOME PEOPLE MAY REQUIRE SUPPLEMENTS. AS WELL AS DIETARY SOURCES, THE MOST WELL-KNOWN PLANT-BASED SOURCE OF OMEGA 3 IS FLAX-SEED OIL. A MORE RECENTLY AVAILABLE VEGAN PRODUCT IS SOURCED FROM ALGAE GROWN IN A CONTROLLED ENVIRONMENT. THIS IS FREE FROM THE POLLUTION THAT CAN BE A PROBLEM IN FISH OILS, IS RICH IN FATTY ACIDS, AND HAS OTHER NUTRITIONAL ATTRIBUTES, SUCH AS PHLOROTANNINS, WHICH ARE A GOOD SOURCE OF ANTIOXIDANTS.²¹

WITH THESE ALTERNATIVES AVAILABLE, THERE IS LITTLE NEED TO RELY ON KRILL TO MEET OUR DEMAND FOR OMEGA 3.

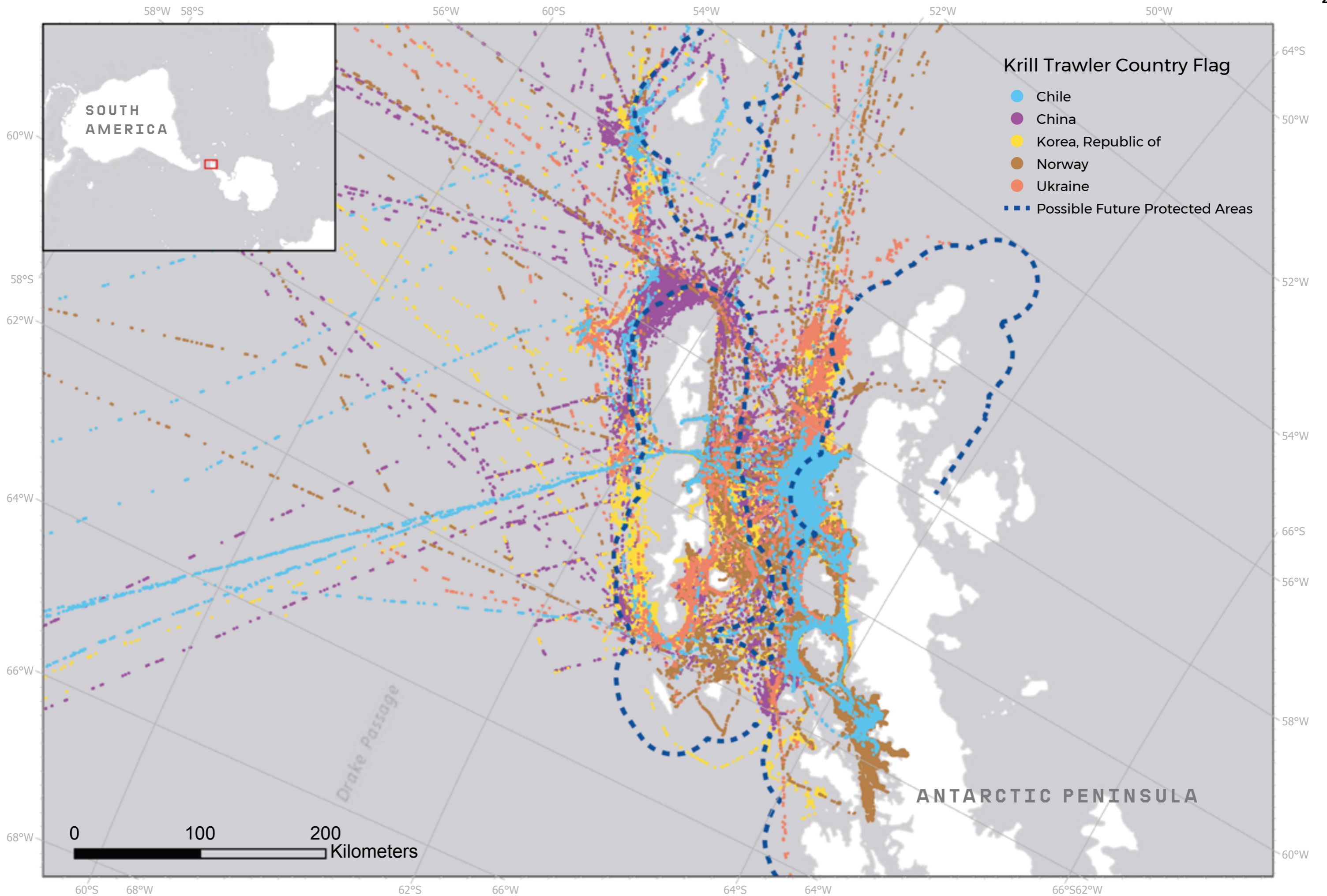


Figure 4: Vessels operating in proposed Marine Protected Areas in the Antarctic



WHO IS FISHING FOR ANTARCTIC KRILL?

KRILL ARE CURRENTLY TARGETED BY A SIGNIFICANT COMMERCIAL FISHERY CONCENTRATED IN THE SCOTIA SEA AND ANTARCTIC PENINSULA REGION. THE FISHERY BEGAN IN 1961, BUT INCREASED DRAMATICALLY IN THE 1970s. THERE WAS A BIG DROP IN CATCHES OF KRILL IN THE EARLY 1990s WHEN THE EASTERN BLOC'S FAR-SEAS FISHERY FLEET WAS REDEPLOYED FOLLOWING THE DISSOLUTION OF THE USSR.²²

For over 20 years, the fishery has taken place almost exclusively in the south-west Atlantic (ie north-west Antarctic waters).²³ Since 2010, the catch has increased quite rapidly with the entry of Norwegian companies, increased catches by South Korean vessels, and the emergence of China as a krill-fishing nation. About 8m tonnes of krill have been caught in the Antarctic over the last 40 years.

A 2016 assessment of the krill fishery noted that "there is currently unprecedented interest in krill as a source of marine proteins and oils and more nations are involved in the fishery than in the past".²⁴ In 2013, China announced it was shifting from experimental to commercial krill-fishing operations in the region. Two years later, Liu Shenli, chairman of the China National Agricultural Development Group, was widely quoted as saying: "We will increase our investment in the Antarctic area in terms of krill fishing. The Antarctic is a treasure house for all human beings, and China should go there and share".²⁵ In August 2017, the Norwegian Ministry of Trade, Industry and Fisheries announced a consultation on doubling Norwegian krill concessions.²⁶ Greenpeace formally objected to this but in February 2018 the Ministry announced they would be handing out two new concessions adding to the existing four.²⁷

How much krill are they allowed to catch, and where?

CCAMLR HAS SET A 'TOTAL ALLOWABLE CATCH' (TAC) FOR THE SOUTH-WEST ATLANTIC AREA OF ROUGHLY 5.6M TONNES EACH YEAR. THIS AREA IS THEN DIVIDED INTO SUB-AREAS, EACH WITH THEIR OWN CATCH LIMITS.

The trigger level (ie the maximum amount allowed to be caught before the fishery is closed for the season) for the south-west Atlantic sub-areas is 620,000 tonnes. This represents "approximately 1% of the estimated 60m tonnes of the unexploited biomass, or virgin size, of the krill population in this region".²⁸ This estimate, however, is based on the most recent comprehensive stock assessment, which took place some 18 years ago.

Given the increased impact of climate change on the Antarctic Ocean, and recovering whale numbers following the moratorium on whaling, there is an urgent need to update this figure.

The trigger level for the Western Antarctic Peninsula (sub-area 48.1 in CCAMLR terms), which overlaps with part of the Peninsula ocean sanctuary proposal, is set at 120,000 tonnes. The level was reached in 2010 for the first time, coinciding with the expansion of the industry, and has been reached several times since, making it the only sub-area to have reached its trigger since the original levels were set. On each occasion, the fishery had to be closed before the fishing season ended.

NAME OF VESSEL	COUNTRY FLAG
Antarctic Endeavour	Chile
Betanzos	Chile
Cabo de Hornos	Chile
Fu Rong Hai	China
Long Teng	China
Kai Li	China
Kai Yu	China
Long Da	China
Antarctic Sea	Norway
Juvel	Norway
Saga Sea	Norway
Insung Ho	South Korea
Kwang Ja Ho	South Korea
Sejong	South Korea
More Sodruzhestva	Ukraine

Table 1: Authorised and tracked fishing vessels in the Antarctic 2012-2017²⁹

Tracking the krill industry

GREENPEACE INVESTIGATIONS REVEAL THAT THE FISHING EFFORT IN THIS AREA CONSISTENTLY OCCURS IN CLOSE PROXIMITY TO BIODIVERSITY HOTSPOTS INCLUDING PENGUIN COLONIES AND WHALE FEEDING GROUNDS (SEE FIGURE 5).

It also includes significant activity within the 30km buffer zone around the coast, an area used by Antarctic predators such as penguins and seals for summer foraging and by Antarctic fish for winter spawning. Despite industry attempts to portray itself as one of the most sustainable fisheries in the world, evidence collected by Greenpeace through the tracking of all krill vessels over a period of five years demonstrates a pattern of fishing activity increasingly close to shore and in the immediate vicinity of penguin colonies which depend on krill.

The Greenpeace investigation analysed the mandatory automatic identification system (AIS) signals of krill trawlers, reefers (refrigerated cargo vessels) and tanker vessels over a period of five years (2012-2017). The information can be used to reveal the areas a vessel visited and its likely fishing speeds, as well as other likely activity including anchoring and transshipments (when a catch from one vessel is transferred to another).

Greenpeace used AIS signals to track the fishing patterns of all vessels authorised to fish in these waters by CCAMLR (see table opposite). We also tracked the activity of ten of the most commonly-seen reefers and tankers in the area.

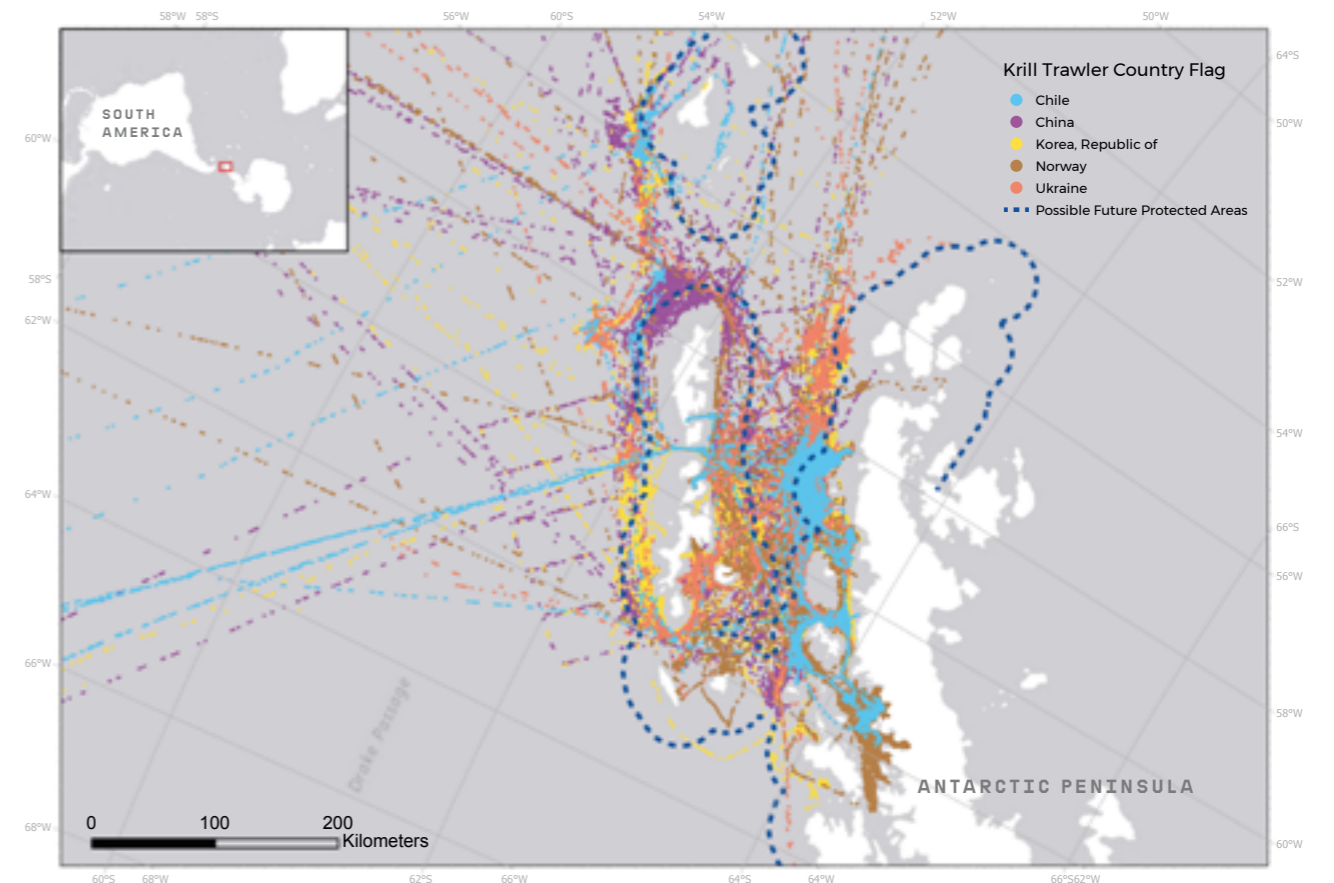


Figure 5: Vessels operating in proposed Marine Protected Areas in the Antarctic (see larger version on pages 20 – 21).



WHAT ARE THE RISKS OF INDUSTRIAL KRILL FISHING?

WHILE THE FISHING INDUSTRY IN THE ANTARCTIC IS IN ITS INFANCY COMPARED TO THE MANY HUGE AND UNSUSTAINABLE PRACTICES TAKING PLACE THROUGHOUT THE OCEANS, IT IS STILL AN INDUSTRY WHERE BUSINESS INTERESTS CAN OVERRIDE SCIENTIFIC EXPERTISE AND REASON.³⁰

Krill-fishing vessels in the Antarctic use the same methods as elsewhere, with many transferring catches to reefers which take them back to port. Krill vessels from China, South Korea and the Ukraine use this method, while the Chilean vessel lands its catch directly in Punta Arenas, at the southernmost tip of South America. The krill vessels used by Aker Biomarine, a Norwegian fishing and biotech company, have their own dedicated reefer, La Manche.

What's the problem with transshipping?

CCAMLR REQUIRES TRANSHIPMENTS TO BE REGISTERED AT LEAST 72 HOURS IN ADVANCE; DETAILS ARE NOT MADE PUBLIC AND ARE ONLY AVAILABLE TO CONTRACTING PARTIES.

When Greenpeace formally requested details of the number of transshipments to have taken place in Antarctic waters over the past five years, CCAMLR declined, saying the information is restricted. This raises serious concerns about the transparency of Antarctic fishery operations.

In general, the use of transshipping and reefers makes it easier to break the direct chain of custody for the catch back to port and

therefore conceal illegal, unreported and unregulated (IUU) fishing. While there is no evidence of wrongdoing in the Antarctic, and tighter regulations make this less likely to occur, Greenpeace investigations across many fisheries have consistently revealed the practice of transshipments at sea to be the source of some of the worst infringements in the fishing industry including human rights abuses.³¹

Tracking suggests that vessels involved in transshipments have regularly anchored up in the sheltered Discovery Bay on the north side of Greenwich Island. This bay has two sites designated under the Antarctic Treaty as Antarctic Specially Protected Areas (ASPAs) for their high seabed diversity and biomass.³² Vessels are required to take additional precautions near these areas, including

avoiding anchoring “except in compelling circumstances”.³³ Anchoring can damage animals and structures on the seabed, either by disturbing sediment or through direct contact with dragging anchors. The effects are of most concern in areas with sensitive or slow-growing species often associated with colder climates.

CCAMLR has a mandate to protect and preserve living resources, and a duty to minimise “the risk of changes in the marine ecosystem... taking into account... the effects of associated activities in the marine ecosystem and (of) the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources”.³⁴ Given the consistently high level of risk associated with transshipment at sea, it begs the question:

Why do CCAMLR members continue to allow it?



THE FRIO DOLPHIN: WHY IS IT ALLOWED TO OPERATE IN PRISTINE WATERS?

THE FRIO DOLPHIN, A REEFER OWNED BY A GREEK COMPANY³⁵ BUT REGISTERED IN PANAMA UNDER A 'FLAG OF CONVENIENCE',³⁶ TRAVELLED TO THE ANTARCTIC IN 2017. THERE WERE SEVEN OCCASIONS WHEN KRILL COULD HAVE BEEN TRANSHIPPED TO IT, FROM THREE DIFFERENT KRILL VESSELS.

IN JUNE 2017, THE AIS DATA STRONGLY SUGGEST THAT THE REEFER WAS TRANSHIPPING IN DISCOVERY BAY, IN THE IMMEDIATE VICINITY OF TWO AREAS OF SPECIAL PROTECTION.

THE FRIO DOLPHIN WAS PREVIOUSLY INVESTIGATED BY THE GREENPEACE SHIP ESPERANZA IN 2013, AND HAS A LONG LIST OF INFRINGEMENTS AND DETENTIONS.³⁷ INSPECTIONS FROM THE LAST THREE YEARS REVEAL A NUMBER OF DEFICIENCIES, INCLUDING CONSISTENTLY LOW STANDARDS IN POLLUTION PREVENTION FROM BOTH SEWAGE AND OIL, POTENTIALLY HARMFUL WORKING CONDITIONS, AND A CLEAR LACK OF COMPREHENSIVE SAFETY REQUIREMENTS.

AT LEAST TWO OTHER REEFERS WITH A RECENT HISTORY OF SIMILAR REPORTED INFRINGEMENTS,³⁸ THE ATMODA AND THE HAI FENG 698, BOTH ALSO REGISTERED IN PANAMA, HAVE BEEN SEEN UNDERTAKING SIMILAR OPERATIONS IN DISCOVERY BAY WITHIN THE LAST THREE YEARS.

Frio Dolphin reefer
© Peter Beentjes / FleetMon.com



LA MANCHE: ANOTHER POTENTIALLY DANGEROUS REEFER IN THE ANTARCTIC

NORWEGIAN KRILL TRAWLERS OPERATING IN ANTARCTIC WATERS PREDOMINANTLY USE A REEFER CALLED LA MANCHE. FLAGGED TO VANUATU, ANOTHER 'FLAG OF CONVENIENCE', THIS VESSEL HAS A LONG HISTORY OF INFRINGEMENTS. MOST RECENTLY, IN JANUARY 2018, ON ITS ROUTE SOUTH IT WAS FOUND TO HAVE A NUMBER OF DEFICIENCIES THAT COULD POTENTIALLY AFFECT ITS SAFE NAVIGATION AND THE SAFETY OF THOSE ON BOARD.³⁹

La Manche reefer
© DiFoo



Krill fishing and the risk of:

a. Spills

Transferring fuel at sea is generally considered to bear a risk due to the ordinary dangers of the sea, such as waves, wind and currents. A fuel spill in the pristine Antarctic environment would have severe consequences for the fragile ecosystem and its inhabitants.

There are no regulations preventing vessels bunkering or transferring fuel in the Antarctic (below 60°S), although the use or transfer of Heavy Fuel Oil is not allowed; all vessels operating in the Antarctic use or carry the lighter grade Marine Diesel Oil.

Data shows that the fuel tanker Curacao Trader was present in the Southern Ocean in 2016, where it was in close proximity to three krill vessels on nine dates between May and August 2016. The Ukrainian krill vessel the More Sodruzhestva and the Curacao Trader are shown meeting and then moving together near the entrance to the bay of the popular tourist destination Deception Island on the Antarctic Peninsula, while the draft changes shown by Lloyds List, a specialist business information service dedicated to the global maritime community, show the Curacao Trader got lighter. The most likely explanation is the transfer of fuel to the krill vessel.



Figure 6: Chinese fish factory krill vessel the Kai Xin, on fire⁴⁰

b. Fire

The risk of accidents is a constant concern, and not without cause. In 2013 the Chinese krill vessel the Kai Xin caught fire and sank in the Bransfield Strait, in a dramatic incident that lasted several days, including explosions and the rescue of the crew. The fire burned on and off for several days while the vessel drifted unmanned, dangerously close to sharp glaciers and at one point only one mile away from the rocks of Greenwich Island, with the risk of grounding and potentially causing huge damage to the environment of the Antarctic. While the fire flared up again and increased with continuous explosions, eventually the reefer Skyfrost was able to tow the vessel away from the coastline; after drifting towards the open sea, the Kai Xin eventually sank.⁴¹

c. Grounding

On 24 February 2014 the South Korean trawler Kwang Ja Ho ran aground about 450m from the coast of Greenwich Island with an estimated 800 tonnes of krill on board, in a bay frequently used to anchor by krill-fishing vessels and their support vessels. In this case crew members were rescued and the damage was limited to a drinking water tank.⁴²

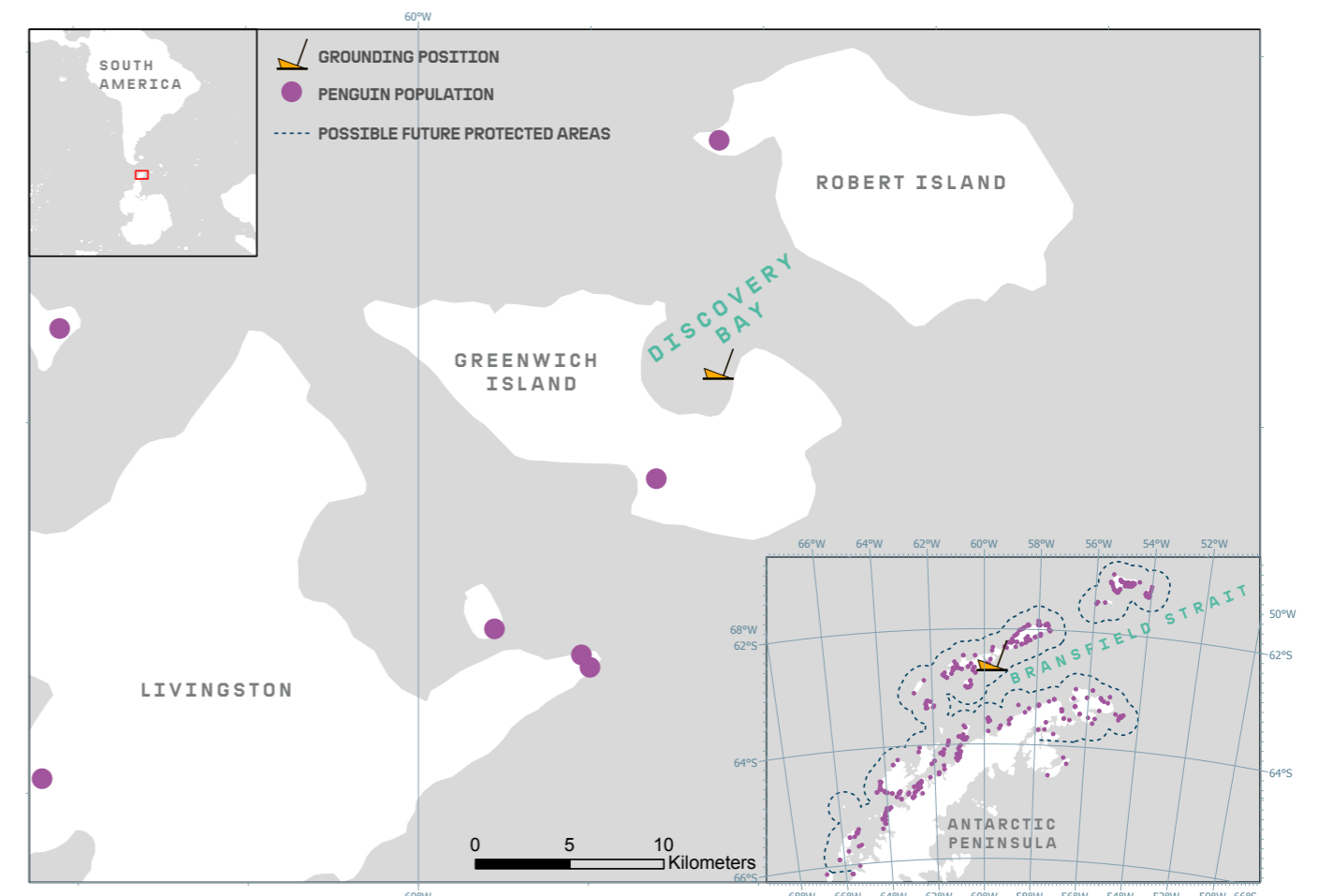


Figure 7: Location of trawler Kwang Ja Ho grounding incident and penguin colonies⁴³

Is there such a thing as sustainable krill fishing?

IN 2010 THE MARINE STEWARDSHIP COUNCIL (MSC) OFFICIALLY BESTOWED ITS BLUE-AND-WHITE “CERTIFIABLE SUSTAINABLE SEAFOOD” LABEL TO THE AKER BIOMARINE OPERATION THAT TARGETS ANTARCTIC KRILL.⁴⁴ THIS HAD BEEN OPPOSED BY GREENPEACE A YEAR EARLIER, ON THE BASIS OF MULTIPLE UNCERTAINTIES.

There were other vehement objections from the Pew Environment Group and the Antarctic and Southern Ocean Coalition. Despite illuminating new research in the intervening years, those large uncertainties remain and are associated with high risks.

What’s more, three key issues were not taken into account in the MSC’s decision: the potential effects of climate change; the impact of all the fisheries targeting krill in the Antarctic; and our limited understanding of the krill’s life cycle and its importance to the food web.

Given these risks, it is not unreasonable to suggest that we are gambling with the future of one of the most important ecosystems on our blue planet.



WHAT IS GREENPEACE CALLING FOR?

GREENPEACE IS CALLING FOR INTERNATIONAL COLLABORATION BETWEEN GOVERNMENTS, COMPANIES AND CIVIL SOCIETY TO CREATE A LARGE-SCALE NETWORK OF OCEAN SANCTUARIES, INCLUDING IN THE ANTARCTIC OCEAN, TO PROTECT AT LEAST 30% OF THE WORLD'S OCEANS BY 2030.

To that end, we call on krill-fishing companies to:

- Immediately restrict all fishing activity, including transshipments, in areas under consideration by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) as ocean sanctuaries and in any areas protected under the Antarctic Treaty. This includes proposals for the East Antarctic, the Western Antarctic Peninsula and the Weddell Sea.
- Publicly support the creation of a network of large-scale ocean sanctuaries in the Antarctic Ocean.

We also call on companies buying krill to:

- Stop sourcing krill products from vessels that continue to fish in areas under consideration by CCAMLR as ocean sanctuaries.
- Publicly support the creation of a network of large-scale ocean sanctuaries in the Antarctic Ocean.

Colony of penguins in the Antarctic, January 2018
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REFERENCES

- ¹ O'Leary, B. C., Winther-Janson, M., Bainbridge, J. M., Aitken, J., Hawkins, J. P. and Roberts, C. M. (2016) Effective Coverage Targets for Ocean Protection. *Conservation Letters*, vol 9, pp 398-404. doi:10.1111/conl.12247; <http://onlinelibrary.wiley.com/doi/10.1111/conl.12247/abstract>
- ² More Than 5 Per Cent of World's Oceans Now Protected With More Commitments Underway, 14 December 2016; UN Environment Wing, UN Sustainable Development Goals; <http://www.un.org/sustainabledevelopment/blog/2016/12/more-than-5-per-cent-of-worlds-oceans-now-protected-with-more-commitments-underway-un-environment-wing/>
- ³ First Global Integrated Marine Assessment, United Nations (2016); Foreword by Ban Ki-Moon p 23, 21 January 2016; http://www.un.org/Depts/los/global_reporting/WOA_RegProcess.htm
- ⁴ CCAMLR to Create World's Largest Marine Protected Area; media release, 28 October 2016; <https://www.ccamlr.org/node/92518>
- ⁵ Alfred Wegener Institut, Germany is Proposing a Marine Protected Area in Antarctica, 16 October 2016; <https://www.awi.de/en/about-us/service/press/archive/germany-is-proposing-a-marine-protected-area-in-antarctica.html>
- ⁶ CCAMLR, Report of the Thirty-sixth Meeting of the Scientific Committee, October 2017, p 76; https://www.ccamlr.org/en/system/files/e-sc-36-prelim-v2_1.pdf
- ⁷ Alfred Wegener Institut, Weddell Sea: 8 Reasons for a Marine Protected Area, September 2016; https://www.awi.de/fileadmin/user_upload/AWI/Ueber_uns/Service/Presse/2016/4_Quartal/KM_Weddellmeer_MPA/WEB_UK_Factsheet_Weddellmeer.pdf
- ⁸ CCAMLR, Krill Fisheries and Sustainability; <https://www.ccamlr.org/en/fisheries/krill-fisheries-and-sustainability>
- ⁹ Atkinson A., Siegel V., Pakhomov E.A. et al. (2008). Oceanic Circumpolar Habitats of Antarctic Krill. *Marine Ecology Progress Series*, vol 362, pp 1-2
- ¹⁰ CCAMLR, Krill - Biology, Ecology and Fishing, 28 April 2015; <https://www.ccamlr.org/en/fisheries/krill---biology-ecology-and-fishing>
- ¹¹ Atkinson A., Siegel V., Pakhomov E. A., Jessopp M. J. and Loeb V. (2009). A Re-appraisal of the Total Biomass and Annual Production of Antarctic Krill, *Deep Sea Research I*, 2009, vol 56, pp 727-740
- ¹² Leaper R., Bannister J.L., Branch T.A., Clapham P.J., Donovan G.P. et al. (2008). A Review of Abundance, Trends and Foraging Parameters of Baleen Whales in the Southern Hemisphere. Paper SC/60.EM3 presented to the IWC Scientific Committee June 2008.
- ¹³ Flores H., Atkinson A., Kawaguchi S., Krafft B.A. et al. (2012). Impact of Climate Change on Antarctic Krill. *Mar Ecol Prog Ser* 458:1-19; <https://doi.org/10.3354/meps09831>
- ¹⁴ Hill S.L., Phillips T., Atkinson A. (2013). Potential Climate Change Effects on the Habitat of Antarctic Krill in the Weddell Quadrant of the Southern Ocean. *PLoS ONE* 8(8): e72246; <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0072246>
- ¹⁵ Piñones A. and Fedorov A.V. (2016). Projected Changes of Antarctic Krill Habitat by the End of the 21st Century. *Geophysical Research Letters* 43, doi:10.1002/2016GL069656
- ¹⁶ Saba G.K., Schofield O., Torres J.J., Ombres E.H., Steinberg D.K. (2012). Increased Feeding and Nutrient Excretion of Adult Antarctic Krill, *Euphausia superba*, Exposed to Enhanced Carbon Dioxide (CO₂). *PLoS ONE* 7(12): e52224; <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0052224>
- ¹⁷ Tarling G.A. and Johnson M.L. (2006). Satiation Gives Krill That Sinking Feeling. *Current Biology* 16 (3) R83-R84; and Swadling K.M. (2006) Krill Migration: Up and Down All Night. *Current Biology* 16 (5): R173-R175
- ¹⁸ Technavio (2017). Global Krill Oil Market 2017-2021
- ¹⁹ Pacific Fishery Management Council, Fishery Management Plan and Amendments: Amendment 12, 5 October 2016; <https://www.pccouncil.org/coastal-pelagic-species/fishery-management-plan-and-amendments/amendment-12/>
- ²⁰ EFSA Panel on Dietetic Products, Nutrition, and Allergies; Scientific Opinion on Dietary Reference Values for Fats, Including Saturated Fatty Acids, Polyunsaturated Fatty Acids, Monounsaturated Fatty Acids, Trans Fatty Acids, and Cholesterol. *EFSA Journal* (2010), vol 8, 1461-1568.
- ²¹ Cytoplan blog; <https://blog.cytoplan.co.uk/omega-3-supplements-fish-krill-algae/>
- ²² CCAMLR, Krill Fishery Report 2016; https://www.ccamlr.org/en/system/files/00_KRI48_2016_v1_1.pdf

- ²³ However, last year (2016/17), for the first time in two decades, fishing for krill in East Antarctic waters began again.
- ²⁴ Nicol, S. and Foster, J. (2016). The Fishery for Antarctic Krill: Its Current Status and Management Regime. In *Biology and Ecology of Antarctic Krill*, Springer, Siegel V. (ed), Switzerland, pp 387-421. ISBN 978-3-319-29277-9
- ²⁵ China Daily (2015). Country Steps Up Operations in Antarctic to Benefit from Krill Bonanza. By Xie Yu, 4 March 2015; http://usa.chinadaily.com.cn/epaper/2015-03/04/content_19716649.htm
- ²⁶ Regjeringen.no. Høring - utlysning av nye konsesjoner for fjernfisk etter krill, 23 August 2017; <https://www.regjeringen.no/no/dokumenter/horing---utlysning-av-nye-konsesjoner-for-fjernfisk-etter-krill/id2568103/>
- ²⁷ Regjeringen.no. To nye krillkonsesjoner, 13 February 2018; <https://www.regjeringen.no/no/aktuelt/to-nye-krillkonsesjoner/id2589524>
- ²⁸ CCAMLR, Krill Fisheries and Sustainability; <https://www.ccamlr.org/en/fisheries/krill-fisheries-and-sustainability>
- ²⁹ Another eight vessels have been authorised to fish during the selected period but were excluded from the investigation for lack of data from the area or having not been seen in Antarctica for a number of years.
- ³⁰ Greenpeace International, Overfishing; <http://www.greenpeace.org/international/en/campaigns/oceans/fit-for-the-future/overfishing/>
- ³¹ Greenpeace International, Turn the Tide: Human Rights Abuses and Illegal Fishing in Thailand's Overseas Fishing Industry; <http://www.greenpeace.org/seasia/PageFiles/745330/Turn-The-Tide.pdf>; Greenpeace International, Tuna: Transshipment, Transparency, video April 2013; https://www.youtube.com/watch?v=SSa_TdcZFo
- ³² Secretariat of the Antarctic Treaty, Area Protection and Management/Monuments, 2011; http://www.ats.aq/e/ep_protected.htm
- ³³ Secretariat of the Antarctic Treaty, Recommendation XIV-5 - Annex; http://www.ats.aq/documents/recatt/Att145_e.pdf
- ³⁴ CCAMLR Convention Text, Article II (c)
- ³⁵ See https://www.ccamlr.org/en/node/95190-quicktabs-vessel_tabs=0
- ³⁶ Egijyan, G.S., 'Flag of Convenience' or 'Open Registration of Ships', Science Direct, 1990; <https://www.sciencedirect.com/sdfe/pdf/download/eid/1-s2.0-0308597X90900959/first-page-pdf>
- ³⁷ Lloyds List Intelligence; <https://www.lloydslistintelligence.com/>
- ³⁸ Ibid.
- ³⁹ Ibid.
- ⁴⁰ Mercopress; <http://en.mercopress.com/data/cache/noticias/40105/0x0/kai-xin.jpg>
- ⁴¹ Lloyds List Intelligence; <https://www.lloydslistintelligence.com/>
- ⁴² Fleetmon; <https://www.fleetmon.com/maritime-news/2014/3209/kwang-ja-ho-ran-aground-antarctica/>
- ⁴³ Mapping Application for Penguin Populations and Projected Dynamics; <http://www.penguinmap.com/>
- ⁴⁴ Greenpeace International (2017), License to Krill; blogpost by Casson Trenor, 6 November 2017; <http://www.greenpeace.org/international/en/news/Blogs/makingwaves/license-to-krill/blog/60637/>



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Humpback whales feeding in Paradise Bay, January 2018
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