

A Review of IUU Salmon Fishing and Potential Conservation Strategies in the Russian Far East



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Presented by



EXECUTIVE SUMMARY

Across the Russian Far East, illegal and unreported catch of Pacific salmon is estimated to be at least 1.4 times and possibly as great as 1.8 times the legally reported catch. There are a number of different types of illegal, unreported and unregulated salmon fisheries in the Russian Far East. It is important to understand their differences when developing an effective anti-poaching strategy. Variations include:

- Subsistence poaching for cash.
- Subsistence poaching for household use.
- Commercial overharvest and misreporting in shore-based pound net and seine fisheries.
- High-grading and misreporting in the research driftnet fishery.
- High-grading and misreporting in the Japanese Bilateral Agreement driftnet fishery.
- Multi-million dollar criminalized, highly-equipped roe fishery on spawning grounds.

The illegal market is extremely lucrative for those involved- illegal salmon is just one component of an overall illegal seafood trade estimated at \$3.0 billion for Kamchatka alone (Trush 2009). Root causes of IUU salmon fisheries include the collapse of subsidized rural economies and lack of economic alternatives, ineffective laws and institutions, and rampant corruption.

Salmon populations of most species cannot sustain extreme catch rates for many years running, without suffering declines. Estimates suggest that some regions may be experiencing catch rates (including IUU fisheries) upwards of 90% of the total run.

NGO efforts to date have been implemented in a somewhat piecemeal and reactive fashion with a primary focus on providing resources for anti-poaching brigades. A comprehensive, multi-organizational strategy has yet to be developed. The Wild Salmon Center and partners have an opportunity to provide leadership on this issue, but it must also understand the limitations to NGO powers in dealing with this epidemic in Russia. We cannot expect to stop poaching in Russia, but rather to mitigate and perhaps isolate the problem.

GOALS, OBJECTIVES AND SCOPE

The goal of this report is to help Wild Salmon Center and partners understand the scope and significance of illegal, unreported and unregulated salmon fishing across the Russian Far East and to serve as a platform for the development of new strategies.

1. Provide a summary report on the scale of IUU salmon fisheries in the Russian Far East using the latest reports, official stats, and grey literature.
2. Review NGO efforts to date on combating poaching/IUU in the RFE and lessons learned from these endeavors.
3. Describe past and potential future WSC and partner anti-poaching activities to refine and enhance our overall anti-poaching strategy.

Although the geographic scope of this white paper includes the entire Russian Far East, attention will be focused primarily on Kamchatka and Sakhalin-Kuriles territories.

WHAT IS THE SCALE OF THE PROBLEM?

Across the Russian Far East, illegal and unreported catch is estimated to be at least 1.4 times and possibly as great as 1.8 times the legally reported catch. This figure is based on World Wildlife Fund's best estimate of the overall salmon catch in 2006, and includes three components – internal Russian market demand for salmon and caviar, the excess of reported imports from the Russian Federation over declared Russian exports, and roe-stripped carcasses left along Russian rivers and bays (Dronova & Spriridonov 2009). Note that the wide variance in the assessment of the domestic market – 100,000 metric tons. This reflects the lack of transparency in current seafood markets and trade in Russia, and the challenge of assessing the all-Russian market solely based on market studies in Moscow.

Calculated illegal catch rates are comparable across the Russian Far East, running between 40% and 90% of the legal fishery. However, survey and anecdotal data put estimates for illegal take as high as three times the legal catch in some places. The illegal catch rates in the table below are all estimations (Russia Far East), expert-based assessments (Kamchatka, Sakhalin), or estimations by analogy (Amur, Primorye and the continental coast illegal catch rates were estimated at the 60 and 92% rates).

	Reported legal	Total estimated catch		Unreport-ed as % of legal catch	Net unreported catch, MT		Unreported catch, millions of fish		IUU relative to North American catches by weight (2006)
	2003-06 mean (MT)	low	high		low	high	low	high	
RFE (2006 only)	273,000*	381,000	481,000	40-80%	108,000	208,000	205.2	395.2	33-63% of Alaska's 2006 catch
Kamchatka	91,545			60-92%	55,000	100,000	104.5	190	4-7x WOC catch
Sakhalin	119,114			42-67%	50,000	80,000	95	152	2-3x BC's catch
Amur	4,498			at Kamchatka rates	2,699	4,138	5		20-30% of WOC
Primorye	1,577			at Kamchatka rates	946	1,451	2	3	
Continental coast (Khabarovsk & Magadan)	14,415			at Kamchatka rates	8,649	13,262	16	25	Comparable to WOC catch
Western Bering Sea (Chukotka)	900			at Kamchatka rates	540	828	1	2	

* Commercial catch only. Reported subsistence, sports and "recreational" or "amateur" licensed fisheries catches cumulatively are equal to less than 1% of reported commercial catch.

EXPORT MARKETS

The Russian salmon export trade can be characterized by the principal buyers of Russian Far Eastern salmon, by the characteristic Russian fishing companies involved, and by its mixed legal and illegal nature. The principal export markets are Japan and the Peoples' Republic of China (PRC, or China). The Republic of Korea (South Korea), buys an increasingly smaller share of Russian exports, primarily sockeye. The Japanese market is interested primarily in "dressed" (headed and gutted; H/G) frozen sockeye, and secondarily in dressed coho. Chinese buyers purchase large quantities of chum and pink salmon, and small quantities of the other species, primarily for processing and re-export. China has become the world's largest seafood processor – a multi-billion dollar trade based on fish primarily from Russia and the US (ABN Newswire 2008).

Japan imports a relatively small volume of Russian salmon caviar, perhaps 3,000 MT of salmon caviar per year (Dronova and Spiridonov 2009). Japanese quality control standards for caviar are very exacting, and it is unlikely that most Russian producers can meet them. (Over the past decade, Japanese roe imports have tended to be frozen roe in the skein, rather than processed caviar or ikura). However, Russian export data reflect a much higher volume of caviar exports to Japan than do Japan's import data. This may be a case of hidden illegal production, which is actually flowing to the Russian domestic market.

The illegal export salmon trade is difficult to track by species, with the exception of sockeye and coho. Russian Customs statistics track sockeye salmon vs. all other salmon species. China also differentiates sockeye salmon, only. Japanese import statistics differentiate sockeye and coho, vs. all other salmon. Each country tracks the product forms in these categories, live, frozen, or various value-added products such as smoked salmon or fillets. Comparing Japanese import statistics to Russia's reported sockeye and coho catch in the coastal and research driftnet fisheries demonstrates that the volume of Japanese sockeye imports (round weight) exceeded the total Russian sockeye catch for each year from 1998 through 2006, by as much as 9,700 metric tons. Japanese imports exceeded the total Russian coho catch in 1999 and 2005, by 200-400 metric tons (Dronova and Spiridonov 2009). These figures don't account for the small volumes of sockeye and coho that were also sold to China and South Korea and on the domestic Russian market. This is irrefutable evidence of the scale of illegal catch for coho and sockeye salmon.

Illegal exports of sockeye and coho likely derive largely from the research driftnet fishery, and possibly from the pound net fisheries as well. Given that the proportion of headed and gutted imports to Japan is rising, that may be an indicator of increased participation by the Russian coastal pound net companies in the Japanese market. Exports to China are likely primarily dressed and semi-dressed salmon from the pound net fisheries.

China likely provides a large market for illegal pink and chum salmon catches. Between 2002 and 2006, Chinese imports of Russian salmon increased eight-fold, according to Russian export statistics. A comparison of Russian export statistics for "other salmon" to Chinese import statistics reveals a surplus of imported fish, likely pink and chum, each year from 2003 onward. Clarke (2007) describes two possible routes for illegal exports to China – direct trade

from Russia, or purchases made through South Korean seafood brokers. South Korean brokerages offer many advantages to Russian exporters – cash payments for fish, rather than expensive credit through Chinese or Russian banks, barter arrangements for payment (fuel, vessel repairs, etc.) to evade Russian income taxes, and abundant, high-quality, bonded cold storage facilities outside of the Korean customs cordon.

Illegal exports are driven by high demand in Japan and China, and by several aspects of the Russian fishery sector. Salmon is a fragile product, unless it is flash-frozen. Once frozen, it must be transported and stored in freezer holds, containers or warehouses. Russian port capacity is inadequate to handle the volume of salmon caught in the legal fishery, given quality control demands. Internal transportation networks to ship high quality flash-frozen Far Eastern salmon to western Russian markets are woefully inadequate. Customs processes are often protracted, creating additional product risks in serving the domestic market. Vessel service infrastructure, from refueling to repairs, has deteriorated at Russian ports since the collapse of the Soviet Union. Lastly, foreign buyers typically pay for product on a contract basis upon delivery, whereas payments in the Russian system may be much slower. These economic considerations have all driven fishing companies toward minimally processed export markets – they are much more reliable and lucrative, despite the risks posed by exporting illegally (Clarke 2007).

Until 2002, driftnet fishing vessels commonly produced false port clearance documents in order to comply with Japanese legislation prohibiting the acceptance of fish directly from the vessels of another country from the fishing grounds. Japanese officials began to reject false port clearance documents after prolonged Russo-Japanese negotiations. Unfortunately, there was a quick work-around in the form of false cargo declarations for fishing vessels, or delivery by transport vessels not carrying fishing gear, and this problem has not yet been resolved. Japanese officials and buyers do not routinely verify the authenticity of documents carried by Russian vessels, in essence supporting this lucrative illegal trade in sockeye and coho (Dronova and Spiridonov 2009).

In summary, illegal and unreported sockeye and coho catches flow mostly to Japan, with a smaller proportion sold to China, South Korea and on the domestic market. It is likely that Chinese demand and weak Russian port infrastructure are fueling an increasing volume of illegal pink and chum exports to China.

WHAT ABOUT THE DOMESTIC MARKET?

The Russian domestic market for salmon is particularly difficult to assess, as evidenced by the 100,000 metric ton variance in the high and low domestic market estimates cited in Dronova and Spiridonov (2009). There are no reliable data on fish processing or internal wholesale and retail trade. The Moscow market consumes approximately 1,600 MT of salmon per month, but only 28% is Pacific salmon – Atlantic salmon is available in more value-added forms and commands a price premium. Moscow demand for Pacific salmon is thus just over 5,000 MT per year.

Salmon caviar production and demand are much more difficult to calculate, as the data from Rosrybolovstva, export and import records, and retail surveys are very divergent. Dronova and Spiridonov (2009) concluded that, based on the availability of 3,900 to 7,200 MT of caviar on the Russian market plus verified exports, total roe production is as high as 10,300 MT (257,500 MT round weight or up to 13 million fish). Approximately one third of this caviar may be illegally produced. Two-thirds of the market is represented by canned caviar, and the remaining third by bulk product.

This market is very lucrative – the price differential per kilo for illegal roe in the Russian Far East and in Moscow ranges from \$26-37, for a profit ratio of 2.4-3.0. A kilo of illegal roe purchased in the RFE for \$18.50 will sell in Moscow for \$44-55/kilo (Dronova and Spiridonov 2009). This multimillion dollar trade is just one component of an overall illegal seafood trade estimated at \$3.0 billion for Kamchatka alone (Trush 2009).

ECOLOGICAL IMPLICATIONS OF THE ILLEGAL FISHERY

Salmon populations of most species cannot sustain extreme catch rates for many years running, without suffering declines. Salmon populations on Kamchatka and Sakhalin have been able to bear heavy harvest pressure because of favorable ocean conditions over most of the past decade. It is unlikely that marine rearing conditions will remain favorable continuously into the future, thus abrupt salmon declines may occur in the future.

Some sources believe that catch rates for salmon populations near towns and accessible by road may be as high as 95%. Field work funded by Pacific Environment on the Bolshaya River in 2007 indicated that catch rates, including the illegal fisheries, were approximately 80-85% of the run for sockeye, chum and chinook. Although the full TAC was taken for each species at the mouth of the river, the spawning populations were the smallest observed in 27 years. Aerial-visual spawner counts on Kamchatka likely misrepresent spawning escapements, as they count fish migrating to the spawning grounds in-river, possibly prior to the time they are intercepted by roe-stripping poachers (Zaporozhets and Zaporozhets 2007).

Small populations are at greater risk of extinction than large populations because they have less capacity to buffer themselves against unpredictable demographic and environmental variability, or major regional catastrophes (e.g., an oil spill affecting return migration of many populations simultaneously). At small population levels, depensation or “inverse density dependence” may occur. At low spawner numbers, the probability of successfully finding a mate diminishes, especially for populations with protracted spawning runs (e.g., Kamchatka coho) and large areas of potential spawning habitat. This effect is exacerbated greatly by roe-stripping, which disproportionately removes females from the spawning populations. At small population levels, it is also much more likely that there will be negative genetic effects – either population inbreeding or genetic drift, possibly with negative adaptations (McElhany et al. 2000).

Overharvest of salmon runs is a threat not only to salmon population viability, but also to the plants and animals that depend upon salmon, carcasses and roe in river ecosystems. Reports

regarding grizzly bear sightings in settlements are increasing – bear contacts with people are an indicator of poor salmon availability and hunger (Anonymous 2009a). Declines in the most abundant runs – pink and chum salmon – may also lead to a downward spiral of freshwater productivity for salmon, steelhead and trout which rear in freshwater, due to a deficit of marine-derived nutrients supporting fish prey – aquatic and terrestrial insects.

It is likely that many Russian salmon populations are reaching dangerously low levels. For example, the regional sockeye population in the Kamchatka River basin was listed as endangered in the 2008 IUCN Red List (<http://www.iucnredlist.org/details/135351>), primarily due to illegal fishing pressure. Population monitoring in most regions of the Russian Far East is limited to a fixed set of index rivers, which are usually some of the most robust and valuable commercial populations, often buffered from depensatory population growth effects by their very large size. The new one-river—one-owner salmon concessions system may set the stage for more realistic abundance trend assessments across a broader spectrum of salmon population sizes, given the self-interest of the concession holders in the long-term sustainability of basin populations (Tabunkov et al. 2009).

TYPES OF POACHING OPERATIONS

There are several different elements to the illegal, unreported and unregulated salmon fishery in the Russian Far East. They are not discrete, but rather tend to blend together. Countering poaching requires an awareness of the different motivations across these types of poachers, and knowing which type of activity predominates in a given river basin or region. There are no published statistics describing the relative contribution of different types of poaching operations to the overall flow of illegal, unreported and unregulated salmon products.

- Subsistence for household use. There are no good records regarding household catch, but this group overlaps with the one below.
- Subsistence for cash. Many residents of small rural communities serve as foot soldiers in the criminalized fishing sector, working with the commercial fishing companies to strip roe upstream, or operating on their own and selling at brokerage points operated by the poaching syndicates (UNDP 2008). In many remote districts far from urban centers, illegal fishing is the major income source for families and local governments. Residents in many communities lack the resources to enter fisheries legally – to qualify for quota one must now own a long-term river lease, document fishing capacity (nets and vessels), labor capacity and a fishing history. Environmental prosecutors report that 95% of the poachers detained on Kamchatka are unemployed (Trush 2009). UNDP (2008) estimates place the volumes of caviar produced by this type of fishery on a par with the criminal fishery in some locales, but describes this sector as less well-equipped and financed. These local groups tend to “professionalize” over time, becoming an extension of the criminal roe fishery or of the shadow commercial fishery.
- Commercial over harvest and misreporting in shore-based pound net and seine fisheries – the shadow fishery. This is a large component of the IUU fishery, driven by a cumbersome allowable catch license system that does not cope well with by-catch issues, business pressures facing small and mid-sized fishing companies, and the

favorable economics of poaching. Most salmon is delivered to factory processors or floating motherships that flash-freeze gutted (“semi-dressed”) or headed and gutted (“dressed”) fish. These vessels are boarded and inspected by the Spetsmorinspeketsiia for violations, but the rate appears to be insufficient. On Kamchatka, it is likely that 40-90% of illegal caviar is shipped out this way, rather than by the helicopter-road-airport, which would require that more people “turn a blind eye”. However, there is considerable uncertainty in these numbers, and in some areas up to 60% of the caviar may be transported by road (UNDP GEF 2008).

- High-grading and misreporting in the research driftnet fishery. These are test fisheries operated by SakhNIRO and KamchatNIRO, with the approval of TINRO-Centre, to improve same-year pink salmon forecasts (Dronova and Spiridonov 2009). This fishery is the likely source of unreported exports to Japan for sockeye, and some years for coho also. According to one news report, the 16 vessels in this fishery were boarded for inspections 15 times during their 2007 season – not even once per vessel per season. Many Kamchatkans would like to see this fishery, commercial in all but name and allocations, significantly curtailed to reflect test fishing needs only (Vakhrin 2009b).
- High-grading and misreporting in the Japanese Bilateral Agreement driftnet fishery. This component would not be easily traceable, as there is no customs paperwork and these landings are treated as a Japanese fishery (Clarke 2007). There is mounting political pressure on Kamchatka to eliminate this fishery (Anonymous 2009a).
- Multi-million dollar criminalized, highly-equipped roe fishery on spawning grounds. This fishery overlaps with the legal commercial fishery, but it is unclear to what extent. Typically, poaching brigades are helicoptered in to remote areas, left for several days to two weeks, and ferried out with several tons of caviar. These poachers tend to be well-equipped in terms of fishing gear, boats, motors, firearms, and communications. Most brigades have satellite phones and contacts within the enforcement establishment, to notify them of enforcement patrols. These illegal businesses cannot operate without the complicity of the militia, airport personnel, port personnel, maritime transport companies, phyto-sanitary inspectors and various security officials.

ROOT CAUSES OF THE POACHING CRISIS

The predominant cause of the poaching epidemic is the collapse of formerly subsidized rural economies across the Russian Far East. Many towns have survived only because of the availability of salmon, providing food and income (licit and illicit). Over the past 18 years, an entire generation has grown up in the illegal salmon fishery – in many places, it provides the highest local wages available. With the increased availability of all sorts of consumer goods, there has been a corresponding demand for disposable income beyond the minimum necessary to satisfy basic needs for food and shelter, health care and education.

Salmon caviar, or “red gold”, has a mystique of its own in Russian culture. It was first introduced to western Russians after the conclusion of the Russo-Japanese War, with soldiers

returning from the Far Eastern front. The rich roe was more affordable and available than black caviar from sturgeon, but was nonetheless a symbol of luxury. Demand for salmon caviar remains very high across the former Soviet Union – it is an almost obligatory dish at celebratory occasions for many Russians (Zolotukhin unpublished manuscript).

Inflexible, conflicting and incomplete laws and regulations and poorly defined, short-term fishing rights create powerful incentives for fishing businesses to cheat. One of the biggest “holes” in the system up until the most recent legal reforms was the fact that the Russian EEZ beyond the 12-mile territorial sea was beyond the Russian Customs zone. If driftnet catches were shipped directly to foreign ports, they were not truly “exported”, as they were beyond the boundary of Russia. The new law requires that all fish caught within the Russian EEZ be landed in Russian ports and processed by Customs. The lack of shoreside infrastructure, driving salmon catch directly to foreign ports rather than to shore-side plants for value-added processing also has played a role (Clarke 2007).

The last “root “ element, corruption, is a very complex one. The most recent World Bank Institute assessment of national corruption describes a declining trend in Russia’s control over corruption (World Bank Institute 2008). Transparency International ranks Russian perceived corruption as 2.1, on a scale of 1 to 10, sharing 147th place with Kenya, Bangladesh and Syria. (The USA is in 18th place, with a score of 7.3; Transparency International 2008). Corruption is defined as the abuse of a public position for private gain, and in many places is characterized by government extortion of extra taxes and fees for routine services to businesses and individuals. This type of administrative corruption is pervasive in Russia, but in the fisheries sector it appears to be secondary to a form of corruption referred to as “state capture” (Hellman et al. 2000). State capture refers to the payment by businesses to public officials in order to affect the way rules, regulations, and decrees are designed and enforced. Pay-offs to fishery inspectors, customs officials, the militia, aviation companies and elected officials all fit into this category. The capture index for Russia, across all sectors, is the third highest across the former Soviet bloc countries.

State capture is typically practiced by relatively new entrants to a sector, particularly one like fisheries, which until recently had insecure, short-term property rights. The high turn-over in agency posts creates a level of instability that facilitates this system. Capturing state officials to facilitate large illegal catches and salmon sales allows small and medium-sized companies to compete with established companies with more secure property rights and powerful political connections. It does not appear that one management or enforcement agency, or one link in the market chain versus another, is any more or less prone to capture. Profit realization from illegal fisheries requires complicity from catch to market. Economic sectors highly affected by state capture tend to perform more poorly economically, as evidenced in the fisheries sector by the downward price pressure in salmon markets from illegal production, especially for caviar (Hellman et al. 2000, Trush 2009).

Battling corruption requires, first and foremost, political will. Instituting long-term property rights for fishing, in the form of leased concessions, is a good first step to stabilize the economic situation for fishing companies. For the concession system to be effective, there must also be clear pathways for entry into the salmon fisheries, specified and transparent

means to transfer rights, and corresponding lease-holder responsibilities. The new system must also clarify the rights of native peoples and local communities, or subsistence poaching pressure will continue unabated. Lastly, the geographic overlap of sport fishing rights and commercial fishing rights must be addressed (Zviagintsev, Personal communication, 4 February 2009).

FISHERY SECTOR INSTABILITY

Over the past fifteen years, there have been ten reforms affecting the leadership of the fisheries sector in Moscow, and eight which have affected the territorial offices of federal agencies. Appointments to key positions are very political, similar to a cut-throat game of musical chairs. The associated jurisdictional uncertainty for enforcement entities has led to frequent transfers of personnel, equipment and authority, and the loss of hundreds of qualified staff. This is fertile ground for state capture by private companies.

For the first time since 1959, the Fisheries Law was wholly overhauled in 2004. There have been a series of amendments to that law through 2008, plus proclamations and regulatory acts clarifying elements of the law. The new Fisheries Law as amended acknowledges the privatization of the Russian economy, and explicitly provides for long-term lease concessions for river basins and salmon protected areas (Tabunkov et al. 2009).

In an effort to corral illegal and unreported catches beyond the 12-mile territorial sea, to stimulate shoreside infrastructure investment and to provide more fish for domestic markets, the most recent Fisheries Law amendments require that all fish be officially landed and processed by customs in Russian ports. In theory, this move will eliminate direct export sales from the fishing grounds. In the context of a 12-year economic stimulus package for the fisheries sector, there are a whole range of tax incentives and subsidies being debated to stimulate port infrastructure development and to lure more fish to domestic markets (Filatova 2009).

The law also mandates that all fish be sold via government Seafood Exchanges as of January 2009, in order to increase transparency in the seafood market place regarding players and prices. However, the Exchange system has not yet been implemented and there has been considerable push-back from the seafood industry, making it increasingly improbable (Bachman 2009).

Routine salmon fisheries enforcement may have hit its all-time low when it was housed in the Ministry of Agriculture's Rosselkhoznadzor from 2004-2007. The number of local inspectors across Russia dropped by 66% under Rosselkhoznadzor, and now number 1,500 across the RFE (Anonymous 2009b). This translates to one inspector for each 28 kilometers of coastline – never mind the thousands of river miles to be patrolled. Authority was transferred to the Fisheries Agency of Russia and its territorial divisions in 2007, and the situation is said to be slowly improving.

The salmon allocation system also changed frequently after the collapse of the Soviet Union. Recent reforms have replaced a cumbersome centralized quota system with little accounting for local fishery specifics in terms of run-timing, species mix, weather challenges, and catch capacity with a system of ten to 20-year concession leases and annual quota confirmation as a proportion of total allowable catch. In-season decisions to increase or decrease total allowable catch in a particular fishing district have been delegated to regional salmon commissions under gubernatorial authority (Dronova and Spiridonov 2009).

Although recent reform measures address many issues in the commercial fishery, they do not adequately address sport fishing, or provide for a shift from the “recreational” licensed fisheries to widespread and well-regulated subsistence fisheries. A great deal of the current reform movement appears to represent a jockeying for control over the salmon fisheries between companies that export a large proportion of their product Japan or China, and companies that would like to see increased private and government investment in shore-side infrastructure for domestic value-added processing and regional economic development (Denikeev 2009, Vakhrin 2009a, 2009b). The pro- and anti-driftnet debate is a subset of these factions (Gritsenko, 2009, Anonymous 2009a).

ENFORCEMENT EFFECTIVENESS – THE LITTLE GUYS GET CAUGHT

Salmon poaching can be prosecuted under the Administrative Code of the Russian Federation Statute 8.17, or in accordance with one of three different statutes of the Russian Criminal Code. Under current law, it is difficult to differentiate whether to apply administrative or criminal law. The principal criterion for differentiation is “severe damage”, but this term is not defined in contemporary law. Under the Soviet Criminal Code, there was a very clear delineation of criminal from civil crimes, based on the magnitude of environmental damage. There is no such threshold in the current Russian Criminal Code for fisheries offenses, although there are thresholds for forestry and property crimes. Secondly, the Russian Criminal Code does not stipulate property confiscation for illegal harvest of aquatic resources, although fish, fishing gear and transport vehicles may be confiscated (UNDP GEF 2008).

The relevant statutes of the RF Criminal Code are Statute 256, pertaining to illegal harvest of aquatic plants and animals; Statute 238, regarding the production, storage, transport or sale of goods and products not meeting sanitary codes; and Statute 175, with respect to acquisition or sale of property by criminal means. Even though many cases are investigated and presented as criminal cases under Statute 175, convictions under this statute are very rare. In criminal convictions, it is also very rare for the courts to impose prison time, correctional labor, or fines beyond damage assessments.

Systematic data regarding enforcement effort, apprehension rates for violators, the number of violators charged, prosecution rates for civil vs. criminal cases, and actual penalties charged are not routinely collected and published. The notable exception is the multi-authored UNDP (2008) report on the Kamchatka illegal salmon fishery, which provides a good analysis of criminal cases. However, even in this document, statistics are fragmentary, data sources are not described, and calculation methods for estimated values are not presented. Based on this report, one may conclude that:

- Criminal charges are difficult to prosecute because of onerous rules of evidence, requiring full production chain analysis for the fish in question and eyewitnesses.
- Although the investigatory caseload consists mostly of cases with damage assessments greater than 20,000 rubles (71%), cases that actually make it to trial are predominantly those levied damage assessments less than 20,000 rubles (68%). In other words, the more serious offenses are less frequently prosecuted and the little guys are usually the ones punished;
- The majority of fines levied are administrative damage assessments, but less than 1% were collected on Kamchatka in 2006;
- About 5% (by value) of the fines were imposed in criminal cases, with a 66% collection rate on Kamchatka;
- Not a single criminal case was prosecuted under Statute 175, “Illegal acquisition and trade in aquatic resources” in Elizovo District Court over the past five years, and none were prosecuted across Kamchatka until 2006. This means that the fish and caviar buyers – the money people behind the illegal fishery business – are very rarely prosecuted;
- It is very rare to achieve convictions in the largest salmon busts, frequently the legal description reads as follows, “an indeterminate person in an unknown place prepared x tons or kilos of salmon or caviar.” These cases rarely make it past preliminary investigations, and thus no damage assessment is levied or collected for the regional budget;
- Less than 0.01% of illegal salmon and no more than 2% of illegal caviar were confiscated across the RFE in 2006.
- Most of the illegal fish and caviar confiscated is apprehended at road checkpoints by the traffic police (UVD and GUVD), but experts estimate that this stream may account for as little as 10% of illegal catch.

ENFORCEMENT CHAIN ANALYSIS

The average damage assessment, approximately \$839, can be earned by selling 45 kilos of roe on the wholesale market in the Russian Far East (UNDP 2008, Dronova and Spiridonov 2009). This sum may be a deterrent for the subsistence poachers, but is merely the cost of doing business for the criminal poaching sector.

To fully appreciate how small a disincentive there is to poaching, one must consider not only the magnitude of the fine, but the probability of detection and apprehension, criminal prosecution, and the average penalty. On Kamchatka, the combined detection and arrest rate is estimated to represent no more than 4% of the total volume of illegal activity. Reviewing statistics from other regions, this statistic may be high. Prosecution rates for administrative versus criminal cases are unclear, but several experts note the challenges of criminal prosecution due to witness requirements, evidentiary rules, and absence of clear definitions in

the Russian Federation’s Criminal Code. Nonetheless, the number of criminal prosecutions on Kamchatka increased ten-fold between 2002 and 2005. More than 90% of these cases relate to salmon poaching, the remainder represent other seafood crimes. Conviction rates for criminal cases may be as high as 70% for Kamchatka, but none received prison time or a fine over and above the damage assessment.

Based upon Sutinen’s (1987) compliance incentive model as presented in Akella and Cannon (2004), the enforcement disincentive can be calculated as follows:

$$\text{Enforcement disincentive} = P_d \times P_{a|d} \times P_{p|a} \times P_{c|p} \times \text{Fine} \times e^{-rt}$$

P = probability	e = a mathematical constant, the exponential function of 1
d = detection	r = interest rate
$a d$ = arrest given detection	t = time from detection to fine
$p a$ = prosecution given arrest	
$c p$ = conviction given prosecution	

Where:

$P_d \times P_{a|d} = .04$ (inferred from UNDP GEF Kamchatka 2008)

$P_{p|a} = 0.03$ (UNDP 2009)

$P_{c|p} = 0.69$ (estimated from UNDP 2009)

Fine = 30,000 rubles or \$839 (estimated from UNDP 2009)

$t = 330/360$ days = 0.0833 (UNDP 2009)

$r = 13\%$ (current financial interest rate)

$$0.04 \times 0.03 \times 0.69 \times \$839 \times e^{-0.11} = \$0.61$$

Given that the net present value of a probable damage assessment for salmon poaching amounts to just 61¢ and the wholesale street value of a kilogram of salmon caviar in the Russian Far East is estimated to be \$45-55/kilo, it is clear that the disincentive structure is inefficient to deter poaching.

While it is clear that the probability of detection could be vastly improved, the greatest obstacle to creating a real disincentive appears to be the evidentiary process, requiring two eyewitnesses to actual illegal fishing or sales of illegal fish or roe. The requirement for two eyewitnesses to establish the validity of a violation must be dropped, in favor of a clear documentary chain of custody from the fishing grounds, through intermediate buyers all the way to retail. Without appropriate salmon documentation, the person apprehended with the salmon or salmon products should be arrested, investigated and prosecuted. Secondly, the apprehended person’s employer should be held liable – either through the company director or shareholders. Under current law and practice, only the courier or “foot soldier” is liable, and lacking proof of illegal procurement of the salmon, the individual is liable only for a modest damage assessment (Dronova and Spiridonov 2009, Sosnovka 2008, UNDP 2008). Criminal and corporate bosses remain untouched, financially, legally and in terms of reputation.

These recommendations are formulated succinctly in the Sosnovka (2008) recommendations for combating poaching

- adoption of a law languishing in the Federal Duma since 2006, entitled “Trade in valuable fish products”;
- amendments to the Administrative Code of Violations of the Russian Federation to increase punishments, require legitimate purchase documents, and allow the confiscation of fishing boats;
- amendments to Statute 256 of the Criminal Code to establish a new crime called “organization or financing of illegal fish harvest”, drop the requirement for two eyewitnesses to the apprehension of the violators, and to impose stiffer criminal penalties.

BIBLIOGRAPHY

- Akella, A. S. and J. B. Cannon (2004). Strengthening the weakest links; strategies for improving the enforcement of environmental laws globally. Washington D.C., Center for Conservation and Government at Conservation International.
- Anonymous (2009a). Kamchatke ne nuzhna "bumazhnaia" ryba – Kamchatke nuzhen losos'!/Kamchatka doesn't need "paper fish" – Kamchatka needs salmon! Posted at Ryba i moreprodukty on February 24, 2009. <http://www.fish-seafood.ru/news/detail.php?ID=9060>. Accessed 17 April 2009.
- Anonymous (2009b). Rybookhrane Rosii – 75 let! Posted at Fishery.ru on April 8, 2009. <http://www.fishery.ru/news?idnews=21534>. Accessed 20 April 2009.
- Anonymous (2009c). Bolee 600 zhitelei Karaginskogo raiona protiv promyslennogo rybolovstva na rekakh. Posted at Ryba i moreprodktly on February 18, 2009. <http://www.fish-seafood.ru/news/detail.php?ID=8960>. Accessed 17 April 2009.
- Asia Business News (ABN) Newswire (2008). China is the world's largest producer and exporter of seafood, according to the latest Glitnir Report. November 5, 2007. <http://www.abnnewswire.net/press/en/44180/China.html>. Accessed 22 February 2008.
- Bachman, Jessica (2009). State in unrivaled drive to clean up fishing. The Moscow Times, 17 April 2009.
- Beliaev, V. A. and V. B. Zviagintsev (2007). Strategiiia sokhraneniia lososevykh I sozdanie rybokhoziaistvennykh zakaznikov na Dal'nem Vostoke Rossii. Moscow: NIA-Priroda.
- Clarke, Shelley (2007). Trading tails: Russian salmon fisheries and East Asian markets. Hong Kong: TRAFFIC East Asia.
- Denikeev, Konstantin (2009). Nado rabotat' na odin rezul'tat/We need toward a common outcome. Posted at Ryba i moreprodukty January 28, 2009. <http://www.fish-seafood.ru/news/detail.php?ID=8505>. Accessed 17 April 2009.
- Dronova, N. A. and V. A. Spiridonov (2009). Illegal, unreported and unregulated Pacific salmon fishing at Kamchatka. Moscow: TRAFFIC Europe-Russia.
- Emel'ianov, A. (2008). Na puti brakon'era my dolzhny postavit' – zakon. Rybak Khabarovskogo kraia 87(452);4.
- Filatova, Elena (2009). Mery srochnogo reagirovaniia. Rosrybolovstvo predlagaet obsudit' kompleks mer, napravlennykh na razvitie otechestvenni beregovoi rybopererabotki, priemki i transportirovki. Posted to Ryba i moreprodukty March 19, 2009. <http://www.fish-seafood.ru/news/detail.php?ID=9650>. Accessed 17 April 2009.
- Gritsenko, O. 2009. Losos' v more i na bumage – argumenty nauki oprovergaiut dovody "spasatelei ot besryb'ia"/Salmon in the ocean and on paper – scientific arguments refute the conclusions of the "saviors from fishlessness". Posted at Ryba i moreprodukty on February 6, 2009. <http://www.fish-seafood.ru/news/detail.php?ID=8755>. Accessed 17 April 2009.
- Hellman, J., G. Jones and D. Kaufmann (2000). Beyond the 'grabbing hand' of government in transition: facing up to 'state capture' by the corporate sector. Transition; the Newsletter About Reforming Economies 11(2):8-12.

- McElhany, P., M. H. Ruckelshaus, M. J. Ford, T. C. Wainwright and E. P. Bjorkstedt (2000). Viable salmonid populations and the recovery of Evolutionarily Significant Units. NOAA Technical Memorandum NMFS-NWFSC 42.
- Sutinen, J. G. 1987. Enforcement of the MFCMA: an economist's perspective. *Marine Fisheries* 49(3):36-43.
- Sosnovka Coalition (2008). Kak pobedit' lososevoe brakon'erstvo? rekomendatsii organam gosudarstvennoi vlasti Rossiiskoi Federatsii, Sakhalinskoi i Magadanskoi oblastei, Kamchatskogo, Khabarovskogo i Primorskogo kraev. /How to defeat salmon poaching? Recommendations to the Russian Federation authorities and RFE territories. Prepared by Dmitrii Lisitsyn, Sakhalin Environmental Watch, on behalf of the Sosnovka Coalition.
- Tabunkov, V., J. Kuchepatov and B. Caouette (2009). An evaluation of long-term leases in Russian salmon fisheries. Wild Salmon Center White Paper. Portland, Oregon.
- Transparency International (2008). 2008 Corruption Perceptions Index. http://www.transparency.org/news_room/in_focus/2008/cpi2008. Accessed 17 April 2008.
- Trush, Maksim (2009). Tandem zakona i biznesa. Eto ta sila, kotoraiia mozhnet protivostoiat' NNN-promyslu/Partnership of law and business is the force that can oppose IUU fisheries. March 4, 2009, posted at Ryba i moreprodukty <http://www.fish-seafood.r/news/detail.php?ID=9247>. Accessed 17 April 2009.
- United Nations Development Program Global Environmental Facility (UNDP GEF). 2008. Regional'naia kontsetptsia sokrashcheniia nezakonnoi dobychi lososevykh ryb v Kamchatskom krae; ekspertnyi variant, predstavliaemyi dlia shirokogo obsuzhdeniia/Regional proposal for the reduction of illegal salmon catch in Kamchatka Krai; expert version presented for broad discussion. Moscow: Izdatel'stvo VNIRO.
- Vakhrin, Sergei (2009a). Bereg bez ryby/Shores without fish. Posted to Ryba i moreprodukty January 23, 2009. <http://www.fish-seafood.ru/news/detail.php?ID=8406>. Accessed 17 April 2009.
- Vakhrin, Sergei (2009b). "Menia volnuet budushee Kamchatki, a ne lichnego biznesa..." An interview with the Vice Chairman of the Zakonodatelnoe Sobranie of Kamchatka Krai and Chair of the Agriculture & Natural Resources Committee, R. G. Granatov. Posted to Ryba i moreprodukty February 18, 2009, <http://www.fish-seafood.ru/news/detail.php?ID=9008>. Accessed 17 April 2009.
- World Bank Institute (2008). Governance Matters 2008, Worldwide Governance Indicators, Country Data Report for RUSSIA, 1996-2007. http://info.worldbank.org/governance/wgi/sc_chart.asp. Accessed 17 April 2009.
- Zaporozhets, O. m. and G. V. Zaporozhets (2007). Brakon'erskii promysel lososei v vodoemakh Kamchatki: uchet i ekologicheskie posledstviia. Petropavlovsk-Kamchatskii: KF TIG DVO RAN, KamchatNIRO, & League of Independent Experts.
- Zolotukhin, S. F. unpublished mss. Istoriiia buterbroda s ikroi (vmeste predisloviia) / A history of caviar sandwiches (in place of an introduction). *In*: Strana lososia. unpublished, Vladivostok.
- Zolotukhin, S. F. (2007). Keta reki Ussuri. Vladivostok: TINRO-Centre.
- Zviagintsev, V. B., Director, Wild Fishes and Biodiversity Foundation. Personal communication, 4 February 2009.

APPENDIX A: ISSUES BY SPECIES/REGION

The nature of the illegal fishery varies by region, depending on the species available, the volume of fish available to poachers, transportation networks, and the distribution of human settlements. Sockeye, coho and chinook are the highest value species, earning the greatest return on the export market.

Kamchatka

This is likely the most complex IUU fishery, because of the territory's rich species diversity and abundance and its scale – Kamchatka is approximately the size of California, with a human population of approximately 360,000, based primarily in the Petropavlovsk-Kamchatsky/Elizovo area. Kamchatka is the only region with abundant sockeye, coho and chinook salmon, though the latter two species are rare relative to pink, chum and sockeye. Poaching pressure is highest in the basins with road networks and towns – the Bolshaya and Kamchatka rivers and the rivers in the immediate vicinity of Petropavlovsk – the Avacha and Paratunka. Subsistence, and subsistence-criminal poaching are very significant in these road-accessible basins, but there is organized criminal activity and commercial overharvest as well (Zaporozhets and Zaporozhets 2007).

The Karaginsk and Oliutorsk Districts on the northeast coast of Kamchatka are particularly hard hit by criminal poaching. The legal and illegal fisheries are the major sector of the economy, and enforcement is ineffective. Karaginsk has seen declining salmon returns, particularly for chum and chinook, for the past several years. Many believe that increasing fishing pressure in the driftnet test fishery off eastern Kamchatka is to blame (Anonymous 2009a). Additionally, twenty lease concessions are proposed to be let for in-river commercial fisheries. The local and indigenous community is protesting this move, which would essentially legalize the criminal poaching sector and also exclude local residents from traditional subsistence fishing areas (Anonymous 2009c).

Sockeye is targeted for illegal commercial take, given the market premium it commands in Japan. Excess catch may go unreported or misreported as pink salmon in the pound net and beach seine fisheries. Most fish from these fisheries is delivered to factory trawlers or factory motherships, once used by the Soviet Union in distant water fisheries, and semi-processed into flash-frozen headed and gutted (H/G) form. At this point, it may be landed in Russian ports, and marketed domestically, either as H/G sockeye or a value-added product. However, it appears that at least half of the total sockeye catch is shipped directly to Japan, and some of that fish may come from these fisheries. It is more likely that the majority of sockeye exports to Japan are caught in the Russian driftnet test fisheries. KamchatNIRO operates three vessels which participate in this mixed research-commercial fishery, which frequently offload their product to transport vessels at sea, which may then deliver directly to Japanese ports. Some sockeye is stripped for roe, but this is not the major focus of IUU sockeye fisheries.

Chinook is also lucrative on the export market. It is the least abundant of the commercial species, and has been a huge challenge for Russian fishery managers. In basins such as the Bolshaya River on West Kamchatka, chinook populations have declined three-fold since the 1990s (Dronova and Spiridonov 2009). Despite catch closures in some areas, chinook is a

common by-catch in the pound net and beach seine fisheries for pink salmon. Although pound nets facilitate selective harvest, the brailing crews do not sort fish in practice – everything is kept. Chinook catch limits have historically been exceeded by two to three times, with the catch frequently misreported as pink salmon (UNDP GEF 2008). Although some of these fish likely make it to local markets in Petropavlovsk-Kamchatsky and Elizovo, it is more likely that they are also processed into H/G form aboard factory processors, who may deliver their fish to processing plants in Petropavlovsk, but are more likely to land their fish on Sakhalin, in Primorye or on Hokkaido, Japan.

Pink and **chum** are considered the premium fish for the roe fishery. The rate of illegal overharvest for these species is estimated to be 28% for pink salmon and over 200% for chum. The majority of the illegal and unreported pink salmon harvest is likely conducted by criminal brigades on the spawning grounds and subsistence poachers. There is also a large volume of Russian pink salmon dumped at sea in the high-grading fisheries conducted by Japanese and Russian driftnet fisheries, but this fish is not included in UNDP calculations for rates of overharvest by species on Kamchatka.

Chum salmon catches are misreported and underreported in the commercial fisheries as well as taken in the roe fisheries on the spawning grounds. It is estimated that more than half of the illegally taken roe (all species) is shipped out of Kamchatka directly from the remote fisheries by factory processors and tenders (UNDP GEF 2008). This indicates collusion or common ownership of legal and criminal fishing operations.

Coho are the last salmon species to return to the rivers each summer, beginning their run in August and continuing to return into November. According to TINRO-Centre data reported by WWF, coho populations are increasing all around Kamchatka. Legal catches do not reflect this increase in abundance, but estimates of illegal catch for coho show it rising year by year. Over the past five years, the illegal or unreported catch is estimated to average almost four times the legal harvest (377%). Illegal fishing pressure may be increasing on coho for a number of reasons – they are accessible after the main enforcement “season” is over, Japanese markets appear to be strong, and they have become more abundant.

Cherry or **masu** salmon are widespread but not abundant. They are not well-studied on Kamchatka, outside of the Utkha River KamchatNIRO intensive monitoring basin. Masu runs overlap with the huge pink salmon runs, and they are taken primarily as by-catch. Legal catch on Kamchatka is not reported to the NPAFC. There does not appear to be any data regarding illegal catch rates.

Sakhalin

Sakhalin Territory, including all 59 islands, is less than a fifth of the area of Kamchatka but catches as much or more salmon each year. Pink salmon dominates the catch in all statistical districts except Southwest Sakhalin, where chum is dominant. The illegal fishery on Sakhalin is as well-developed as on Kamchatka, likely accounting for at least a third of Sakhalin’s total catch. Lacking the high market-valued species on the main island, most of the illegal catch has historically been roe-stripping for caviar and misreporting and underreporting in the commercial pound net and beach seine fisheries.

Pink salmon are targeted across Sakhalin Island for roe-stripping, and may be underreported in commercial fisheries, especially when new companies join in the fishery. When new companies begin to fish, even under the new one-owner—one-river system, they are given token quotas 1-10 MT allowance. However, breakeven is closer to 100 MT of fish. According to Valery Tabunkov, this commonly leads to significant underreporting of catch.

Chum salmon begin their spawning run at the peak of the pink salmon fishery, and are a common by-catch. Under the historical system, by law all of the incidental chum salmon was to have been discarded, because permits were often written for each species to different companies on a given river. The requirement not to retain chum salmon in the pink fishery led to huge sums of chum salmon misreported as pink catch. This situation should change under the new river concession system. Each concession holder will now be allocated a license for a proportional share of Total Allowable Catch (TAC) instead of fixed tonnage quota permits as in the past five years (Tabunkov et al. 2009).

Coho and **masu** (cherry) salmon are also caught as by-catch, and frequently misreported. Sakhalin has been reporting a legal catch of masu salmon of approximately 10 MT to the NPAFC for recent years. Although these species are also stripped for roe, caviar from coho and masu salmon fetches a lower market price and, because they do not run in large numbers, it is less efficient to poach them.

Most of the **sockeye** returning to Sakhalin Territory is caught in the Kurile Islands. There is also a very large research driftnet fishery (~13 vessels) based on Sakhalin, which may be the source of a great deal of unreported sockeye exported to Japan.

Khabarovsk

Summaries for Khabarovsk Territory are spotty, more in the nature of highlights than systematic reports. Khabarovsk is the largest jurisdiction in the Russian Far East (larger than Texas), followed by Chukotka and then Kamchatka. The Amur River chum and pink fishery is the focal salmon fishery for the territory, with enforcement falling under the Amur Territorial Division of the Fisheries Agency of Russia (Rosrybolovstva). The Amur Division employs 113 inspectors to cover 22,000 rivers, plus lakes, shorelines, and the international border fishery shared with the Peoples' Republic of China (Emel'ianov 2008). The Border Service and militia also participate in enforcement operations.

Pink and chum are the principal species in the Amur River and the continental coast of the Japan Sea, with masu playing a minor role. On the western shores of the Sea of Okhotsk in Khabarovsk Territory, coho is also a significant component of the catch. IUU issues in Khabarovsk Territory are similar to those on Sakhalin, with respect to mis- and underreporting of catch. However, there are more in-river fisheries in the Amur River basin, including a series of licensed fisheries referred to as "sports fisheries". They might more aptly be called personal use fisheries, as they are typically conducted from small boats with drift gillnets. These fisheries are difficult to control, and anecdotally catches are reported to be six-seven times greater than the official catch.

In the greater Amur basin, as for roe-stripping fisheries in other regions, the favored gear is either a stationary gillnet or a channel-spanning weir. Data from Kamchatka indicate that in some cases 90+% of the spawning escapement may be taken from readily accessible rivers (Zaporozhets and Zaporozhets 2007).

The more northerly rivers draining into the Shantar Sea or the Sea of Okhotsk are accessed by helicopter or fished by remote local communities with illegal catch transported to market by pound net tenders, factory processing vessels, or large transport vessels. Criminal poaching brigades landed by helicopter remain in the field for several days to catch as much as they can and prepare as much caviar as possible. Salmon-rich, remote basins in all regions are targeted in this manner.

Primorye

This is the most densely settled territory in the Russian Far East, with 12.5 people per sq km spread over an area a little smaller than Washington State. The chum, pink and masu populations in this territory are sparse relative to Kamchatka and Sakhalin, with commercial fisheries occurring at the Samarga River and in the Khasan District near the border with North Korea and China. With a widely distributed rural population and sparse salmon runs, poaching has taken a hard toll on the viability of many salmon populations and the situation is critical in many areas (Beliaev & Zviagintsev 2007, Zolotukhin 2007).

Although Primorye does not have rich salmon resources, it is the historical hub of the Far Eastern fishing fleet, and is still home to many of the largest and most powerful fishing companies. After Primorye, Sakhalin hosts the most fishing companies. In many cases, Kamchatka operations are subsidiaries of companies based in either Primorye or Sakhalin.

"The industry could easily be legalized, it's just that that would eat into the authorities' profits from bribes and fines," Chernov says. "Most of our fish goes abroad, so locals are forced to poach, and we have no choice but to buy fish from them. That's just not right." -- Vadim Chernov, Elizovo fish vendor (Kamchatka)

Poaching in Far Eastern Russia Threatens Ecosystem, By Gregory Feifer [National Public Radio](http://www.pacificenvironment.org/article.php?id=2515) July 20th, 2007 <http://www.pacificenvironment.org/article.php?id=2515> accessed 20apr09.