

“A shadow is . . . falling upon the Arctic’s intertwined environment and economy, particularly in the region’s Russian half.”

The Dark Arctic

MIA M. BENNETT

In the late winter of 2018, an unlikely protest was staged in Yakutsk, a Siberian city traditionally blanketed each year in a deep snow. Here, in the middle of the Sakha Republic, the Soviet Union built the city on the tundra where mammoths once roamed. From five million years ago until as recently as 4,000 years ago, their padded feet trod on permafrost soils that encased sparkling seams of diamonds. As the Ice Age came to a close, extinction stalked the mammoths, whose roving packs ended in fixed graves. Ivory tusks and burly bones accumulated in the tundra, where they remained buried in frozen dirt and grass for millennia—until climate change reared its head.

As the permafrost has thawed, allowing mammoths’ massive teeth to poke above ground, residents have come with picks and shovels to dig them out. Groups of Chinese mammoth ivory hunters have also arrived, armed with hydraulic hoses and deals with so-called Russian mammoth oligarchs. While the prehistoric commodity is whisked out in Russian helicopters and boats on its way to ornate shops in mainland China and Hong Kong, Yakutian mammoth ivory hunters are getting the short end of the stick. Angry at this dispossession, locals protested in 2018 with signs bearing succinct demands. “Return the tusks to the people!” one declared. Another exclaimed, “Stop creating a nightmare for Arctic communities!”

The events in Yakutsk are a microcosm of the “dark Arctic.” This darkening is twofold. Climate change is casting a pall over the Arctic’s legendarily snow-white land- and seascapes. Once-frozen oceans are melting into cobalt blue pools. Snow and ice are turning shades of black, gray, and pink as soot and algae accumulate on their warming surfaces.

Meanwhile, the region’s economic underworld, which has long thrived due to being located on the world’s hard-to-police periphery, is burgeoning. Geopolitical ruptures caused by Russia’s full-scale invasion of Ukraine are creating new opportunities for illicit activities. The Arctic’s economy is typically associated with commodities like oil, gas, and minerals, but in the murky margins, resources like ivory, furs, cloudberies, fish, and timber are wrested out of the earth and waters, often destined for global export. In this shadow economy, local and transnational criminal networks intersect with state-owned companies, foreign traders, and even Indigenous peoples. Although the latter historically have been dispossessed, a select few individuals profit from trading in illicit goods.

Exposing the dark Arctic across its physical and geo-economic dimensions requires attention not only to well-documented environmental shifts and conventional geopolitical structures like nation-states and intergovernmental organizations, but also to the many nonstate actors leveraging legal and geographic loopholes. Such entities range from illegal fishing trawlers to private military companies, and they often work in areas difficult for authorities to monitor and regulate.

SMUGGLERS’ HAVEN

For as long as states, empires, and corporations have sought to control northern populations and lands through brutal projects of colonialism, imperialism, and extractivism, others have sought to avoid their grip. The region’s inaccessibility and distance from global metropoles facilitates clandestine activities.

In the twelfth and thirteenth centuries, narwhal horns collected in Greenland were smuggled by Icelandic pirates to the Orkney Islands (which then belonged to the Kingdom of Norway), from

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where they made their way to the British Isles. Demand in Europe for narwhal and walrus ivory was high, since the expansion of the Muslim caliphates of North Africa and the Middle East had impeded access to African elephant ivory. In the same waters of the North Atlantic in the eighteenth century, Dutch smugglers trafficked cod and, of all things, woolen socks.

In North America, the voluminous fur trades under the Russian, British, and French empires stimulated the smuggling of everything from liquor to firearms. In many instances, conquering powers resorted to criminality to develop the Arctic's resources at a scale viable for global export. The British and American empires stole land and resources from Indigenous peoples, the Russian empire forced Siberian Indigenous peoples to pay tribute (*yasak*) in furs, and the Soviet Union constructed gulag camps to incarcerate prisoners and develop distant resources.

In the twenty-first-century Arctic, the shadow economy—normally defined as comprising unregistered business activities and cash payments that evade taxation, as well as criminal activities—stands to grow as the region reels from Russia's full-scale invasion of Ukraine, which began in February 2022. The war has strained relations between

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Russia and the seven other states with sovereign territory in the Arctic: the United States, Canada, Denmark, Iceland, Norway, Sweden, and Finland. All seven will be members of NATO if Sweden's bid to join succeeds. Given the reemergence of the "Ice Curtain" that divided the Arctic seas of the Soviet Union and the West during the Cold War, along with the imposition of Western sanctions on Russia, black market activities will likely rise. These include human trafficking and illegal trade in both sanctioned products and those for which war-related supply chain disruptions have hampered availability.

The war in Ukraine is also reconfiguring state-approved channels for trade in Arctic goods. Asian markets are becoming prime destinations for commodities from the Russian Arctic, many of which would have been exported to Europe before the recently imposed sanctions. After being traded to Asia, some of these items still ultimately reach the European Union. Although the EU has officially banned imports of Russian crude oil, coal, steel, iron, gold, seafood, and liquor, these products

are winding their way to the continent via intermediary countries. India has become a hub for Russian crude oil, whereas the United Arab Emirates serves as a nexus for Russian gold and nickel. All three of these commodities are heavily sourced from Russia's northern and Siberian territories.

In late 2023, the EU was considering banning Russian diamonds, 99 percent of which come from Sakha—the region with ample mammoth ivory deposits. Yet they could still end up on the rings and necklaces of European consumers, traded via Surat, India's diamond hub, instead of Antwerp, Belgium, which has dominated the global trade for five centuries.

These tenebrous trading channels may not be illegal, but they suggest the potential for the dark Arctic to grow. In addition, sanctions make it unlikely that Russia will be able to access more environmentally friendly extractive technologies from the West, possibly resulting in dirtier Arctic industries. A shadow is thus falling upon the Arctic's intertwined environment and economy, particularly in the region's Russian half.

TIPPING POINTS

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For centuries, imaginaries of the Arctic have rested on its pristine whiteness. But in the Anthropocene, human activities are sullying the

fantastical snow globe. Circulating in the atmosphere are light-absorbing particles (LAPS) like black carbon, mineral dust, and volcanic ash, all of which can cast a pall on the Arctic.

In 1815, the cataclysmic eruption of Tambora, an Indonesian volcano, shot 150 cubic kilometers of ash, pumice, and other rocky debris into the stratosphere. The eruption blocked solar radiation, spurred a volcanic winter, and decreased the global temperature by 3°C. But the Arctic warmed as less rain fell on North America, reducing the amount of cold fresh water in the Atlantic that normally flowed north. Whalers' reports of suddenly open, ice-free channels spurred the British Admiralty to recommence its search for the Northwest Passage. Yet this brief period of Arctic warming was short-lived; the channels refroze by 1818.

Two centuries later, more of the Arctic is transforming into open water—and this time, humans are to blame. The incomplete combustion of fossil fuels, biofuel, and biomass is depositing black carbon, or soot, across the Arctic. These fine particulates absorb sunlight and release heat into the

atmosphere, making them a major contributor to climate change. Black carbon is especially pernicious in the Arctic: it significantly lowers the albedo, or the proportion of reflected light, of the snow on which it falls. As ice and snow shrink and melt, creating even more dark surfaces, the positive feedback loop accelerates regional warming.

Where black carbon is released also matters. Particulates emitted from wood-burning stoves in places like South Asia can affect the Arctic, but those emitted locally have a larger impact.

This is why the actions of Russia, whose northern regions account for two-thirds of Arctic economic activity despite accounting for only half of the region's landmass, can alter the fate of the entire circumpolar North. The country's efforts to reduce gas flaring and emissions from transportation in recent years have been shown to reduce radiative forcing, or the amount of energy entering the atmosphere. At the same time, Russia will continue to burn heavy fuel oil (HFO) in the Arctic until 2029—the last possible moment under International Maritime Organization (IMO) regulations. The IMO recently voted to ban HFO in the Arctic to reduce black carbon levels, with voluntary restrictions beginning in 2024 and mandatory ones in 2029. The five-year "grace period" was included partly as a concession to Russia, which had opposed the restrictions altogether. (Canada, too, does not plan to immediately implement the HFO ban in 2024.)

Another LAP of note is algae. As warmer spring and summer temperatures hasten melting on the Arctic's snow and ice surfaces, algae that lay dormant in the ice during winter venture up to the surface, where they bloom in grimy green, pink, and gray. Exposure to sunlight darkens the algae, which accelerates melting of the ice beneath. Climate change is also increasing wind speeds, leading to greater transport of phosphorus, a naturally occurring ingredient used in fertilizer. This trend is feeding the annual algal blooms as well. One portion of the Greenland ice sheet has become so covered in algae that scientists refer to it as "the dark zone," a phenomenon that has increased in size and duration over the past two decades.

As temperatures rise globally, the most dramatic change to the Arctic is its shrinking ice cap. When Soviet leader Mikhail Gorbachev gave a speech on October 1, 1987, in the Arctic city of Murmansk, urging that the Arctic should be designated a "zone of peace," the minimum extent of sea ice was a relatively robust 6.25 million square

kilometers. It was hoped that the eight Arctic states could cooperate to tackle environmental pollutants, which were the chief fear at the time, as opposed to climate change. Yet by 2023, the frozen surface totaled only 4.23 million square kilometers—just two-thirds of its extent when Gorbachev called on the Arctic's nation-states to come together.

With the amount of open water increasing each year, the world can no longer overlook the Arctic Ocean's darkening. The pace of climate change is occurring at a rate that is rendering it difficult for the region's many ice-reliant cultures and ecosystems to adapt. By the end of this century, it is estimated that the Arctic's open-water periods will have lengthened by two months—including in the central Arctic Ocean, which was still covered in permanent ice at the end of the twentieth century.

In roughly the same time span since Gorbachev's speech, the Arctic has warmed nearly four times faster than the rest of the world. Such abrupt change has led scientists to warn of "tipping points," or thresholds at which Earth systems can be radically pushed into a qualitatively different state. For instance, approximately 4°C of global warming could cause not only the irreversible melting of the Greenland ice sheet, but also the dieback of the boreal forest and its replacement by grasslands and open woodlands.

Whereas the Arctic Ocean is set to become darker due to climate change, the forests of pine, spruce, and larch that comprise the sprawling taiga—the world's largest land biome—may turn to turf that casts no shadow. All the while, the boreal forest from Siberia to Canada is burning each summer with heightened intensity, blackening the skies and thawing the permafrost below, pushing climate goals further out of reach.

MURKY MARKETS

Not only is the Arctic darkening physically; the currents underpinning the region's economy are growing murkier, too. Though the far north is not the first place that comes to mind when one thinks of shadow economies, the region is far from immune to black markets. In the North American and the European Arctic, illicit activities center on trafficking people and goods, such as drugs and alcohol, into the region. In the Russian Arctic, illicit activities focus on getting things out of the region, namely natural resources high in demand in the rest of the world. Such trade often relies on economic networks that merge the criminal

underworld with the political “upperworld,” as a European Council on Foreign Relations policy brief published in 2017 put it.

In Europe and North America, human trafficking has historically targeted vulnerable populations. Beginning in the late eighth century, Vikings kidnapped and trafficked women from the British Isles to help settle Iceland. In 1627, pirates from present-day Algeria and Morocco raided three locations in coastal Iceland, kidnapping 400 people who were sold in Ottoman slave markets.

Today, regional trafficking networks prey on women from both inside and outside the Arctic. Young Inuit women in Nunavut and Greenland are targeted for human and sex trafficking; in Alaska, a disproportionate number of female victims of sex trafficking are Alaska Natives. In Norway, 30,000 Ukrainian refugees have applied for temporary protection, of whom 14,000 are women and 10,000 are children—both demographics vulnerable to trafficking.

Labor trafficking takes place in the northern reaches of countries like Sweden, Finland, and Norway despite the comparatively high level of protections that workers enjoy in the Nordic countries. Thai laborers are often used to pick cloudbERRIES—a delicate, peachy fruit whose taste and medicinal properties are prized worldwide. Some laborers are convinced by Thai women married to Nordic men to travel north on three-month tourist visas to avoid taxation. The wages these laborers earn—potentially up to 6,000 euros for three months of work—is double the average salary in Thailand, but the working conditions are backbreaking.

Cloudberry pickers routinely travel long distances to begin their shifts early in the morning and then spend hours crawling through mosquito-infested swamps. Their earnings have been decreasing over time, and some berry pickers end up in debt. This has jeopardized the well-being of the Thai villages whose economies have circuitously come to rely on Arctic extraction. Hundreds of berry pickers have protested in both Sweden and Thailand demanding better wages and working conditions.

Though the grunt work of berry picking does not attract headlines, Arctic megaprojects like mines and oil fields do. For all their shininess, these infrastructure projects often have unsavory

underbellies. Large-scale Arctic resource development in places like Canada and Russia has increased the use of fly-in, fly-out labor, often comprising well-paid, single, and itinerant men. Their ample disposable income can fuel the cash economy—and with it, drugs, prostitution, and other illicit activities.

As shown by research into the Asbestos Hill mine (called Putuniq in the Inuit language) in Nunavik, or northern Quebec, which operated from 1972 to 1984, the development of direct flights linking remote Arctic locales with southern hubs facilitated the introduction of alcohol and drugs. In Nunavik, substances began appearing not only at the mine, but also in villages, brought by Indigenous workers returning home and residents who had traveled to the site via snowmobile.

Elsewhere in parts of the North American Arctic, like Canada’s Yukon Territory, the development of roads and highways leading to southern metropoles has hastened inflows of illicit drugs. Even in places not connected by road, such as rural Alaskan villages, resourceful bootleggers and smugglers find alternative routes, including by air or snowmobile (as was necessary when flights were halted during the COVID-19 pandemic), to bring their goods to icy northern streets.

The region’s inaccessibility facilitates clandestine activities.

RUSSIAN RESOURCE GRABS

On the other side of the Arctic, in Russia, the region’s vast resources are torn out of the ground by state and market forces that have institutionalized criminality. Russia’s shadow economy is estimated to range from 10 to 45 percent of gross domestic product, a level on par with former Soviet republics such as Ukraine and Kyrgyzstan.

Much of Russia’s shadow economy can be traced to the rapid transition from communism to capitalism in the 1990s. Criminal networks, members of the state security apparatus, and military and law enforcement personnel—many of whom had experience in the black market—quickly purchased and privatized state assets at below-market prices through “loans for shares” auctions.

Vladimir Potanin, the second-wealthiest oligarch in Russia in 2023 and a close friend of President Vladimir Putin, helped mastermind this scheme while becoming the largest shareholder in one such auctioned company, Norilsk Nickel.

Known as Nornickel, it is now the world's largest refined nickel producer, churning out billions of dollars in annual revenues alongside vast amounts of toxins, from sulfur dioxide to heavy metals. Despite the company's efforts to reduce the metallurgical complex's environmental impact, the city in which it is situated, Norilsk, located above the Arctic Circle, remains one of the world's most polluted.

Nornickel's impact has spread far beyond the city limits. Heavy metals drift to eastern Siberia via long-range atmospheric transport, sulfur dioxide spurs acid rain in the Arctic, and pollution taints the Yenisey River, eventually souring the Arctic Ocean. Meanwhile, in 2022, a sanctioned Potanin sailed his \$300 million superyacht, purchased with the proceeds of Arctic environmental devastation, into the safe harbor of Dubai.

The oil, gas, and mining industries in the Russian Arctic are notorious for institutionalized corruption. Over the years, numerous investigations have found that revenue from state-owned Gazprom, the world's largest producer of natural gas and one of Russia's biggest companies, has enriched several of the oligarchs closest to Putin, and allegedly the president himself, to the tune of billions of dollars. Gazprom has been rapidly expanding its natural gas projects in the Arctic with help from Chinese companies, including China National Offshore Oil Corp., China National Petroleum Corp., and Sinopec, which Ukraine has branded as "international sponsors of war" due to their support for the Russian fossil fuel industry.

Gazprom's oil-producing subsidiary, Gazprom Neft, has also been boosting its Arctic activities, and not just in the extractive realm. In early 2023, with state permission, Gazprom Neft formed a private military company (PMC), supposedly to protect its assets in the Arctic. Yet the force has allegedly been deployed to wage war in Ukraine. At least three other PMCs fighting in Ukraine have been linked to Gazprom and Gazprom Neft, which operate under the names Potok ("Stream," likely alluding to the Nord Stream pipelines), Fakel ("Torch"), and Plamya ("Flame"). A *Financial Times* investigation published in 2023 found that men who work for Gazprom are enticed to sign up for the corporation's PMCs with promises of handsome pay and safeguarded jobs. Some Gazprom workers worry that they might lose their jobs if the state were to conscript them. If they voluntarily fight for their employer, however, they can

leave for the battlefields with hopes of returning to the gas fields.

One implication of this development is that Russian Arctic hydrocarbons may be providing a steady stream of recruits and revenues to fuel the war effort. A second is that more companies and oligarchs in Russia may be seeing value in forming a PMC, despite the fate of the country's most prominent mercenary force, the Wagner Group, which was reined in after a 2023 mutiny. These shadowy actors could be bracing for an internecine fight in Russia in which Arctic resources may again be up for grabs, as they were in the "Wild East" era of the 1990s.

Illegal, inhumane, and rapacious practices are rampant in sectors beyond energy and mining. Russia's boreal forests, which are larger than the Amazon and contain 11 percent of the world's biomass, are under severe pressure from rising global demand for hardwood. Much of the demand emanates from neighboring China, where commercial logging of natural forests was banned in 2017. Once Russian timber is exported to China, it is often turned into flooring and furniture that is exported globally by multinational conglomerates such as Ikea.

Although the Russian government has attempted to crack down on criminal logging networks, those efforts have been stymied by corruption. In 2018, the regional forestry minister of Irkutsk Oblast was sentenced to six months in prison after he deliberately misclassified 120 hectares of forest in a nature reserve as diseased to enable illegal logging.

The construction and logging sectors in the Russian Far East also employ thousands of North Korean workers, who toil in harrowing conditions. Their labor allegedly helps pay down their country's debt. North Korean laborers have worked in the region since 1967, when an agreement was signed between the Soviet Union and the Democratic People's Republic of Korea to allow North Korean loggers to serve as cheap replacements for recently closed timber gulag camps. The Soviet Union's dehumanizing practices did not disappear: they globalized.

OVERFISHING IN THE SHADOWS

Across the Arctic's seas, rough and remote waters conceal illicit practices. From the 1950s through the 1970s, Soviet whaling in contravention of international regulations decimated cetacean populations. Today, as far north as the Bering and Barents seas, fish and crab species are

being depleted by commercial fishing and trawling, which pose the risk of industrial-scale illegal fishing. These practices threaten international stocks, since Arctic fisheries constitute 10 percent of the global marine fishing catch by weight.

In the West Bering Sea, an estimated one-third of fish are caught illegally, often by Chinese or Russian vessels. In 2015, the United States and Russia signed an agreement to combat illegal crabbing in the Bering Sea, which was reported to have cost Alaskan crab fishers \$600 million over 15 years while depriving the state of tax revenues. Even in Norway, a country lauded for its lack of corruption, illegal fishing is growing. In 2022, the director of the country's National Authority for Investigation and Prosecution of Economic and Environmental Crime declared "fishing crime" as "one of the major threats to the welfare state."

Recognizing climate change's potential to render the Central Arctic Ocean more accessible to the world's fishing fleets, the five Arctic littoral states and four major maritime actors—the European Union, China, Japan, and South Korea—signed a moratorium on fishing in its waters, which entered into force in 2021 and will last until 2037. Although the signatory states are legally bound by the agreement, rogue fishing vessels, which routinely flout regulations in less extreme latitudes, may choose not to comply. As

fish species move north to evade warming waters, illegal trawlers will likely try to follow. With inspections even less likely in such remote waters than closer to shore, technologies such as satellite remote sensing and onboard sensors may be necessary to combat the pelagic shadow economy.

On fishing vessels, labor trafficking and illegal resource exploitation converge. One study by Global Fishing Watch, an international nonprofit, estimated that between 14 and 26 percent of 16,000 fishing vessels worldwide had a high risk of forced labor, with hot spots around squid jigging in the North Pacific and trawling in the North Atlantic. Forced laborers are often sourced from vulnerable populations. In 2015, the Russian trawler *Dalny Vostok* sank in the Sea of Okhotsk, 250 kilometers south of Magadan. Whereas the vessel was built to carry 94 crewmembers, 132 were onboard, including 78 Russians and 54 foreign nationals from Myanmar, Ukraine, Latvia, and Vanuatu.

Magadan is a remote Siberian oblast (a sub-national political division) with its own sordid history within the Arctic's grim annals. Gold and silver mines in Magadan formed part of the Kolyma gulag system, arguably the Soviet Union's most depraved. The region's still-in-use highway, colloquially called the Road of Bones, is rumored to have been built with the prisoners' skeletal remains. Now those of the fishing industry's forced laborers lie in the ocean's depths.

Occasionally the shadow economy can serve more humane purposes, helping to fill gaps created by invidious state policies. Along Russia's northeast coastline, Sakha fishermen catch fish outside of quotas established in 2004 as part of the transition to a market economy. They do so to try to make a living and sell fish directly to consumers at fairer prices. But since their practice is technically illegal, they are subject to detention by Russian authorities.

For Sakha fishermen, one saving grace is poor infrastructure, which prevents regular inspections. The lack of reliable and consistent monitoring across much of the Arctic—a region which, despite all its warming, remains inhospitable and remote—is one reason why economic activities on its legal and geographic margins can flourish.

Industries in the Russian Arctic are notorious for institutionalized corruption.

ILLUMINATING THE DEPTHS

Climate change and the war in Ukraine are darkening the Arctic. Fractured and frozen regional cooperation is impeding Arctic science, climate change mitigation, and continued activism by and on behalf of Indigenous peoples, whose populations cross borders.

Under pressure to fund its ballooning defense budget, which accounted for a third of national public expenditures in 2023, Russia may double down on Arctic extraction, adding to the pressure on northern ecosystems. The country's willingness to use non-ice-class tankers to transport oil via the Northern Sea Route in late summer 2023 revealed the risks it is willing to take, operating outside even its own regulations. As emissions, pollutants, and the threat of environmental disaster within the Russian Arctic rise, the entire region's ice may shrink even more.

The willingness of large markets such as China and India to import Russian Arctic resources—and

the willingness of Western countries to buy such products indirectly—suggests that polar riches will continue to bankroll Putin's war. Gazprom's establishment of PMCs active in Ukraine deepens the complicity of the Russian Arctic extractive complex in the conflict.

The Kremlin's decision to invade its neighbor to the southwest is also unduly burdening the people living in its own northeast. A disproportionate number of Russian conscripts come from Krasnoyarsk Krai, the very region in which Norilsk is located. The territory's suffering bleakly illustrates the human and environmental tolls of revanchist imperialism on northern peripheries. While resources and people from the Russian Arctic drain out, prisoners, forced laborers, and radioactive and metallurgical waste pour in.

Although the Arctic's seven other states may be able to refocus their Arctic initiatives within their geographic half of the region, such efforts will be incomplete without Russia. Yet the dark Arctic need not be a death spiral. A first step is to find the means to illuminate the region's inky undercurrents, such

as by identifying environmental and geopolitical tipping points and tracing criminal networks.

Many of those networks are transnational, offshore, or in Russia—a country now physically inaccessible for many Western researchers. New methods in remote investigations, digital fieldwork, and open-source intelligence—analyzing social media, satellite imagery, and myriad other data sources—offer ways to gather information about the entire region from a distance. Such techniques can offer insights into clandestine economic and political networks and activities.

Once the dark Arctic is exposed, fully bringing it into the light of day will depend on state capacity and will, along with an active and informed citizenry. These may be hard to cultivate, and any actions will inevitably be conducted at less-than-circumpolar scales for the foreseeable future. Nevertheless, we can neither take the Arctic for granted nor leave it for dead. Like the mammoths now emerging from the permafrost, it may be possible to unearth the region—and perhaps even revive it. ■