Pollockonomics

WHAT A SINGLE TRAWLER PURCHASE REVEALS ABOUT THE ECONOMICS OF THE WORLD'S LARGEST SOURCE OF PALATABLE FISH

A PLANET TRACKER **INVESTIGATION** JULY 2021

Planet Tracker

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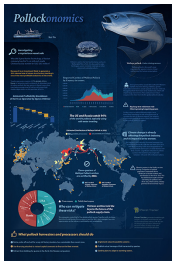

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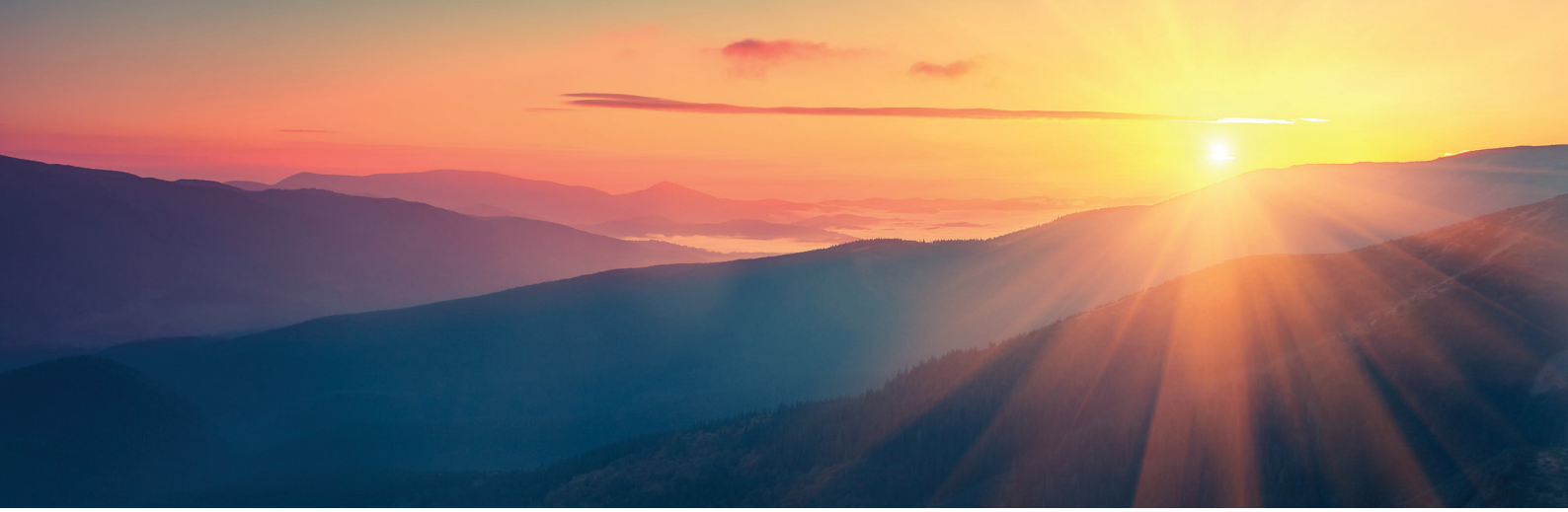

ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank aligning capital markets with planetary boundaries. It was created primarily for the investor community to analyse the risk of market failure related to environmental limits which, other than climate change, are often not aligned with investor capital. Planet Tracker generates breakthrough analytics to redefine how financial and environmental data interact with the aim of changing the practices of financial decision makers to help avoid both environmental and financial failure.

SEAFOOD TRACKER

Seafood Tracker investigates the impact that financial institutions can have on sustainable corporate practices through their funding of publicly listed wild-catch and aquaculture companies.

Our aim is to align capital markets with the sustainable management of ocean and coastal marine resources.

In this report, we focus on the financials of factory trawling, investigate second-hand trawler sales, assess the long-term profitability of the world's largest fishery and discuss the natural capital and geopolitical implications of Russia's ambitious seafood investments.

Seafood Tracker is a part of the wider Planet Tracker Group of Initiatives.

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KEY MESSAGE

Profits are at risk in the high-margin and sustainable walleye pollock industry due to considerable investments in vessels and warming waters, with key repercussions for global food security and geopolitical tensions.

There are thirteen organisations – eight of them controlled by private individuals – which can ensure that the world's largest fishery for human consumption remains sustainable and profitable.

EXECUTIVE SUMMARY

Investigating a mysterious vessel sale

Why did Sigma Marine Technology, a Russian company buy an old and unsafe Chinese factory trawler for USD 24.5 million in December 2020? Planet Tracker has investigated. The answer offers fascinating insights into the world's largest source of palatable wild fish (walleye pollock) and its fragile value chain.

Factory trawling is one of the most profitable industries in the world

Environmentally we may not like it, but factory trawling is extremely profitable – 30% EBIT[1] margins or more in Russia, 27% globally, i.e. almost as much as tobacco. Our analysis reveals that even below average levels of catches would ensure high double-digit returns on the purchase of this old Chinese vessel, which had a price tag slightly above the market value of comparable second-hand vessels.

Sustainability means high profitability for the world's largest fishery for human consumption

Can these margins be maintained? In Russian waters, the answer rests on the management of walleye pollock, the key species for the Russian fleet and the world's most caught fish species for human consumption (used in fish fingers, "crab" sticks, surimi or fish burgers).

Typically using mid-water trawlers, walleye pollock *(Gadus chalcogrammus)*[2] fisheries are very profitable for the Russian and US fleets, the two main producing countries by far. This is because they are among the most sustainably managed globally, particularly thanks to reasonable quotas.

In contrast, where the walleye pollock stock was not managed (in the Central Bering Sea), it was almost wiped out by overfishing in the late eighties, and thirty years later pollock populations in that sea are still too low to allow commercial fishing to resume.

Yet **profits are now at risk in the global pollock industry**, with key financial, environmental, geopolitical and food security implications.

Considerable investments in vessels could hit pollock margins in the short term

Three quarters of the world's catches of walleye pollock are MSC[3]-certified, and that share is set to rise.[4] Strong demand for sustainable seafood in Western markets has been driving ambitious government-led investments in vessel capacity in Russia. In the US, the aged pollock fleet needs to be modernised, which will require large investments. This could pressure future margins in the short-term for the global pollock industry.

[1] Earnings before interest and tax

[2] In this report, we use the words "walleye pollock", "Alaska pollock", or simply "pollock" interchangeably but they all relate to the same species. "Alaska pollock" is the commercial term used for US-caught fish.

[3] Marine Stewardship Council, the largest certification standard for wild-caught seafood

[4] Since the third-party assessor of a large pollock fishery in Russia (Western Bering Sea/Navarinsky) has backed its certification

Climate change is already affecting the pollock industry, and its impact is set to worsen

Climate change is taking its toll too: the frequency and intensity of marine heatwaves has increased in the Pacific, with the one from 2014-2016 (the 'Blob') resulting in the near disappearance of walleye pollock born in 2015. A lower biomass will likely result in a significant reduction in pollock quotas in the next five years (expected between -15% and -50% in Russian waters).

Warming waters in the Pacific are also driving a migration of pollock populations westwards and northwards (to the Arctic Sea): a third of the US pollock population is likely to migrate to Russian waters by 2040. The long-term implications of this outlook are multiple.

Key long-term upstream risks: Arctic fishing and submarines

The most extreme is the heightened risk of geopolitical tensions between Russia and the US: warships, warplanes and a submarine were deployed by the Russian Navy in US waters in August 2020, and "harassed" vessels belonging to the largest US pollock producer. There are precedents for fish-related conflicts, particularly in polar regions.

The future of the Arctic Sea's ecosystem may also be at stake. Last year, Russia opened part of it for pollock fishing, threatening a fragile ecosystem.

Key long-term midstream risk: China's growing bargaining power

Any disruption to the supply of walleye pollock would significantly jeopardise the long and complex pollock supply chain, mapped in this report.

In addition, further stress on Russian fisheries might come from China leveraging its role as a key processor of pollock (it accounts for 60% of Russian exports). China could pressure Russia to allow Chinese fleets to fish pollock in Russian waters (trawling margins are much higher than processing margins). There is a precedent in Latin America, where Chinese fleets started to target squid directly rather than importing it.

An example of China's influence on pollock supply chains materialised at the start of this year, when the near-closure of the Chinese pollock market for Russian exporters due to COVID-19 concerns associated with Russian seafood products led to a sharp drop in pollock catches. This still did not prevent a supply glut, in turn leading to a drop in Russian pollock wholesale prices.

The implications are not limited to Russia though: walleye pollock is the most important seafood import for the EU and the majority of it comes processed from China. Overall, 53 companies in two countries fish MSC-certified pollock that ends up being sold by at least 8,000 retailers and foodservice companies across the world.

Who can mitigate these risks?

Thirteen entities hold the keys to the future of the pollock supply chain

The source of the pollock supply chain is highly concentrated causing thirteen entities to have a disproportionate influence on the future of the pollock supply chain:

- Ten companies[5] control half of the global quotas of walleye pollock, and that number is set to decrease given ongoing consolidation among fishing companies. Eight of them are controlled by private individuals; only three are publicly-listed.

- Fishery agencies in Russia and the US set and attribute the quotas, and apply the regulations in walleye pollock fisheries. Since 2018, quotas have been stable in the US and rising in Russia, but are expected to substantially decrease by 2025. If they do not decrease in line with the expected decline in biomass, there is a risk that walleye pollock becomes overfished again in Russian waters.

- By continuing to ensure improvements in sustainability at certified companies and withdrawing certification if need be, the Marine Stewardship Council (MSC) also has considerable influence on the industry's profitability too given the significant premium currently paid for MSC-certified walleye pollock.

Call for action

Fishery agencies in Russia and the US need to ensure that fishing quotas always reflect the best science available at the time they are set, to prevent any return of overfishing in walleye pollock fisheries.

The MSC should in turn ensure that certification is used as a tool to ensure continuous improvement in sustainability at certified companies and can be withdrawn should sustainability standards deteriorate.

Pollock producers (and in particular the ten largest quota holders) can also help ensure the long-term profitability and sustainability of the industry on which they rely, by:

- Retiring, writing off and selling for scrap old factory trawlers, which are typically less sustainable than recent ones (e.g. higher bycatch rates, higher fuel consumption).

- Using sustainability-linked loans or other forms of financing attached to natural capital covenants to finance the fleet renewal.

- Refraining from bidding for quotas in the Arctic (for Russian companies).

[5] American Seafoods, Nissui, Trident Seafoods, Maruha Nichiro, and Cooke for US-caught pollock; Russian Fishery Company, Gidostroy, Okeanrybflot, NBAMR and Ocean Trawlers for Russian pollock.

- Implementing robust traceability systems (for those who have not yet done so) and ensuring that these are compatible with those used across the supply chain, for instance by using GDST standards. This is especially the case for secondary processors that use Russian-caught pollock, where IUU risk is material.

- Publishing actual tonnage of fish harvested by species.

- Outlining plans to adapt to the climate change-induced change in the distribution of pollock populations (especially for US-based companies).

Investors in these companies should:

- Demand that any capital raised to fund fleet modernisation or other investments be linked to greater sustainability (e.g. better incorporate prey needs of marine mammals and seabirds reliant on pollock, lower bycatch, lower GHG emissions and better traceability to ensure lower IUU risk, especially in Russia).

- Demand that companies implement and abide by codes of conducts by which operations need to be undertaken.

- Ensure that companies (especially in the US) have mitigation plans for the impact of warming waters.

INVESTIGATING FACTORY TRAWLING IN THE RUSSIAN FAR EAST

Why spend USD 24.5 million for a 1992 factory trawler with "high safety hazards"?

In December 2020, Chinese distant-water fishing company Shanghai Kaichuang Marine International (SKMI, ticker 600097-CN) announced it would sell Kai Yu, one of its factory trawlers[6], to Sigma Marine Technology (Sigma), a privately-owned Russian fishing company, for USD 24.5 million.[i]

Kai Yu was built in 1992 and was sold mainly because demand for jack mackerel in Nigeria, its main end-market, is in decline and because she carried "high maintenance costs" and "high safety hazards", issues further compounded by the ongoing COVID-19 pandemic.[ii]

Figure 1: Kai Yu, as photographed in Faroe Islands in October 2020 by Regin Torkilsson.[iii]

Analysis of the vessel's movements using Global Fishing Watch data reveals that it was primarily fishing off the coasts of Chile and Peru, just outside these countries' Exclusive Economic Zones (EEZ), in international waters – see Figure 3. This is exactly where a very high number of large Chinese distant-water fishing vessels congregate every summer, posing a threat to local ecosystems (see our July 2020 blog).[iv]

Why would Sigma spend USD 24.5 million for what seems to be a risky asset? And how much fish does Sigma need to catch and process through Kai Yu in order to make a decent return on this acquisition? Planet Tracker investigated, in order to understand the financial drivers of overfishing.

[6] Factory trawlers are large fishing vessels that tow a fishing trawl net and process the catch on board into fillets or headed and gutted fish. Onboard fishmeal plants ensure that the waste is utilised.

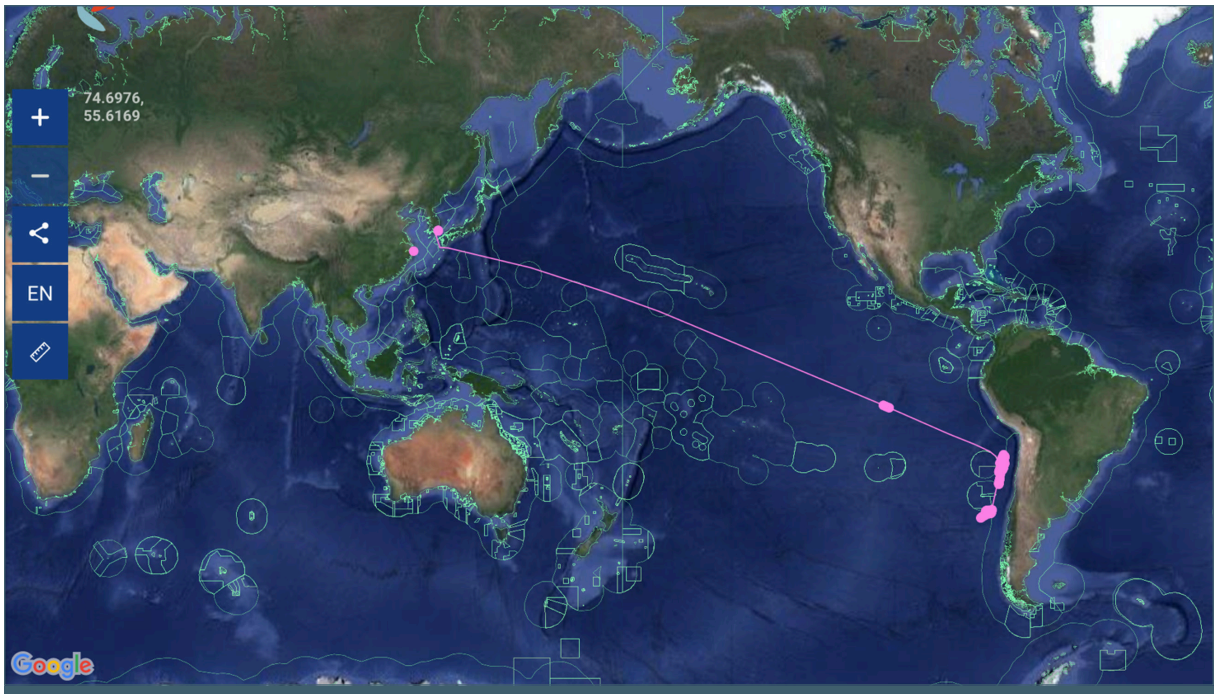

Figure 2: Positions of Kai Yu between July and October 2019, where Dots Indicate Fishing Activity.[v]

Factory trawling typically generates EBIT margins of 30% or more

In addition to Kai Yu, SKMI - the seller - owns another factory trawler, Kai Li. Together, these two vessels mainly catch and process jack mackerel, but also walleye pollock, cod and Antarctic krill. In 2019, the trawling fleet of SKMI caught and sold 35,000 tonnes of fish and generated an operating income of RMB 236 million (USD 34 million), down 18% year-on-year.[vi] Based on the divisional reporting of SKMI, we estimate that 2019 sales were USD 89 million for the two trawlers, suggesting an operating margin of 38%.[vii]

This is a very high level of profitability, but it is not an unusual level of margin for trawling fleets:

- Sigma, the buyer of Kai Yu, generated sales of USD 46 million in 2019 and an EBIT margin of 33.4%.[viii] This Russian company owns seven longliners and four trawlers.[ix]
- Another Russian factory trawling company, Nakhodka Active Marine Fisheries Base (NBAMR) generated an average EBIT margin of 29% in 2015-2019.[x] It currently owns nine factory trawlers.[xi]
- Intraros, one of the subsidiaries of the Russian Fishery Company (RFC, for which pollock is 80% of catch volumes)[xii] had a 30% EBIT margin in 2019[xiii] and the Russian Fishery Company (the parent company) had a projected EBITDA margin of 32% in 2017.[xiv]
- Ozernovskiy RKZ N 55, a Russian company that catches and process pollock generated a net margin of 33% in 2018, in line with 2017.[xv]

Such a level of high margin is not specific to Russia: **the average EBIT margin of all fishing companies engaged in trawling worldwide (whether private or public) that at least partly report their financials is 27%** (as per FactSet data).[xvi]

Achieving an operating margin of 30% is rare in most industries: in a sector comparison of margins across 94 industries in the US, only three (38 firms out of 7,582) had average operating margins of 30% or above: tobacco, railroad transportation and water utilities.[xvii]

Kai Yu has a sister ship: the vessel which caught the most fish ever in a single year

Among Sigma's trawlers is MRKT Petr 1, a very large factory trawler with a daily capacity of 400-450 tonnes of finished products.[6] In 2019, that vessel caught and processed 87 thousand tonnes of fish, establishing a new world record for the most fish caught and processed in a year, according to Sigma.[xviii] This single vessel therefore accounted for c.1.7% of all fish caught in Russian waters in 2019.[xix] A catch between 50 and 60 thousand tonnes is considered a "good year" for that vessel (from the perspective of the company).[xx]

Petr 1 was originally called Vigo[xxi] when it was built in 1993 by Factorias Vulcanos in Spain.[xxii] This Spanish manufacturer also built Kai Yu, the vessel that Sigma has agreed to purchase - see Figure 3.[xxiii]

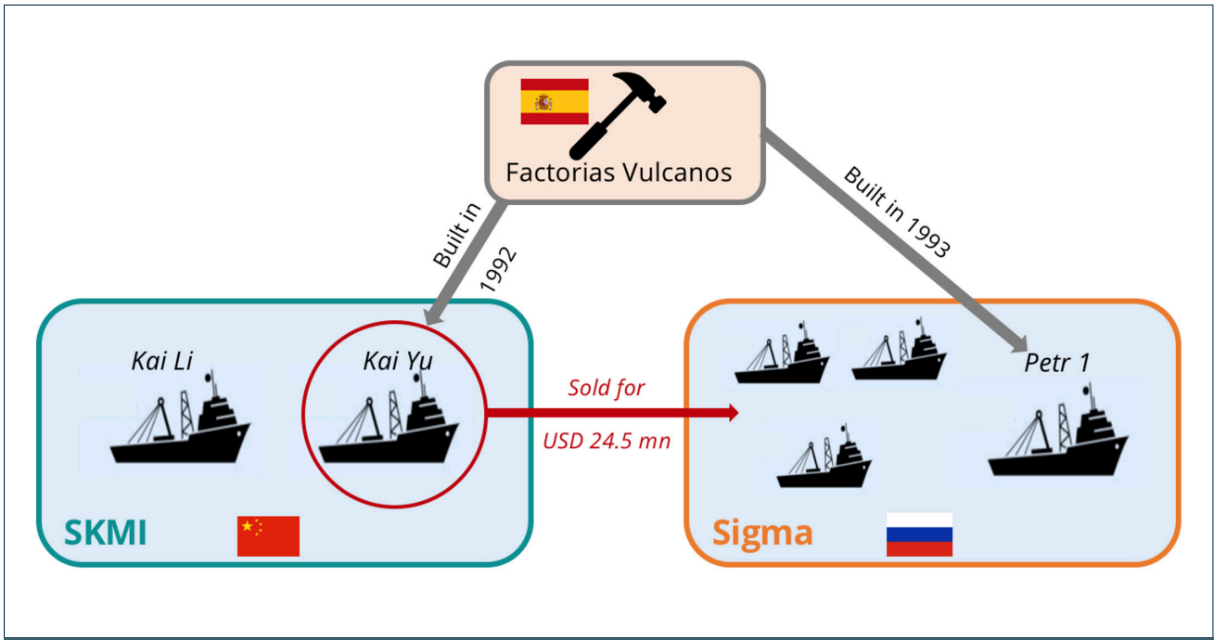

Figure 3: Factorias Vulcanos Built Both Kai Yu (the Vessel SKMI Sold to Sigma) and Petr 1, a Factory Trawler Already Owned by Sigma.[8]

Kai Yu and Petr 1 have exactly the same technical specifications,[xxiv] i.e. they are identical vessels, bar any subsequent modifications they might have been through. This means that Sigma already knows exactly how to operate, maintain and repair Kai Yu, ensuring that the company is in a good position to minimise operating risks.

[6] The English version of the website, quoted in the Undercurrentnews article, mentions "daily output" but the Russian version mentions "capacity".

[7] Only factory trawlers belonging to each firm have been represented on this diagram

Targeting high double-digit returns

Whilst Sigma has not commented on the acquisition of Kai Yu, we assume that the transaction would not have been pursued if it was not expected to generate, over time, a high double-digit return on equity (ROE) - since the average ROE of the company over the last ten years was 57% - and in any case a ROE significantly higher than 6%, the yield on a 10-year Russian government bond (a risk-free investment from the perspective of Sigma).[xxv]

Given that Sigma already operates a vessel identical to Kai Yu, it is likely that Sigma will be targeting a minimum 35% EBIT margin on this latest purchase (the mid-point between Sigma's group margin and the estimated margin of SKMI's trawler fleet, and also the average EBIT margin of Sigma group over 2015-2019) - see Figure 4.[xxvi]

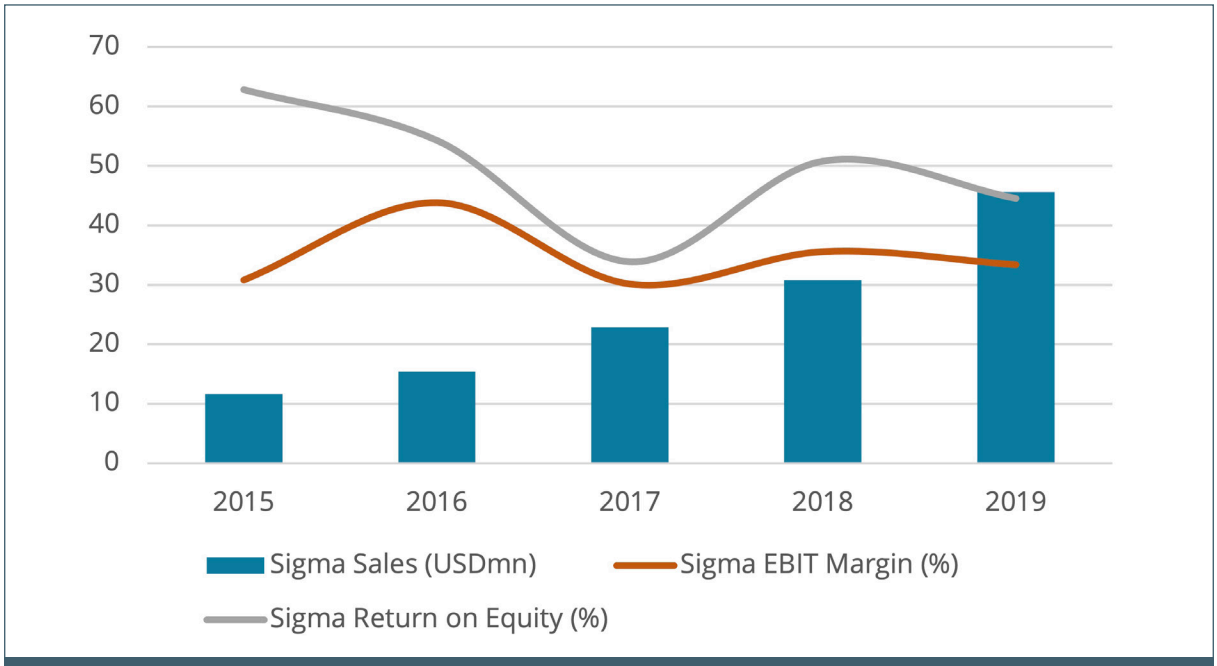

Figure 4: Sales, EBIT Margin and Return on Equity of Sigma Marine Technology.[xxvii]

Kai Yu needs to catch 16,469 tonnes of pollock to generate a 35% EBIT margin

To estimate whether such returns and margins are possible, Planet Tracker developed a financial model for Kai Yu (as operated by Sigma) - see Table 1.

We assume that Kai Yu will be used to catch walleye pollock and sell pollock fillet, headed and gutted pollock,[9] and fishmeal because:

- Sigma's existing fleet already catches pollock.[xxviii]
- Kai Yu was likely also used to catch pollock in the past, along with jack mackerel.[xxix]
- Pollock is the most common catch in Far East Russia and is typically but not only sold as fillets or simply headed and gutted - see Box 1.

It is however possible that species other than pollock are caught.

[9] We have not assumed any production of pollock roe, for the sake of simplicity

Box 1: Pollock 101

- Walleye pollock (Alaska pollock in the US) is one of the most abundant and widespread fish in the Northern Pacific. It accounts for c.60% of the fish biomass in the Bering Sea.[xxx]
- Walleye pollock *(Gadus chalcogrammus)* actually belongs to the cod genus *(Gadus)* and family *(Gadidae)*. It is distinct from the Atlantic pollock or pollack *(Pollachius pollachius)*.[xxxi]
- It is the world's most important fish species in terms of total catches used for human consumption (second behind anchoveta, almost only used as fishmeal).[xxxii]
- Pollock is used in the fast food industry, such as in McDonalds' Filet-o-Fish. It is also used to make fish fingers, surimi, imitation crabmeat, or other processed seafood products.[xxxiii]
- Harvesters of pollock sell it at one euro per kilogram when simply headed and gutted, and three euros when filleted. It is sold at around five euros per kilogram as a fillet or fish finger by Western European retailers. [xxxiv, xxxv, xxxvi]
- Pollock was dubbed "the largest remaining source of [wild] palatable fish in the world".[xxxvii]
- Pollock is not currently considered to be overfished.[xxxviii]
- The US and Russia catch 94% of the world's pollock, typically using mid-water trawling.[xxxix]
- Three-quarters of walleye pollock catches are certified by MSC[10].[xl]
- Pollock gained in popularity after cod stocks (a similar fish) collapsed in the Pacific.
- Pollock accounts for around 30% of total fish catches in Russia.[xli]

Gadus chalcogrammus

[10] The Marine Stewardship Council, the largest certification programme for wild-catch seafood globally.

Table 1: Main Facts and Assumptions for Modelling the Returns on the Purchase of Kai Yu.			
Variable	**Value**	**Fact/Estimate**	**Source**
FISHING			
Species targeted	walleye pollock	Estimate (Sigma already catches pollock)	Sigma Marine Tech [xlii]
Days at sea	304 p.a. (90 in 2021, due to maintenance/ repair)	Estimate (around ten months, over two fishing seasons, A and B)	Russian Pollock Catchers Association [xliii]
Days spent trawling	228 (0 in 2021, due to maintenance/repair)	Estimate (65% of time at sea)	Ulstein Group [xliv]
Number of hauls per day	3	Fact (average in season A in 2018, all trawlers)	Russian Pollock Catchers Association [xlv]
Average tonnes of pollock caught per haul	36	Fact (average in season A in 2018, all trawlers)	Russian Pollock Catchers Association [xlci]
Bycatch rate	1.5%	Estimate (max 2% by law)	Russian Pollock Catchers Association [xlvii]
PROCESSING			
% of caught pollock filetted	50%	Estimate (commercial decision based on demand and catch)	Planet Tracker
% of caught pollock headed & gutted (H&G)	50%	Estimate (commercial decision based on demand and catch)	Planet Tracker
Yield on fillets (kg/kg)	41%	Estimate	FAO [xlviii]
Daily fish fillets capacity	198 tonnes	Fact	Factorias Vulcano [xlix]
Yield on Headed &Gutted (kg/kg)	62%	Estimate	Chef Resources [l]
% of waste turned into fishmeal (by weight)	80%	Estimate	Planet Tracker
Yield on fishmeal (kg/kg)	25%	Estimate	University of Florida [li]
Daily fishmeal plant capacity	150 tonnes	Fact	Factorias Vulcano [lii]
Median walleye pollock price (from Russia, filleted)	USD 3,450 per tonne	Fact	Undercurrent News [liii]
Median walleye pollock price (from Russia, headed & gutted, frozen)	USD 1,250 per tonne	Fact	Undercurrent News [liv]
Average fishmeal price in Russia	USD 1,160 per tonne	Estimate, average price from November 2020	Tridge [lv]

Variable	Value	Fact/Estimate	Source
OPERATING COSTS			
Crew number	72	Fact	Factorias Vulcano [lvi]
Crew average salary	USD 19,000 p.a.	Estimate based on average salary at competitor	NBAMR [lvii]
Kai Yu engine output	5,920 kW	Fact	Factorias Vulcano [lviii]
Hourly diesel consumption during trawling	625 litres	Estimate, based on analysis of other trawlers, adjusted for engine output	Campos et al.[lix]
Hourly diesel consumption when in transit	184 litres	Estimate, based on analysis of other trawlers, adjusted for engine output	Campos et al.[lx]
Gross fuel price (before subsidy)	USD 0.60 per litre	Estimate, based on local prices and price paid by competitor	Global Petrol Prices, NBAMR [lxi]
Fuel subsidy	USD 0.18 per litre	Estimate, based on median fuel subsidy for fishing companies in Russia	Sumaila et. al [lxii]
Maintenance/repair costs	10% of vessel value p.a.	Estimate, based on competitor	NBAMR [lxiii]
Depreciation method	Linear, over 10 years	Estimate	Planet Tracker
Other operating costs	25% of sales	Estimate, based on competitor	NBAMR [lxiv]
OTHER FINANCIAL CONSIDERATIONS			
Kai Yu purchase price	USD 24,500,000	Fact	SKMI [lxv]
Kai Yu salvage value	USD 988,000	Fact	SKMI [lxvi]
Kai Yu scrap value	Equal to salvage value	Estimate (it could be higher)	Planet Tracker
Financing of Kai Yu by Sigma	50% 10 year-bullet debt at 10% interest rate, 50% equity	Estimate (Sigma's capital structure is c. two-thirds equity, one-third debt)	Planet Tracker
Capital expenditures	USD 2 million in 2021 (modernisation), USD 500,000 p.a. afterwards	Estimate	Planet Tracker
Inflation	No inflation	Estimate	Planet Tracker
Timing	Kai Yu bought and repaired in 2021, operated in 2022-2031 and sold on 31/12/2031	Estimate	Planet Tracker

Based on these model inputs, we calculate that Kai Yu needs to catch 16,469 tonnes of pollock per year to generate a 35% EBIT margin, equivalent to 21.5 tonnes per haul.

That would be equivalent to 0.8% of the total pollock catch in Russia, i.e. the additional pressure on Russian pollock stocks would be relatively small.[lxvii]

Kai Yu most likely can generate such a level of catch, if it owns the right quotas

Provided that Sigma secures the necessary quotas, we believe this level of catch is likely to be feasible in the short term, because:

- the average pollock catch per haul by Russian trawlers was 36 tonnes in 2018, 67% more than assumed in our model (above);
- a sister ship of Kai Yu (Petr 1) caught much more than this in a single year (87,297 tonnes, although not of the same species);
- a harvest in a "good year" for an identical vessel yields 50 to 60 thousand tonnes;
- the catch level of pollock is currently more limited by quotas in Far Eastern Russia than by the difficulty in finding fish: this is evidenced by the fact that quota utilisation rates tend to be very close to 100% for pollock[11] (99.6% over 2016-2019 at the country level, 94% for NBAMR for instance), which is not the case for many other species – see Figure 5.

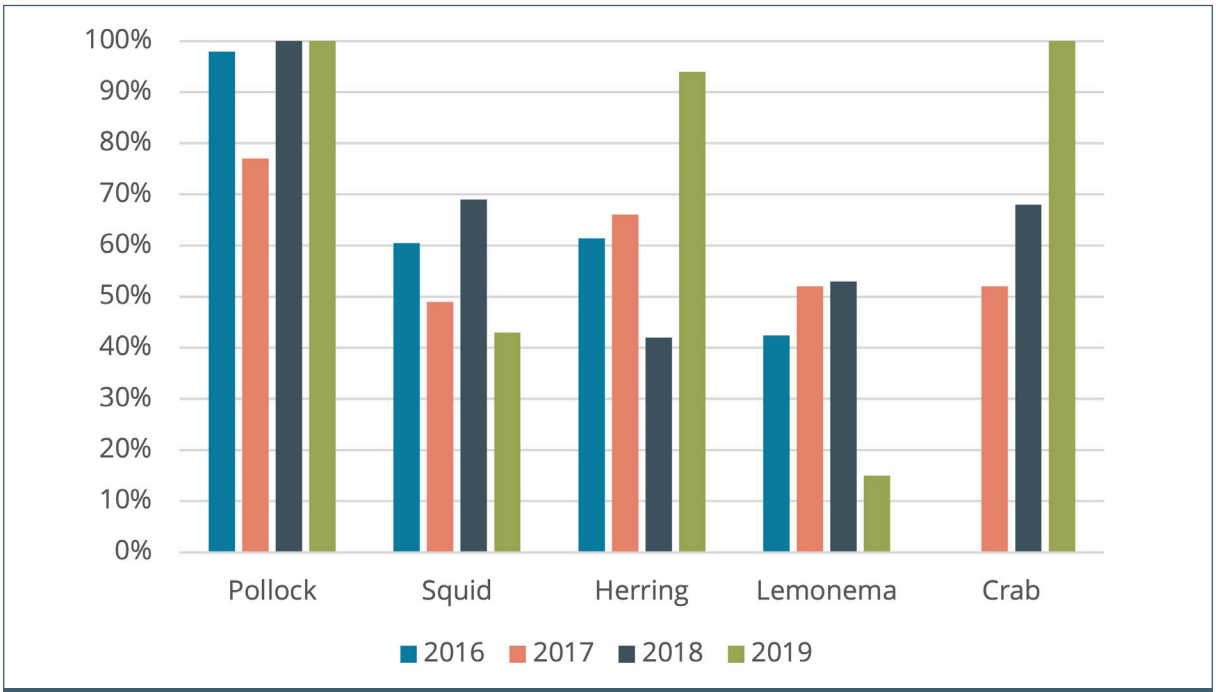

Figure 5. NBAMR - Utilisation Rate of Allocated Quotas by Species and by Year.[lxxii]

[11] This was not the case in 2020 and 2021 though, due to the COVID-19 crisis that forced fleets to catch less than they can to avoid a supply glut

We model an internal rate of return (IRR) of c. 26% on the transaction

Assuming an average level of catches at 16,469 tonnes a year, which we believe is a conservative assumption, the purchase of Kai Yu would generate sales of USD 20 million and an EBIT of USD 7 million a year on our estimates – see Figure 6 and Table 2.

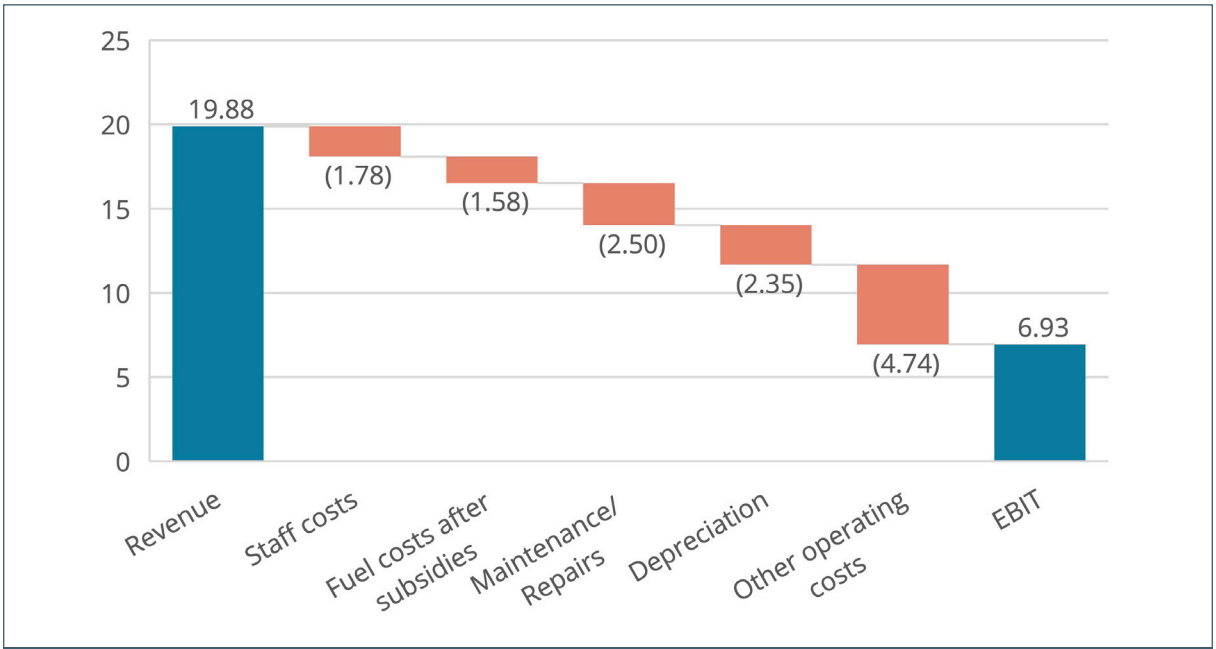

Figure 6: Estimated Profitability Breakdown of Kai Yu as Operated by Sigma with Catches of 16,469 Tonnes of Pollock per Year (in USD millions).[lxxiii]

This transaction would generate value in 2026 (i.e. the cumulative discounted free cash flows would be higher than the purchase price from 2026 onwards) and the transaction would generate an internal rate of return (IRR) of 27% over eleven years and a return on invested capital of 28% - see Table 2.

Table 2: Key Financial Indicators – Returns on the Purchase of Kai Yu by Sigma.

Pollock catches (tonnes p.a.)	**16,469**
Revenue (USD mn p.a.)	19.9
EBIT Margin (%)	35%
Total DCF-Based Value (2021-2031, USD mn)	54.6
Return on Equity (%)	**43%**
Return on Invested Capital (%)	27%
IRR (%)	**26%**

In brief, whilst it might appear counter-intuitive to spend USD 24.5 millions on an old factory trawler, there is a strong financial rationale for doing so.

The returns on the transaction would be even higher (IRR at 28%) if the vessel was sold in ten years at a price similar to the one it was purchased for now, rather than sold for scrap at around USD 1 million, as we have assumed.

The price paid for Kai Yu is slightly above the market price of second-hand factory trawlers

Given how profitable the purchase of Kai Yu appears to be, could it be that Sigma secured the vessel at a bargain and not at a high price, as we initially anticipated? To form an opinion, we researched the market price for second-hand factory trawlers.

As of 28 January 2021, the market price of factory trawlers built around 30 years ago, with a length of around 100 meters and a cargo capacity of around 4,000 m^3 (i.e. factory trawlers similar to Kai Yu) appears to be c. USD 20 million – see Figure 7.[lxxiv]

Many other factors drive the valuation of such vessels, but based on this simple analysis (see Figure 7 below where the Kai Yu is represented in red), the price paid for Kai Yu is slightly above market prices.

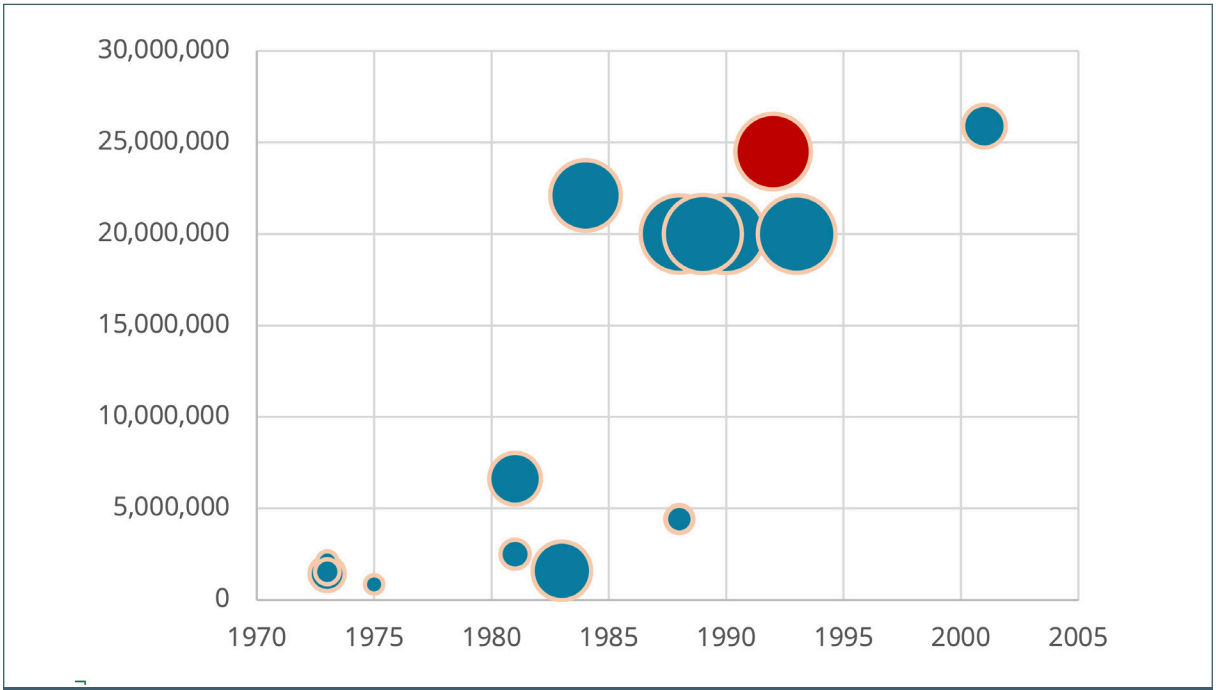

Figure 7: Asking Price (in USD, y-axis) of Second-Hand Factory Trawlers Based on their Construction Date (x-axis) and the Size of their Hold in Cubic Meters (Bubble Size), with Kai Yu in Red.[lxxv]

Sigma could have bought a new or more modern vessel with a better technical specification, but the cost differential would have been considerable. A large similar vessel could be expected to cost between USD 60-110 million each, when ordered new in Russia.[lxxvi] However, the benefits of new vessels is that they tend to pollute less, everything else being equal, as new trawlers typically have more fuel-efficient engines and hulls.[lxxvii] More sophisticated technology on board should also ensure lower level of bycatch on modern vessels.[lxxviii]

It is likely that the sale of second hand Chinese-flagged factory trawlers to Russian companies is a common practice. To mention just one other example, Kai Shun, a Chinese-flagged trawler that was fishing in the Russian EEZ in 2015 [lxxvii] is now called Baltiyskaya Kosa [lxxx] and belongs to Atlantrybflot JSC,[lxxxi] a subsidiary of For Group, a Russian company.

This common practice is likely to be brought to an end though: on 31 December, 2020, the Russian government issued a resolution prohibiting vessels built, purchased or serviced outside of Russia, Kazahkstan, Armenia, Belarus and Kyrgyzstan from receiving any quota for fishing in domestic waters, starting in 2022. A transition period allowing companies to pay the necessary fees to regularise existing vessels (25% of the vessel's cost) is under discussion.[lxxxii]

For Sigma, paying the necessary fees would reduce the IRR on the transaction from an estimated 26% to 21%.

28-year-old Kai Yu is only middle-aged

What about the risks linked to Kai Yu's age? In our modelling, we have assumed that Sigma will modernise the vessel following its delivery (in March 2021 in Dalian, China),[lxxxiii] and will start trawling in 2022. Sigma had refurbished and modernised Petr 1 in 2017 so the same can be expected for Kai Yu.[lxxxiv]

Can a 28-year-old factory vessel still be operated? Interestingly, in a Russian context, the answer is likely to be "da" (yes), given that this was exactly the average age of the entire Russia commercial fishing fleet in 2020.[lxxxv]

That does not mean that this should remain the case though: in 2015, 36% of Russian captains rated the state of their ships "bad" or "very bad", with 78% of them saying that most fishing vessels are obsolete and need to be replaced.[lxxxvi]

Factory trawling is very profitable, especially for walleye pollock, a relatively abundant fish species, which constitutes the largest source of fish used for human consumption. Will profitability and sustainability endure?

Planet Tracker investigated and found out that profits might be at risk in the walleye pollock value chain, with considerable implications in terms of food security, sustainability, financial and even geopolitical risks.

PROFITS AT RISK IN THE WORLD'S LARGEST FISHERY [12]

Strong Demand For Walleye Pollock, Considered Sustainable

Demand for walleye pollock is expected to accelerate.[lxxxvii] In the UK for instance, the largest processor of seafood (Young's) turned to walleye pollock to tempt consumers away from cod and haddock and its pollock fish burger reportedly was the best-selling fish burger in 2020.[lxxxviii] Other European companies such as Nomad Foods (the owner of the Birds Eye and Iglo brands), Angulas Aguinagua and Pickenpack Seafoods have also launched new products made from walleye pollock in 2020.[lxxxix]

In Western European and American markets, walleye pollock can be sold as a sustainable fish, since all of American and most of Russian catches of pollock are certified by the Marine Stewardship Council (MSC).[xc] The supply of walleye pollock to the EU reached its highest level ever in 2019, at 305,007 tonnes, equivalent to EUR 838 million (USD 939 million).[xci]

The proportion of certified pollock is likely to rise since several pollock fisheries in Russia have entered Fisheries Improvement Programmes (FIP), with a view to securing MSC certification. Industry executives expect that nearly all of Russian pollock fisheries will be certified by the end of the year.[13] We estimate that if all fisheries currently assessed by MSC obtain MSC certification, the global share of walleye pollock certified by MSC will rise from c. three quarters to almost 100% – see Table 3.

This strong retail-led demand for pollock is driving increased investment at the beginning of the value chain.

Table 3: Pollock Fisheries Certified by MSC.[xcii]

Fishery Name	Gear Types	MSC Status	% of global catches
Bering Sea, Aleutian Islands and Gulf of Alaska walleye pollock	Trawls - Midwater trawls	Certified	43%
Russia Sea of Okhotsk pollock	Trawls - Midwater trawls	Certified	34%
Russia Navarinsky pollock	Trawls - Midwater trawls	In Assessment [14]	8%
Western Bering Sea Pollock	Trawls - Midwater trawls	In Assessment [15]	5%
East Kamchatka Alaska (Walleye) pollock mid-water trawl	Trawls - Midwater trawls	In Assessment	5%
Kuril Islands Pelagic Trawl and Danish Seine Pollock Fishery	Seine Nets - Boat or vessel seines - Danish seines, Trawls - Midwater trawls	In Assessment	2%
Vityaz-Avto Danish seine walleye pollock fishery	Seine Nets	In Assessment	<1%

[12] For human consumption (catches of anchoveta are greater than those of walleye pollock but they are overwhelmingly used as fishmeal).

[13] https://www.undercurrentnews.com/2021/06/14/norebo-pollock-prices-expected-to-rise-further-as-russia-faces-supply-china-export-issues/?utm_medium=email&_hsmi=133868290&_hsenc=p2ANqtz-971vcudEIqpSMgYitD5WssfplThDhh4edSuR2r8Sxz_DQYIgKKGJenHj6MU4cRk4si9ZF9XFDltT-jnoldUzBqXPTDSq3tggqLYkd517P5SA8ePMo&utm_content=133868290&utm_source=hs_email

[14] Certification backed by Lloyds Register, the third-party assessor for MSC certification, with conditions

[15] Certification backed by Lloyds Register, the third-party assessor for MSC certification, with conditions

Considerable Investment In Pollock Capacity In Russia

Russia's fishing fleet is being modernised

The old age of the Russian fleet (28 years on average, see earlier Case Study) prompted Russia's Federal Agency for Fishery (Rosrybolovstvo) to launch incentives to spur fishing companies to renew their vessels. This initiative started in 2009 as part of Russia's strategic development objectives for fisheries, for completion by 2020. However, after a 2015 audit revealed that only 26% of the fleet had been renewed, it was pushed out to 2030 and aggressively revised: between 2018 and 2030, half of the Russian fleet is expected to be renewed.[xciii] Because of the considerable investments needed to reach this target (an estimated USD 6.4 billion),[xciv] investment quotas were introduced in 2016 to incentivise the purchase of new vessels.[xcv]

Investment quotas incentivise growth in large vessels in Russian Far East basin

The idea of investment quotas is that that a share of the fishing quota (20%) allocated in a given year is put aside and made conditional on investment in Russian seafood production assets over a 10-15 year period.[xcvi] Of the 20% share, 15% is for shipbuilding at Russian shipyards and the remaining 5% for onshore fish processing factories.[xcvii] In addition, the investment quota system requires that companies catch at least 70% of the quota allocated with vessels they own.[xcviii]

During the first wave of the programme (in 2017), the majority of these investment quotas were for ship-building and the majority of ships being built were large factory trawlers - see Table 4.[xcix]

Table 4: Details of the First Wave of Russia's Investment Quota Programme (2017). [c,ci]

Areas concerned	Northern and Far East fishery basins
Number of applications for future investments approved	56
Of which investments in processing facilities	23
Of which investments in ship-building	33
Of which ship building in the Northern basin	24
Of which 80-meter factory trawlers	14
Of which medium-sized trawlers	9
Of which 35-meter vessels	1
Of which ship building in the Far East basin	**9**
Of which 55-meter seiners	3
Of which 108-meter factory trawlers	**6**

The investment quota programme continued in subsequent years, resulting in increased processing capacity for multiple species, including pollock.[cii] For instance, in the first four months of 2021, five processing plants have come on stream in Russia, bringing an additional 7,000 tonnes of fillets to markets in the period.[ciii]

Incentives for investments in the Far East Basin are higher.[civ] Two thirds of Russian vessels operate in this area.[cv]

It was also argued that the way investment quota programmes are designed favours large companies that already hold significant quotas.[cv] One of the largest fishing companies in Russia (the Russian Fishery Company, RFC) recently pushed for a further expansion of the investment quota programme.[cvii]

Considerable investment in the pollock fishing fleet in Russia

In Russia, industrial fishing accounts for 83% of pollock quotas, with another 13% allocated to coastal fishing.[cvii] In 2016, five companies (RFC, Okeanrybflot, Gidrostroy, Norebo and NBAMR) owned 50% of the quotas for pollock in Russia.[cix]

Table 5: Overview of the Largest Fishing Companies in Russia.

Company	Russian Fishery Company	NBAMR	Okeanrybflot	Gidrostroy	Norebo (formerly Ocean Trawlers)
Key species	Walleye Pollock, Pacific Herring	Walleye Pollock, Pacific Herring, Commander Squid, Lemonema	Walleye Pollock Herring Squid [cx]	Walleye pollock, Pacific Cod, Herring, Pink Salmon, Chum Salmon [cxi]	Atlantic Cod, Haddock, Saithe, Walleye Pollock [cxii]
Estimated pollock quota	283,800 tonnes (2020) [cxiii]	117,196 tonnes (2019)	c. 240,000 tonnes (2019) [cxiv]	c. 100,000 tonnes (2018) [cxv]	c. 90,000 tonnes (2014) [cxvi]
Total quota (all species)	330,000 tonnes [cxvii]	207,054 tonnes	282,800 tonnes [cxviii]	410,000 tonnes [cxix]	430,000 tonnes [cxx]
Total catch (all species)	n.a.	172,493 tonnes	> 270,000 tonnes [cxxi]	335,000 tonnes (2018) [cxxii]	592,000 tonnes (2017) [cxxiii]
Estimated revenue	USD 360 mn (2017) [cxxiv]	USD 204 mn (2019)	USD 362mn (2018)	USD 552mn (2018)	n.a.
Estimated margin	32% EBITDA margin in 2017	29% EBITDA margin in 2019	n.a.	n.a.	n.a.
Employees	c. 2,000	> 2,000	c.2,800 [cxxv]	c. 3,600 [cxxvi]	c. 3,000 [cxxvii]
Fleet	15 vessels	12 vessels	16 vessels [cxxviii]	15 vessels [cxxix]	40 vessels [cxxx]
Ongoing investment	8 supertrawlers (2 recently delivered)	n.a.	2 supertrawlers (1 recently delivered)	n.a.	10 trawlers [cxxxi]

Overall, these initiatives are therefore likely to lead to increased investments in the Russian Far East Basin by large companies and in pollock in particular.

One example of the investments ongoing in the pollock fishing fleet in the Russian Far East Basin, RFC launched an investment of c. USD 900 million for the construction of ten pollock supertrawlers

in St Petersburg.[cxxxii,cxxxiii] The construction of the fifth trawler began in January 2021.[cxxxiv] Each vessel is designed to catch about 60,000 tonnes of fish, around twice as much as the level we identified as being enough for Kai Yu to generate a profit and twice as much as existing vessels in the fleet.[cxxxv]

In February 2021, at a press conference, the head of the Russian Federal Agency for Fishery said: "The priority task of the Federal Agency for Fishery is to increase the pace of construction of new processing plants on the Russian coast and the general renewal of the fishing fleet in terms of capacity up to 60%".[cxxxvi] As of June 2021, there are 56 new fishing vessels and 35 new crab vessels under construction, each built by companies under the investment quota programme. A further 16 vessels are under construction but not related to investment quotas.[cxxxvii]

The COVID-19 crisis is leading to an acceleration of Russian investment programmes

In January 2021, Chinese customs authorities announced a tightening of inspections after they reportedly found live strains of COVID-19 on the packaging of seafood imported from Russia. As a result, in February 2021, all seafood exports from Russia to China ceased. Pollock caught in Russia is typically sent to China to be processed. Chinese pollock imports are worth c. USD 600 million to Russia and China accounts for more than 60% of Russian pollock exports.[cxxxviii]

Even though the near-closure of the Chinese pollock market led to a sharp drop in pollock catches in Russia (-23% for the first two months of 2021 compared to the same period in 2020), a supply glut still ensued for pollock caught in Russia and wholesale prices dropped significantly in Russia.[cxxxvix]

To respond to the crisis, the head of Russia's Federal Agency for Fishery supported further expansion of the investment programmes, to build more processing plants and cold storage facilities in Russia (and therefore absorb the excess supply).[cxl]

In Russia, processing facilities with a total output capacity of 1.8 million tonnes are expected to come on stream by 2023.[cxli] Before the COVID-19 crisis, the total Russian output of processed pollock was expected to rise to 762,000 tonnes by 2025.[cxlii]

New rules against vessels of foreign origin could further pressure margins in Russia

Until 2021, fishing vessels built, purchased or serviced outside Russia were banned from landing their catch at Russian ports, but still allowed to obtain quotas and fish in Russian waters if they received clearance from the Russian Customs Service.[cxliii]

On 31 December, 2020, the Russian government issued a resolution prohibiting vessels built, purchased, or serviced outside of Russia, Kazahkstan, Armenia, Belarus and Kyrgyzstan from receiving any quota for fishing in domestic waters, starting in 2022. The Russian Association of the Fishing Industry said that move would cost the industry a total of RUB 25 billion (USD 324 million), due to the cost of receiving clearance from the Customs Service. If implemented (discussions with the industry are ongoing), profits of the industry would be significantly affected and lead to companies moving away from the least profitable species (such as sardines) to more profitable ones (like pollock for instance).[cxliv] This could potentially result in additional fishing capacity in pollock fisheries.

Likely Renewal of the Pollock Fleet in the US

On the US side, the pollock sector is also facing the challenges of an ageing fleet. Overall on the US side of the North Pacific, the average age of the entire fleet and the average age of pollock factory trawlers was 40 years in 2016, even greater than in Russia (28 years).[cxlv]

Arctic Storm Management Group was among the first key industry players in the US that recently ordered a new pollock trawler, set for delivery in 2021. The cost of a new, US-built factory trawler is believed to range from USD 150 million to USD 200 million.[cxlv]i

However, other large companies in the US pollock sector have not yet renewed their fleet, although this will be needed very soon.[cxlvii]

Likely Declines in Walleye Pollock Catches and Stock Ahead

Russia and the US are the two countries that now largely dominate the fishing of walleye pollock after the collapse of the Central Bering Sea fishery - see Figure 8 and Box 2.

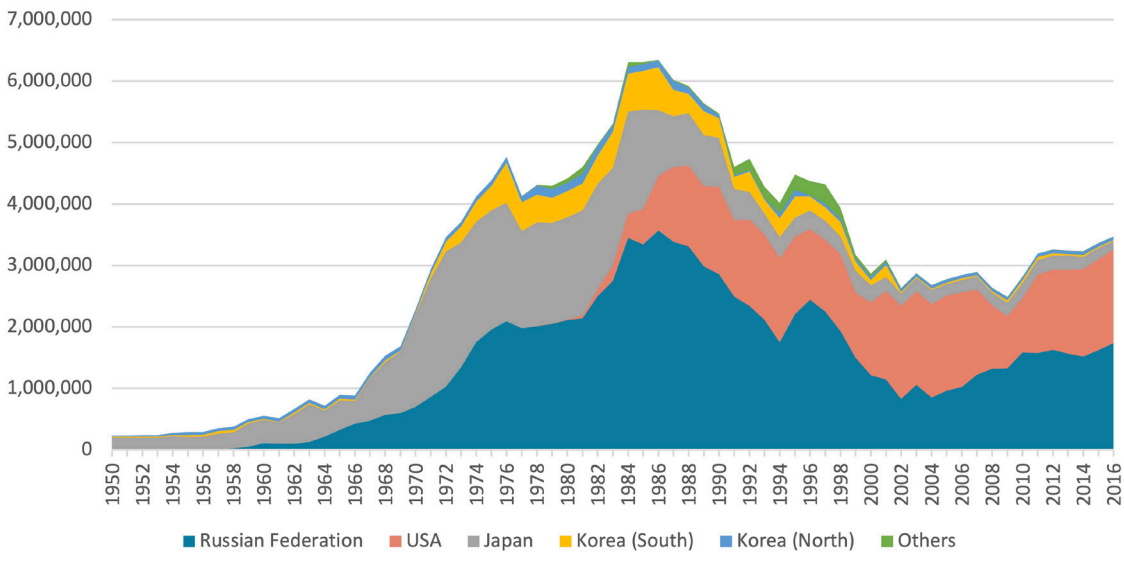

Figure 8: Reported Catches of Walleye Pollock by Country.[cxlviii]

Box 2: The tragedy of the commons in the Central Bering Sea pollock fishery [cxlvix]

Before the United Nations Convention on the Law of the Sea (UNCLOS) was concluded in 1982, several countries used to fish the Bering Sea, including Russia, the US and distant-water fishing states such as China, Japan, Poland and Korea. Since UNCLOS allowed coastal states to claim jurisdiction over their Exclusive Economic Zones (EEZ), distant-water fishing states had to shift to the high seas for pollock resources. Only 8% of the Bering Sea is not part of an EEZ - the Central Bering Sea, sometimes called the Donut Hole - see Figure 9.

Pollock was abundant in the Central Bering Sea and its fishing was not regulated. From 15,000 tonnes in 1980, pollock harvests in the Central Bering Sea escalated dramatically to reach 1,448,000 tonnes in 1989. In 1988, the US and USSR met, but failed to agree on quotas to regulate pollock fishing in the Bering Sea. Negotiations with distant-water fishing states also failed repeatedly. By 1992, **only three years after the peak, pollock stocks had been so depleted that only 10,000 tonnes were caught in the Central Bering Sea, a 99% drop.** This prompted all parties to finally agree the same year to a moratorium on fishing in that sea.

Yet it was already too late. All six states agreed through the CBS Pollock Convention in 1995 that no pollock fishing should take place in the Central Bering Sea until the stock has recovered to a level capable of maintaining maximum sustainable yield. **Three decades after the collapse, it is still not the case today.**

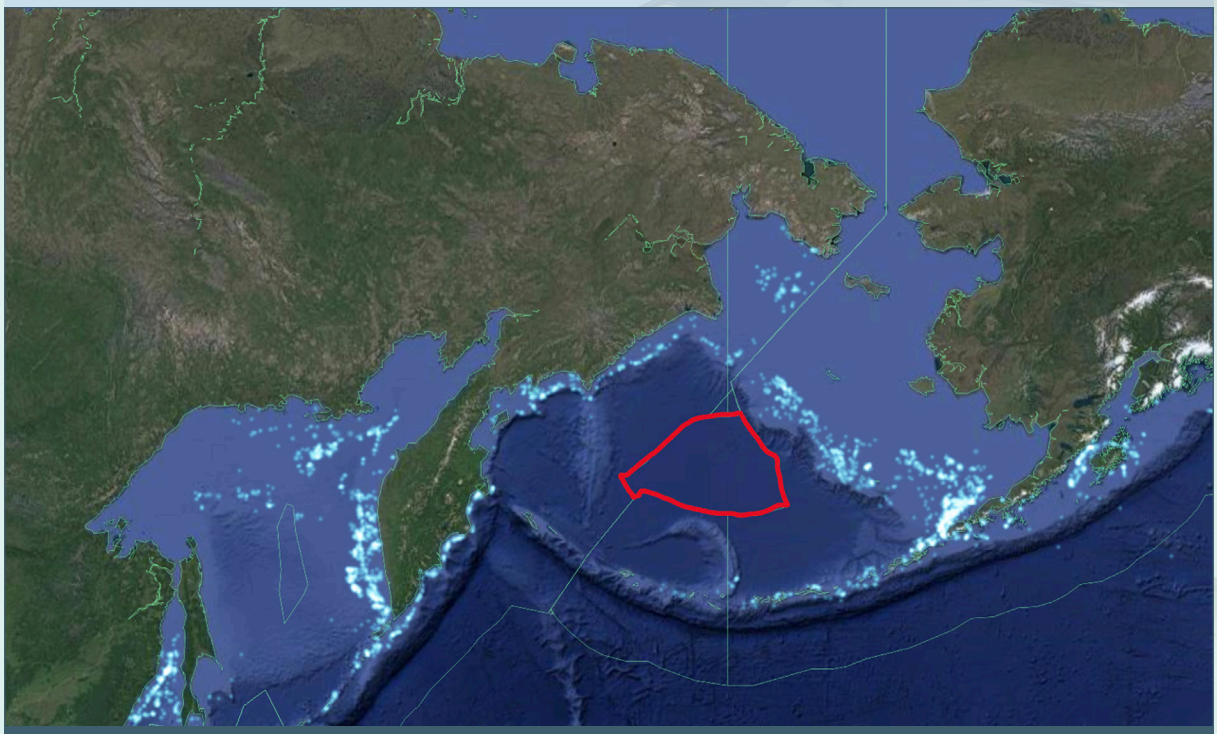

Figure 9: The Central Bering Sea (circled in red), EEZ of Russia, the US and Japan (green lines in the sea), and Fishing Effort (blue dots, January-March 2021).[cl]

Walleye pollock catches likely to decline

Walleye pollock is not currently overfished.[cli] However, a consensus is building that walleye pollock catches will nonetheless decline in the coming years:

- Director of the Pacific Fishery Scientific Research Center (TINRO) Igor Melnikov said at a session of the Far Eastern Scientific Fishing Council in 2018 that pollock would see a decline in stocks from 2020.[clii]
- In 2020, TINRO estimated that **quotas for pollock in Russia could be halved in in the next five years**.[cliii]
- The Russian Pollock Catchers Association shares similar worries,[cliv] although its estimate of future quota reduction (15-20% reduction by 2024) is not as pronounced as TINRO's.[clv]
- On the US side (Eastern Bering Sea), scientists also warned in 2019 that catches of pollock would be below average in coming years.[clvi]

This is because catches are a function of quotas, which themselves are set based on the spawning biomass at a given date. The biomass on which future catches will be based (the generations of fish post 2013) is lower than the one on which existing catches were based.[clvii]

Climate Change is Disrupting Walleye Pollock Stocks

In the long run, it is feared that a link exists between the ice melting at the poles and the decline of biomass of pollock stocks. Higher temperatures in summer and autumn are associated with poor feeding conditions for juvenile pollock. Scientists fear that by 2040-2050 the 'recruitment' of walleye pollock (i.e. the proportion of fish that reaches the stage where it can be fished) could drop by 32-58%.[clviii] This in turn would lead to lower stocks and lower catches.

More pollock in Russian waters, less in American waters due to climate change

Due to the warming of the Northern Pacific, the Russian Fishery Administration estimates that **one third of the walleye pollock biomass could at least temporarily migrate from US waters into the catchment area of the Russian fishing fleet**.[clix]

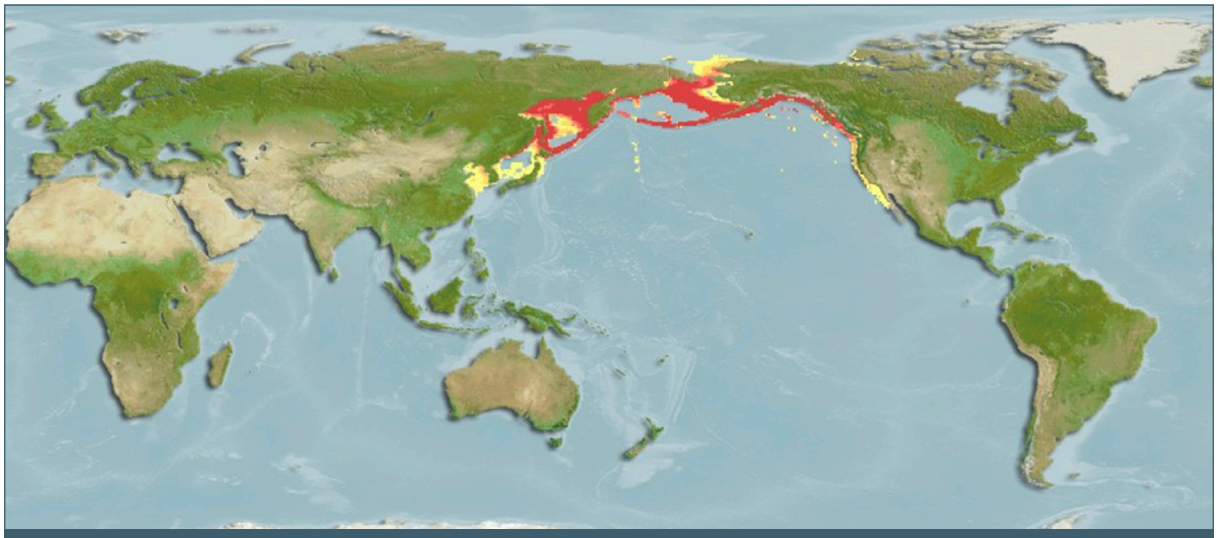

Figure 10: Estimated Distribution of Walleye Pollock in 2050 (red: high probability of occurrence, yellow: low probability).[clx]

Like pollock, several other fish species which are part of the US Northern Pacific biomass and key to US food security are also migrating north and/or west due to climate change.

Increased risk of marine heatwaves with potential detrimental impact on fish populations

In addition, the occurrence of marine heatwaves which dramatically impacts marine ecosystems has increased. In 2020, one of the biggest marine heatwaves ever, was recorded in the Pacific Ocean and was part of several record-setting spikes in ocean temperatures since 2014. A noticeable event was the so-called "Blob", where a pool of warm water developed off Alaska in 2013, spread far (to Mexico) and lasted much longer than usual, dramatically impacting marine ecosystems and resulting in plummeting populations of Chinook salmon, leading to the starvation of sea lions and the shutdown of much of the US Pacific fishing industry.[clxii] This heatwave resulted in the near disappearance of the 2015 year class for walleye pollock populations, as low salinity impacted egg survival and warmer waters resulted in higher feeding requirements for pollock larvae at a time when their prey (zooplankton) was less abundant.[clxiii]

Pollock is controlled by two countries (Russia and the US). Russia is set to increase its share of pollock stocks through large ambitious investments and thanks to climate change-related migration. What does that mean for the future of the largest remaining source of wild palatable fish in the world? Watch out for pollock politics.

IMPLICATIONS: POLLOCK POLITICS, POPULATIONS AND PROFITS

Geopolitical Tensions Between Russia and the US

Russia has opened the Arctic for pollock fishing

In 2020, Russia opened the first-ever commercial harvest of pollock north of the Bering Strait - in the Chukchi Sea, a new Arctic frontier for commercial fishing. The recommended quota for the Russian side of the Chukchi Sea was 68,000 tonnes in 2020 (equivalent to the annual catch of one new super-trawler), on a biomass of 890,000 tonnes.[clxiv] For 2021, the quota was set at 37,200 tonnes, split in 36 different allocations, where the winners of the auctions for the quotas will be awarded 15-year contracts. The starting price for each of the 36 lots is RUB31 million (c. USD 400,000).[clxv]

With the exception of a handful of research/survey vessels belonging to the Russian Federal Research Institute of Fisheries and Oceanography (VINRO), no fishing has yet taken place in the Chukchi Sea.[clxvi] Planet Tracker recommends that this remains the case - see Box 3.

Box 3: Fishing in the Chukchi Sea would further endanger fragile Arctic ecosystems

Using the catch/fuel consumption ratio implied in our modelling of Kai Yu returns, we estimate that if all the quota for pollock in the Chukchi Sea were utilised, an estimated 3 million litres of fuel would be consumed by vessels fishing in that sea every year. The extent of the pollution would depend on the type of fuel used and the age of the fishing vessel but in any case would be very damaging.

The Chukchi Sea is a key area for biodiversity, including polar bears, walrus, beluga whales, bearded seals, gray whales and spectacled eiders.[clxvii] An estimated 3,000 polar bears live in the Chukchi Sea, one of the largest known populations of this threatened species (IUCN status).[clxviii]

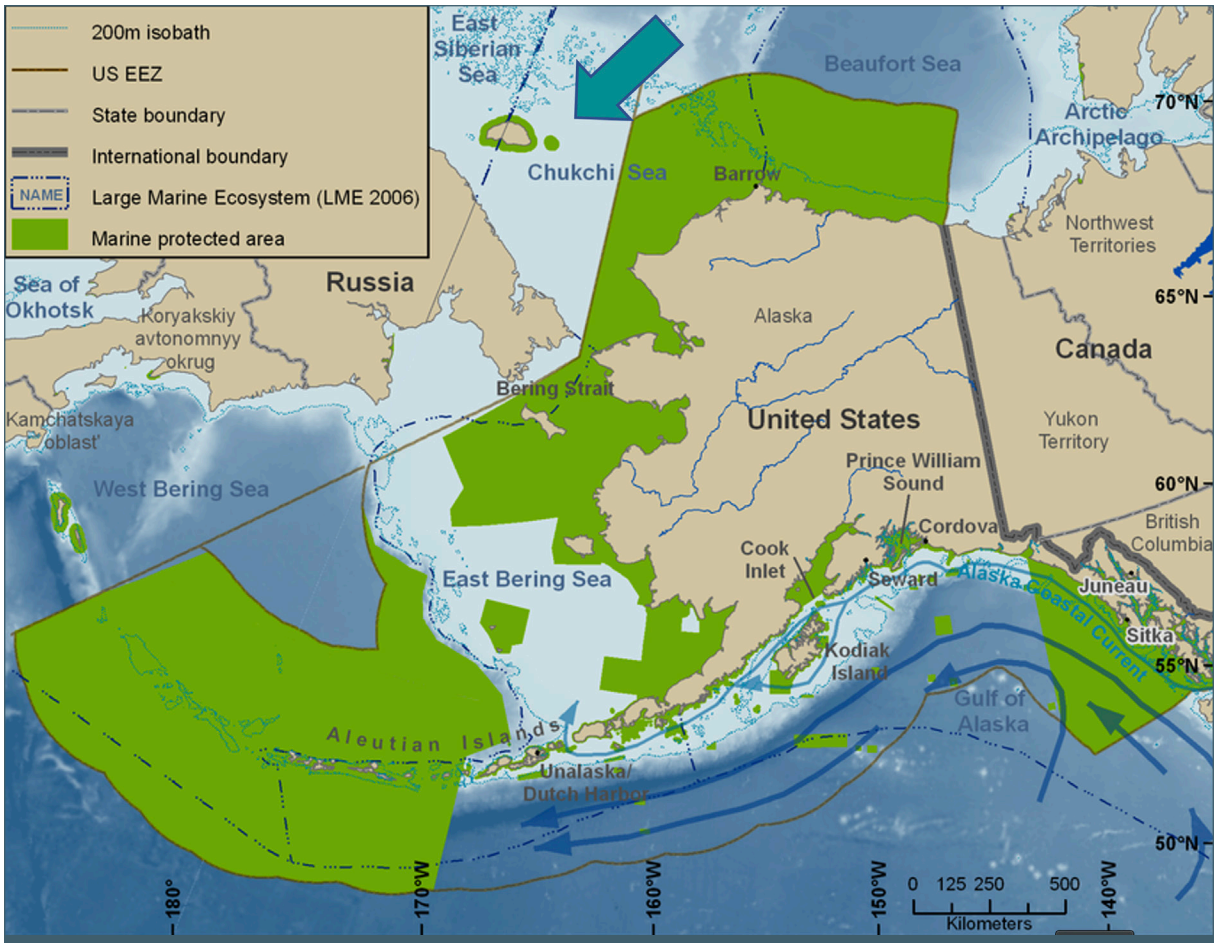

Figure 11: The Chukchi Sea, Part of the Russian and US EEZ.[clxvix]

Key fishing nations have agreed not to fish the Central Arctic high seas for now

In 2018, Russia, the US, the EU, Denmark, Iceland, Canada, Norway, China, South Korea and Japan signed an agreement[16] that prohibits commercial vessels carrying their flags from fishing in the Central Arctic high seas (covered in ice for most of the year for now) - see Figure 12.

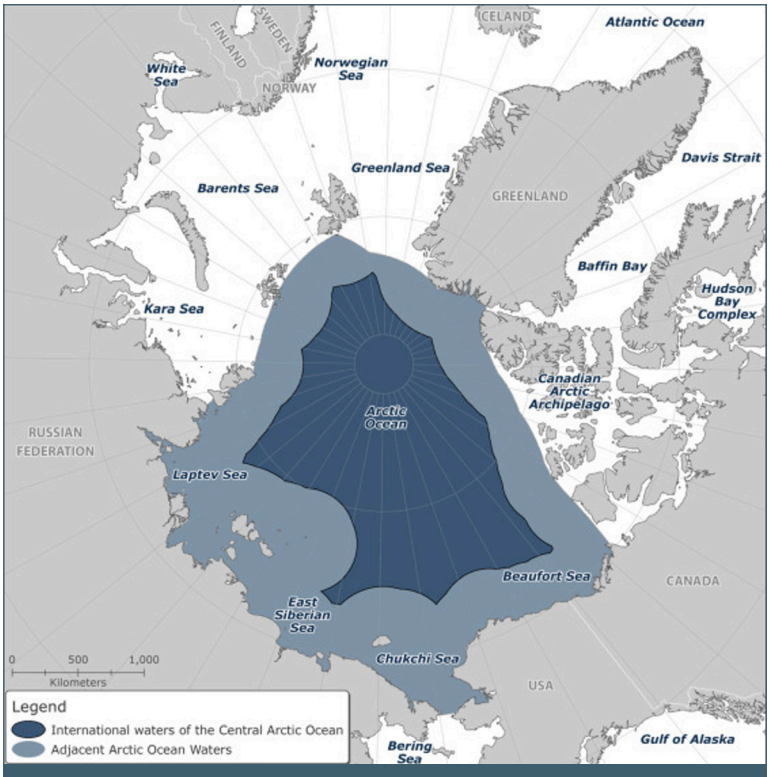

Figure 12: International Waters of the Central Arctic Ocean.

[16] The International Agreement to Prevent Unregulated Fishing in the High Seas of the Central Arctic Ocean

The agreement will enter into force 30 days after the last party ratifies it, last for 16 years and then will be renewed automatically unless a party objects.[clxx]

All parties have ratified the agreement and it entered into force on 25 June 2021.[clxxi]

Whilst the agreement is positive for the conservation of fish populations and ecosystems in the Arctic, we note that the parties to the agreement:[clxxii]

- Are authorized to conduct commercial fishing in the target area, if it is for the purpose o *"conservation and management measures for the sustainable management of fish stocks adopted by one or more regional or subregional fisheries management organizations or arrangements", provided that its "duration, scope and scale" [...] minimize impacts on fish stocks and ecosystems."*
- Are expected to form a joint research programme that will aim at *"determining whether fish stocks might exist in the Agreement Area now or in the future that could be harvested on a sustainable basis and the possible impacts of such fisheries on the ecosystems of the Agreement Area."*

In other words, commercial fishing might still happen in the long-term based on this agreement.

There are precedents for fish-related conflicts in polar regions

The US closed off American Arctic waters to any new commercial fishing in 2009. It will be interesting to see how the US reacts to an expansion of Russia's pollock fishing fleet in the Arctic, at a time when the American stock of pollock is migrating north and west due to warming waters (towards Russia or the Arctic Ocean).

One previous example of conflict involving migrating fish stocks was around mackerel in Iceland. Due to warming waters, mackerel populations moved northwards in the Atlantic and waters around Iceland (where mackerel were virtually absent before) became a new feeding ground for mackerel in the summer. This led Iceland to establish a mackerel fishery, which was disputed by the EU and Norway. In the absence of a compromise reached around quotas for mackerel between the EU, Iceland and Norway, Iceland remained outside of the quota-setting scheme. Mackerel from the North East Atlantic lost its MSC certification in 2019 after years of overfishing (not just by Iceland).[clxxiii]

Equally, Russia and Norway have had regular disputes in the past over fishing in the waters around Svalbard (under the control of Norway) with several Russian vessels arrested by Norwegian authorities and the presence of a Russian navy vessel in the waters around Svalbard.[clxxiv]

Russian warships, warplanes and a submarine deployed in US pollock fisheries

In that context, it is telling to note that Russian warships were deployed in the Bering Sea last year. American pollock vessels fishing legally in the US EEZ were allegedly "harassed" by Russian "submarines and destroyers" in August 2020 – see Box 4, leading the US pollock industry to ask the US senate for military back-up.[clxxv, clxxvi, clxxvii]

Box 4: Russian Navy's largest war games exercises since the Cold War – in the US EEZ

Tensions between American and Russian fleets in the Bering Sea, which supplies more than half of all American seafood,[clxxviii] are not new.[clxxix] However, the August 2020 events were the Russian Navy's largest war games exercises since the Cold War.

Specifically, on August 25th and 26th and September 14th, several Russian warplanes, warships and a submarine came in very close proximity to US-flagged pollock fishing vessels and "harassed" them, telling them to leave the area (e.g. by "sailing south for five hours").[clxxx] The US fishing vessels were between 25 and 70 nautical miles inside the US EEZ.

The fishing vessels that encountered the Russian naval exercises belonged to American Seafoods, the largest holder of pollock quotas in the US (with 17.3% of total quotas).[clxxxi] American Seafoods claim to supply fish for a billion people.[clxxxii]

It is not clear why the Russian Navy conducted these exercises, but they occurred in a context where senior Russian officials and parliamentarians agreed in 2020 that Russia should end its "provisional enforcement" of the 1990 accord signed by the USSR and the US on the delimitation of the sea border between the two countries in the Bering Strait. Neither the USSR nor Russia ratified the agreement.[clxxxiii]

In the past, geopolitical tensions between Russia and the US already affected the pollock market. In 2014, Vladimir Putin issued an import ban to keep American pollock out of Russia in response to US sanctions over Ukraine.[clxxxiv] It is still enforced as of May 2021.[clxxxv]

Many historical precedents and recent newsflow show that Russia is serious about defending its fishing interests and expanding the area it fishes, even if it is in pristine Arctic seas. There are key natural capital and financial implications of this stance, detailed below.

Natural Capital and Financial Implications in Russia

Pollock quotas on the rise in Russia, stable in the US

Quotas for pollock total allowable catches (TAC) have been increased in recent years, both by Russia and the US - see Figure 13.

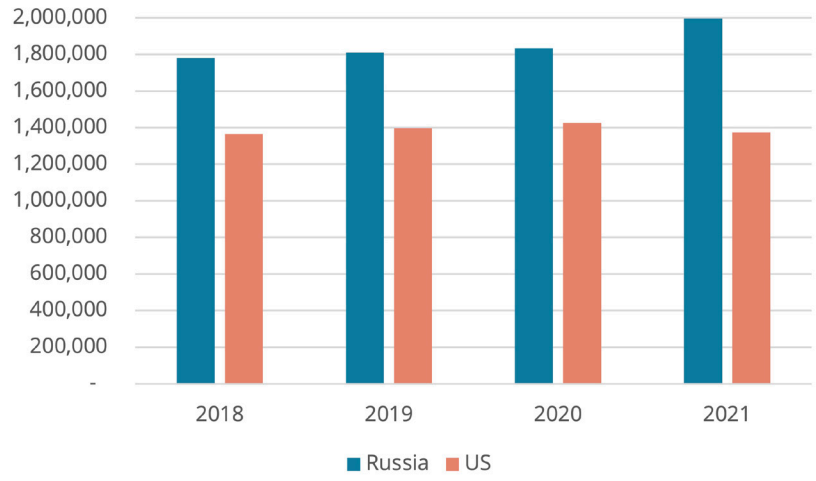

Figure 13: Total Allowable Catches (Quotas) of Pollock in Russian Far East Basin (Russia) and Eastern Bering Sea (US).[clxxxvi]

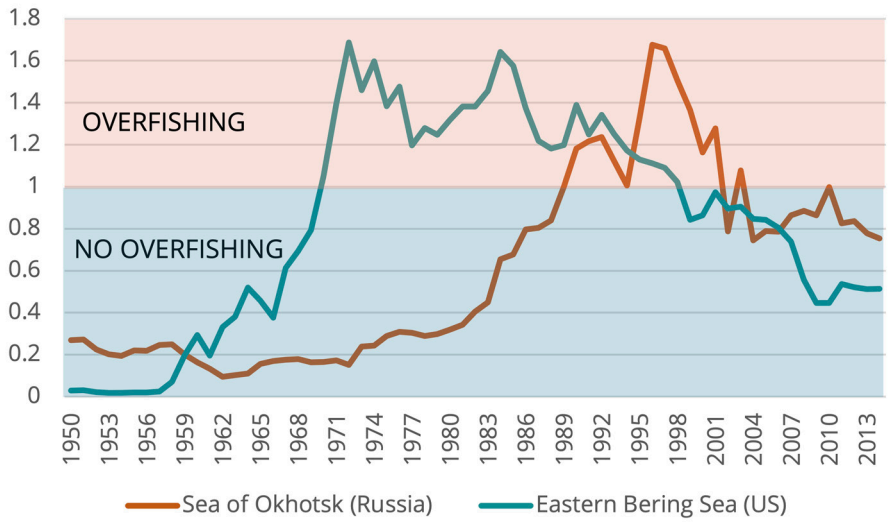

Figure 14: Exploitation Rate (F/FMSY) of the Two Main Stocks of Walleye Pollock.[cxc]

For 2021, Russia further increased the TAC for pollock in its Far East Basin by 9% year-on-year.[clxxxvii] The TAC for 2022 will be 0.2% higher than in 2021.[clxxxviii] It is only recently (for the year 2021) that the US cut its TAC by 3.5%.[clxxxix] Since 2018, quotas have been stable in the US and rising in Russia.

As previously seen, current projections of future quotas (based on scientific assessments of biomass) point to a decline in quotas and therefore catches in the coming years, because of an expected decline in biomass.

Walleye pollock is no longer overfished either on the Russian or the US side - see Figure 14. However, fishing pressure is higher in Russian waters and an unexpected quota increase or a drop in biomass not accompanied by a drop in quotas could mean the Sea of Okhotsk becomes at risk of overfishing again.

The role of MSC

Because around three quarters of the global walleye pollock catch is certified by MSC, MSC is a very important stakeholder in pollock value chains, especially in Russia, where around two-thirds of the pollock catch is already certified by MSC and where other pollock fisheries are taking actions to become certified.[cxci]

Being MSC certified is an important driver of foreign demand: all certified fisheries in Russia are export-oriented and the vast majority of them indicated that *"having an MSC certificate is not merely a competitive advantage, but a must in foreign markets"*.[cxcii]

In addition, **certified seafood products from Russia are able to generate a significant price premium** when sold abroad compared to non-certified products: about 15-20% according to a 2018 study [cxciii] and as much as 30-40% for pollock filets specifically based on prices reported by Undercurrent News in 2020.[cxciv] Key Russian pollock companies expect that premium to remain in 2021, given that retailers Aldi, Lidl and Kaufland only purchase MSC certified pollock.[cxcv]

Certification decisions by MSC can therefore significantly affect profitability for Russian pollock harvesters – see Figure 15.

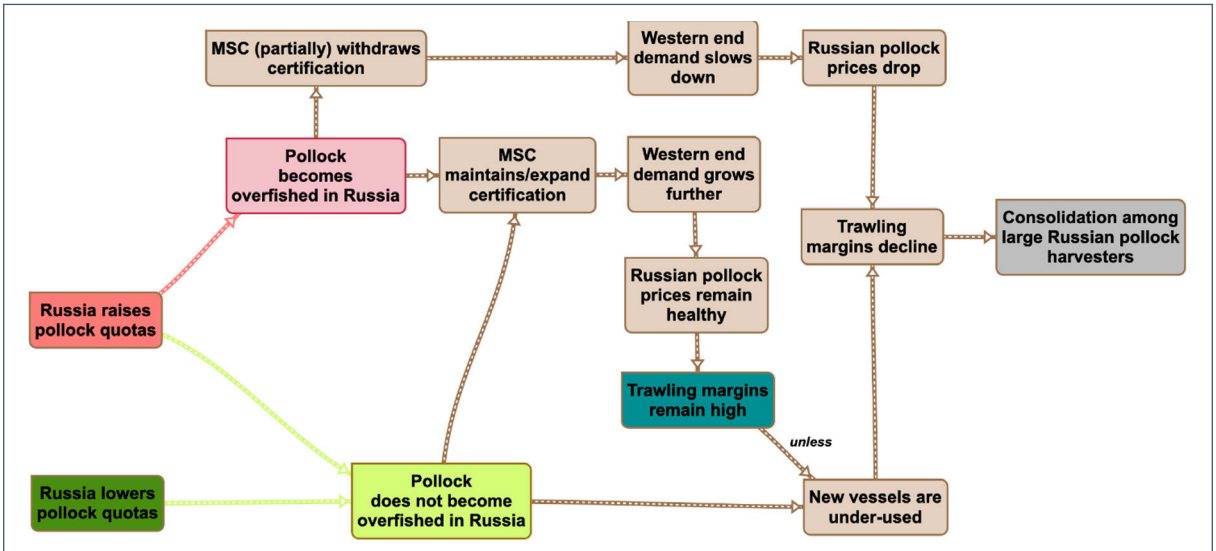

Figure 15: Possible Scenarios for Russian Walleye Pollock Harvesting Profits based on Quotas and Certification Decisions.[cxcvi, 17]

[17] The arrow between "Pollock becomes overfished" and "MSC maintains certification" might appear controversial, but it is to account for the possibility that a stock that becomes subject to overfishing might still be certified for a temporary period. This was the case, for instance, for mackerel in the North East Atlantic.

- If MSC were to withdraw their certification of a fishery (for instance, if it became overfished), we would expect end demand for pollock caught in that fishery to decline, potentially affecting Russian pollock prices and harvesters' margins.
- However, if MSC maintain their certification of the Sea of Okhostk fishery and potentially also certify either the Western Bering Sea or the East Kamtchatka fishery, we would expect Western end demand for Russian walleye pollock to grow further, allowing trawling margins to remain high (provided that investments in new vessels do not pressure profitability too much). A decision on the certification of the Western Bering Sea/Navarinsky stock is expected in June 2021.[cxcvii]

Not all organisations agree that all walleye pollock caught in Russia is managed sustainably enough:

- The Marine Conservation Society rates walleye pollock from the Navarinsky stock in Russia 4 out of 5 (where 5 is the worst), due to ***"a lack of available data on fishing mortality", meaning that "there is concern for the fishing pressure"***.[cxcviii]
- WWF Russia, in a response to a report released in February 2021 on the MSC scope extension assessment process of the Russian Sea of Okhotsk fishery – the largest in Russia – commented: ***"Information on the discard of juvenile pollock, roe-stripping and juvenile mortality due to trawl escapement is controversial and in several cases incomplete. The effective regulation of the Russian Pollock fishery is impaired by inadequate observer programs, assessment of total catch using product recovery rates applied to final products volumes, and the absence of information on harvest capacity relative to stock size."*** [cxcix] WWF had originally opposed the certification of the Sea of Okhotsk fishery but withdrew its objection after it found an agreement with the Russian Pollock Association.[cc]

Further consolidation in the Russian pollock industry

In most scenarios, we would expect further consolidation among Russian pollock fishing companies, especially if trawling margins were to decline, either because of the weight of new investments in vessels and processing capabilities, or because harvester prices would drop if pollock became overfished and/or MSC (partially) withdrew its certification.

In fact, consolidation in the industry is already ongoing - see Box 5.

Box 5: Examples of consolidation in the Russian pollock industry

- In 2014, pollock fishing company Karat bought Sakhalin Leasing Flot, adding 60,000 tonnes of pollock quotas.[cci]
- The same year, Russian Fishery Company bought Imlan and Pelagial, adding 17,000 tonnes of pollock quotas and Gidostroy purchased Kamchatimpex, adding around 18,700 tonnes of pollock quotas.[ccii]
- In 2017, an entity controlled by the owners of Russian Fishery Company bought a company from Dalmoreproduct which had quotas for more than 60,000 tonnes of pollock.[ccii]
- The same year, Okeanrybflot bought Dalintorg and also Lights of the East.[cciv]
- In 2019, Gidrostroy purchased Preobrazhenskaya Basa Tralovogo Flota.[ccv]
- In 2020, Russian Fishery Company bought the assets of Russian Pollock LLC.[ccvi]
- In February 2021, it was reported that NBAMR merged with Okeanrybflot, another giant trawling firm. If confirmed, it would be Russia's largest fishing company by volume, with quotas of 464,000 tonnes.[ccvii]

The investment quota program, which incentivises future growth for companies able to invest in new vessels is a key driver of that consolidation according to Norebo, one of the largest Russian fishing companies.[ccviii]

Ten organisations control half of the world's pollock quotas

Further consolidation in the Russian pollock industry could eventually result in an even higher concentration level than in the US, where a limit on the share of quotas owned by each company (17.5%) prevents an excessive concentration level.[ccix]

In the US, American Seafoods (the company whose vessels were disrupted by the Russian Navy) is the largest holder of pollock quotas, with 17.3% of the total.[ccx] Other large holders of pollock quotas in the US include Trident Seafoods (family-owned), or Japanese listed companies Maruha Nichiro and Nissui, via their US subsidiaries.[ccxi]

Overall, Planet Tracker estimates that ten organisations control around half of the world's pollock quotas - see Figure 16.[ccxii]

Among these ten organisations (namely all of those mentioned in the pie chart right except Western Alaska Native villages), eight are controlled by wealthy individuals and only three are publicly listed - see Table 6.

Note that a significant part of the quotas owned by Western Alaska native villages via the Community Development Quota program are often leased back to other fishing entities, meaning that the estimates displayed in Figure 16 are most likely too low on the American side.

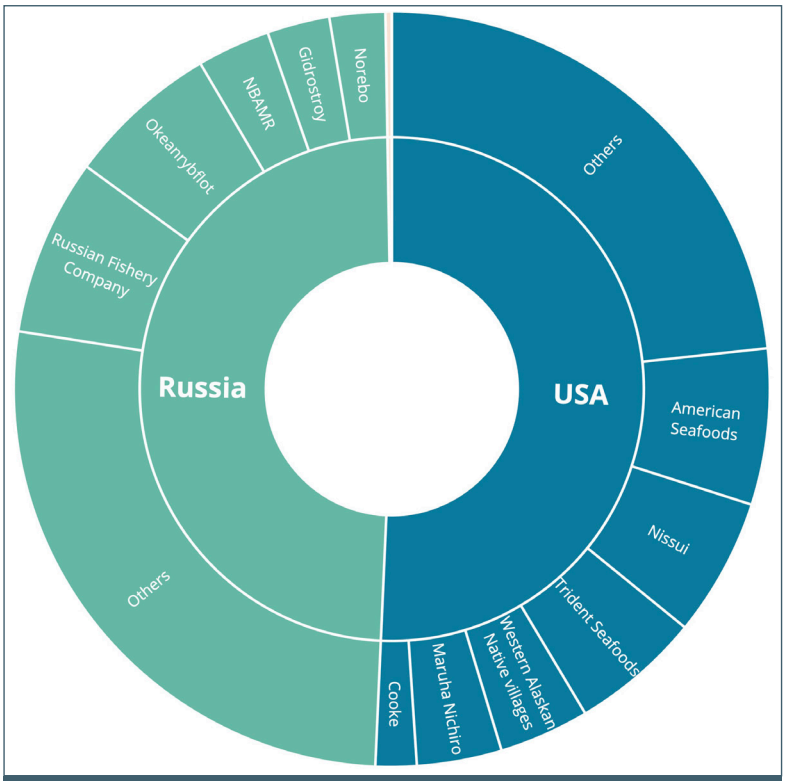

Figure 16: Estimated Breakdown of Walleye Pollock Fishing Quota by Organisation.[ccxiii]

Table 6: Key Owners of Walleye Pollock Quota Holders.[ccxiv]

Organisation/Community	Type	Key Owner
Russian Fishery Company	Private company	Gleb Frank
Okeanrybflot	Private company	Sergey Darkin
NBAMR	Private company	Valery Ponomarev
Gidrostroy	Private company	Alexander Verkhovsky
Ocean Trawlers	Private company	Vitaly Orlov & Magnus Roth
American Seafoods	Private company	Bregal Partners (private equity firm)
Nissui	Publicly listed company	
Trident Seafoods	Private company	Chuck Bundrant
Western Alaskan Native villages		Community Development Quota Associations
Maruha Nichiro	Publicly listed company	
Cooke	Publicly listed company	Glenn Cooke

In Russia, large ambitious investment expansion plans favour larger companies, which incentivises further consolidation in the sector. It could also result in a deterioration of the walleye pollock biomass, which is in no one's best interest. Alongside fisheries agencies, the MSC is a key stakeholder that can prevent this. There are major implications for the US pollock industry.

Natural Capital and Financial Implications in the US

In the short term, pollock fishing companies in the US have been hit by COVID-19 outbreaks at processing plants, and this in turn has supported prices: as of March 2021, prices for US-caught pollock are near record highs given the lack of supply owing to coronavirus-related closures in US processing plants and Chinese ports.[ccxv]

Fresh injection of capital likely in the medium-term

The long-term outlook for US-based pollock fishing companies is cause for concern:

Box 6: Future challenges in the US pollock industry

- The US pollock fishery is already MSC-certified and an increasing proportion of Russian pollock fisheries is certified too, potentially meaning that **Russian companies might take share from American ones** as wholesalers are keen to secure MSC-certified products. Approximately 40% of pollock sold in the US allegedly came from Russia in 2016.[ccxvi]
- **Warming waters are challenging for some vessels**: as Alaska pollock is found further away from the coasts in the summer season,[ccxvii] vessels without on-board processing facilities become less competitive against factory trawlers.
- The **old age of the fleet** (40 years for pollock factory trawlers in 2016, 12 years more than in Russia)[ccxviii] means that it will have to be renewed sooner than later.[ccii]
- This will necessitate **substantial investments**: the cost of a new, US-built factory trawler is believed to range from USD 150 million to USD 200 million,[ccxix] which is more than the EBITDA generated by American Seafoods, the largest holder of pollock quotas (estimated at around USD 140 million in 2019).[ccxx] By law, the fleet renewal can only be done via US-built fishing vessels.[ccxxi]
- **Modernisation investments are unlikely to be profitable** if they do not come together with an increase in sales. It is expected that part of the pollock populations in US waters could migrate outside of the US EEZ due to warming waters. In the short run, pollock quotas are likely to decrease given that the acceptable biological catch (ABC) for 2022 was set below 2021's.[ccxxii]
- **Further consolidation is difficult** given the threshold on pollock quotas and the need for investment in the fleet. Evidence for this is the difficulty that American Seafoods has to sell itself: the largest pollock quota holder, in which private equity firm Bregal Partners is the key shareholder, has been for sale since February 2019 but has still not found a buyer two years later, despite having "a well-kept fleet of factory trawlers".[ccxxiii]

Improvements in sustainability could help future equity raises in the US pollock industry

Bar a change in regulations, Planet Tracker believes that in the medium to long term, **the Alaska pollock industry will therefore need substantial capital**, through a combination of debt finance and equity.

We believe that the industry might transition from being traditionally privately-held to greater public ownership and would not be surprised to see one or several pollock harvesters being IPO'd[18] in the future. For instance, the key shareholder in American Seafoods (Bregal Partners) is reportedly in talks with several special purpose acquisition companies (SPAC) as a potential exit route out of the company. SPACs are companies that raise capital through IPOs for the purpose of a later acquisition of an existing company.

Should equity raises be required, we believe that **existing best practices in terms of natural capital management in the industry and further improvements in sustainability could constitute a key attraction of the 'equity story'** and help offset some of the challenges listed above. Such improvement could be:

- on bycatch: the rate is already very low but given the volumes are very high, the absolute tonnage of non-target species caught is still high. For instance, even if the bycatch of Pacific halibut in Alaska pollock fisheries is well below 1%,[ccxxiv] bycatch of that species negatively impacts some Native Alaskan communities who rely on that species.[ccxxv]
- on prey competition: the pollock fishery competes with pollock-reliant animals such as Steller sea lions and northern fur seals. Better incorporating prey needs of marine mammals and seabirds reliant on pollock would allow the industry to avoid fishing restrictions. In 1999 and 2000, pollock trawling within endangered Steller sea lion critical habitat was banned due to the dramatic decline in Steller sea lion populations.[ccxxvi]

Interestingly, the Biden Administration might well help the sustainability credentials of the Alaska pollock industry, having re-opened the conversation about creating an organic labelling standard for US-produced seafood. We understand that Alaska pollock would be the key candidate for a potential designation as wild-caught organic seafood.[ccxxvii]

Lenders could use sustainability-linked covenants or loans to ensure the Alaska pollock industry remains best-in-class in terms of sustainability

Even more so than equity, loans are likely to be the key source of capital to renew the Alaska pollock fleet. Introducing natural capital-related covenants to these loans could be an effective mechanism for ensuring that the inevitable renewal of the fleet does not affect the sustainability of the fishery. As a corollary, sustainability-linked loans (where the interest rate charged is tied to one or several sustainability indicators) could be introduced, for instance by **offering better interest rates to companies with the lowest bycatch rates or those that adequately account for direct and indirect impact to the food web**. This can easily be made possible since data transparency and quality is very good for the US pollock fleet, with e.g. bycatch rates per week and per vessel available online.[ccxxviii]

[18] IPO: Initial Public Offering

Of interest, the Department of Commerce, Community and Economic Development of Alaska offers loans to finance vessel purchases for Alaskan residents. These loans are capped at USD 200,000 though, indicating they are primarily aimed at the artisanal fleet, not at factory trawlers. Up to April 2021, interest rates charged on these loans has been 5.25%, with a maximum maturity of 15 years.[ccxxix] However, we found no evidence that sustainability criteria are used for these loans.

For in-shore processors, improved sustainability means mitigating imported IUU risk

For pollock processors in the US based in-shore (i.e. not including catcher-processors), a key way to improve sustainability is to ensure that the share of IUU[19] pollock is reduced to an absolute minimum.

In 2019, 10.9% of US imports of walleye pollock from Russia and 22.3% of US imports of the same species from China were estimated by the US Industry and Trade Commission to be from IUU sources.[ccxxx] Pollock imported from China was either caught by Russian vessels and processed in China or caught by Chinese vessels in the Russian or Japanese EEZ.[ccxxxi]

IUU fishing is possibly still high but decreasing in Russian pollock fisheries

Data from the Sea Around Us database (used by the US Industry and Trade Commission to estimate imported IUU tonnage) shows that **as much as 50% of the walleye pollock caught in Russia was estimated to be unreported** in 2016, vs. 19% in Japan and only 0.7% in the United States.[ccxxxii] If correct, **that would be more than the entire catch of Alaska pollock in the US**. This data however uses an estimate made by the Kamchatka Regional Directorate for Protection and reproductions of Fish Stocks and Regulation of Fishery in 2001.[ccxxxiii] It is likely that the situation has improved since. Indeed, in the Sea of Okhotsk, observer coverage rose from 4% of fishing operations in 2016 to 15% in 2020.[ccxxxiv] A high level of coverage by fisheries observers (at least 20%) is key to ensure adequate measurement of bycatch and IUU fishing (for more details, see our report Bonding with Observers).[ccxxxv]

This assumption is corroborated by MSC reports and assessements, which for instance argue that: ***" violations of fishing rules were related to harvesting in prohibited areas or in prohibited seasons, discards of undersized fish and discards of fish carcasses after the roe has been stripped from the fish because roe has higher market price. It is commonly accepted that very high level of poaching occurred in the Russian Far East mostly in the 1990s-early 2000s. Since the 2000s, poaching has gradually decreased"***.[ccxxxvi]

Whilst it is difficult to measure IUU activity, a recent report by Global Fishing Watch shows that globally, vessels flagged to Russia are responsible for the majority of trawler activity that relies on support vessels (through the use of transshipments, sometimes associated with IUU activity). Globally, out of all the ports visited by carrier vessels following a transshipment, the two most visited are Vladivostok and Petropavlosk, both in the Far East Basin.[ccxxxvii]

Unreported discards by Russian vessels in Russian waters are estimated to contribute to the majority of unreported catches of walleye pollock globally - see Figure 17.[ccxxxviii] This is because the popularity of pollock roe in Japanese and Korean markets means that young and male fish are sometimes discarded when caught.[ccxxxix]

[19] Illegal, Unreported and Unregulated fishing

Figure 17: Estimated Breakdown of Unreported Walleye Pollock Catches by EEZ in 2016.[ccxl]

The entry into force of the PSMA in Russia could help reduce IUU risk

In March 2021, the Port State Measures Agreement (PSMA) entered into force in Russia.[ccxli] The PSMA was designed to target IUU fishing by preventing foreign vessels engaged in IUU fishing from using ports and landing their catches. If enforced thoroughly, it should help reduce the share of IUU fishing for pollock catches in Russia, but not greatly, as it focuses solely on foreign vessels (in this case, Korean vessels would be the primary targets - see Figure 17).

...but further traceability investments in the US would arguably be more efficient

To reduce the risk of importing IUU walleye pollock into the US supply chain, further investments in traceability systems with a focus on interoperability of the solutions chosen between harvesters, processors and retailers/wholesalers/distributors are likely to be the best option. One effective way for processors to do so would be to invest in traceability solutions compliant with the GDST [20] standards, designed to allow inter-operability through the value chain. Planet Tracker previously showed that such an investment typically generates high returns (thanks to the reduction in food recall costs, waste, and insurance/legal costs it enables).[ccxlii]

Walleye pollock is currently not a species included in the US Seafood Import Monitoring Program (SIMP), which establishes reporting and recordkeeping requirements for imports of certain seafood products.[ccxliii] There are, however, signs that the regulation on traceability could be tightened. In September 2020, the US Food and Drug Administration (FDA) proposed the establishment of additional recordkeeping requirements for all finfish species, including pollock. Imported seafood was traditionally exempted from FDA programs.[ccxliv] In May 2021, two US congressmen filed legislation that, if adopted, would expand the role of the US SIMP to include all species, including pollock.[ccxlv]

[20] Global Dialogue on Seafood Traceability

Global Food Security Implications

Our analysis reveals that ten companies control half of the world's pollock quotas, which could mean that any substantial issue affecting that species would only impact a minority of companies. That is, however, misleading. In fact, the Alaska pollock supply chain is very complex - see Box 7.

Box 7: The long pollock supply chain

After it is caught, pollock is typically processed and in most cases processed at least twice before it reaches the end consumer.[ccxlvi] Primary processing happens either in-shore or on a catcher-processor (such as the we one whose financials we estimated in the Case Study earlier). The resulting product (headed and gutted fish, fillet, surimi or roe) is then shipped to a secondary processor (typically based in China for fillets or in Japan for surimi and roe).

For instance, after primary processing in the US, (frozen) fillets of Alaska pollock are typically shipped to China. There, they are thawed and can be injected with various additives, such as sodium tripolyphosphate (STTP), a water retention agent that increases the weight of the fish.[ccxlvii] The fillets are then re-frozen and either re-processed or shipped to a secondary processor, who turns the fillets into fish sticks or patties.

A consequence of that long supply chain is that the processing phase of pollock typically accounts for twice the climate impact compared to the fishing phase.[ccxlviii]

Using only pollock certified by MSC as a proxy for the entire pollock market (since certified pollock accounts for three quarters of the total caught in volume terms), we can map the entire supply chain to understand the ramifications of any disruption.

In particular, using data from MSC,[ccxlix] Planet Tracker was able to map the supply of MSC-certified walleye pollock from **53 harvesting companies in Russia and the US to at least 8,000 retailers and foodservice companies in 28 countries**.

Mapping the pollock supply chain

Figure 18 below shows how pollock is primarily caught in the EEZ of two countries.

It is then processed a first time by at least 300 companies, typically in China, the US or Western Europe - see Figure 19.

Often, pollock is processed a second time, typically in Japan, China, Western Europe or the US before ending up on the plate of consumers - see Figure 20.

Other stages of the supply chain involve storage, packing and repacking, distribution and wholesale - see Figure 21.

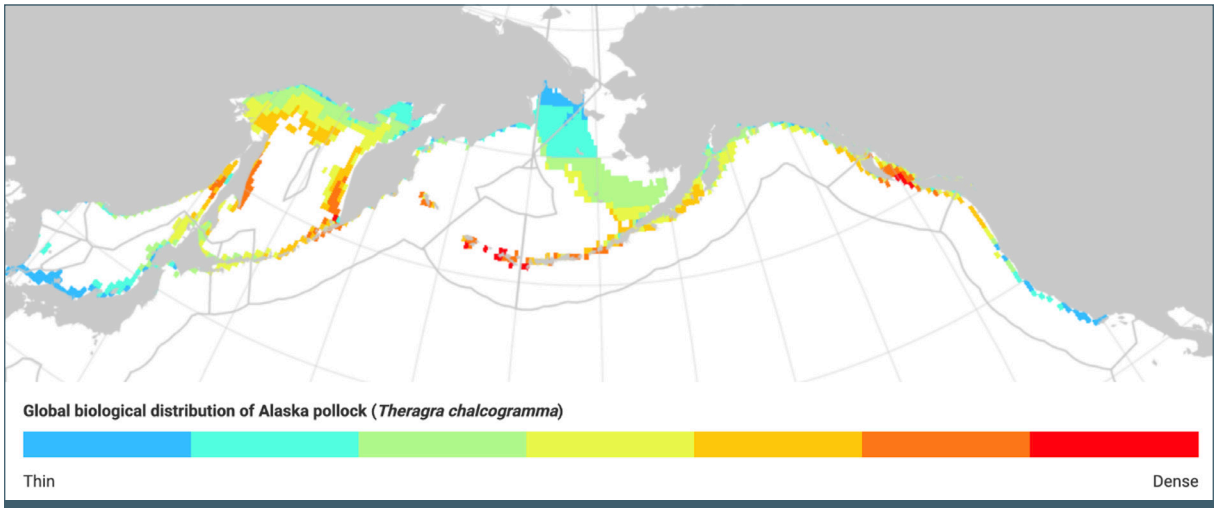

Figure 18: Current Distribution of Walleye Pollock (coloured pixels) and EEZ (gray lines).[ccl]

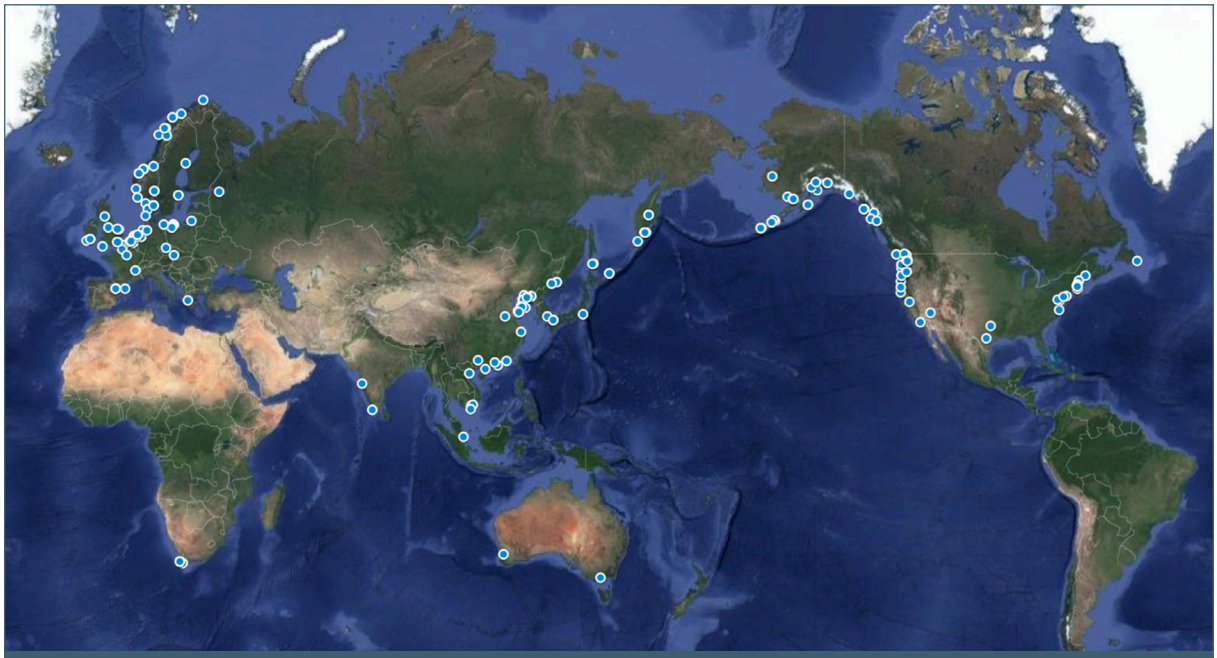

Figure 19: MSC-Certified Primary Processors of Walleye Pollock
(Click the map for interactive map, created by Planet Tracker and based on data from MSC).[ccli]

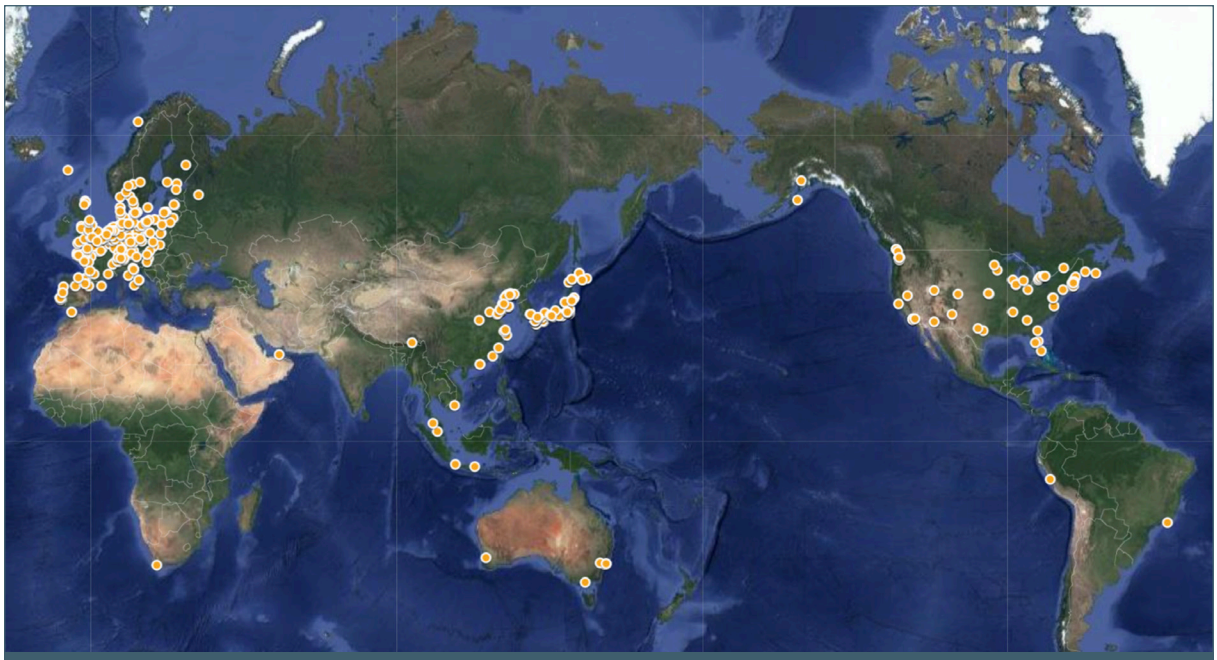

Figure 20: MSC-Certified Secondary Processors of Walleye Pollock
(Click the map for interactive map, created by Planet Tracker and based on data from MSC).[cclii]

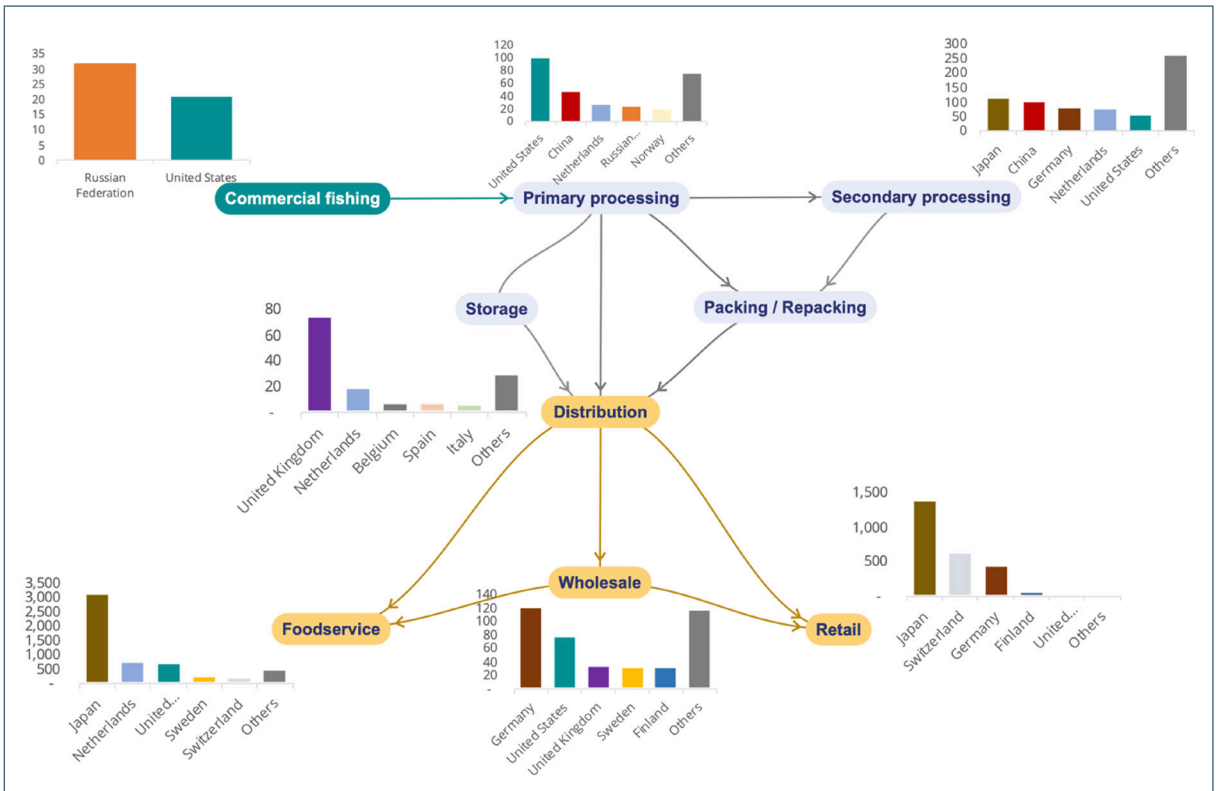

Figure 21: Supply Chain of MSC-certified Walleye Pollock with Number of Companies Involved at Key Stages of the Supply Chain per Country (Planet Tracker chart).[ccliii]

China's growing bargaining power

From this mapping of the supply chain, the importance of China's decisions becomes evident.

From a Russian perspective, dependency on China for processing was made acutely evident in February 2021, when the suspected presence of coronavirus on Russian seafood products led to the closure of Chinese ports and a glut of pollock from Russia. China accounts for more than 60% of Russian pollock exports (see page 23).

Whilst Chinese vessels do not currently fish for walleye pollock in Russian waters, catches of other species by Chinese-flagged vessels in the Russian EEZ have significantly increased, as shown in Figure 22.

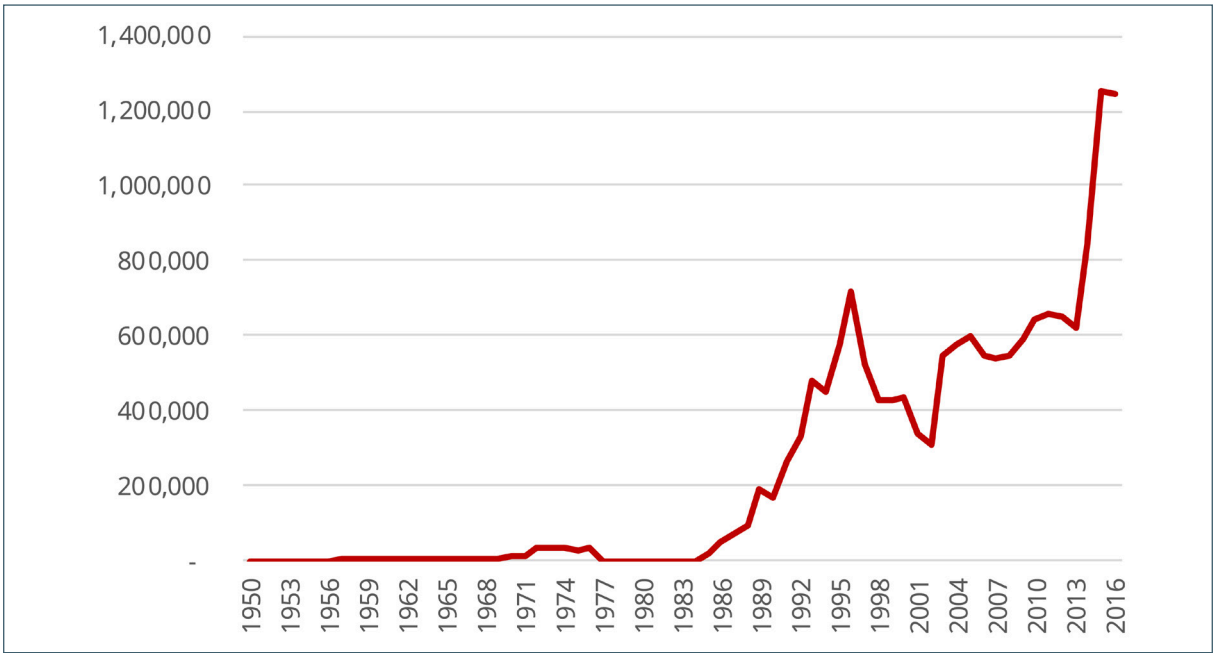

Figure 22: Catches by Chinese-flagged Vessels in Russian EEZ (in tonnes).[cclv]

In addition, Russian companies have been increasingly targeting the domestic Chinese market, where consumers are starting to develop a taste for pollock. For instance, the Russian Fishery Company (RFC) has secured a deal in May 2021 to supply pollock to Ocean Gala Brands, one of the leading branded seafood companies in China. Ocean Gala Brands' key clients include Disneyland Shanghai, where pollock is featured as a sustainable fish.[cclv] RFC also secured a deal with KFC, the largest fast food chain in China, where pollock will be used as an alternative to chicken.[cclvi]

In a hypothetical scenario, where Chinese companies decide to vertically integrate the production of pollock rather than just processing it (i.e. by engaging in harvesting, a profitable activity as we saw before), the risk is that Russia would find itself in a difficult position to refuse to grant more access to its waters. Indeed, China could well threaten to close its facilities (and its growing and promising end market) to Russian exporters unless it secured greater use of Russian waters (e.g. to fish walleye pollock). Mitigating this threat might also explain why Russia is heavily investing in processing facilities.

Whilst currently hypothethical, this scenario has materialised in recent history: after having imported squid from Peru, Chile and Argentina for years, China decided to fish directly off the EEZ of these countries, with negative consequences for the local South American economies. In 2001, 22 Chinese vessels fished in Latin American waters and by 2019, there were 503[cclvii] - see Figure 23.

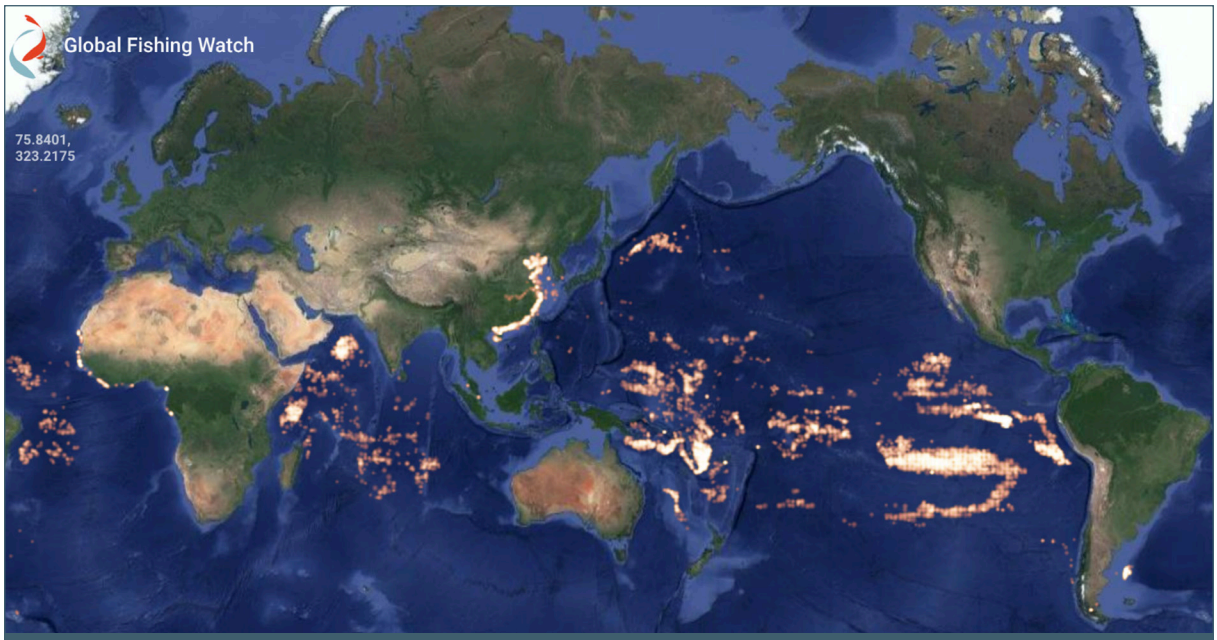

Figure 23: Fishing Effort by Chinese-Flagged Vessels (orange dots) for the 6-month period ending on March 19th, 2021.[cclviii]

At the other end of the supply chain, the European Union is also vulnerable to any China-led disruption. Walleye pollock accounts for a growing share of EU seafood consumption (7% in 2018, behind tuna, salmon and cod) and more than half of EU imports of Alaska pollock comes from China.[cclix]

EU demand for walleye pollock reached an all-time high in 2019. It is not just for walleye pollock that the EU is highly reliant on imported seafood, but its reliance on imports is the most pronounced for that species - see Table 7.

Table 7: Self-Sufficency Rates of Most Consumed Seafood Products in the EU.[cclx]

Seafood product	Share of EU seafood consumption	Per capita consumption (kg)	Self-sufficiency rate [21]
Tuna	13%	3.05	33%
Salmon	9%	2.24	15%
Cod	9%	2.14	8%
Walleye pollock	**7%**	**1.68**	**0%**
Shrimp	6%	1.58	13%
Mussels	5%	1.21	81%
Herring	5%	1.18	98%
Hake	4%	1.00	37%
Squid	3%	0.66	12%
Mackerel	2%	0.60	106%
Surimi	2%	0.59	n/a
Sardine	2%	0.57	74%
Trout	2%	0.42	90%
Sprat/Brisling	2%	0.40	111%
Saithe/Coalfish	1%	0.34	20%

[21] Domestic production over domestic consumption

CONCLUSION

Findings of our investigation

This report opened with one question: why would Russian fishing company Sigma Marine Technology buy a 28-year old factory trawler judged unsafe by its seller, a Chinese fishing company, for USD24.5 million? We now know why: because it is a **highly profitable investment**, likely to generate a 26% internal rate of return.

This is because of the relatively **low price of second-hand vessels** compared to new ones, and the **high operating margins (c. 30%) generated on the factory trawling of walleye pollock**, the species likely to be targeted by the new owner given its abundance in Russian waters.

However, such **second-hand vessel sales are likely to be less profitable and therefore less frequent in the future**: in Russia, and in the US, the regulatory environment looks set to force fishing companies to only buy vessels built domestically[22] or pay a high cost to regularise vessels build elsewhere. This is a good thing for the environment, as everything else being equal, new vessels are generally more sustainable than old ones of similar size (more efficient engines, lower bycatch, etc.).

The high level of profitability in the walleye pollock trawling industry is key evidence that the **sustainable management of fish populations can ensure high financial rewards**: effective management both in Russia and the US notably through reasonable quotas have taken that species out of the overfishing zone. In contrast, where the walleye pollock stock was not managed appropriately (in the Central Bering Sea), it was almost wiped out by overfishing.

However, **profitability is now at risk in the walleye pollock industry**.

High demand for sustainable fish has driven **considerable investments in new vessels in Russia**, and the age of the US fleet means it will need to be renewed sooner rather than later.

Climate change is playing a role too: the frequency and intensity of **marine heatwaves** has increased in the Pacific, with the 2014-2016 one resulting in the near disappearance of walleye pollock born in 2015. A lower biomass will result in a **significant reduction in pollock quotas in the next five years** (expected between -15% and -50% in Russian waters).

Warming waters in the Pacific are also driving a **migration of pollock populations** westwards (from American to Russian waters) and northwards (to the Arctic Sea). This has led Russia to open commercial **fishing for pollock in the Arctic Sea**, which carries a heavy potential environmental impact. It also raises the risk of **fish-related disputes**: in its largest military exercise since the Cold War, the Russian Navy allegedly "harassed" US-flagged pollock vessels in American waters in 2020.

Any disruption to the supply of walleye pollock would have significant impact further down the value chain. It is the **largest source of wild fish for human consumption** in the world, and at least 8,000 retailers or foodservice companies sell this species globally, focusing only on MSC certified pollock, which accounts for c. 75% of the supply. The EU for instance, where walleye pollock consumption reached an all-time high in 2019 (7% of total seafood consumption, behind tuna, salmon and cod) is highly reliant on imports of processed pollock (mostly coming from China, which in turn purchases 60% of Russian exports).

[22] And also in Kazahkstan, Armenia, Belarus and Kyrgyzstan

High concentration at the start of the supply chain means that **only thirteen entities together have a disproportionate influence on the future of the pollock supply chain**:

- **Ten companies (of which eight are controlled by private individuals) control half of the global quotas of walleye pollock**, and that number if set to decrease given ongoing consolidation among fishing companies. Their strategies have key repercussions on the industry's profitability and sustainability, including on smaller companies, like Sigma Marine Technology.
- **Fishery agencies in Russia and the US** (Rosrybolovstvo and NOAA) set and attribute the quotas, and the applicable regulations in walleye pollock fisheries. Their decisions are therefore fundamental for the industry's short-term and long-term sustainability and profitability.
- **The Marine Stewardship Council** (MSC) has certified c. 75% of the walleye pollock supply. By continuing to ensure improvement in sustainability at certified companies and withdrawing certification if needed, it too has considerable influence on the industry's sustainability, and also profitability given the premium currently paid for MSC-certified walleye pollock.

Together, these thirteen entities can ensure that walleye pollock remains a large, sustainable and hence profitable source of palatable fish and continue to lower its impact on marine ecosystems. We outline how below.

Call for action

Fishery agencies Rosrybolovstvo and NOAA need to ensure that fishing quotas always reflect the best science available at the time they are set, to prevent any return of overfishing in walleye pollock fisheries.

The MSC should ensure that certification is used as a tool to ensure continuous improvement in sustainability at certified companies, remains stringent to force real change in the industry, and can be withdrawn should sustainability standards deteriorate.

In turn, pollock producers (and in particular the ten largest quota holders) can also help ensure the long-term profitability and sustainability of the industry on which they rely.

What pollock harvesters and processors should do

- Retire, write off and sell for scrap old factory trawlers, which are typically less sustainable than recent ones (e.g. higher bycatch rates, higher fuel consumption, etc.).
- Use sustainability-linked loans or other forms of financing attached to natural capital covenants to finance the fleet renewal.
- Refrain from bidding for quotas in the Arctic (for Russian companies).
- Implement robust traceability systems (for those who have not yet done so) and ensure that these are compatible with those used across the supply chain, for instance by using GDST[23] standards. This is especially the case for secondary processors that use Russian-caught pollock, where IUU[24] risk is material.
- Publish actual tonnage of fish harvested by species.
- Outline plans to adapt to the climate change-induced change in the distribution of pollock populations (especially for US-based companies).

What investors and lenders in these companies should do

In the US, substantial fleet modernisation is needed. This, coupled with a US ceiling on quotas ownership for each company, makes further consolidation difficult and is likely to translate into a need for a fresh capital injection.

This provides investors and lenders with a once in a generation opportunity to further improve the sustainability of the pollock industry by demanding for instance lower bycatch volumes, reduced GHG emissions and reduced IUU risk.

Many of the issues described in this report about walleye pollock are applicable to other seafood supply chains (e.g. sustainability vs profitability, traceability and IUU, fleet capacity and returns, the rising demand for certified fish and thus the importance of MSC certification, climate change impact, food security and geopolitical tensions, etc.). With this in mind, investors and lenders should:

- Demand that any capital raised to fund fleet modernisation or other investments be linked to greater sustainability (e.g.better incorporate prey needs of marine mammals and seabirds reliant on pollock, lower bycatch, lower GHG emissions and better traceability to ensure lower IUU risk, especially in Russia.
- Ensure that companies (especially in the US) have mitigation plans for the impact of warming waters.
- Demand that companies implement and abide by codes of conducts by which operations need to be undertaken.
- Realise that, as for many other fisheries, the wild-catch of walleye pollock carries a significant geopolitical risk.

[23] Global Dialogue on Seafood Traceability standards, designed to ensure interoperability across the supply chain

[24] Illegal, Unreported and Unregulated fishing

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