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VA-Delta Kamchatka Salmon Fisheries

MSC 3rd Surveillance Report

Prepared for Delta Co, Ltd. & Vityaz-Avto Co, Ltd.

Certificate No: MRAG-F-0061

MRAG Americas, Inc.
August 13, 2019

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1 General Information

Fishery name	VA-Delta Western Kamchatka Salmon Fishery		
Unit(s) of assessment	Sockeye Salmon (*Oncorhynchus nerka*)—Ozernaya River only Pink Salmon (*Oncorhynchus gorbuscha*) Chum Salmon (*Oncorhynchus keta*) Coho Salmon (*Onchorynchus kisutch*) – Kol River only		
Date certified	13 Sep 2016	Date of expiry	12 Sep 2021
Surveillance level and type	Surveillance level 6, on-site surveillance audit		
Date of surveillance audit	July 3-5, 2019		
Surveillance stage	1st Surveillance	March 28 - 30, 2017	
	2nd Surveillance	April 2 -4, 2018	
	3rd Surveillance	July 3 – 5, 2019	
	4th Surveillance		
	Other (expedited etc,)		
Surveillance team	Lead assessor: Amanda Stern-Pirlot Assessor(s): Ray Beamesderfer, Dr. Dmitry Lajus		
CAB name	MRAG Americas		
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	Contact name(s)	Aleksas Ramanauskas, General Director	

2 Background

This report contains the findings of the 3rd surveillance cycle in relation to the West Kamchatka Salmon fishery. The client's responses to the conditions of certification were set out in the Client Action Plan (CAP). Progress associated with the actions set forth in the CAP was examined as a part of this surveillance audit. For each condition, the report sets out progress to date. This progress has been evaluated by MRAG Americas Audit Team (set out below as "Progress on Condition") against the commitments made in the CAP. Principle level scores were revised in following closure of four of seven extant conditions in 2019.

Table 1. Principle-level scores (unchanged).

Principle	Final Principle Scores		
	Pink Salmon	Chum Salmon	Coho Salmon
Principle 1 – Target Species	~~81.9~~ 86.6	~~81.9~~ 86.6	~~81.9~~ 86.6
Principle 2 – Ecosystem	85.7		
Principle 3 – Management System	~~81.9~~ 83.1		

2.1 Update on the fishery since the 2018 surveillance audit

Changes to Management systems: There were no major changes highlighted for the fishery or management system. Since 2019, KamchatNIRO as well as other regional fishery research institutes (like TINRO, PINRO, etc.) has become a branch of All-Russian Fishery Research Institute (VNIRO).

Changes to Relevant regulations: None identified.

Changes to personnel involved in science, management or industry: There have been no substantive changes to the organisations managing the fishery. Andrey Zdetovetsky replaced Vladimir Galitsyn as minister of fisheries of Kamchatka. Vladimir Galitsyn became a head of a newly founded (April 2019) Association of salmon catchers of Kamchatka. The person responsible for administration of the certification program within Vityaz-Avto and Delta fishing companies, Andrei Bokov, has been in place for over three years.

Changes to scientific base of information – including stock assessments: No significant changes in the scientific base of information regarding this fishery were identified beyond information provided to address conditions. Stock assessments are conducted annually with results detailed in Appendix I.

Updates on enhanced fishery's position in relation to scope criteria: Not applicable

Any developments or changes within the fishery which impact traceability or the ability to segregate between fish from the Unit of Certification (UoC) and fish from outside the UoC (non-certified fish): None of the clients in the West Kamchatka region is using MSC logo in product labeling or marketing. The only claim by the Client is that the fishery is MSC certified and is a sustainable fishery. No unsupportable claims are made. The scope of this certification was extended to include the Pymta River in 2019 (scope extension assessment still ongoing).

Table 2. TAC and Catch Data for Pink Salmon.

TAC	**Year**	**NA[a]**	**Amount**	**--**
UoA share of TAC	**Year**	**NA[a]**	**Amount**	**--**
UoC share of (UoA)	**Year**	**2018**	**Amount**	**27%[b]**
Total green weight catch by UoC	**Year (most recent)**	**2018**	**Amount**	**80,007 mt**
	Year (second most recent)	**2017**	**Amount**	**964 mt**

[a] *Not applicable: Fishery managed based on realized annual escapements rather than a prescribed total allowable catch.*

[b] *Based on West Kamchatka total.*

Table 3. TAC and Catch Data for Chum Salmon.

TAC	**Year**	**NA[a]**	**Amount**	**--**
UoA share of TAC	**Year**	**NA[a]**	**Amount**	**--**
UoC share of (UoA)	**Year**	**2018**	**Amount**	**16% [b]**
Total green weight catch by UoC	**Year (most recent)**	**2018**	**Amount**	**3,067 mt**
	Year (second most recent)	**2017**	**Amount**	**863 mt**

[a] *Not applicable: Fishery managed based on realized annual escapements rather than a prescribed total allowable catch.*

[b] *Based on West Kamchatka total.*

Table 4. TAC and Catch Data for Coho Salmon (Kol River only).

TAC	**Year**	**NA[a]**	**Amount**	**--**
UoA share of TAC	**Year**	**NA[a]**	**Amount**	**--**
UoC share of (UoA)	**Year**	**2018**	**Amount**	**80%**
Total green weight catch by UoC	**Year (most recent)**	**2018**	**Amount**	**14 mt**
	Year (second most recent)	**2017**	**Amount**	**128 mt**

[a] *Not applicable: Fishery managed based on realized annual escapements rather than a prescribed total allowable catch.*

Table 5. TAC and Catch Data for Sockeye Salmon (Ozernaya River only).

TAC	**Year**	**NA[a]**	**Amount**	**--**
UoA share of TAC	**Year**	**NA[a]**	**Amount**	**--**
UoC share of (UoA)	**Year**	**2018**	**Amount**	**34%**
Total green weight catch by UoC	**Year (most recent)**	**2018**	**Amount**	**8,905 mt**
	Year (second most recent)	**2017**	**Amount**	**5,760 mt**

[a] *Not applicable: Fishery managed based on realized annual escapements rather than a prescribed total allowable catch.*

2.2 Conditions

Seven conditions were identified in the latest assessment (Table 6). The annual assessment found that milestones for Conditions 1 through 7 have been met. Conditions 1, 2, 4 and 7 were closed and corresponding scores were revised. Conditions 3, 5, and 6 remain open. The action plan for condition 5 was revised at the third surveillance based on current information per FCR 23.13.3 and this is explained in the Results section of this report.

Table 6. Summary of Assessment Conditions

Condition	Indicator	Status	PI original score	PI revised score
1	1.1.1 Stock status	**Closed in 3rd surveillance**	Pink: 70 Chum: 70 Coho: 70	Pink: 80 Chum: 80 Coho: 80
2	1.2.2 Reference points	**Closed in 3rd surveillance**	Pink: 70 Chum: 70 Coho: 70	Pink: 85 Chum: 85 Coho: 85
3	1.2.3 Information & monitoring	**On Target**	Pink: 65 Chum: 65 Coho: 65	
4	1.2.4 Assessment of stock status	**Closed in 3rd surveillance**	Pink: 75 Chum: 75 Coho: 75	Pink: 80 Chum: 80 Coho: 80
5	2.1.3 Retained species information	**On Target**	70	--
6	3.2.2 Decision-making processes	**On Target**	75	--
7	3.2.3 Compliance & enforcement	**Closed in 3rd surveillance**	70	80

2.3 Recommendations

Recommendation for Condition 3 and Condition 5 CAP: An alternative to the current information gathering process would be to implement systematic annual escapement surveys for all species in selected index streams and reaches. Another alternative would be a scientifically justified multiannual plan for applying annual survey effort across the region which might rotate among the drainages. Either of these would provide the assessment team with a means to evaluate the ongoing provision of information on spawning escapement without keeping this condition open.

Table 7. Fishery surveillance program.

Surveillance Level	Year 1	Year 2	Year 3	Year 4 (2020)
Level 6	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	**On-site surveillance audit/reassessment site visit**

Based on the guidelines as set out in CR v2.0, the team has set Surveillance at Level 6. Table 7 indicates that the Year 4 annual surveillance audit should be normal and on site. As part of the annual surveillance process, the fishing companies are expected to provide (or arrange for provision by KamchatNIRO) the following information:

1. Description of any substantive changes in management systems, regulations, fishing sites, personnel involved in science, management or industry, or the scientific base of information.
2. Dates of passing days in the river and sea for the fishery.

3. Harvest in metric tons by each client fishing company of sockeye salmon, pink salmon, chum salmon, coho salmon and char by fishing parcel in the fishing season.
4. Annual estimates of aerial survey effort and spawning escapement by species and river, similar to information received in 2019 in the form of reports from KamchatNIRO.
5. Summary of fishery enforcement activities including level of effort, nature of activities, and any violations identified.

An expedited audit of the Ozernaya sockeye fishery was initiated in 2017 as a scope extension of the West Kamchatka certification in lieu of a reassessment. No additional information and conditions were identified during the 2017 scope extension to add the Ozernaya sockeye fishery to the West Kamchatka salmon fishery certification. This surveillance includes both the West Kamchatka salmon fishery and the Ozernaya sockeye fishery. In addition, a scope extension in 2019 added the Pymta River – this area was subject to a separate assessment in 2019. Therefore, the 2020 surveillance audit should be held concurrently with the re-assessment site visit for the VA-Delta Western Kamchatka fisheries, including Ozernaya sockeye, and Pymta river pink and chum salmon.

3 Assessment Process

The surveillance audit process as defined in the MSC Fishery Certification Process v2.1 was followed in this audit.

Information supplied by the clients and management agencies was reviewed by the assessment team ahead of the on-site meeting, and discussions with the clients and management agencies centered on the content within the provided documentation. In cases where relevant documentation was not provided in advance of the meeting, it was requested by the assessment team and subsequently supplied during or shortly after the meeting.

Thirty days prior to the surveillance audit, all stakeholders from the full assessment and previous surveillance audits were informed of the meeting and the opportunity to provide information to the auditors in advance of, or during, the meeting. The notification of the surveillance audit was also published on the MSC website on 23 May 2019.

The surveillance audit was held in Petropavlovsk-Kamchatsky and Ozernovsky, Russian Federation on June 24 – July 5, 2019. The surveillance team consisted of Amanda Stern-Pirlot (team leader) accompanied by Ray Beamesderfer and Dr. Dmitry Lajus, both of whom were members of the assessment team. Meetings were conducted in the Vityaz Avto Company Offices. A meeting with government scientific agency KamchatNIRO was conducted at the agency office. participants were in attendance are identified in Table 8. This surveillance audit was part of a 2-week on-site visit to several Kamchatka salmon fisheries in either their first full assessment or surveillance cycles.

Discussions covered all issues as laid out in Section 7.23.12 of the MSC Certification Requirements, including the principal changes occurring to the fishery since the previous surveillance and the outcomes as outlined in the Client Action Plan (CAP) against the conditions set. The assessors drew from referenced material (emails, notices, research submissions,

published and draft documents and personal communications) to support the findings in the report.

New documents provided to the surveillance team at this audit included:

- Harvest numbers in 2018 of salmon by the fishing companies for the unit of certification (spreadsheet tables) and total salmon harvest in Kamchatka by species and subdistrict.
- KAMCHATNIRO REPORT CONTRACT № 05/19-НИР dated 06.03.2019) Subject: Pacific salmon stock and fishery management analysis (Pink salmon, Chum salmon, Sockeye Salmon, Coho salmon) in Ozernaya and Opala rivers and in adjacent water basins in West Kamchatka in 2018 (compared to date of previous years) within the framework of scientific consultation for VA-Delta salmon fishery certification to MSC standards). Bugaev, A.V., and six coauthors.
- Related Anadromous Fisheries Commission Protocols for 2018
- Sociological estimation of illegally harvested fish in Western Kamchatka and preliminary model of illegal fisheries of in a quantitative regime. A reporting document by Dr. Veronika V. Simonova for MSC certification action plan, 'Vitiaz Avto' LLC and 'VA DELTA' LLC. Dr. Veronika V. Simonova, 2019.

Selected documents are included as appendices to this report.

Standards and Guidelines used:

MSC Certification Process version 2.1 (for process requirements)
MSC Certification Requirements version 1.3 (for performance requirements, including assessment tree)
Guidance to the MSC Certification Requirements version 2.0 (for process requirements)
Guidance to the MSC Certification Requirements version 1.3 (for performance requirements, including assessment tree)
MSC Surveillance Reporting Template version 1.0

Table 8. Surveillance meetings in Petropavlovsk-Kamchatka, 2019.

Имя / Name	Организация / Organization	Должность / Title	Time & location / время и место встреч
Aleks Ramanauskas	VA-Delta	General Director	VA office
Andrei Bokov	VA-Delta	Chief Technologist	VA office
Roman Onofryichuk	Kamber and Pymta	General Director	VA office
Natalia Novikova	ForSea Solutions	Founder and Director	All
Randy Ericksen	ForSea Solutions and RP Ericksen Consulting	Fisheries Advisor	All
Amanda Stern-Pirlot	MRAG	MSC Assessment Team Leader	
Dmitry Lajus	MRAG, St. Petersburg State University	Independent Consultant and MSC Assessment Team	All
Ray Beamesderfer	MRAG, Fish Science Solutions	Sr. Fish Scientist and MSC Assessment Team	All

Nina Artukhina	KamchatNIRO (Kamchatka Research Institute of Fisheries and Oceanography)	Statistician	KamchatNIRO
Alexander Bugaev	KamchatNIRO (Kamchatka Research Institute of Fisheries and Oceanography)	Deputy Director of Research	KamchatNIRO
Sergey Shubkin	KamchatNIRO (Kamchatka Research Institute of Fisheries and Oceanography)	Head, Group of aerial survey works	KamchatNIRO
Andrey Zdetovetsky	Kamchatka Fisheries	Minister	VA office
Vladimir Galitsyn	Kamchatka Association of Salmon Fishermen	Head	VA office
Aleksandr Khristenko	SKTU/FAR	Head of SKTU/FAR	FAR
Veronika Simonova	University of St. Petersburg	Research Fellow, Department of Anthropology	VA office

4 Results

4.1 Condition 1

Performance Indicator	**1.1.1. Stock status - The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)**
Score	70 (all species except Ozernaya sockeye)
Rationale	The SG 80 standard is not achieved because of uncertainty regarding stock status relative to TRPs due to the aggregate nature of the stock assessment to derive goals, reductions in annual assessments of spawning escapement due to recent funding constraints and system-specific differences in fishing intensity. Objective values may not be met in every system and every year and in some cases, may not have been identified. It is unclear whether objectives maximize sustained yield.
Condition	Condition 1. Demonstrate that the species management unit is at or fluctuating around its target reference point.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: Annually report spawning escapements by species and river system in relation to an established escapement goal. Include goals for even and odd year pink salmon and other stocks as appropriate based on run timing.
Client action plan	The Client will provide an analysis of the relationship between historical escapement monitoring data to actual escapements during the first surveillance audit (see Condition 3). For example, are they estimates of total escapement abundance or are they relative indicators of abundance. If they are estimates, the analysis will include a description of how escapements are extrapolated from aerial surveys and why this is appropriate. The Client will also provide a justification for the revised escapement monitoring plan during the first surveillance audit. For example, if only select "indicator" streams/stream sections are surveyed, the analysis will include a rationale for why they are representative of unsurveyed streams in the unit of certification. Starting with the first surveillance audit, the Client will provide annual information on escapements compared to the relevant escapement targets, by species.
Consultation on condition	Client will work with KamchatNiro to provide the analysis of historical escapement monitoring and graphs of escapement compared to escapement targets. Client will work with their consultants (previously Ocean Outcomes, now ForSeaSolutions) and KamchatNiro to provide reporting of this

	information.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, replaced Ocean Outcomes in this project, to prepare a work plan for the annual surveillance audits. This work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. Accordingly, information needed to address this condition has been requested from KamchatNiro and a contract has been entered with this agency for delivery. Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.
Progress on Condition [Year 2]	A work plan was developed and implemented to address this condition. The fishing companies contracted with KamchatNIRO to report annual spawning escapements by species and river system in relation to an established escapement goal. Goals were included for even and odd year pink salmon and other stocks as appropriate based on run timing (See Appendix III). Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on Condition [Year 3]	KamchatNIRO provided a detailed report on stock status relative to goals. Over the last decade, the federal fishery scientific agency (KamchatNiro) has been refining the scientific basis for salmon management by developing productivity functions for stocks and populations throughout Kamchatka. With this work, KamchatNIRO has been formalizing estimation and application of quantitative reference points including optimum spawning levels and points of potential reproductive impairment. This information is currently being tested by the management systems but has not yet been fully incorporated, in part due to limitations in annual stock assessments which are addressed in PI 1.2.4. (Due to past reductions in aerial survey effort, data on spawning escapements in some rivers is lacking in some years and corresponding escapement are reported as low values by KamchatNIRO). This assessment reports results of recent estimates of spawning escapement relative to preliminary reference points identified by KamchatNIRO but these results are not the primary basis for scoring of the PI which places more emphasis on long term abundance and harvest trends under current fishing intensity. However, KamchatNIRO reports that spawning escapements consistent with optimum production levels are regularly achieved and the range of escapement values for the most species tends to or exceeds the target reference points (Shevlyakov et al. 2016; Bugaev et al. 2019). At the same time, fishery management intensity is scaled to the vast area of the region and the limitations of the available institutional resources for stock assessment and management. Stocks of each species are effectively managed as regional aggregates which is generally appropriate given the productivity of the habitat and the normal covariation among substocks resulting from shared freshwater and ocean productivity patterns. System-specific regulatory mechanisms are implemented based on local abundance and fishery dynamics. Potential improvements in population-specific management with population-

	specific escapement objectives are also being explored. Consistent high levels of Pink and Chum Salmon production over the last decade confirm that the management strategy based on target reference points has effectively maintained the reproductive capacity of the aggregate stock of each species. Fishing effort and strategies have been scaled based on historical information to ensure adequate spawning escapement during most years in most areas. Fishing effort may be scaled somewhat in-season based on annual stock assessments but the fishery is not intensively managed at a fine scale in order to maximize harvest in any given year. Given the demonstrated success of this approach it is not necessary to quantify river-specific escapement of every stock in every year.
Status of Condition	Condition closed in the 3rd surveillance

4.2 Condition 2

Performance Indicator	**<u>1.2.2. Harvest control rules and tools</u> -There are well defined and effective harvest control rules (HCRs) in place**
Score	70 (all species except Ozernaya sockeye)
Rationale	The SG80 standard is not met because it is unclear whether harvest control rules are sufficiently robust to maintain appropriate levels of escapement in the event of a prolonged period of reduced ocean productivity. HCR's appear to be generally effective in regulating exploitation rates during the current period of high salmon productivity in West Kamchatka corresponding to a period of favorable marine conditions. High productivity makes these stocks extremely resilient and capable of sustaining high harvests and harvest rates. Production remains high even in the face of periodic low escapements that sometimes occur among exploited salmon populations as a result of normal annual variability in returns and inexact forecast and assessment methods. However, high harvests create an expectation for continuing high harvest and a fishery infrastructure consistent with supporting demands. Pink salmon do not meet the SG80 standard because escapement goals do not distinguish odd and even years.
Condition	Condition 2. Demonstrate that harvest control rules are likely to be robust to the main uncertainties regarding future marine productivity regimes for Pink, Chum and Coho Salmon of the unit of certification. Demonstrate that well-defined harvest control rules are in place that ensure that the exploitation rate is reduced as the LRP is approached and are expected to keep the SMU fluctuating around a target level consistent with MSY for component populations in different rivers and stocks (e.g. distinguish even and odd year runs for pink salmon).
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the

	plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: Need annual information on passing days, exploitation rates/index and escapements in response to run size. Need separate escapement goals for even and odd year pink runs.
Client action plan	The Client will provide an annual report summarizing management actions taken by the Anadromous Fish Commission (establishment and modification of passing days) relevant to the certified fisheries during the previous fishing season at each surveillance audit and identify steps to assure the harvest control rule is robust to main uncertainties. In addition, the report will include: the catch of salmon by the Client fisheries by species and river/fishing parcel; and escapement data by species and river. The report will include results of any independent observer program in place in this fishery. See action plan for conditions 1 and 3 regarding pink salmon escapement goals.
Consultation on condition	Client will work with KamchatNiro to provide the necessary information.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, to prepare a work plan for the annual surveillance audits. Th is work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. Accordingly, information needed to address this condition has been requested from KamchatNiro and a contract has been entered with this agency for delivery. Protocols adopted by the Anadromous Fish Commission in 2016 were also provided. These actions are summarized in section 4.3 of this report. Related information may also be found in Appendices 8.5 (Summary of Kamchatka Krai government meeting of the regional fishery) and 8.6 (The 2016 results of “Red” fishing season according to SVTU). Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.
Progress on Condition [Year 2]	A work plan was developed and implemented to address this condition. The fishing companies contracted with KamchatNIRO summarize information on actions taken by Anadromous Fish Catch Monitoring and Controlling Commission in Kamchatka krai (Protocols) in 2017 and justification of actions in certified West Kamchatka fisheries (See Appendix III). Passing days were established by the Anadromous Fish Commission prior to the fishing season by management subzone. A series of in-season modifications were subsequently adopted based on monitoring results to ensure that sustainable escapements were achieved. Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on Condition [Year 3]	KamchatNIRO provided a detailed report on stock status relative to goals in 2018. The main uncertainty affecting HCRs is annual variability in run strength

	and run timing. HCR's appear to be generally effective in regulating exploitation rates under conditions of normal annual variability during the current period of high salmon productivity in West Kamchatka in a period of favorable marine conditions. High productivity makes these stocks extremely resilient and capable of sustaining high harvests and harvest rates. Production remains high even in the face of periodic low escapements that sometimes occur among exploited salmon populations as a result of normal annual variability in returns and inexact forecast and assessment methods. Significant escapements of target stocks are consistently achieved and continuing high levels of salmon production provide evidence that harvest control rules are effective in producing appropriate exploitation rates. The fishery is managed on a daily basis using real time stock assessment information to regulate harvest consistent with escapement targets. Fisheries are restricted as appropriate based on actual run size and escapement. For instance, the harvest strategy has been revised to allow two passing days after every two fishing days to protect escapement for below average returns and harvesting has been suspended for the same reason during years of very poor runs (Shevlyakov et al. 2016).
Status of Condition	Condition closed in the 3rd surveillance

4.3 Condition 3

Performance Indicator	**<u>1.2.3. Information and monitoring</u> - Relevant information is collected to support the harvest strategy**
Score	65 (all species except Ozernaya sockeye)
Rationale	Concern for the sufficiency of information on spawning escapements for a representative range of component populations in the future is raised by the continuing reductions in aerial survey effort that is the basis for inseason and post season stock assessment, thereby not meeting SG80.
Condition	Condition 3. Provide sufficient information on wild spawning escapement for a representative range of wild Pink, Chum and Coho populations in the unit of certification to support the harvest strategy and demonstrate that wild abundance is regularly monitored at a level of accuracy and coverage consistent with the harvest control rule.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. ~~By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.~~ At the third annual surveillance, this condition was deemed on target, but was left open to enable the clients to request, and the assessment team to

	continue formally receiving reports from KamchatNIRO regarding aerial survey effort and spawning abundance estimates. Recommendations for an alteration to the CAP to allow for ongoing reporting and also close this condition are provided in the "Status of condition" box.
Client action plan	The Client will provide a plan to improve escapement monitoring during the first annual surveillance audit. The plan will include the methodology (e.g. aerial surveys, weir counts, etc.), approximate time period (e.g. mid-August to early September), frequency (e.g. weekly surveys), streams/stream sections for each species, and identify steps to provide sufficient information on wild spawning escapement to support the harvest strategy and demonstrate monitoring of abundance. Annual escapement data for the previous season will be provided during each audit.
Consultation on condition	Client will work with Ocean Outcomes and KamchatNiro to develop the plan. The plan presented during the first surveillance will include agreement with KamchatNIRO to provide information.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, replaced Ocean Outcomes in this project, to prepare a work plan for the annual surveillance audits. This work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. Accordingly, information needed to address this condition has been requested from KamchatNiro and a contract has been entered with this agency for delivery. The client has also completed an agreement with KamchatNIRO to provide logistical support for additional aerial spawning ground surveys. VA is affiliated with a helicopter transportation company and staff from the scientific agency will accompany regular helicopter flights and conduct spawning ground surveys. This activity is expected to substantially increase sampling which has been reduced by government cutbacks in recent years. The fishing companies intend to maintain their own records of this activity to supplement information that will be provided by KamchatNIRO. Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.
Progress on Condition [Year 2]	A work plan was developed and implemented to address this condition. The fishing companies contracted with KamchatNIRO to provide logistical support for aerial spawning surveys of selected West Kamchatka streams (See Appendix III). This information was the basis for spawning escapement estimates reported by KamchatNIRO. Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on Condition [Year 3]	The work plan was implemented as planned and corresponding information was provided in a report by KamchatNIRO. The surveillance identified a continuing need for related information in light of the continuing development

	and application of species and river specific escapement goals.
Status of Condition	Condition is on target, however the assessment team decided to leave it open to accommodate continuing needs for information on spawning escapement relative to goals, enabling the clients to request, and the assessment team to continue formally receiving reports from KamchatNIRO regarding aerial survey effort and spawning abundance estimates However, the team has also provided a recommendation potentially enabling the requisite level of monitoring and information provision on an ongoing basis and also the closure of this condition. Recommendation: One alternative would be to implement systematic annual escapement surveys for all species in selected index streams and reaches. Another alternative would be a scientifically justified multiannual plan for applying annual survey effort across the region which might rotate among the drainages. Either of these would provide the assessment team with a means to evaluate the ongoing provision of information on spawning escapement without keeping this condition open.

4.4 Condition 4

Performance Indicator	1.2.4. Assessment of stock status - There is an adequate assessment of the stock status of the SMU
Score	75 (all species, except Ozernaya sockeye)
Rationale	Current assessments also provide low resolution on major stock subcomponents and limited precision due to a reliance on peak escapement counts in selected index areas. Stock assessment has become increasingly reliant on indicator streams with the reduction in sampling rate but changing distribution pattern over time at different scales of abundance can confound interpretation of index samples. Reliance on index areas may not provide representative estimates for a full spectrum of strong and weak stock subcomponents within a system. Peak spawner counts from the most productive habitats may not be representative of the total stock under conditions of low productivity or declining returns. Further, escapement goals are generally based on production functions for aggregate stock and river populations of a species. Curves and goals thus represent an average stock and may be disproportionately driven by large strong stocks in the aggregate.
Condition	Condition 4. Estimate stock status of Pink, Chum and Coho Salmon of the unit of certification relative to reference points that are appropriate to the SMU and demonstrate there is some evidence of coherence between the status of the indicator streams and the status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity to match those of the representative SMU where applicable.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: Need description of the extrapolation methodology for escapement estimates. Why is it underestimated at low run sizes? How do escapements compare to the goals? Provide justification for selection of index areas. For instance, one stream each in north and south. Could include correlations in historical abundance to justify rationale for representative sampling. Peak sampling based on historical timing and sex ratio monitoring. The statistical basis for descripting relationships and related applications should be included. Develop methodology of spawning escapement estimations based on sampling areas, where average estimates of spawners would not directly depend on intensity of aerial observations (recognizing that sampling error will probably increase with decrease of flight hours).
Client action plan	The Client will provide an analysis of the relationship between historical escapement monitoring data to actual escapements during the first surveillance audit. For example, are they estimates of total escapement

	abundance or are they relative indicators of abundance. If they are estimates, the analysis will include a description of how escapements are extrapolated from aerial surveys and why this is appropriate. The Client will also provide a justification for the revised escapement monitoring plan (Condition 2) during the first surveillance audit. For example, if only select "indicator" streams/stream sections are surveyed, the analysis will include a rationale for why they are representative of unsurveyed streams in the unit of certification. Starting with the first surveillance audit, the Client will annually provide information comparing annual escapements (for at least the previous 15 years) compared to the relevant escapement targets, by species, and identify steps to assure an estimate of stock status relative to reference points and demonstrate coherence between the status of the indicator streams and the status of the other populations they represent.
Consultation on condition	Client will work with KamchatNiro to provide the analysis of historical escapement monitoring and graphs of escapement compared to escapement targets. Client will work with Ocean Outcomes and KamchatNiro to provide justification for the revised escapement monitoring plan.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, to prepare a work plan for the annual surveillance audits. This work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. Accordingly, information needed to address this condition has been requested from KamchatNiro and a contract has been entered with this agency for delivery. Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.
Progress on Condition [Year 2]	A work plan was developed and implemented to address this condition. The fishing companies contracted with KamchatNIRO to assess spawning escapements relative to species and stream-specific escapement goals. Results are documented in Appendix III. Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on Condition [Year 3]	KamchatNIRO provided an analysis of the coherence of between the status of the indicator streams and the status of the other populations they represent within the management unit (Shevliakov and Maslov 2011 as cited in the KamchatNIRO report attached herein).
Status of Condition	Condition was closed at the 3rd surveillance

4.5 Condition 5

Performance Indicator	**2.1.3. Primary species information - Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species**
Score	70
Rationale	Primary species include coho salmon (in rivers except for Kol where they are a P1 species), sockeye salmon (in rivers except for Ozernaya), and Chinook salmon (all rivers). Assessments also include direct estimates of natural stock productivity on a regional and population-specific. Continuing reductions in aerial survey effort, which is the basis for inseason and post-season stock assessment, raise concern for the sufficiency of information on spawning escapements for a representative range of component populations in the future. The SG80 standard is not met due to reductions in the accuracy and precision of wild abundance estimates resulting from recent reductions in aerial survey efforts.
Condition	Condition 5. Provide quantitative information on escapement of (non-Ozernaya) Sockeye and (non-Kol) Coho Salmon adequate to assess the impact of the UoA with respect to status.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: survey abundance and compare to goals (same info as in PI for other species.
Client action plan	Starting with the first surveillance audit, the Client will annually provide graphs comparing annual escapements of Coho and Sockeye (for at least the previous 15 years) compared to the relevant escapement targets, by species.
Consultation on condition	Client will work with KamchatNiro to provide the necessary information.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, to prepare a work plan for the annual surveillance audits. This work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. Accordingly, information needed to address this condition has been requested from KamchatNiro and a contract has been entered with this agency for delivery. Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.

Progress on Condition [Year 2]	A work plan was developed and implemented to address this condition. The fishing companies contracted with KamchatNIRO to provide logistical support for aerial spawning surveys of selected West Kamchatka streams (See Appendix III). In 2017, this funding allowed resumption of escapement surveys for Sockeye in the Opala/Golygina and Vorovskaya rivers. Addition efforts are in development for Coho assessments. Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on Condition [Year 3]	The fishing companies contracted with KamchatNIRO to continue to provide logistical support for aerial spawning surveys of selected West Kamchatka streams. This funding allowed resumption of escapement surveys for Sockeye in the Opala/Golygina and Vorovskaya rivers. Addition efforts are in development for Coho assessments.
Status of Condition	Condition is on target and has been left open to accommodate continuing needs for information on spawning escapement relative to goals, enabling the clients to request, and the assessment team to continue formally receiving reports from KamchatNIRO regarding aerial survey effort and spawning abundance estimates. However, the team has also provided a recommendation potentially enabling the requisite level of monitoring and information provision on an ongoing basis and also the closure of this condition. See above under Condition 3 and recommendations.

4.6 Condition 6

Performance Indicator	**3.2.2. Decision-making processes - The fishery-specific and associated enhancement management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.**
Score	75
Rationale	Monitoring of decision making for the fishery is limited by the inconsistent availability of information outside the local governmental management system. Results of fishing season and effectiveness of management actions undertaken are discussed at the both management agencies such as AFC, SVTU and FAR, and also at Research Councils of fisheries institutes such as KamchatNIRO, TINRO-Center and VNIRO on a regular basis. However, information on run size, harvest by time and area, fishery management actions, and escapement is not typically reported outside the management system except in rare cases. Occasional publications of related information (e.g. Shevliakov 2013b) provide a historical perspective but are not sufficient to allow tracking action associated with findings and relevant recommendations.
Condition	Condition 6. Demonstrate that information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. Recommendation: The client report should include information used to make

	decisions plus the final outcome such as final spawning escapements and harvests in the watersheds, and age of chum and coho salmon.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: Annual report to assessment team summarizing management actions and rationales based on fishery data.
Client action plan	Beginning with the first surveillance audit, the Client will provide annual reports documenting the rationale behind fishery management actions taken the previous fishing season affecting the unit of certification. In addition to reporting on Anadromous Fish Commission protocols establishing opening dates, initial passing days, modifications to passing days, season closures, etc., the report will provide rationale for the actions. For example, pre-season run forecasts, inseason catch/escapement information may have been used to set or modify passing days based on projected run strength. The report will include results of any independent observer program in place in this fishery regarding regulatory compliance.
Consultation on condition	Client will work with KamchatNiro to provide the necessary information.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, to prepare a work plan for the annual surveillance audits. This work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. Accordingly, information needed to address this condition has been requested from KamchatNiro and a contract has been entered with this agency for delivery. Related information may also be found in Appendices 8.5 (Summary of Kamchatka Krai government meeting of the regional fishery) and 8.6 (The 2016 results of “Red” fishing season according to SVTU). Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.
Progress on Condition [Year 2]	A work plan was developed and implemented to address this condition. The fishing companies contracted with KamchatNIRO summarize information on fishery harvests, spawning escapements, and actions taken by Anadromous Fish Catch Monitoring and Controlling Commission in Kamchatka krai (Protocols) in 2017 and justification of actions in certified West Kamchatka fisheries (See Appendix III). Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on	A work plan was developed and implemented to address this condition. The

Condition [Year 3]	fishing companies contracted with KamchatNIRO summarize information on fishery harvests, spawning escapements, and actions taken by Anadromous Fish Catch Monitoring and Controlling Commission in Kamchatka krai (Protocols) in 2018 and justification of actions in certified West Kamchatka fisheries.
Status of Condition	Condition is open and on target, but has been extended to accommodate continuing needs for information on management actions and the basis for corresponding decisions. The condition may be closed at the next surveillance if additional information continues to demonstrate that related information on management decisions is available on request and/or by publication on the internet.

4.7 Condition 7

Performance Indicator	**3.2.3. Compliance and Enforcement - Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.**
Score	70
Rationale	Effective enforcement is only possible with considerable funding and cooperation among companies fishing companies depending on local fish resources. The chronic nature of this problem indicates that the monitoring, control and surveillance system has not demonstrated a complete ability to enforce relevant rules throughout the system. Enforcement cannot be considered comprehensive because the notable level of illegal fishing is apparently still significant.
Condition	Condition 7. Demonstrate that a monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules, and that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Client action plan	The Client will provide a detailed plan for assessing the magnitude of illegal fishing in the unit of certification by the first surveillance audit. In addition, to independent fishery observer reports, enforcement activities, and media reports, the plan will include some methodology to evaluate the relative quantity of fish illegally harvested. For example, this may include

	anthropological/sociological studies of local communities to assess the types and scale of different illegal activities, potential trade routes, and strategies for reducing incentives for these activities. The Client will present evidence that the plan has been implemented during the second surveillance audit. A final report on the results demonstrating an effective monitoring, control, and surveillance system will be provided during the third surveillance audit.
Consultation on condition	Client will work with Ocean Outcomes and academic consultants to develop and implement the plan. The Plan provided at the first surveillance will include agreement with relevant contractors to collect and analyse information.
Progress on Condition [Year 1]	The fishing companies have contracted with ForSeaSolutions, a consulting company with expertise in Russian salmon fisheries, to prepare a work plan for the annual surveillance audits. This work plan was provided to the surveillance team. This work plan identifies specific actions planned and schedules to address milestones for conditions of the certification. For this condition, the work plan reported that the client will work with consultants and/or academics to develop a plan. The plan will include an agreement with consultants/academics to collect and analyse information. Accordingly, the client is considering alternatives for conduct of this work. A plan for socio-anthropological research of Illegal salmon fishing in Western Kamchatka has been prepared by Veronika Simonova of Sociological Institute of the Russian Academy of Science. The proposal called for work to be conducted from April 2017 – March 2019. The main goal of the project is to study role of illegal fishing in social life and in Western Kamchatka and obtain information about amount of Pacific salmon illegally fished in the region. In the Western Kamchatka, as well as in other regions of the Russian Far East, illegal fisheries are one of main subsistent strategies and relationships with the environment relevant for local populations. The project will describe patterns of illegal fishing, characterize people, involved in illegal activities, assess significance of illegal fishing in local economy and provide information to assess amount of Pacific salmon removed illegally. The basic project method stands upon social anthropology and its main technics: in depth interviews, ethnographic observations, diaries. The project will also employ theoretical background of related disciplines such as ecological and economic anthropology, history, and sociology. It will also address historical sources such as archival documents and local press in order to have a historical perspective on social memory of the practice and its ongoing life. The distant analysis of illegal fishing in Western Kamchatka will be done to prepare for field fork in order to have a better view over discourses concerning to illegal fisheries and informal economies of the target region. The project result will be not only a detailed analysis of the problem, but also will represent a better version of original method of figuring out and analysis of the impact of illegal fisheries on local eco-cultural system but will allow the Client company to reduce potential financial and other risks. Finally, the project shall contribute to local sustainable development and understanding of local

	community where the Client company runs its businesses. The client is also exploring alternatives with the Kamchatka State University. The surveillance team recommends that a study plan be provided for review upon availability. Conclusion - This action effectively addresses the first annual surveillance milestone that the client must present evidence that a plan is in place to address this condition.
Progress on Condition [Year 2]	A project of socio-anthropological research of Illegal salmon fishing in Western Kamchatka was initiated by Veronika Simonova of Sociological Institute of the Russian Academy of Science with funding by the fishing companies. A preliminary report of year 1 activities and findings was provided to the surveillance team (attached in Appendix III). Subsequent phases of this research are planned to continue. Conclusion - This action effectively addresses the second annual surveillance milestone.
Progress on Condition [Year 3]	Socio-anthropological research of Illegal salmon fishing in Western Kamchatka by Veronika Simonova of Sociological Institute of the Russian Academy of Science continued for a second year with funding by the fishing companies. A preliminary report of year 2 activities and findings was provided to the surveillance team (attached in Appendix III). This report presents initial findings though more study is needed for conclusive results regarding quantification of poaching/illegal harvesting activity in Kamchatka. However, it is clear that the rivers fished by Vityaz-Avto and the subject of this certification are low risk for significant levels of poaching relative to other areas of Kamchatka (e.g. Bolshya and Kamchatka Rivers), as fishing and processing sites (other than Ozernaya River which is tightly patrolled) are remote with little to no means of transportation overland. Therefore, this sociological/anthropological study will continue and will be refined in order to get better information on poaching in areas where it is most prevalent, but the initial results allow this condition as pertains to the VA-Delta fishery and associated rivers, to be closed.
Status of Condition	Condition was closed at the 3rd surveillance

5 Conclusion

MRAG Americas concurs with the assessment team that the certification of the VA-Delta West Kamchatka salmon fishery against the MSC Principles and Criteria for Sustainable Fishing be continued for a further year.

Appendix I – Rescoring Evaluation Table

Evaluation Table for PI 1.1.1 – Stock status

PI 1.1.1		**The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)**		
Scoring Issue		SG 60	SG 80	SG 100
A	Stock status			
	Guidepost	It is **likely** that the SMU is above the limit reference point (LRP).	It is **highly likely** that the SMU is above the LRP.	There is a **high degree of certainty** that the SMU is above the LRP.
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – Yes Chum – Yes Coho - Yes	Pink – No Chum – No Coho – No
	Justification	SG 60 – See SG80. SG80 – Quantitative data on long-term production trends and escapement provide strong evidence that Pink, Chum and Kol coho are highly likely above the point where recruitment would be impaired by the current commercial fishery. Run sizes, harvest and escapement have all increased or remained at high levels for all three species over the last decade. In part, this is related to an extended period of favorable ocean conditions for these species throughout the northern Pacific. These stocks have also benefited by improvements in fishery management structures and enforcement which appear to have substantially reduced the illegal and unreported harvest which reduced spawning escapements. Productivity functions have been estimated and optimum spawning levels have been identified relative to the point where recruitment would be impaired. Stock assessment information indicates that spawning escapements consistent with optimum production levels are consistently achieved. KamchatNIRO reported that for the subject populations the escapement value did not go below the limit reference point, and the range of escapement values for the most species tends to or exceeds the target reference points (Shevlyakov et al. 2016). Management for optimum spawning escapement levels provides a conservative standard for protecting populations from critical low levels that impact diversity, resilience and future production. Management for these target reference points effectively provides an operational equivalent of a limit reference point in salmon management systems by effectively avoiding lower escapements to the extent that this is possible by regulating fisheries. Highly variable annual run sizes are characteristic of salmon. Thus, it is not always possible to meet optimum targets in every population and year. However, effective management for target reference points should ensure that average escapements will be maintained over the long term above the level at which there is an appreciable risk of impairing reproductive capacity. Consistent high levels of Pink, Chum and Kol Salmon production over the last decade confirm that the management strategy based on target reference points has effectively maintained the reproductive capacity of the aggregate stock of each species. Freshwater habitat conditions in western Kamchatka, with few exceptions, are excellent for salmon production. Watersheds are virtually pristine and support tremendous diversity of aquatic systems including rivers, streams, lakes and wetlands which provide ideal conductions for salmon production. These conditions are conducive to high levels of salmon productivity and inherent resilience to harvest which in turn can sustain robust		

PI 1.1.1		The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)		
Scoring Issue		SG 60	SG 80	SG 100
		levels of fishery exploitation. At the same time, fishery management intensity is scaled to the vast area of the region and the limitations of the available institutional resources for stock assessment and management. Stocks of each species are effectively managed as regional aggregates which is generally appropriate given the productivity of the habitat and the normal covariation among substocks resulting from shared freshwater and ocean productivity patterns. System-specific regulatory mechanisms are implemented based on local abundance and fishery dynamics. Potential improvements in population-specific management with population-specific escapement objectives are also being explored. Occasional poor run years and escapements into portions of some systems are characteristic of salmon. Long term population viability and fishery sustainability for salmon is maintained under these circumstances by a diverse meta-population structure including multiple, interacting populations and subpopulations, and by only a portion of each population or brood year Cohort returning to spawn in any given year (McElhany et al. 2000). SG100 – A high degree of certainty is precluded for the SMU because specific limit reference points have not been incorporated into management practice and not every population is fished at optimum levels in every year. A complex mixed species and stock fishery results from substantial overlap in run timing of salmon species, interannual variation in run sizes of different species, different fishing capacity and intensity in different systems, and a higher incidence of illegal, unaccounted, non-industrial fishing in some areas. The management system has developed a methodology for identifying precautionary limit reference points at a population scale for the UoA and it is expected that the applicability and utility of these reference points will be further evaluated in coming years.		
B	Stock status in relation to target reference point (TRP, e.g. target escapement goal or target harvest rate)			
	Guidepost		The SMU is at or fluctuating around its TRP.	There is a **high degree of certainty** that the SMU has been fluctuating around its TRP, or has been above its target reference point over recent years.
	Met?		Pink – ~~No~~ Yes Chum – ~~No~~ Yes Coho – ~~No~~ Yes	Pink – No Chum – No Coho – No
	Justification	~~The SG 80 standard is not achieved because of uncertainty regarding stock status relative to TRPs due to the aggregate nature of the stock assessment to derive goals, reductions in annual assessments of spawning escapement due to recent funding constraints and differences in fishing intensity in different systems. In aggregate, species are fished at levels consistent with high yields (and low probability of recruitment overfishing) but this may not always be the case for some populations. Under the current management system which was adopted in 2008, quantitative stock assessments indicate that aggregate stocks in the Unit of Assessment are generally fluctuating in the past decade around spawning escapements that were historically demonstrated to produce high sustained yields in conventional spawner stock-recruitment analyses. However, corresponding production functions were generally based on regional aggregates by species. Spawning escapement~~		

PI 1.1.1		The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)		
Scoring Issue		SG 60	SG 80	SG 100
		~~goals were then derived for specific river systems by apportioning aggregate values based on the relative sizes of the respective populations in each system.~~ The SG80 standard is achieved. Under the current management system which was adopted in 2008, quantitative stock assessments indicate that aggregate stocks in the Unit of Assessment are generally fluctuating in the past decade around spawning escapements that were historically demonstrated to produce high sustained yields in conventional spawner stock recruitment analyses. Production functions were generally based on regional aggregates by species. Spawning escapement goals were then derived for specific river systems by apportioning aggregate values based on the relative sizes of the respective populations in each system. In aggregate, species are fished at levels consistent with high yields (and low probability of recruitment overfishing) but this may not always be the case for some populations. Salmon escapement goals are managed based on production functions defined by stock-recruitment curves relating spawner numbers with adults produced in the next generation of return. Escapements greater than the habitat capacity will reduce productivity due to density-dependent regulating factors involving competition for limited space and food. Escapements substantially less than capacity reduce fishery yields. Maximum sustainable yield typically occurs somewhere between 50% and 100% of the habitat capacity where capacity is defined based on the point of maximum production in the stock recruitment curve (Ricker 1975). Stock-recruitment curves are utilized to derive escapement objectives for western Kamchatka salmon consistent with a biomass that produces high levels of sustained yields and high rates of replacement in the historical dataset. Spawning escapements were historically assessed each year relative the target values and in-season management is used to regulate fishing intensity in order to achieve spawning objectives. ~~However, objective values may not be met in every system and every year. It is unclear whether objectives maximize sustained yield.~~ Over the last decade, the federal fishery scientific agency (KamchatNiro) has been refining the scientific basis for salmon management by developing productivity functions for stocks and populations throughout Kamchatka. With this work, KamchatNIRO has been formalizing estimation and application of quantitative reference points including optimum spawning levels and points of potential reproductive impairment. This information is currently being tested by the management systems but has not yet been fully incorporated, in part due to limitions in annual stock assessments which are addressed in PI 1.2.4. (Due to past reductions in aerial survey effort, data on spawning escapements in some rivers is lacking in some years and corresponding escapement are reported as low values by KamchatNIRO). This assessment reports results of recent estimates of spawning escapement relative to preliminary reference points identified by KamchatNIRO but these results are not the primary basis for scoring of the PI which places more emphasis on long turn abundance and harvest trends under current fishing intensity. However, KamchatNIRO reports that spawning escapements consistent with optimum production levels are regularly achieved and the range of escapement values for the most species tends to or exceeds the target reference points (Shevlyakov et al. 2016; Bugaev et al. 2019a). Consistent high levels of Pink and Chum Salmon production over the last decade confirm that the management strategy based on target reference points has effectively maintained the reproductive capacity of the aggregate stock of each species. Fishing effort and strategies have been scaled based on historical information to ensure adequate spawning escapement during most years in most areas. Fishing effort may be scaled somewhat in-		

PI 1.1.1		The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)		
Scoring Issue		SG 60	SG 80	SG 100
		season based on annual stock assessments but the fishery is not intensively managed at a fine scale in order to maximize harvest in any given year. Given the demonstrated success of this approach it is not necessary to quantify river-specific escapement of every stock in every year. The SG 100 standard is not achieved because of uncertainty regarding stock status relative to TRPs due to the aggregate nature of the stock assessment to derive goals, reductions in annual assessments of spawning escapement due to recent funding constraints and differences in fishing intensity in different systems. However, objective values may not be met in every system and every year. It is unclear whether objectives maximize sustained yield.		
C	Status of component populations			
	Guidepost			The **majority** of component populations in the SMU are within the range of expected variability
	Met?			Pink – No Chum – No Coho – No
	Justification	While the majority of the component populations are within the range under the expected variability under the aggregate stock assessment approach, it cannot be concluded that target reference points provide a precautionary standard sufficient to meet the 100 scoring guidepost without explicit consideration of stock and system-specific escapement goals derived independently for each system. The management system has developed a methodology for identifying precautionary target reference points at a population scale for the UoA and it is expected that the applicability and utility of these reference points will be further evaluated in coming years.		
References		See Section 3.3.4 Management - Assessment Methods		
Stock Status relative to Reference Points				
See sections 3.3.1 Pink Salmon, 3.3.2 Chum Salmon, and 3.3.3 Coho Salmon for specific reference points				
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – ~~70~~ 80 Chum – ~~70~~ 80 Coho – ~~70~~ 80
CONDITION NUMBER (if relevant): ~~**Condition 1. Demonstrate that pink, chum and coho salmon escapements are at or fluctuating around target reference points established for each stream system.**~~				

Evaluation Table for PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
A	HCRs design and application			
	Guidep	**Generally understood** HCRs	**Well defined** HCRs are in	The HCRs are expected to

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
	ost	are in place or available which are expected to reduce the exploitation rate as the SMU LRP is approached.	place that ensure that the exploitation rate is reduced as the LRP is approached, are expected to keep the SMU fluctuating around a target level consistent with MSY.	keep the SMU fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – ~~No~~ Yes Chum – ~~No~~ Yes Coho – ~~No~~ Yes	Pink – No Chum – No Coho – No
	Justification	SG60 – Generally understood control rules include season dates, establishing passing days, and time/area closures based on real time escapement monitoring data in conjunction with other indicators of run strength and timing based on harvest and biological composition of the harvest. Recent fishery actions are detailed in Section 3.3.4. Operation of the fishing gear is modified in response to whether escapement goals are being met. Harvest control rules are specifically defined in licenses issued for commercial fishery operation and in-season regulation changes adopted by an Anadromous Fish Commission as appropriate at the recommendation of scientific and fishery management authorities. In-season management has the effect of reducing exploitation rates at low abundance. SG80 – ~~The SG80 is not met because it is not clear that escapement levels consistent with MSY are consistently met for stocks in some rivers and years. In addition, Pink salmon do not meet the SG80 standard because escapement goals do not distinguish odd and even years.~~ The SG80 is met because harvest control rules are in place that ensure the exploitation rate is reduced during years of low abundance. As a result, the SMU is generally fluctuating around escapement levels consistent with MSY (Bugaev et al. 2019a, 2018b). SG100 – ~~Not scored.~~ The SG100 standard is not met because escapement objectives are not always met for stocks in some rivers and years.		
b	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide range** of uncertainties including the ecological role of the SMU, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Pink – ~~No~~ Yes Chum – ~~No~~ Yes Coho – ~~No~~ Yes	Pink – No Chum – No Coho – No
	Justification	~~SG80 – The SG80 standard is not met because it is unclear whether harvest control rules are sufficiently robust to maintain appropriate levels of escapement in the event of a prolonged period of reduced ocean productivity. HCR's appear to be generally effective in regulating exploitation rates during the current period of high salmon productivity in West Kamchatka corresponding to a period of favorable marine conditions. High productivity makes these stocks extremely resilient and capable of sustaining high harvests and harvest rates. Production remains high even in the face of periodic low escapements that sometimes occur among exploited salmon populations as a result of normal annual variability in returns and inexact forecast and assessment methods. However, high harvests create an expectation for continuing high harvest and a fishery infrastructure~~		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		~~consistent with supporting demands.~~ ~~Salmon productivity has been observed to increase and decrease in long term cycles related to periodic shifts in marine productivity patterns. These shifts can pose significant challenges to harvest control rules in the implementation of timely restrictions of fisheries consistent with reduced stock productivity. The risk is significant overfishing relative to yield potential.~~ ~~This concern is compounded by uncertainty in stock assessments associated with recent reductions in aerial survey efforts. Reduced certainty in stock assessments will make it difficult to recognize reduced returns in-season and to implement timely fishery restrictions necessary to protect spawning escapement. Reduced certainty in stock assessments may also make it difficult to recognize extended productivity downturns which warrant more conservative preseason measures.~~ ~~These concerns are acknowledged by the management system. Uncertainties in population-specific escapement goals are recognized with the development of precautionary escapement reference points but these reference points have not yet been fully incorporated into annual management.~~ SG80 – The main uncertainty affecting HCRs is annual variability in run strength and run timing. HCR's appear to be generally effective in regulating exploitation rates under conditions of normal annual variability during the current period of high salmon productivity in West Kamchatka in a period of favorable marine conditions. High productivity makes these stocks extremely resilient and capable of sustaining high harvests and harvest rates. Production remains high even in the face of periodic low escapements that sometimes occur among exploited salmon populations as a result of normal annual variability in returns and inexact forecast and assessment methods. SG100 - The SG100 standard is not met because evidence will be needed to demonstrate that harvest control rules are sufficiently robust to maintain appropriate levels of escapement in the event of a prolonged period of reduced ocean productivity. High harvests create an expectation for continuing high harvest and a fishery infrastructure consistent with supporting demands. Salmon productivity has been observed to increase and decrease in long term cycles related to periodic shifts in marine productivity patterns. These shifts can pose significant challenges to harvest control rules in the implementation of timely restrictions of fisheries consistent with reduced stock productivity. The risk is significant overfishing relative to yield potential.		
c	**HCRs evaluation**			
	Guidepost	There is **some evidence** that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence** indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – Yes Chum – Yes Coho – Yes	Pink – No Chum – No Coho – No
	Justification	SG60 - see SG80 SG80 – Significant escapements of target stocks are consistently achieved and continuing high levels of salmon production provide evidence that harvest control rules are effective in producing appropriate exploitation rates. The fishery is managed on a daily basis using real time stock assessment information to regulate harvest consistent with escapement targets. Fisheries are restricted as appropriate based on actual run size and escapement.		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		For instance, the harvest strategy for summer chum in Opala River was revised to allow two passing days after every two fishing days to protect escapement for below average returns in 2013-2014 and harvesting was suspended in 2015 for the same reason during the period of spawning run of autumn chum (Shevlyakov et al. 2016). SG100 - It remains to be seen whether harvest control rules will be adequate to control exploitation during poor runs or extended periods of reduced salmon productivity. Tools for implementing harvest control rules for Coho do not appear to have been sufficiently effective in controlling exploitation to achieve escapement objectives of that species in systems outside the Kol River although Coho assessment challenges and reduced survey intensity make it difficult to make a definitive assessment of Coho status in some systems.		
d	Maintenance of wild population components			
	Guidepost	It is **likely** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).	It is **highly likely**, that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).	There is a **high degree of certainty** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – Yes Chum – Yes Coho – Yes	Pink – No Chum – No Coho – No
	Justification	SG60 – See SG80 SG80 – Diversity in salmon is represented among populations inhabiting different rivers within a species management unit and substocks returning to different areas within each river, often with different run timing (early vs. late for instance). Current harvest control rules maintain this diversity by managing to protect escapements in all rivers and across the duration of the run. Stock assessment data indicates this system is generally effective. SG100 – The SG 100 is not met because specific objectives for component populations and substocks are not explicitly incorporated in management.		
References		See Section 3.3.4 Management		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – ~~70~~ 80 Chum – ~~70~~ 80 Coho – ~~70~~ 80
CONDITION NUMBER (if relevant): ~~**Condition 2.**~~ ~~**Demonstrate that harvest control rules are likely to be robust to the main uncertainties regarding future marine productivity regimes for Pink, Chum and Coho Salmon of the unit of certification. Demonstrate that well defined HCRs are in place that ensure that the exploitation rate is reduced as the LRP is approached, and are expected to keep the SMU fluctuating around a target level consistent with MSY for component populations in different rivers and stocks (e.g., distinguish even and odd year runs for pink salmon).**~~				

Evaluation Table for PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
	Guidepost		The assessment **is appropriate** for the SMU and for the harvest control rule.	The assessment **takes into account** the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Pink – Yes Chum – Yes Coho – Yes	Pink – No Chum – No Coho – No
	Justification	SG 80 - The assessment includes in-season estimation of harvest, catch per effort, biological characteristics, timing and distribution of harvest and returns, and spawning escapement. This in-season information is used in real time to guide harvest control rules designed to optimize harvest and ensure escapement sufficient to sustain future production. Spawning escapement is estimated for representative samples of stock management units for each species. SG100 – Not all major features of stock structure are fully addressed by the stock assessment. In many cases, assessments and management actions are based on aggregate rather than component stock considerations. For instance, production curves used to identify optimum escapement levels are historically based on data aggregated over multiple component stocks for a species.		
b	Assessment approach			
	Guidepost	The assessment estimates stock status relative to generic reference points appropriate to salmon.	The assessment estimates stock status relative to reference points that are appropriate to the SMU and can be estimated.	The assessment estimates with a high level of confidence both stock status and reference points that are appropriate to the SMU and its wild component populations.
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – ~~No~~ Yes Chum – ~~No~~ Yes Coho – ~~No~~ Yes	Pink – No Chum – No Coho – No
	Justification	SG 60 - Stock status is estimated by species, river system, and sometimes major substock. These escapement estimates are evaluated relative to target spawner numbers for each system. Spawning escapement goals are historically established based on production functions for the aggregate return of western Kamchatka salmon by species apportioned by the relative size of the respective populations. The management system is exploring the development of goals based on population-specific analyses. ~~SG80 - The SG80 standard is not met because of uncertainty in the accuracy and precision of future stock assessments due to a continuing reduction in aerial spawning ground survey effort. Current assessments also provide low resolution on major stock subcomponents and limited precision due to a reliance on peak escapement counts in selected index areas.~~ ~~Standardized aerial surveys have been much reduced over the years due to limitations in resources and the current survey intensity may not be adequate to avoid significant imprecision or bias in escapement estimates during any given year due to abnormal run timing or fish distribution. Estimates likely include sufficient precision to distinguish large and small runs but lack the resolution to avoid estimation bias due to abnormal run timing or unrepresentative fish distribution. Assessments may not be adequate for timely recognition of significant downturns in production cycle should they occur.~~ SG80 - The SG80 standard is met based on information on stock status and reference		

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
		points provided by KamchatNIRO (Bugaev et al. 2019a, 2019b). Recent stock assessment efforts have been expanded due to support and funding provided by the fishing companies. This follows a period of reduce stock assessment as government funding was curtailed. SG100 – This standard is not met because status and reference points of some wild component populations are inferred from index or aggregate stock information. Current assessments provide low resolution on major stock subcomponents and limited precision due to a reliance on peak escapement counts in selected index areas.		
c	Uncertainty in the assessment			
	Guidepost	The assessment **identifies major sources** of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – Yes Chum – Yes Coho – Yes	Pink – No Chum – No Coho – No
	Justification	SG60 - The stock assessment has identified major sources of uncertainty including normal environmentally-driven variability in productivity, normal annual variability in run timing and distribution, and heterogeneity in productivity of major stock subcomponents. SG80 – Major uncertainties are taken into account in management. Harvest is controlled in-season based on real-time data on spawning escapement in aerial spawning ground surveys as well as numbers and characteristics of fish entering the fishery. In-season assessments allow fisheries to be regulated based on normal annual variability in productivity and run timing. Assessments incorporate spatial patterns which address heterogeneity in major stock subcomponents. The management system is also exploring the development of goals based on population-specific stock-recruitment analyses. These goals include explicit precautionary safety factors based on statistical analysis uncertainty in population-specific stock-recruitment relationships. SG100 - Stock status is not evaluated relative to reference points in a probabilistic way. Uncertainty in escapement estimates has not been quantified.		
d	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Pink – No Chum – No Coho – No
	Justification	A rigorous exploration of alternative hypotheses and approaches has not been reported.		
e	Peer review of assessment			
	Guidepost		The assessment of SMU status, including the choice of indicator populations and	The assessment, including design for using indicator populations and methods

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
			methods for evaluating wild salmon in enhanced fisheries is subject to peer review.	for evaluating wild salmon in enhanced fisheries, has been **internally and externally** peer reviewed.
	Met?		Pink – Yes Chum – Yes Coho – Yes	Pink – No Chum – No Coho – No
	Justification	SG80 - The stock assessment is subject to extensive peer review within the management system. KamchatNIRO scientists regularly review and improve assessment methodologies and results which are subject to additional review by the regional scientific institute (VNiro). In-season assessment information receives extensive review as part of the annual management process overseen by the Anadromous Fish Commission. SG100 - External peer review is limited.		
f	Representativeness of indicator populations			
	Guidepost	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some scientific basis** for the indicators selection.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some evidence of coherence** between the status of the indicator streams and the status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity (i.e., those with a higher conservation risk) to match those of the representative SMU where applicable.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, the status of the indicator streams are **well correlated** with other populations they represent within the management unit, including stocks with lower productivity (i.e., those with a higher conservation risk).
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – ~~No~~ Yes Chum – ~~No~~ Yes Coho – ~~No~~ Yes	Pink – No Chum – No Coho – No
	Justification	SG60 – The stock assessment historically surveyed representative areas of most river systems for each salmon species. Index reaches were selected based on their representative nature based on analysis of a fuller complement of historical survey areas. ~~SG80 – The SG 80 guidepost is not met due to the introduction of substantial uncertainty in interpretation of index areas introduced by recent reductions in aerial survey efforts. Stock assessment has become increasingly reliant on indicator streams with the reduction in sampling rate but changing distribution pattern over time at different scales of abundance can confound interpretation of index samples. Reliance on index areas may not provide representative estimates for a full spectrum of strong and weak stock subcomponents within a system. Peak spawner counts from the most productive habitats may not be representative of the total stock under conditions of low productivity or declining returns. Further, escapement goals are generally based on production functions for aggregate stock and river populations of a species. Curves and goals thus represent an average stock and may be disproportionately driven by large strong stocks in the aggregate.~~		

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
		SG80 – This guidepost is met based on recent information provided by KamchatNIRO (Bugaev et al. 2019b) on the coherence between the status of stocks in indicator streams and other populations they represent within the management unit as inferred from historical data. Conclusions are bolstered by recent increases in stock assessment funded by the fishing companies. SG100 – This guidepost is not met due to limited stock assessment in recent years of nonindex streams as a result of previous reductions in aerial survey efforts. Stock assessment has become increasingly reliant on indicator streams with the reduction in sampling rate but changing distribution pattern over time at different scales of abundance can confound interpretation of index samples. Reliance on index areas may not provide representative estimates for a full spectrum of strong and weak stock subcomponents within a system. Peak spawner counts from the most productive habitats may not be representative of the total stock under conditions of low productivity or declining returns. Further, escapement goals are generally based on production functions for aggregate stock and river populations of a species. Curves and goals thus represent an average stock and may be disproportionately driven by large strong stocks in the aggregate.		
g	Definition of Stock Management Units (SMUs)			
	Guidepost	The majority of SMUs are defined with a clear rationale for conservation, fishery management and stock assessment requirements.	The SMUs are **well-defined** and include definitions of the major populations with a clear rationale for conservation, fishery management and stock assessment requirements.	There is an **unambiguous description** of each SMU that may include the geographic location, run timing, migration patterns, and/or genetics of component populations with a clear rationale for conservation, fishery management and stock assessment requirements.
	Met?	Pink – Yes Chum – Yes Coho – Yes	Pink – Yes Chum – Yes Coho – Yes	Pink – No Chum – No Coho – No
	Justification	SG60 – See SG 80 SG80 - Stocks of west Kamchatka salmon are comprised of subcomponents including substocks (e. g., early and late runs), demographically-independent populations (e.g. species returning to home rivers or lakes), and with a spectrum of natural diversity expressed in run timing and spatial distribution. Stocks including major populations are well defined based on river system, run timing, and spawning distribution. Major substocks include five groups of Pink Salmon; summer and fall runs of Chum Salmon, and early and late coho runs. Substocks can be distinguished over the course of the fishing season based on run timing, size and sex ratio. Assessments are made of the major component stocks and management and include considerations for each. SG100 - Descriptions and rationale for stock management are not unambiguous. Harvest and escapement of stock components are understood based on run timing and spatial distribution, respectively. Information is generally sufficient to estimate the significance of fishery harvest at the species and river system level but not at the substock level within a river system. Substock-specific estimates of harvest and escapement are limited.		
References		See section 3.3.4 for description of stock assessment methodology. See chapters 3.3.1		

PI 1.2.4	There is an adequate assessment of the stock status of the SMU
	(Pink Salmon), 3.3.2 (Chum Salmon), and 3.3.3 (Coho Salmon) for species specifics.
OVERALL PERFORMANCE INDICATOR SCORE:	Pink – ~~70~~ 80 Chum – ~~70~~ 80 Coho – ~~70~~ 80
CONDITION NUMBER (if relevant): ~~**Condition 3.**~~ ~~**Estimate stock status of Pink, Chum and Coho Salmon of the unit of certification relative to reference points that are appropriate to the SMU and demonstrate there is some evidence of coherence between the status of the indicator streams and the status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity to match those of the representative SMU where applicable.**~~	

Evaluation Table for PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guidepost	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and associated enhancement activities and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Yes	~~No~~ Yes	No
	Justification	SG60 - A monitoring, control and surveillance system has been implemented in the fishery under assessment. All the enforcement agencies and stakeholders report reduction of level of illegal fishing in all the areas of Kamchatka during the last decade in comparison with extremely high level of illegal fishing during 1990s-early 2000s. Reforms in the management system have effectively addressed high historical levels of under-reported on misreported catches by commercial fishing companies. Well-run and profitable fishing companies, including Vitiaz-Avto and Delta, reportedly demonstrate a very high rate of compliance and also support enforcement efforts throughout the fishery. Valuable long term leases provide a large incentive for sustainable management and for compliance. SG80 - However, significant enforcement problems still exist in some systems due to poaching by local residents and abuse of the indigenous fishery permitting system. Among the rivers included in this assessment, information available from stackeholders, evidences practical absence of poaching in the Opala, Golygina and Koshegochek rivers, which are strongly protected by the companies under certification and by other fisheries operating in these areas in combination with absence of roads.		

<table>
<tr><td colspan="2">PI 3.2.3</td><td colspan="4">Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.</td></tr>
<tr><td></td><td></td><td colspan="4">At the same time, there is information about poaching in the Kol river, and especially in Vorovskaya River, which is easily accessible from villages Sobolevo and Ustievoe (total population 2005 inchabitants). It is important also that these rivers are connected to Petropavlovsk-Kamchatsky by so-called technological road constructed to build up and maintain gase pipeline. Quality of this road is not good, but it is nevetherless actively used for transportation of illegal roe from this area to Petropovlovsk-Kamchatsky (http://www.chaspik41.ru/wp-content/uploads/2015/01/1-67.pdf). Other sources also confirm high level of poaching in Vorovskaya River (http://regnum.ru/news/society/1402567.html; https://news.mail.ru/incident/4284561/; http://pressa41.ru/crime/putina3/; http://www.kamchatinfo.com/news/ecology/detail/3067/; http://www.kamchatinfo.com/news/ecology/detail/3272/; http://www.regnum.ru/news/1725345.html.

~~Effective enforcement is only possible with considerable funding and cooperation among companies fishing companies depending on local fish resources. The chronic nature of this problem indicates that the monitoring, control and surveillance system has not demonstrated a complete ability to enforce relevant rules throughout the system. Enforcement cannot be considered comprehensive because the notable level of illegal fishing is apparently still significant.~~

An assessment of illegal harvest has been completed as a condition of the reassessment. This assessment found that some poaching continues to occur among local residents but that the current monitoring, control and surveillance system has been implemented and demonstrated an ability to enforce relevant management measures, strategies and/or rules in order to provide significant control of illegal harvest.

SG100. This standard is not met because the monitoring, control and surveillance system has not completely eliminated chronic background levels of illegal harvest.</td></tr>
<tr><td>b</td><td colspan="5">Sanctions</td></tr>
<tr><td></td><td>Guidepost</td><td>Sanctions to deal with non-compliance exist and there is some evidence that they are applied.</td><td>Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.</td><td colspan="2">Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.</td></tr>
<tr><td></td><td>Met?</td><td>Yes</td><td>~~No~~ Yes</td><td colspan="2">No</td></tr>
<tr><td></td><td>Justification</td><td colspan="4">SG60 - Sanctions to deal with noncompliance exist, are consistently applied and thought to provide effective deterrence for well-run fishing companies including Vitiaz-Avto and Delta. For example, loss of opportunity to fish when convicted of serious offenses provides a major incentive for fishery operators to stay within the rules.

~~SG80 - Questions remain regarding the consistency of application and the effectiveness of deterrence for illegal harvest activities in freshwater by non-commercial fishers. Sanctions do not appear to provide effective deterrence to components of illegal fishing which remains significant in accessible systems including the Vorovskaya and Kol rivers.~~

SG80 - An assessment of illegal harvest has been completed as a condition of the reassessment and documentation has been provided on significant enforcement efforts by the fishing companies. Sanctions to deal with non-compliance exist, are consistently applied and provide effective deterrence.</td></tr>
<tr><td>c</td><td colspan="5">Compliance</td></tr>
</table>

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.		
	Guidepost	Fishers and hatchery operators are **generally thought** to comply with the management system for the fishery and associated enhancement activities under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery and associated enhancement activities.	There is a **high degree of confidence** that fishers and hatchery operators comply with the management system under assessment, including, providing information of importance to the effective management of the fishery and associated enhancement activities.
	Met?	Yes	Yes	Yes
	Justification	SG60 - See SG80 SG80 – See SG100 SG100 - There is a high degree of confidence that commercial fishing companies included in this assessment comply with the management system under assessment, including providing information of importance to the effective management of the fishery and its enhancement activities. No evidence of systematic noncompliance by commercial fishing companies included in this assessment has come to the attention of the assessment team regarding monitoring, control, and surveillance activities in the freshwater portion of this fishery. Authorities and stakeholders confirm compliance of the companies participating in this certification. The fishery closely cooperates with SVTU to protect salmon populations from illegal activities and funds enforcement hiring people to help state fish inspection. Moreover, incentives for illegal fishing for companies considerably reduced after introduction of Olympic system of management in 2010.		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Yes	
	Justification	SG80 - No evidence of systematic noncompliance has come to the attention of the assessment team regarding monitoring, control, and surveillance activities in the commercial sector of this fishery. Authorities and stakeholders confirm compliance of the companies participating in this certification.		
References		See Section 3.5		
OVERALL PERFORMANCE INDICATOR SCORE:				~~**70**~~ **80**
CONDITION NUMBER (if relevant): ~~**Condition 4.**~~ ~~**Demonstrate that a monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules, and that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.**~~				

Appendix II – Fishery Information

Fishery Area

The fishery occurs in the Western part of Kamchatka Peninsula on the Sea of Okhotsk coast and the lower reaches of six coastal rivers, the Ozernaya, Koshegochek, Golygina, Opala, Kol, Vorovskaya (Figure 1). A scope extension in 2019 added the Pymta River. No hatchery enhancement of salmon occurs in these rivers.

Gear

The fishery is prosecuted with fixed trap nets in nearshore marine waters, beach seines in the lower reaches of the river. Gill nets are not included in the units of assessment.

Seasons

Commercial salmon fishing seasons generally run from July until September. Fishing in the rivers generally begins around July 5-9. Fishing in sea nets generally begins around July 15-20. Salmon species return and are harvested in broadly overlapping distributions throughout this period. Fishing generally continues as long as fish abundance and weather permit. Sea nets are typically removed in September as the bulk of the salmon run is complete and autumn storms begin. Fishing may continue in river sites when fish are available.

Organization

Fishing parcels consisting of trap or seine sites are leased to fishing companies by the government under a long-term lease arrangement. Fishing parcels were distributed for period 2008-2027. Only commercial fishing occurs in sea fishing parcels. River parcels may be allocated for commercial fishing, sport fishing or hatchery purposes. Vityaz-Avto leases 18 fishing parcels, 14 of which are in the sea, and 4 of which are in the Ozernaya, Koshegochek, Golygina and Kol rivers. Delta leases 9 fishing parcels, 7 of which are in the sea, and 2 of which are in the Ozernaya and Opala rivers. The companies also participate in marine fisheries for white fish.

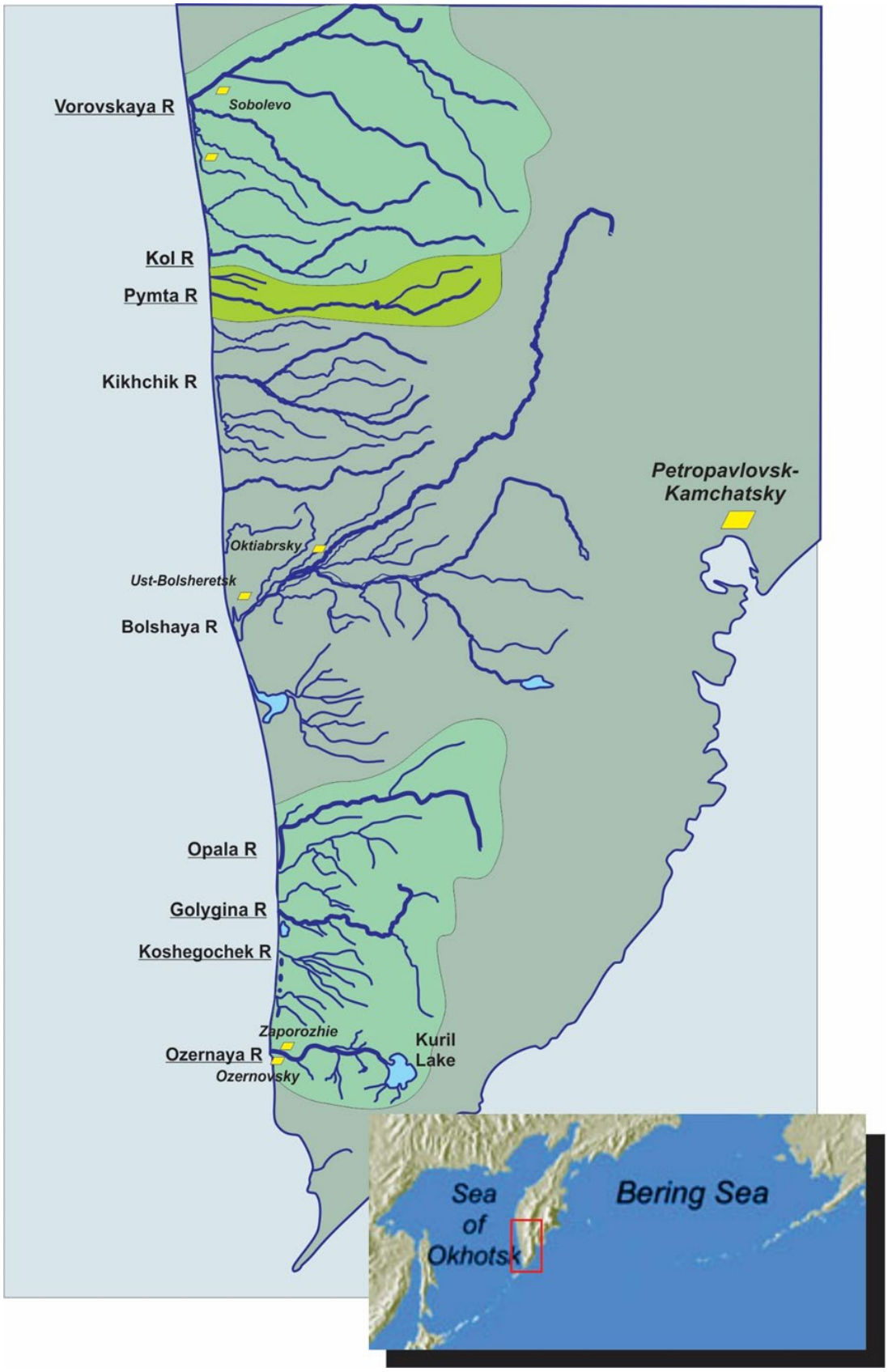

Figure 1. Western Kamchatka region of the fishery assessment. Names of rivers included in this assessment are underlined (noting Pymta River is still in assessment as a scope extension).

Target Stock

Pink Salmon

This species is found throughout the north Pacific, including streams of western Kamchatka south of 54° Northern Latitude. The largest populations in western Kamchatka occur in the Bolshaya, Vorovskaya, and Kikhchik rivers. Unit of certification rivers contribute approximately 30% of the regional return on average. The distribution of Pink Salmon in western Kamchatka Rivers changed from 1998 to 2006, generally shifting northward.

Pink Salmon return to western Kamchatka primarily in July and August, and spawning occurs in August and September. Spawning typically occurs in the lower and middle reaches of streams, rivers and sometimes the intertidal zone at the mouths of streams. After spawning all Pink Salmon die. In Western Kamchatka, Pink Salmon typically average 1.2 - 1.5 kg and 50 cm. In Western Kamchatka, a massive run of Pink Salmon in 1983 resulted in excessive spawning escapement that subsequently depressed odd-year runs (KamchatNIRO 2013). The even-year return now dominates.

Run patterns in larger river systems suggest that the aggregate return includes a number of substocks. KamchatNIRO reports that up to five overlapping runs can be distinguished in large systems like the Bolshaya River based on run timing, size and sex ratio. Smaller systems may support fewer types. Genetic analyses of Pink Salmon stock structure have generally identified broad geographical patterns but little or no difference among local populations in any given region.

This species is currently at historical levels of high production throughout the western Pacific including the west Kamchatka rivers. High levels of production are demonstrated by high levels of commercial harvest during even years since the late 1990s. This follows an extended period of low returns from the 1950s through the 1970s due to impact of the Japanese high seas drift net fishery and unfavorable ocean environmental conditions. Even-year numbers have decreased in the 2012-2014 cycle for unknown reasons but rebounded in 2016.

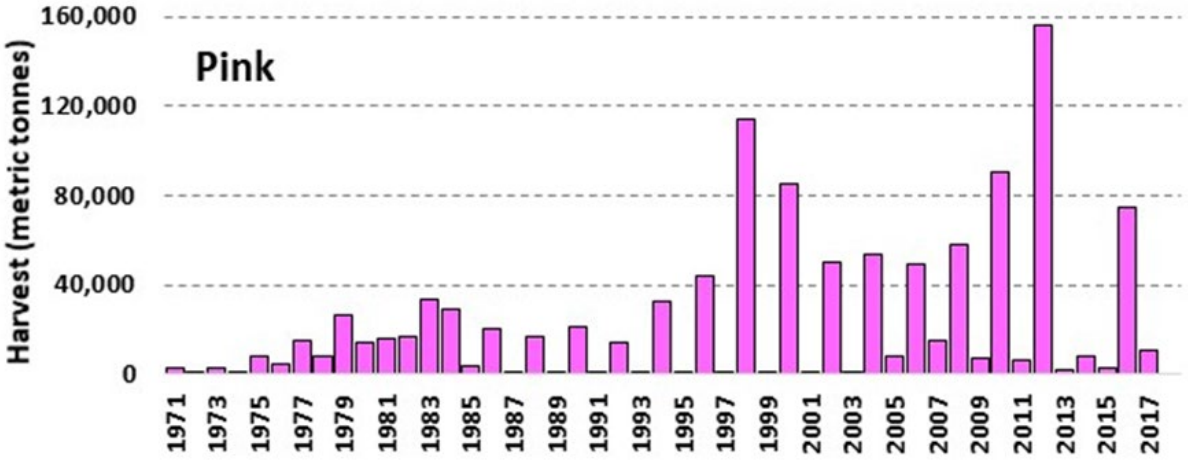

Figure 2. Commercial harvest of Pink Salmon in West Kamchatka (North Pacific Anadromous Fish Commission data).

Spawner-recruitment analysis of the aggregate western Kamchatka return has estimated that maximum sustained yield (MSY) is produced by spawning escapements of approximately 40-50 million Pink Salmon. Fisheries on the west coast of Kamchatka are managed to achieve region-wide escapement goals of 40-50 million Pink Salmon during even years. Pink Salmon escapements in western Kamchatka are estimated to achieve this goal on average for 2004-2012. Specific goals are not identified for the subdominant odd-year run but fishing effort is substantially reduced in those years.

Chum Salmon

Chum Salmon are abundant in western Kamchatka streams and generally return to western Kamchatka from late June through October. Numbers peak in late August and early September. Chum Salmon typically reach their spawning grounds in August and September. Spawning typically occurs in the lower and middle reaches of streams, rivers and sometimes the intertidal zone at the mouths of streams. Spawning areas often occur in areas of upwelling springs.

Western Kamchatka Chum Salmon typically average about 3 to 4 kg in length and 60 to 70 cm in length. Age of maturity is 2 to 6 years (primarily at 4 years of age). Kamchatka Chum include spring, summer and fall runs, returning in June, July-August, and October-November, respectively. Different runs typically spawn in different portions of a basin with earlier fish generally traveling farther upstream. Genetic analyses have generally identified system and run-specific differences among Chum populations in others regions. All three stocks are present in the area of this assessment. The early run is significant in the Opala River.

Chum Salmon returns and commercial harvest rates have steadily increased in western Kamchatka from very low levels observed in the 1970s. Since 2010, runs have averaged about 5 million Chum per year, exploitation rates have averaged 90% for an annual average harvest of 17,000 mt. The assessment team suspects that increases in run size and harvest since 2008 result from more accurate commercial catch reporting following the implementation of the "Olympic" management system. Historical abundance of Chum Salmon has varied widely as evidenced by harvest numbers. Mortality of juvenile Chum Salmon in the Japanese drift net fishery in the open ocean explains much of the variation.

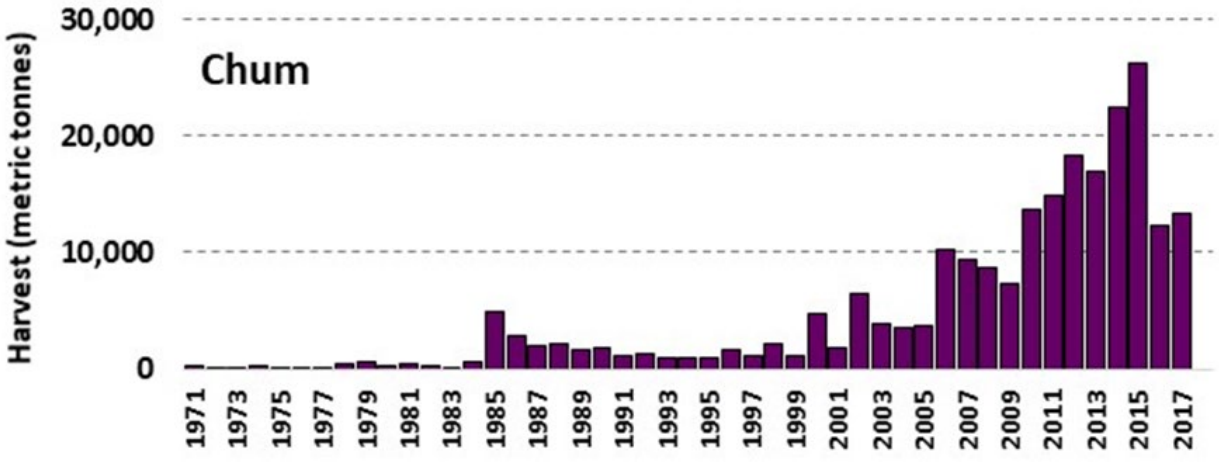

Figure 3. Commercial harvest of Chum Salmon in West Kamchatka (North Pacific Anadromous Fish Commission data).

Spawning escapement of Chum Salmon is estimated based on expansions of aerial counts in a series of index areas throughout western Kamchatka since 1957. Spawning escapements have grown concurrent with increasing run sizes, averaging 410,000 from 1970-1985, 640,000 from 1986-2000, and 940,000 from 2001-2013.

Since the mid-1970s, the intensity of fishing has been steadily increasing, reaching a maximum in the last 11 years. Chum are currently the primary focus of the commercial fishery in odd-numbered years when Pink Salmon are less abundant. Chum Salmon escapement objectives may limit the catch of Pink Salmon in large Pink return years.

Escapement objectives are identified for Chum Salmon based on historical production patterns although the spawner-recruit relationship is not as pronounced for Chum Salmon as for other species in western Kamchatka. Maximum yield is estimated to be produced by an aggregate spawning escapement of 800,000 Chum. Fisheries on the west coast of Kamchatka are managed to achieve region-wide escapement goals. Estimated escapements have averaged over 500,000 Chum Salmon per year in Western Kamchatka rivers from 2009-2013. Fisheries are regulated to ensure that significant escapements are distributed among individual rivers but each river is not managed to achieve a river-specific goal as long as the aggregate goal is being achieved.

Coho Salmon

Distribution in Kamchatka is generally limited to the southern portion of the Peninsula where they may be found in most mid-large and large bodies of water. Significant populations in southwest Kamchatka occur in the Bolshaya River and in the rivers of the Central-West region including the Vorovskaya, Krutogorova, Pymta, Kol, and Kikhchik.

Coho return over a protracted period from August to December with spawning as late as February. Spawning typically occurs in a wide range of rivers and streams, including the uppermost accessible tributaries. Low water temperatures and the presence of shallow gravel areas allow Coho Salmon to spawn along nearly the entire lengths of the rivers. Rivers with significant groundwater upwelling areas typically include two distinct Coho Salmon runs - summer and autumn (early and late). The early run includes fish returning in August and September. The late run includes fish returning beginning in late September.

Western Kamchatka Coho average 3.0 - 3.5 kg in size but may reach 5 to 7 kg. Adults typically return to spawn at 3 to 4 years of age after 1 year at sea. Juvenile Coho may rear in streams for one to three years before undergoing a physiological transformation to smolts and migrating to the sea. As with other species that have a protracted freshwater rearing period, Coho Salmon are characterized by a complex age structure that includes up to 8 different age-at-maturity groups.

KamchatNIRO reports that reliable fishing statistics are available since 1970 but additional data is available as far back as 1934. Numbers can vary substantially from year to year with no clear trend since 1970. Coho Salmon landings increased over the past few years, but this increase may have resulted in a reduction of previously-unreported catch due to changes of management system.

Spawning escapement of Coho Salmon is estimated based on expansions of aerial counts in a series of index areas. Estimates are made for only the early portion of the run due to the

protracted run timing of Coho and difficulty of conducting surveys later in the year. As a result, KamchatNIRO estimates that counts include only 50 to 70% of the total number.

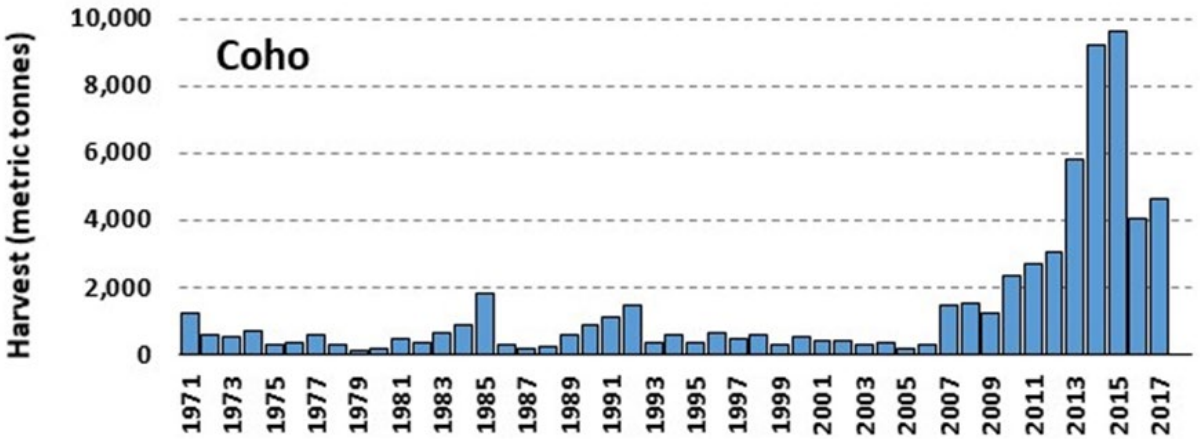

Figure 4. Commercial harvest of Coho Salmon in West Kamchatka (North Pacific Anadromous Fish Commission data).

Coho Salmon returns were heavily impacted by unregulated drift gillnet fishing in the ocean from 1950 until the 1970s. Run sizes improved from 1979-1990 with the restriction and closure of the drift fishery. Run sizes and escapements of Coho Salmon have declined substantially from 1990-2006. Returns have improved from 2007. KamchatNIRO attributed the recent improvement in returns, despite low estimates of spawning escapement, to favorable ocean conditions.

Spawner-recruitment analysis of the aggregate western Kamchatka return has estimated that maximum sustained yield (MSY) is produced by spawning escapements of approximately 300-350 thousand Coho Salmon. Total runs of Coho Salmon have been increasing in recent years, although data reported to the NPAFC suggests that escapement targets have not been reached since 2009. However, most Coho Salmon spawn late in the season after aerial surveys have been conducted so escapements are likely under-estimated.

Sockeye Salmon

The Ozernaya system supports one of only two large Sockeye populations in Russia (the other being the Kamchatka River in eastern Kamchatka). The peak of the run typically occurs in late July and early August. Adults generally return to spawn at 5 or 6 years of age after 2 or 3 years at sea. Spawning occurs predominately in the littoral zone of Kuril Lake at depths of 3 m or less (71%) and also in the upstream part of Ozernaya River (26%) and in lake tributaries (3%). Lake tributary spawners comprise the early portion of the run returning primarily in June and early July.

Run size and escapement of Ozernaya Sockeye has been collected since 1940 when the Pacific Institute for Fisheries and Oceanography established a research station and fish counting weir downstream from Kuril Lake. Abundance of Ozernaya Sockeye is currently fluctuating about record high levels as a result of favorable ocean conditions and a reduction in unregulated Japanese driftnet fishing on the high seas in the early 1990s. The drift net fishery in the Russian EEZ was closed after 2016. Annual run size to the Ozernaya River and local fisheries has

averaged over 10 million Sockeye per year over the last 10 years (Figure 6). Record high returns have occurred during this period.

Escapements are managed to produce maximum sustained yield based on production curves fit to spawner-recruit data. Current escapement goals are 1 to 2.3 million Sockeye as counted at the weir (1.5-1.9 million optimum).

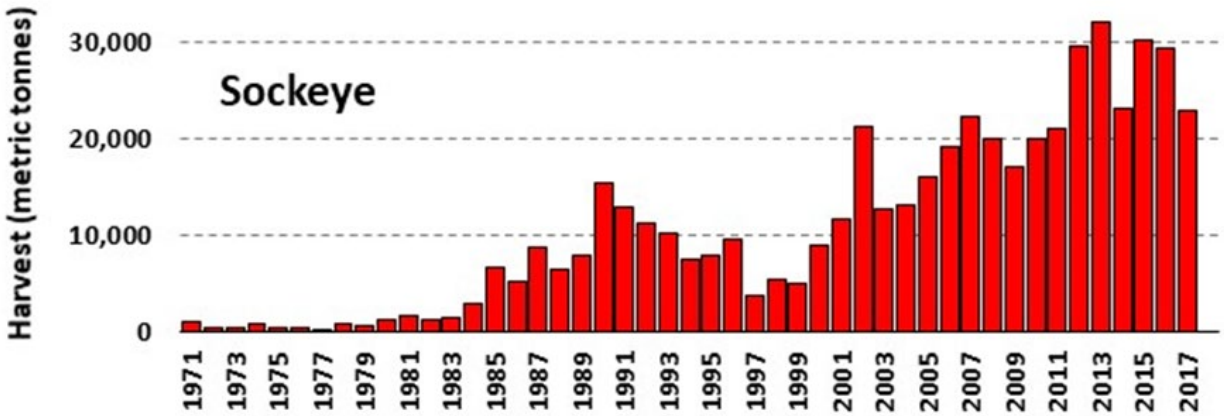

Figure 5. Commercial harvest of Sockeye Salmon in West Kamchatka (North Pacific Anadromous Fish Commission data).

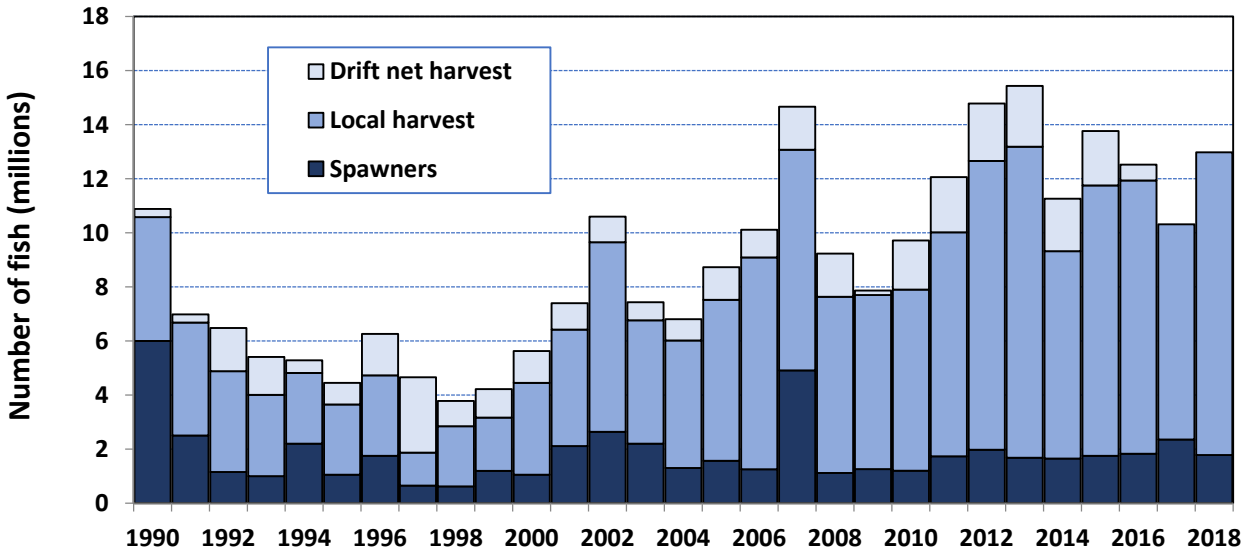

Figure 6. Abundance, harvest and escapement of Ozernaya Sockeye, 1990-2017.

Table 9. Abundance of Ozernaya Sockeye, 1990-2018 (unpublished KamchatNIRO data).

	Abundance (thousands)			Harvest (thousands)			Exploitation rates		
Year	Ocean	Coast return	Spawners	Drift net	Coast	Total	Drift net	Local	Total
1990	10,883	10,583	6,000	300	4,583	4,883	3%	43%	45%
1991	6,979	6,679	2,500	300	4,179	4,479	4%	63%	64%
1992	6,477	4,883	1,150	1,594	3,733	5,327	25%	76%	82%
1993	5,408	4,005	1,000	1,403	3,005	4,408	26%	75%	82%
1994	5,282	4,818	2,200	464	2,618	3,082	9%	54%	58%
1995	4,448	3,648	1,050	800	2,598	3,398	18%	71%	76%
1996	6,258	4,728	1,750	1,530	2,978	4,508	24%	63%	72%
1997	4,654	1,870	650	2,784	1,220	4,004	60%	65%	86%
1998	3,778	2,842	620	936	2,222	3,158	25%	78%	84%
1999	4,217	3,163	1,190	1,054	1,973	3,027	25%	62%	72%
2000	5,625	4,450	1,050	1,175	3,400	4,575	21%	76%	81%
2001	7,398	6,421	2,110	977	4,311	5,288	13%	67%	71%
2002	10,598	9,650	2,635	948	7,015	7,963	9%	73%	75%
2003	7,433	6,764	2,200	669	4,564	5,233	9%	61%	70%
2004	6,806	6,016	1,300	790	4,716	5,506	12%	69%	81%
2005	8,726	7,520	1,565	1,206	5,955	7,161	14%	68%	82%
2006	10,111	9,088	1,250	1,023	7,838	8,861	10%	78%	88%
2007	14,667	13,073	4,910	1,594	8,163	9,757	11%	56%	67%
2008	9,229	7,633	1,114	1,596	6,519	8,115	17%	71%	88%
2009	7,862	7,697	1,255	165	6,442	6,607	2%	82%	84%
2010	9,719	7,899	1,200	1,820	6,699	8,519	19%	69%	88%
2011	12,062	10,020	1,730	2,042	8,290	10,332	17%	69%	86%
2012	14,783	12,660	1,972	2,123	10,688	12,811	14%	72%	87%
2013	15,432	13,182	1,681	2,250	11,501	11,236	15%	75%	89%
2014	11,263	9,320	1,650	1,943	7,670	8,639	17%	68%	85%
2015	13,765	11,755	1,750	2,010	10,005	12,015	15%	73%	87%
2016	12,524	11,936	1,826	588	10,110	12,015	5%	81%	85%
2017	10,314	10,314	2,350	0	7,964	12,015	0%	77%	77%
2018	12,976	12,976	1,778	0	11,198	12,015	0%	86%	86%
Avg. (all)	*8,954*	*7,779*	*1,843*	*1,175*	*5,936*	*7,205*	*15%*	*70%*	*79%*
Avg. 10-yr	*12,070*	*10,776*	*1,719*	*1,294*	*9,057*	*10,620*	*10%*	*75%*	*85%*

Harvest

Annual salmon harvest in western Kamchatka commercial fisheries currently averages about 50,000 mt per year. Pink Salmon average about 88% of the even year harvest and 14% of the odd year harvest. Of the non-Pink Salmon harvest, Chum typically comprise about 50%, Sockeye about 37%, Coho about 10%, and Chinook about 4%. Pink Salmon are caught primarily by sea nets in even years. During odd years, Pink Salmon harvest is distributed between sea and river sites. Chum Salmon catch is distributed between sea and river sites. Sockeye are harvested primarily in sea nets where the harvest included substantial numbers of the large MSC-certified Ozernaya run which migrates south along the coast. Coho Salmon are harvested mainly in the river.

Table 10. Salmon and char harvest by fishing area of fishing companies included in Unit of Assessment (metric tonnes).

Year	Area (River & Sea Parcels)	Pink	Chum	Sockeye	Coho	Char
2010	Vorovskaya	0.0	0.0	0.0	0.0	0.0
	Kol	0.0	0.0	0.0	0.0	0.0
	Opala	2,563.8	570.7	144.3	55.0	64.7
	Golygina/Koshegochek	65.6	31.3	241.3	5.8	3.9
	Ozernaya	282.5	20.0	2,207.2	0.0	10.9
	Total	*2,911.9*	*622.0*	*2,592.8*	*60.8*	*79.4*
2011	Vorovskaya	374.2	1,078.4	95.3	105.6	79.0
	Kol	185.0	366.4	10.0	47.0	66.7
	Opala	0.0	0.0	0.0	0.0	0.0
	Golygina/Koshegochek	0.2	170.5	111.8	45.1	0.3
	Ozernaya	14.2	61.4	4,174.0	0.0	0.6
	Total	*573.6*	*1,676.7*	*4,391.2*	*197.7*	*146.5*
2012	Vorovskaya	9,247.0	843.4	21.1	86.4	38.6
	Kol	3,982.7	170.9	10.8	23.7	42.9
	Opala	6,971.0	488.7	293.4	0.0	12.4
	Golygina/Koshegochek	2,932.6	529.6	713.1	87.0	10.1
	Ozernaya	2,229.9	217.3	9,514.6	0.0	12.3
	Total	*25,363.1*	*2,249.8*	*10,553.1*	*197.1*	*116.4*
2013	Vorovskaya	15.6	234.9	10.8	21.8	36.9
	Kol	29.9	197.2	14.6	487.3	49.5
	Opala	35.0	466.7	33.1	0.0	76.8
	Golygina/Koshegochek	86.4	346.9	2,763.8	54.7	42.1
	Ozernaya	65.4	216.8	10,409.5	74.6	8.0
	Total	*232.2*	*1,462.6*	*13,231.9*	*638.4*	*213.3*
2014	Vorovskaya	113.2	507.8	31.2	4.9	86.4
	Kol	340.4	822.9	53.8	704.5	145.5
	Opala	130.2	446.2	117.0	0.0	42.9
	Golygina/Koshegochek	90.8	268.0	1,010.3	34.4	8.6
	Ozernaya	105.6	247.4	6,675.1	0.0	10.4
	Total	*780.1*	*2,292.3*	*7,887.3*	*743.9*	*293.8*

2015	Vorovskaya	45.4	631.6	28.0	300.1	49.3
	Kol	68.7	790.8	32.9	444.7	68.0
	Opala	38.5	374.0	135.1	7.2	1.2
	Golygina/Koshegochek	97.1	335.2	2,081.6	46.2	17.3
	Ozernaya	107.1	198.5	7,259.6	64.0	13.4
	Total	*356.7*	*2,330.1*	*9,537.2*	*862.4*	*149.2*
2016	Vorovskaya	3,490.8	163.0	30.5	51.3	24.9
	Kol	5,735.4	166.8	34.8	41.1	54.2
	Opala	1,040.3	263.8	301.3	5.8	0.3
	Golygina/Koshegochek	686.5	66.9	2,644.7	0.0	16.0
	Ozernaya	325.0	154.6	5,372.6	22.2	8.9
	Total	*11,278*	*815*	*8,384*	*120*	*104*
2017	Vorovskaya	73.5	62.2	6.7	85.9	0.0
	Kol	486.9	149.5	11.8	127.8	0.9
	Opala	86.9	389.9	247.3	4.0	0.0
	Golygina/Koshegochek	224.7	128.3	1,005.3	0.0	0.0
	Ozernaya	91.5	133.1	4,784.6	7.3	0.1
	Total	*963.5*	*863.0*	*6,055.6*	*224.9*	*1.0*
2018	Vorovskaya	22,316.6	333.3	8.2	190.7	4.8
	Kol	12,525.8	329.4	6.9	14.2	0.3
	Opala	5,637.6	514.0	338.9	0.0	9.7
	Golygina/Koshegochek	3,831.0	513.6	2,843.3	0.0	5.9
	Ozernaya	1,847.3	721.8	5,708.3	5.0	13.1
	Total	*46,158.3*	*2,412.1*	*8,905.5*	*209.9*	*33.8*

Management

Stock assessments for fishery management purposes include catch estimation based on daily reporting of commercial fishery landings, fishery catch per unit effort, regular subsampling of the catch for estimation of biological characteristics, and estimation of run size and spawning escapement.

Detailed records on daily harvest are kept because fishermen are paid in part based on their catch volume and companies are required to maintain detailed records for production and licensing purposes. Fish volumes are recording upon delivery to the processing plants. Biological sampling of the catch is conducted periodically throughout at fishing season in fish processing plants by government inspectors. Measurements include length, weight, sex and age.

Run size and spawning escapement data is estimated with a combination of aerial surveys, ground surveys, and remote sensing. Aerial surveys are a primary assessment tool throughout Kamchatka due to the numerous rivers and vast area involved. Current effort is allocated to high value index areas and flights are timed to allow counting of multiple species. Index areas were established by selecting the most representative areas in the comprehensive historical data set. Counts from index areas are expanded to non-index areas based on formulae established from historical sampling data.

Extensive ground counts of fish numbers are made to supplement aerial surveys. Counts are made weekly or every other week in each of the Bolshaya, Opala and Kikhchik rivers. Ground surveys also include smaller streams not included in aerial surveys. Biological samples are collected concurrently by beach seine. Fishing associations and several fishing companies currently help support the stock assessment program by providing food, accommodation and transportation.

Optimum escapement objectives are established by KamchatNIRO for each salmon species and management area based on analysis of historical production patterns. In most cases, this involves stock-recruitment analysis where comparisons of numbers of progeny vs. parents (using for instance, a Ricker model) are used to calculate spawning escapements that produce maximum levels of sustained yield. In most cases, stock-recruitment analyses where based on aggregate species run reconstructions for multiple rivers within western Kamchatka. River specific objectives were then defined by apportioning the totals based on relative population sizes in the various areas. Recent work by KamchatNiro has developed river-specific reference points based on stock-recruitment analysis.

The fishery is managed in-season with time and area openings and closures based on catch, biological characteristics of the catch, run size and escapement information. Management occurs with time and area closures. Fishery openings and closures may be made on short notice based on fish availability and progress in meeting spawning escapement objectives. A primary means of controlling harvest in freshwater is through the use of passing days where fishing is closed. The number of passing days may be reduced to avoid exceeding established escapement goals or increased to avoid falling short of achieving escapement goals. Areas and dates that sea nets can be fished are also regulated. Regulations may take the form of temporary closures where leads and traps are tied up so as to allow fish to pass or season-long closures where nets are removed.

For instance, in 2018 a total of 34 meetings of the Anadromous Fish Commission were held. In addition to Pacific salmon management, the Commission deals with management of other anadromous fish such as smelt and char. Meetings of the Commission were organized by the minister of fisheries of Kamchatka Krai Vladimir Galitsyn. Representatives of Kamchatka ministry of Fisheries, SevvostRybvod, North-Eastern administration of Federal Fishery Agency, KamchatNIRO, Federal Security Service, RosPrirodNadzor, Federal border guard service, Federal antimonopoly service, Indigenous people associations, fishing companies and fisheries associations attended the meetings. The following questions were considered: dates of beginning and terminating of fishing for particular fish species and for different geographic regions, setting up and changes of fishing regime (setting up days off and on), providing additional quota for specific regions and license holders. The detailed information about all the decisions is provided at website of Northeastern administration of the Federal Fishery Agency (svtu.ru, свту.рф).

Illegal or Unreported Harvest

Illegal or Unreported harvest is a chronic concern for salmon fisheries throughout Kamchatka. It is fundamentally a social problem resulting from economic factors and ineffective enforcement. Illegal fishing can take various forms:

- Industrial poaching: exceeding of quota by fishing companies.
- Criminal poaching: organized illegal fishing in industrial scale.
- Everyday poaching of first type: unorganized illegal fishing by the local population for sale to the market, processing factories and/or illegal packers.
- Everyday poaching of second type: unorganized illegal fishing by the local population primarily for personal use.

Since 2002 KamchatNIRO has conducted research on scale of poaching in Kamchatka. Illegal harvest during 2002-2006 was estimated to equal or exceed the legal catch depending on species. Illegal harvest was most significant in the Bolshaya River due to its accessibility by a developed road system. Poaching pressure on low-abundance species (Sockeye, Coho, Chinook) was typically much higher than on high-abundance (Pink and Chum). Illegal harvest levels were reportedly much lower in other western Kamchatka rivers than the Bolshaya River due to difficulty of access. Illegal fishing in the Opala and Ozernaya areas is reported to be negligible because of inaccessibility, local peoples are primarily employed by the fishing companies, and fishing companies are heavily involved in fishing control activities.

Estimates of illegal harvest during 2002-2006 included substantial levels of industrial poaching by licensed fishing companies as well as criminal poaching by unlicensed fishermen. During these years, commercial fishing companies operated under a quota system where allowable catch levels were assigned prior to the season based on run forecasts and an allocation formula established by the fishery management system. This system encouraged widespread under and misreporting. Much of the illegal harvest occurred in the form of misreporting of one species as another to avoid species-specific quota limits.

Illegal harvest appears to have been considerably reduced since 2002-2006 due economic improvements, changes in the management system, and an increased commitment to enforcement. Economic conditions have continued to improve over time following the upheaval of the 1990s and these improvements have provided other opportunities for employment. KamchatNIRO estimates that illegal fishing currently accounts for approximately 8-15% of the total salmon harvest in West Kamchatka.

Recent use of set gillnets has reportedly expanded in some areas of west Kamchatka, primarily from the Bolshaya River north. This fishery occurs in years of subdominant pink salmon runs when sea trap nets are not fished and some fishing companies sublease their fishing parcels to other fishermen. A portion of the associated catch may be sold to the fishing company but portions may also be diverted to the illegal, unreported markets. Neither Vitaz-Avto nor Delta engage in the sublease of their fishing parcels.

High seas drift gillnet fishery in the Russian exclusive economic zone was closed effective 1 January 2016.

Ecosystem Elements

Primary Species

For the purposes of this assessment, primary species in the catch are defined as those not included under Principle I in the Unit of Assessment but subject to management tools and

measures intended to achieve stock management objectives reflected in either target or limit reference points. MSC assessment criteria further distinguish Principle II species based on level of harvest. “Main species” constitute 5% or more of the catch by weight, or 2% or more of the catch for less resilient species. There are also provisions for identifying a “main” retained species if there is concern that the fishery is having a negative impact on the stock status or if the volume of the fishery is very large. All other species are identified as “not main.”

- Sockeye salmon are a main primary species because they regularly exceed 5% of the catch by weight in some areas, particularly in odd-numbered years of the sub-dominant Pink Salmon return. In other years, catch percentages are low because total catch of Pink Salmon in the Unit of Assessment is very large. Sockeye catch is sufficiently large to impact affected populations.

- Coho salmon are a main primary species because they exceed 5% of the total commercial salmon harvest in many years, particularly in odd-numbered years of the sub-dominant Pink Salmon return. In other years, catch percentages are low because total catch of Pink Salmon in the Unit of Assessment is very large. Coho catch is sufficiently large to impact affected populations.

- Chinook Salmon are not considered a main primary species because this species is protected from commercial harvest, commercial seasons are scheduled to avoid Chinook run times, and incidental catch levels are very small. Chinook Salmon are considered bycatch as current regulations prohibit retention.

Secondary Species

For the purposes of this assessment, secondary species in the catch are defined as those not included under Principle I in the Unit of Assessment and not identified as primary. These include both retained and nonretained catch. Retained secondary species in this fishery predominately include char which are harvested in significant numbers for commercial use. Non-retained catch includes a variety of species, none of which comprise a significant volume of catch. There are no main secondary species.

Other species that are not typically processed for commercial value are treated as bycatch. Some bycatch species are released at fishing sites and additional sorting occurs at the processing plants. By-catch of non-retained species comprises a negligible portion of the harvest in the fishery. Due to the very low percentage of bycatch relative to the total fishery, no ‘main’ bycatch species are identified. By-catch can include a variety of marine and freshwater species including codfish (Gadidae), flatfish (*Platichthys stellatus* sp.), smelt (*Osmerus* sp.), sculpins (*Cottus* sp.) and jellyfish. There is no official reporting of bycatch such as cod, flounder, silver smelt and birds in these fisheries. By-catch species are reported to be abundant throughout the region and fishery managers do not consider harvest levels to significantly affect these species.

ETP Species

For the purposes of this assessment, endangered, threatened, or protected species are those that are recognized by national legislation, binding international agreements (e.g., CITES) to which jurisdictions controlling the fishery under assessment are party, or ‘out-of scope’ species

(amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE). In this case, national legislation provides for protection of ETP species identified in the Russian Federation Red Data Book, also known simply as the Red Book. The only red-listed species present in this area are steelhead (*Oncorhynchus mykiss*) and Steller sea lion. These as well as a number of other fish, marine mammals and birds are also discussed briefly below. Although no ongoing observer program exists for the fisheries, federal scientists, managers, and inspectors regularly visit the fishing sites and processing plants throughout the season. Over the course of the many years of fishing operations, none of these species are observed to have adverse impacts from the fishery. The fishing authorities have determined that the fishery has such low impacts that it needs no specific data collections on interactions with ETP species.

Habitat

The footprint and scale of human development in western Kamchatka is very small and impacts on watershed and river habitats and functions are very limited. Human habitation is concentrated in only a few sites. Alterations of these sites may be substantial but impacts appeared to be quite localized. Similarly, road construction was very limited in the basin and related habitat effects appeared minor relative to the scale of the watershed and impacts were likely localized to a few areas. Coastal habitats are shaped entirely by natural processes rather than human activities.

Fishing activities with traps and beach seines do not have a significant long-term impact on habitat. Beach seines used in the river and estuary may be dragged along the bottom but any impact is minor and temporary. The river bottom is comprised of gravel and cobble which is regularly redistributed by flood flows. River seine sites in some areas (e.g., Ozernaya) are physically graded during low water to facilitate use of beach seines. This activity is permitted and monitored by government agencies and has been determined to produce no significant ecological effect.

Management System

Management of Kamchatka salmon fisheries is administered by Federal and Regional governmental agencies. Kamchatka Kray, which includes Kamchatka Oblast and Koryak Autonomous Okrug is the subject of the Russian Federation and is a part of Far Eastern Federal Region (Okrug). It is under the direction and control of the Government of the Russian Federation.

Federal Fishery Agency (FAR: Federal'noe Agentstvo po Rybolovstvu), located in Moscow, is responsible for management and control of fisheries in the Russian Federation. FAR interacts with various agencies at the federal level while controlling its territorial departments. FAR Policies and Regulation of fisheries are created by a consultative process involving a Public Council, which facilitates public discussions of accepted and proposed regulations.

SVTU is the Northeastern Territorial Administration of FAR which oversees local management and enforcement for Kamchatka Kray. SVTU has final approval of fishing concessions and in-season fishery management regulation actions (to open and close fisheries). They give fishing companies permission to harvest, monitor fishing companies and processors to ensure regulation compliance, and patrol streams to reduce poaching activities.

KamchatNIRO, located in Petropavlovsk-Kamchatsky, is the regional scientific agency responsible for research and monitoring of marine and freshwater resources in the Kamchatka region including the status of commercial species. It is one of a network of scientific research organizations operated by FAR under the oversight of TINRO-Center in Vladivostok. Branches are also located in Khabarovsk and Anadyr; Magadan (MagadanNIRO), and Yuzhno-Sakhalinsk (SakhNIRO). The status of these institutions is different. In Khabarovsk they have branch of TINRO-Tsentr, but SakhNIRO and KamchatNIRO are independent institutions.

SevvostRybvod (Northeastern Rybvod) is a Department of FAR responsible for operation of salmon hatcheries and conduct of related assessments. SevvostRybvod does not occupy as important a role in management of salmon fisheries in Kamchatka as, for instance, SakhRybvod in Sakhalin, because artificial reproduction is relatively insignificant in Kamchatka.

Rosprirodnadzor is the Federal agency responsible for enforcement and control. It is also responsible for State supervision of usage and protection of water bodies, wildlife and their habitats, federal level wildlife preserves, and environmental protection status.

Rosselkhoznadzor (Federal Agency for Veterinary and Phytosanitary Supervision) is responsible for Federal enforcement and control including accounting for and analysis of violations of technical regulations and other regulatory documentation, supervision of compliance with Russian Federation laws by the state agencies, local government, and the public, supervision of marine fishery ports and vessels, and administration of the Convention on the International Trade in Endangered Species of Wild Fauna and Flora.

Ministry of Fisheries of the Kamchatsky Kray operates an Anadromous Fish Commission (AFC) with responsibility for the distribution of expected yearly catch of salmon among users and identifying areas of commercial fishery, recreational fishing, and traditional fishery of the indigenous population. The AFC is chaired by the regional governor and consists of representatives from Federal executive bodies, including the federal security and environment protection authorities, as well as representatives of the regional government, federal, public associations, consolidations of legal entities (associations and unions), and scientific organizations. The AFC meets regularly and makes operational decisions on the time and duration of fishing by either closing fishing in spawning grounds in case of insufficient filling or by increasing the quotas in order to harvest excessive spawners from the mouths of rivers to avoid overflow of spawning grounds. The AFC's decisions are made through discussions and consultations with stakeholders. All meetings are open to the public. All decisions of AFC on fisheries management are subject to final approval by Territorial Administrations of FAR. Meeting minutes and decisions are posted on the Territorial Administration website (http://www.terkamfish.ru).

The current management system is regulated according to the federal law which was substantially amended in 2008 to give the government the authority to assign fishery sections to individual lease holders for up to 20 years, and entrust salmon fisheries management to the regional executive authorities. This regulation replaced the previous system, which was based on Total Allowable Catch allocations and centralized fishery management decisions through Moscow, with a much more responsive and effective regional system. The current system is widely viewed as an improvement for fisheries management as it can react more quickly to changes in run strength. In addition, fishing companies no longer have an incentive to under-

report their catch because management is based on achieving spawning escapement rather than by quota limitations of a TAC.

Appendix III - Information Received at the 2019 Surveillance

Report by KamchatNIRO regarding Conditions

Federal Agency for Fishery
(Rosrybolovstvo)
Federal State Budgetary Scientific Institution
"Kamchatka Research Institute of Fisheries and Oceanography"
(FSBSI "KamchatNIRO")

Seen and agreed"
Acting Director
FSBSI "KamchatNIRO"
N.Yu. Shpigalskaya
[signature]
_____2019

REPORT (CONTRACT № 05/19-НИР dated 06.03.2019)

Subject: Pacific salmon stock and fishery management analysis (Pink salmon, Chum salmon, Sockeye salmon, Coho salmon) in Ozernaya and Opala rivers and in adjacent water basins in West Kamchatka in 2018 (compared to date of previous years) within the framework of scientific consultation for Delta salmon fishery certification to MSC standards)

Project leader:
Deputy Director of Research,
Doctor of Science (Biology) [signature] A.V. Bugaev

Petropavlovsk-Kamchatskiy, 2019

Prepared by:

Project leader: Deputy Director of Research, Doctor of Science (Biology)	**A.V. Bugaev** General guidance and edition
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Senior Researcher	**V.A. Dubynin** Chapter: 3, 4
Researcher	**S.V. Shubkin** Chapters: 2, 6, 7, 8
Research Engineer	**S.V. Koptev** Chapters: 1, 5, 6
Senior Researcher	**N.B. Artyukhina** Chapter: 1, 5, 6
Manager of Ozernovskiy counting weir	**V.I. Krasilnikov** Chapter: 1, 5

CONTENTS

INTRODUCTION

In relation to the certification of Delta salmon fishery to the standards of the Marine Stewardship Council (MSC), the required biological information on this fishery in 2018 as well as in 2016 and 2017 years was prepared. Contract with Delta Co., LTD (# 811 dated from 06.03.2019).

MSC Manual for issuing bodies states that the certification unit is “Fisheries or fish stocks (biologically distinctive unit) in combination with their fishing method (fishing tools, industry practice and management infrastructure)”.

Therefore, within the framework of the preliminary assessment, Vityaz-Avto Co., LTD fishery is defined as follows: 1) Target fish species: pink salmon Oncorhynchus gorbuscha, chum salmon Oncorhynchus keta, red salmon Oncorhynchus nerka and coho salmon Oncorhynchus kisutch; 2) The geographical area (fishing area): the western coast of Kamchatka, the Sea of Okhotsk, as well as the administrative zone - Kamchatka-Kuril subzone - 61.05.4 and West Kamchatka subzone - 61.05.2 (Ust-Bolsheretsky and Sobolevsky districts of Kamchatka Krai; 3) Fish stocks (fishing units): populations (local herds) of four species of Pacific salmon (pink salmon, chum salmon, sockeye salmon, and coho salmon) reproduced in the basins of Ozernaya, Koshechek, Golygina, Vorovskaya and Kohl rivers.

Research goal — Pacific salmon stock and fishery management analysis (Pink salmon, Chum salmon, Coho salmon) in certain rivers (Ozernaya, Koshegochek, Golygina, Vorovskaya, Kol) and in adjacent water basins in West Kamchatka in 2018 (compared to date of previous years)

Tasks:

1) Description of any changes in fishery management system, in fishing areas and fishing plots, science and fishing industry management systems. Provide updated information on legal status of gillnets use in commercial catching of Pacific salmon

2) Salmon escapement in each river (for certified rivers and fishing areas) in 2018

3) Report on target escapement goals for Pink salmon of odd-year and even-year production line (including scientific explanation)

4) Update and include data for 2017 and 2018. Appendix A (Table ‘Red salmon spawning in Ozernaya river’)

5) Annual report on fishery management actions taken in 2018 that have a direct impact on certified rivers/areas. In addition to Protocols of Anadromous Fish Commission (September 2018), setting fishing season open/closing dates, escapement days, changes in the escapement days etc; this report will provide scientific basis/justification for these actions. For example, salmon run forecast before fishing season start, catch/escapement data during fishing season, that can be used to set or change escapement days as it is based on forecast run

6) Report on monitoring improvement measures including analysis of whether the updated monitoring plan is representative for all salmon stock, including recommendations for improvements

7) Description of how red and coho salmon escapement monitoring has been improved in 2018 n relation to salmon stock (except red salmon in Ozernaya river, which is well monitored). Red and coho salmon escapement data in each river in 2018. Table with aerovisual monitoring data (date and places of aero monitoring) in 2018, and comparison with data in 2016 and 2017 to show that the monitoring has been improved

8) Report on escapement monitoring improvements in Opala river in 2018 based on information (from MRAG) that in 2017 escapement level was low but monitoring was not conducted

CHAPTER 1. Description of any changes in fishery management system, in fishing areas and fishing plots, science and fishing industry management systems. Provide updated information on legal status of gillnets use in commercial catching of Pacific salmon

The significant change in the system of applied (sectoral) science in Kamchatka Krai in 2018–2019. is the reorganization of the Federal State Budgetary Scientific Institution 'Kamchatka Research Institute of Fisheries and Oceanography' (FSUE 'KamchatNIRO') by joining the Federal State Budget Research Institution 'All-Russian Research Institute of Fisheries and Oceanography' (FSBI 'VNIRO') from January 16, 2019, pursuant to the Orders of the Ministry of Agriculture of the Russian Federation dated July 23, 2018 No. 322 and the Russian Fishery Agency No. 537 dated August 10, 2018. The Contractor is referred to as the Kamchatka branch of the FSUE "VNIRO" ("KamchatNIRO") (hereinafter - KamchatNIRO).

In general, this change will not have a significant impact on the existing system of biological monitoring and control of Pacific salmon fisheries in Kamchatka.

As of 2018, the legal status of gillnets use in the commercial fishing of Pacific salmon in Kamchatka remains unchanged. Restrictions on the use of gill nets when harvesting (catching) Pacific salmon in Kamchatka region, which were included in the Fishery Rules for the Far Eastern Fisheries Basin by Order of the Ministry of Agriculture of Russia No. 228 dated 04.06.2018, are still in force. These regulations prohibit the use of gillnets in the coastal zone of Kamchatka-Kuril subzone, which reduces the commercial risks of Vityaz-Avto Co., LTD when harvesting Pacific salmon in the Ozernaya, Koshechek, Golygina, Vorovskaya and Kol rivers.

The status of alternative (drifter nets) net fishing gear in the Pacific salmon fishery in the exclusive economic zone of the Russian Federation at the present time, in particular ring nets, is also not defined.

Specialists of KamchatNIRO declared their position on this issue by the Decision of the Academic Council (Protocol No. 2 dated January 14, 2016), which was sent to VNIRO (No. 24-02 / 153 dated January 14, 2016), expressing a negative view to the use of ring nets in Pacific salmon catching in the exclusive economic zone of the Russian Federation.

This decision stems from the fact that, under a different name, all the same (drift) nets are being used because, despite all the innovations, the principle of the 'new' fish catching gear remains the same – trapping during the drift. This contradicts to the Federal Law No. 208-ФЗ dated June 29, 2015 "On Amendments to the Federal Law 'On Fisheries and the Conservation of Aquatic Biological Resources". Entangling gillnets, while being less effective, have the same drawbacks (all risks, negative impact on the environment) that caused the prohibition of drifter gillnets. The latter, in our opinion, will lead to violations of any restrictive measures that regulate fishing by unscrupulous users, as was the case with the use of so-called "surface traps" in 2016. In the absence of constant monitoring, for example, nothing will prevent setting entangling nets not in a circle but in a straight line, like in the use of ordinary drifter nets. Nevertheless, the code of the sectoral monitoring system (OSM) was assigned to this fish catching gear without conducting full-scale tests, which is a gross violation of the OSM code assigning procedure established by the Russian Fishery; even for coastal fishing gears this procedure is mandatory. It was planned to conduct tests of entangling nets in 2017, and then in

2018, however, these works were not carried out. Therefore, at present there is no reliable scientific data on the absence of the potential negative environmental impact of the above-mentioned catching gears on aquatic biological resources, as well as about their effectiveness.

CHAPTER 2. Salmon escapement in each river (for certified rivers and fishing areas) in 2018

PINK SALMON

2016 pink salmon population, which returned in 2018, is considered to be superproductive. The escapement level of pink salmon spawners in the west coast of Kamchatka was at an extremely high level of 112 million spawners, exceeding the value of 1983 year, when 111 million producers were counted, which subsequently led to a change in the dominant pink salmon production lines. Pink salmon runs to the coast in the latitudinal direction formed the core of the maximum in the river systems in the area from r. Kihchik to r. Vorovskaya, main fishing grounds were concentrated here as well. To the south and north of this zone, in the boundaries from r. Bolshaya to r. Icha, the intensity of salmon run decreased. South to r. Bolshaya the number of pink salmon in the rivers did not exceed 0.4 million fish (Fig. 2.1).

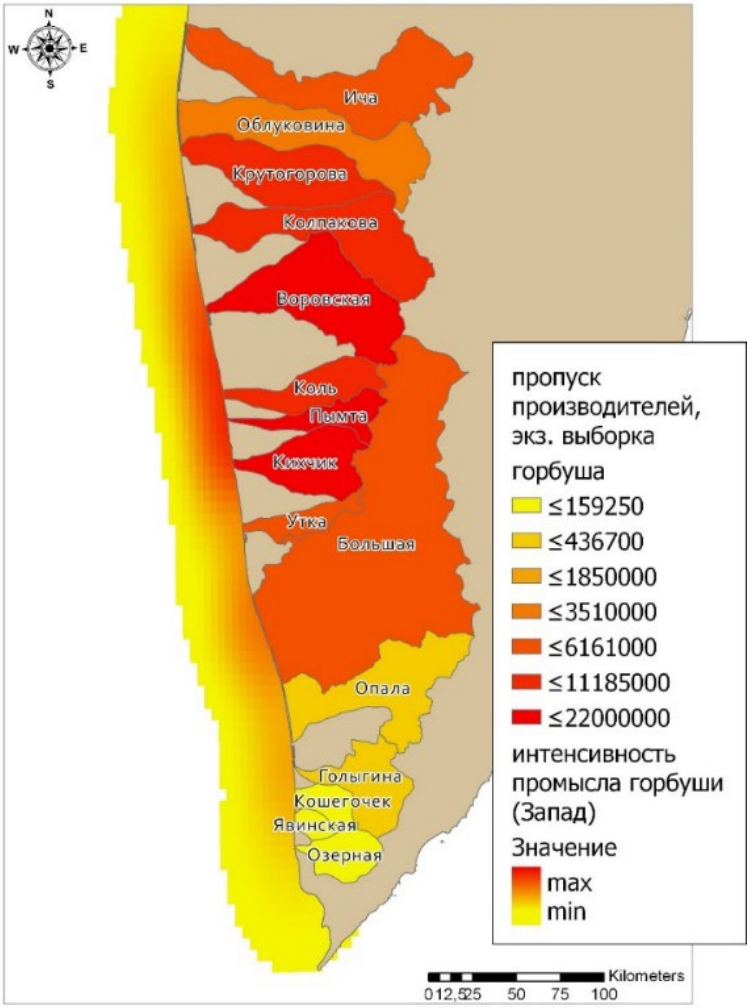


Figure 2.1 — Pink salmon spawners distribution in West Kamchatka rivers and pink salmon catch value in 2018

In the zone of highly abundant runs, the maximum pressure on the spawning grounds is registered in r. Vorovskaya, the number of counted pink salmon spawners was about 16 million. In r. Kol number of pink salmon is estimated at the level of 11.2 million spawners.
The dynamics of pink salmon spawners escaped into the target rivers located in the “discharge” zone are illustrated in Figures 2.1 and 2.2., here the maximum escapement level is registered in r. Golygin (398 thousand spawners). We should note that r Golygina and r. Opala present a single river system with a common riverbed and, based on the results of aerovisual surveys, the total number of pink salmon, registered in Opala-Golygin cluster of rivers, was about 750 thousand spawners, which corresponds to the target escapement goal calculated for the minimum strata (SMSY MIN) (Fig. 2.2) .
The number of recorded spawners in Koshegochek and Ozernaya rivers amounted to 33.5 and 2.75 thousand spawners, respectively, and is below the boundary reference points defined for these watercourses (Fig. 2.2).

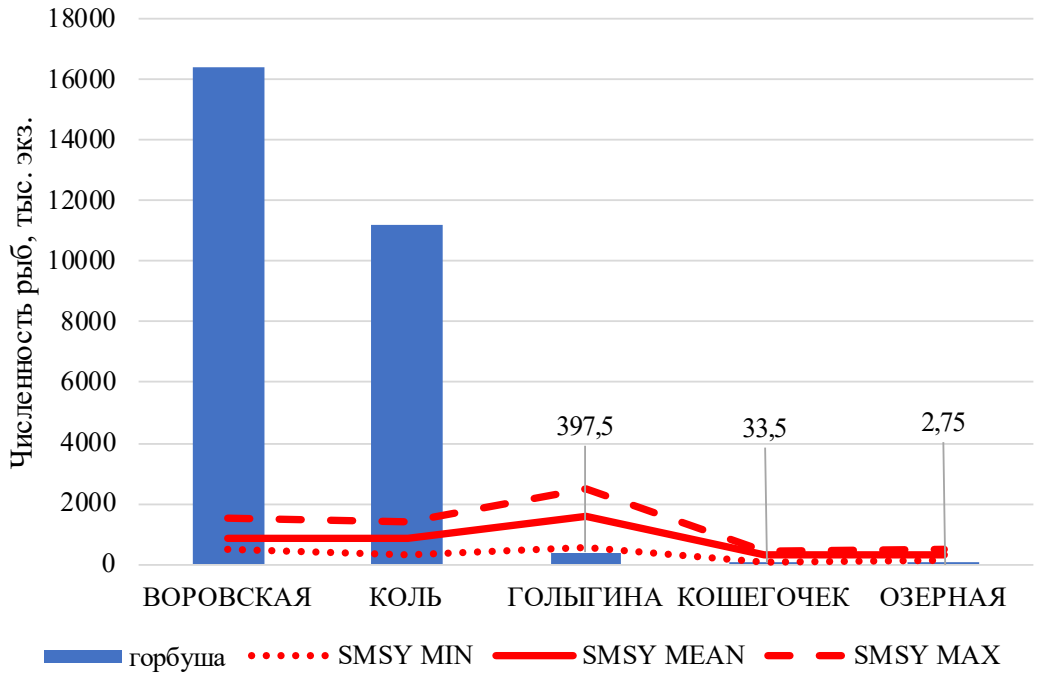


Figure 2.2 — Pink salmon escapement level in control rivers in 2018 and escapement target goals

CHUM SALMON
The abundant runs of pink salmon made certain “interferences” in estimating the number of chum salmon spawners, crowding out chum salmon to the periphery of the spawning areas, which objectively were not covered by aerovisual surveys. Nevertheless, certain quantitative patterns were traced quite clearly.
In 2018, the spawning stock of chum salmon in the rivers of Kamchatka Krai made up the maximum level over the past ten years. The relatively high escapement level of chum salmon spawners to the west coastal rivers is likely to be due to abundant pink salmon runs, which prevented chum salmon harvesting. This assumption is proved by a graphical analysis of fishing pressure distribution (Fig. 2.3). Chum salmon was most intensively harvested in the southwestern and northeastern (south of the Karaginsky district) directions, i.e. in places where

relatively low pink salmon runs were recorded (Fig. 2.1). Dynamics of chum salmon escapement level to target rivers also proves the objectivity of the aerovisual survey. The maximum number of chum salmon spawners is recorded in r. Vorovskaya (100 thousand spawners) and r. Kol (54 thousand spawners). In the southern direction, the number of chum salmon decreased significantly in r. Golygina and did not not exceed 5 thousand spawners, and in Ozernaya river no more than 1 thousand spawerns were counted (Fig. 2.4). The omnly exception is chum salmon in r. Opala, where relatively high escapement levels are explained by the early form of chum salmon. In r. Koshegochek in chum salmon spawners were not recorded in the first decade of September.

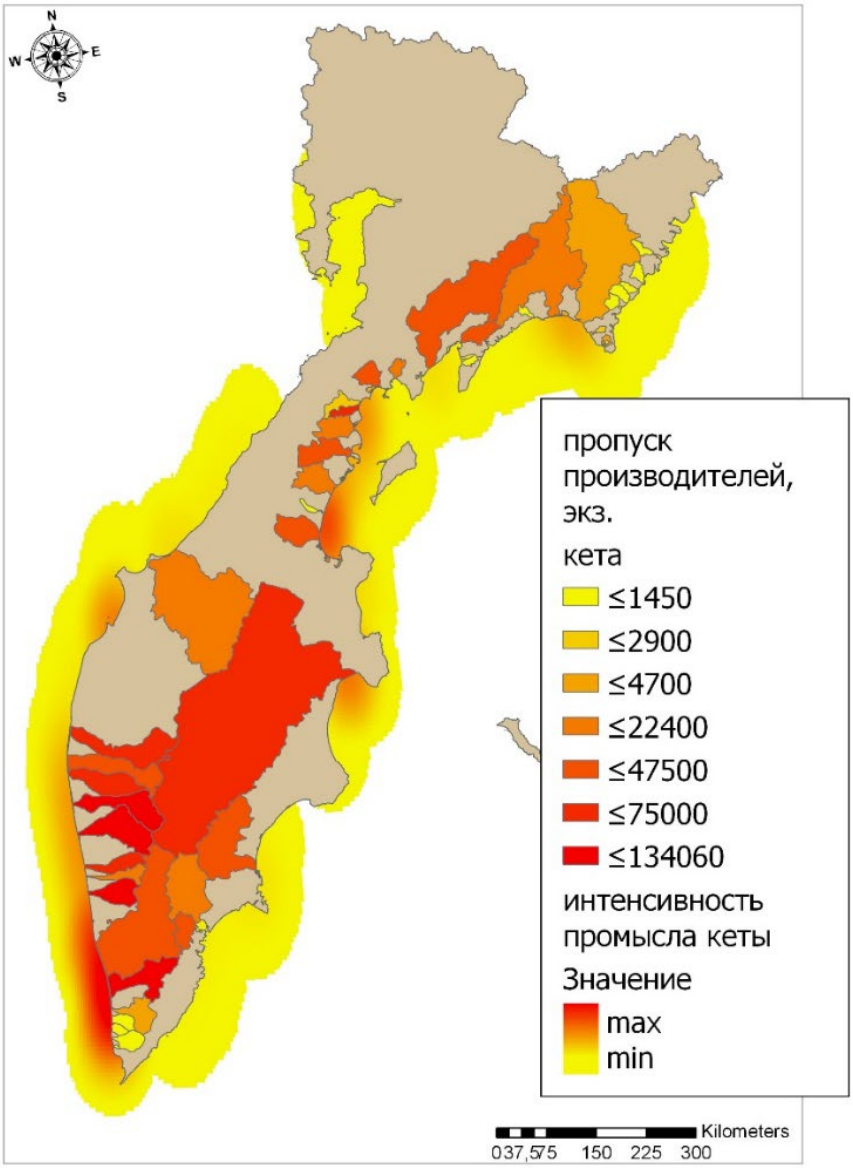


Figure 2.3 — Chum salmon distribution in Kamchatka kray rivers and chum salmon catch intensity (outside coastline) in 2018

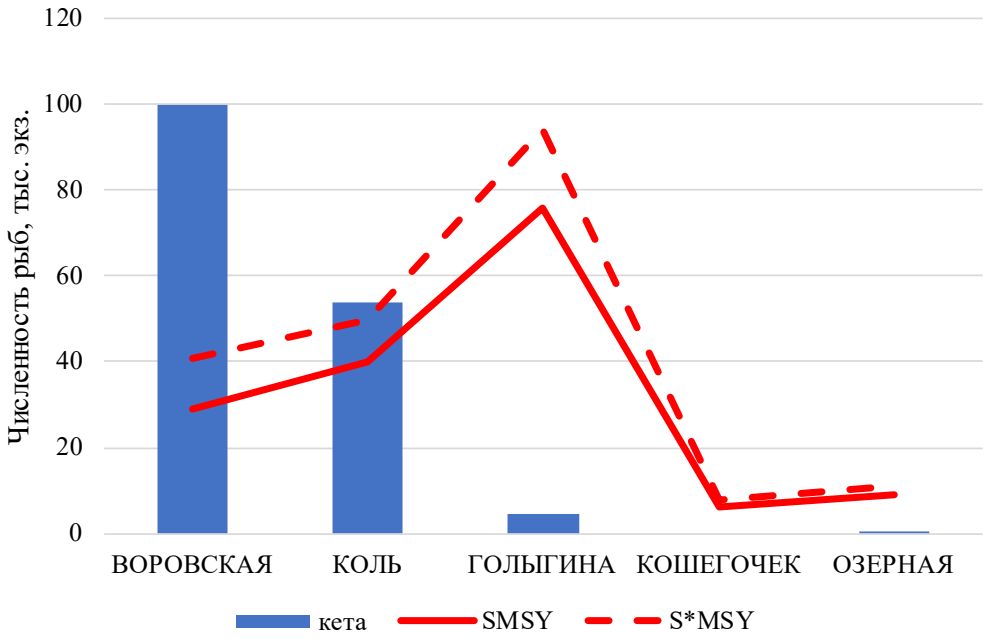


Figure 2.2 — Chum salmon escapement level in control rivers in 2018 and target escapement goals

COHO SALMON

Spawning migration of coho salmon in 2018 was characterized by the delay of about 2 weeks. Mass spawning run was weak. Monitoring work on hydrometeorological conditions was completed in the second decade of October - during this period the spawning run of coho salmon was still going on. Obviously, the registered value of coho salmon escapement level in r. Kol (13 thousand spawners) is understated and can only be used as additional information.

RED SALMON

Recorded number of red salmon spawners in Ozernaya river is estimated at 1778.5 thousand spawners. Data on red salmon escapement in r. Ozernaya is described in detail in chapter 6.

CHAPTER 3. Report on target escapement goals for Pink salmon of odd-year and even-year production line (including scientific explanation)

In the second decade XX century, the number of pink salmon in the west coast of Kamchatka is booming relative to the available data from the historical observation period. However, the presence of two production lines of even and odd years, isolated from each other, makes its own adjustments to the overall picture. In 2018, in accordance with the new data, target goals for pink salmon in Western Kamchatka were revised. The redesigned general stratified model of ‘stock replenishment & escapement’ was used for calculating new reference points (Fig. 3.1).

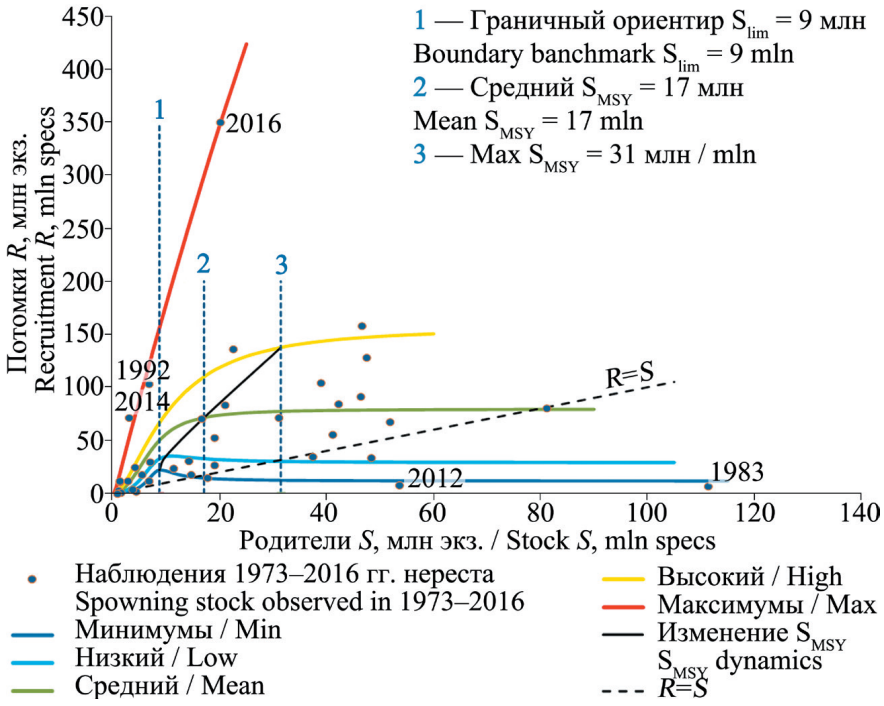


Figure 3.1 — Stratified model 'stock-replenishment' for pink salmon in West Kamchatka. Observations 1973-2016 spawning season

The new model has five strata, unlike the previously used one, in which three levels of reproduction were used. This is mainly due to the data of recent years, in particular, the 2016/2018. (350 million descendants per 20 million parents), which showed the presence of a higher stratum, describing observations with maximum levels of reproduction. This model was justified by using the likelihood ratio test (Table 3.1). Only a four-stratum model can be competitive to a five-stratum model, which combines observations of the low and minimum levels of the five-level model, but since the null hypothesis is significant above α = 0.05, the five-strata model was considered the best.

Table 3.1. Assessment of the significance of five-strata model in comparison with other short models

Number of strata	Maximum likelihood	Likelihood ratio	p-level
5 strata	-141,5	-	-
4 strata	-144,3	5,688	0,017
3 strata	-387,9	492,82	0,000
2 strata	-709,3	1135,59	0,000

In the new model, the MSY reference points have significantly changed towards an increase (Table 3.2). Boundary and target reference points of pink salmon spawners escapement level are defined for each of the strata in such a way that the target reference point of one stratum is at the same time boundary reference point for the upper stratum level, and the precautionary target reference point of the lower stratum is the target for the higher one.

Table 3.2. Revision of reference points for low depressive and high harvest years of pink salmon

Rivers	Depressive			High harvest		
	Slim	SMSY	S*MSY	Slim	SMSY	S*MSY
Ozernaya	0,21	0,24	0,41	0,24	0,41	0,76
Koshegochek	0,19	0,21	0,37	0,21	0,37	0,67
Opala-Golygina cluster	1,11	1,26	2,18	1,26	2,18	4,01
Vorovskaya	0,8	0,91	1,57	0,91	1,57	2,89
Kol	0,61	0,69	1,20	0,69	1,20	2,20

For the maximum stratum, a precautionary target reference point is 25% larger than the target reference point. This approach, in our opinion, should direct the population to the mode of optimal population growth, which is one of the goals of fishery management strategy. So, for example, for pink salmon, depressive generations are inevitable (Feldman, Shevlyakov, 2015), but as simulation modeling (Feldman et al., 2018a) shows, compliance with the rule of fishery regulation minimizes the risks of low harvest production lines of pink salmon in the future. In other words, when a depressive production line is forecast (the two lower strata), the task is to bring the stock in the next generation to a more productive level (middle stratum), and in the future to the maximum productive level. Accordingly, in the case of low production line, one should strive to let salmon spawners escape to the spawning grounds in numbers falling between the target reference point and its precautionary assessment but not less than the boundary reference point. The efficiency of fishery regulation will depend directly on the quality of forecasting.

CHAPTER 4. Update and include data for 2017 and 2018. Appendix A (Table 'Red salmon spawning in Ozernaya river')

The total number of matured salmon herds of r. Ozernaya in 2017–2018 in the sea before the start of spawning migration amounted to 10.314 and 12.976 million spawners, respectively (Table 4.1).

Table 4.1. Ozernaya red salmon stock reproduction in 217-2018, thousand spawners

Year	Spawn	Sea catch	Land catch	Total catch
2017	2350	–	7964	7964
2018	1778	–	11198	11198

Until recently, a significant number of Pacific salmon, including red salmon, were caught by drift nets in the sea. However, Federal Law N 208-ФЗ "On Amendments to the Federal Law 'On Fisheries and Conservation of Aquatic Biological Resources" was issued on June 29, 2015. According to this law, Federal Law of December 20, 2004 N 166-ФЗ "On Fisheries and conservation of aquatic biological resources" Chapter 6 was supplemented by article 50.2 of the following content: "In order to ensure the preservation of anadromous fish species in migration routes to spawning sites, the use of drifter nets is prohibited in the industrial fishing, scientific fishing, and offshore fishing of anadromous fish species in the inland waters of the Russian Federation, in the territorial sea of the Russian Federation and in the exclusive economic zone of the Russian Federation". The law came into force on January 1, 2016.

In 2017–2018 red salmon was not harvested with drift nets in the open sea in the EEZ of the Russian Federation.
In 2017 2.350 million salmon producers spawned in the Kuril lake, which was 0.770 million spawners which is more than the forecat number for this year and exceeded the optimum of 1.500–1.800 million spawners (Dubynin, 2012). How can this affect the dynamics of red salmon stock in Ozernaya river in the future?
Comprehensive analysis of hydrometeorological observations in the Kuril lake and results of hydrochemical, hydrobiological and ichthyological monitoring for the period 1980–2016 showed that warming is taking place in the lake basin, which has activated biological processes and led to a decrease in the stock of fish phosphorus in the reservoir. The stock of phosphorus is formed by spawning salmon, and it can be increased or decreased by regulating spawning runs. These events, in its turn, resulted in the change of the structure of phyto-, micro-, and zooplankton, which led to a worsening of trophic feeding conditions for juvenile salmon in the lake and a decrease in body weight of smolts of all age groups (Lepskaya et al., 2017).
We believe that the additional (beyond estimated number) number of red salmon, escaped to the Kuril lake to spawn in 2017 will only positively affect the ecosystem and biota of this reservoir. Additional phosphorus intake into the ecosystem will contribute to the expanded red salmon reproduction in Ozernaya river and, consequently, to abundant salmon runs and their catches in the future.

CHAPTER 5. Annual report on fishery management actions taken in 2018 that have a direct impact on certified rivers/areas. In addition to Protocols of Anadromous Fish Commission (September 2018), setting fishing season open/closing dates, escapement days, changes in the escapement days etc; this report will provide scientific basis/justification for these actions. For example, salmon run forecast before fishing season start, catch/escapement data during fishing season, that can be used to set or change escapement days as it is based on forecast run

Recommendations for salmon season in 2018 were formed on the basis of scientific data, analysis of the dynamics and results of previous salmon fishing seasons. The main fisheries in the west coast of Kamchatka are pink salmon of even year production line, chum salmon, late red salmon and, in recent years, coho salmon. Chinook salmon is harvested in limited quantities (amateur and research fishing). The early Bolsheretskaya red salmon harvest is still prohibited. Red salmon, in particular late red salmon, mainly forms significant stocks in lake-river systems, and red salmon spawners escapement control is carried out directly on spawning grounds locally - in Kurilskoye, Nachikinskoe, Palanskoe lakes. Only chum and coho salmon are spread along rivers along the coast everywhere, gradually reducing its numbers to the north. Chum salmon and coho salmon escapement serves as a criterion for rational and sustainable fishing and, in accordance with the available spawning areas, should be maintained at the level of about 1.0–1.2 million spawners for chum salmon and about 300–350 thousand spawners for coho salmon. This escapement level ensures extended reproduction and is outside the risk of population decrease by random factors (forecast materials for 2018). However, against the historical increase in salmon stock, the escapement level has being reduced recently, both in relative (share of the total run) and in absolute values, which, in its turn, is undoubtedly associated with the increased fisheries efficiency in the modern period. Despite the shortage of

funding for aerovisual surveys, monitoring works in the target reservoirs are still able to give an objective picture of the spawning capacity not only in these reservoirs, but also in the spawning area as a whole.

The continuous pressure on salmon stocks in the sea coast results in highly sporadic clusters of salmon run to the river estuaries, which, taking into account the frequency and length of escapement days in the rivers, cannot even provide minimal escapement level. The goal of rational and sustainable salmon fishery is to ensure sufficient escapement of spawners to the spawning grounds, and the harvest of the remaining amount. Moreover, the saturation of spawning grounds cannot be a one-time event in one of the escapement phases, but should be evenly distributed along the salmon run, ensuring that all epigenetic groups of spawners enter the spawning grounds. As salmon move toward spawning grounds, they successively overcome the sea coastal areas, the estuaries of the river, and only then reach the spawning biotopes. Thus, fishing limits should be imposed consistently, first in the sea coast, and then on river fishing plots. Escapement days are used for this purpose - periods when anadromous fish species can escape to water bodies or their parts intended for these fisheries.

Among areas favorable for reproduction which require special regulatory measures is a river fishing plot in Ozernaya river and sea fishing plots (№№ 189-209), located on the routes of migration of red salmon to the river. On the coastal site, in particular, in the river fishing plots in Ozernaya river, fishing season begins with early red salmon harvest from June 21, according to the general schedule: 2 fishing days after 2 escapement days, and on sea sites - in the middle of July.

The spawning run of pink and chum almost overlap each other, except that the pink salmon run is more transient than the chum one, whose runs are still significant until the end of August (Fig. 5.1). 15% of the total catch of coho salmon is reached approximately by August 20 - by this time, pink salmon and chum salmon usually are not harvested. For this reason, as far as coho salmon goes, it is possible to apply an individual approach in its fishery management, while regulating the catch of pink salmon and chum salmon requires compromise solutions.

2018 was expecting a historically abundant run of pink salmon in the western coast. Accordingly, the fishery regulation was carried out by the “pink salmon” type, taking into account the high abundance of this species. The emphasis was placed on installing the large number of fixed nets and ship processing of raw fish.

Stocks of other salmon species (late red salmon, chum salmon) remain at the same level. However, red salmon stocks concentrated locally in the coastal areas adjacent to the r. Ozernaya and Palana, were regulated separately. River red salmon and chum salmon were harvested together with pink salmon. The practice shows that, with abundant pink salmon run, species that are harvested together, are much less prone to the fishing pressure compared to pink salmon run of low harvest years. This is explained by the fact that fishing companies during pink salmon run of high harvest reproduction line are able to harvest and process up to 50–100 million spawners, that constitutes about 50% of the total number of salmon run. Accordingly, the adjacent fisheries, being distributed in clusters of pink salmon, are harvested with it to the same extent, unlike the low harvest years for pink salmon, when the focus of the fishery is shifted in their direction, and the catch intensity reaches and exceeds 70%.

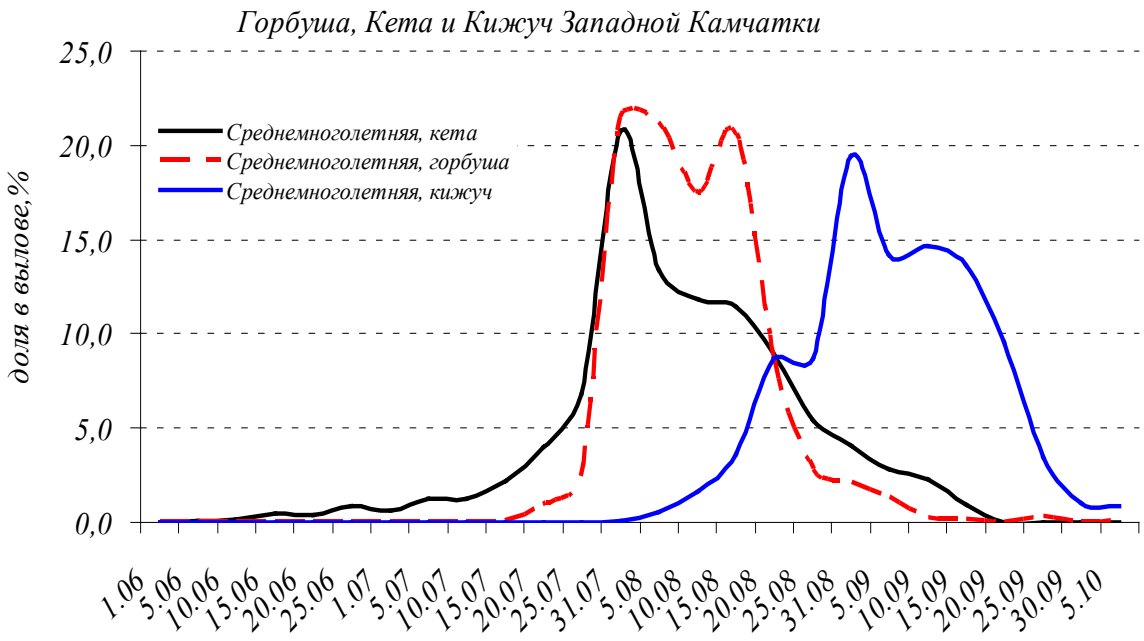


Figure 5.1 — Average long-term dynamics of pink, chum and coho salmon harvest (% catch of each species) in West Kamchatka

In general, the ratio of fishing capacities were taken into account, and it was assumed that Pacific salmon spawners escapement to the rivers of the west coast during pink salmon runs would be objectively higher than the average long-term values. Keeping pink salmon producers from escaping to the rivers was a strategic task aimed at maintaining a high level of catch in even-numbered years. Thus, closing down catching for letting salmon producers escape into the rivers during the period of mass pink salmon run to the coast was impractical. Before and after pink salmon runs, the escapement regime for chum salmon, red salmon and coho salmon was planned in line with previous years.

Thus, the recommended regime for harvesting Pacific salmon and char in the target areas of Kamchatka in 2018 is as follows.

The harvest opened:

- in river fishing plots in r. Ozernaya, due to early red salmon run, the harvest opens from June 21;
- in other sea and river plots of Ust-Bolsheretsky region from July 11; - in the sea area from fishing plot No. 189 (including) to the south to fishing plot No. 209 - from July 21.

At the same time, for all types of fisheries (with the exception of sport and amateur fishing using line fishing gear, scientific fishing and fishing for artificial reproduction), the following escapement regime was recommended:

- in marine fishing plots in the West Kamchatka and Kamchatka-Kuril subzones, with the exception of the water area from fishing No. 189 (including) south to fishing No. 209 (including) from the beginning of the catch to July 25 and no later than from September 3 to the end of the harvest - Monday, Tuesday. During mass pink salmon runs (07.27 / 03.09) escapement days were not necessary.

In river fishing plots:

- in the rivers and lakes of the West Kamchatka and Kamchatka-Kuril subzones, with the exception of Bolshaya, Ozernaya (western) river basins, Khayryuzova and Belogolovaya estuaries during the period from the beginning of the catch untill July 25 and no later than September 3 before the end of the harvest – Monday, Tuesday, Wednesday;
- in the rivers and lakes of the West Kamchatka and Kamchatka-Kuril subzones, with the exception of Bolshaya, Ozernaya (western) river basins, Khayryuzov and Belogolovaya estuaries during the period from July 26 to September 3 - Monday, Tuesday;
- in the basins of Ozernaya (Western) river, the escapement days were set as two escapement days after two days of fishing.

Fishery management in actual salmon run in 2018

Fishery regulations targeted for red salmon stock replenishment were applied in the fishing plot in Ozernaya river and adjacent water areas. Red salmon escapement level in the the Kuril lake as of July 30, 2018, according to the fish-counting weir, was about 743 thousand spawners, and according to the hydroacoustic system ~ 940 thousand spawners. Approximately, up to 150–200 thousand spawners were on the migration routes to the hydroacoustic reference section. In this regard, according to Protocol No. 18 of the Commission for Anadromous Fish Species Harvest in the Kamchatka Territory dated as of July 30, 2018, the escapement day on July 30 from 12:00 was canceled, until the number of counted spawners was specified.

Later having discovered that the escapement level of red salmon to the Kuril lake reached the lower limit of optimum, the previously set escapement regime in river fishing plots in r. Ozernaya was changed (Protocol No. 5 dated 05.25.2018). It was recommended to cancel 2 escapement days-two fishing days and set the following escapement regime - Monday, Tuesday, weekly.

On August 13, 2018 the recorded number of escaped red salmon spawners in the Kuril lake reached a level of 1.5 million spawners, and according to the hydroacoustic system, at least more 70 thousand spawners were expected to escape to the lake. So, it was recommended to cancel escapement days river fishing plots in Ozernaya river (Protocol No. 23 of August 15, 2018).

Based on the latest update information received in 2018 about a significant decrease in the intensity of pink salmon spawning run in the rivers of the southwestern coast of Kamchatka, in order to ensure even distribution of coho salmon throughout the spawning run it was recommended to set the following escapement regime in the river fishing plots intended for industrial and traditional fishing, set from 08.27.2018 in the fishing plot located south of Bolshaya river (with the exception of Ozernaya River): Monday, Tuesday,weekly (Protocol No. 25 of August 22, 2018).

The results of aerovisual surveys on pink salmon and chum salmon escapement into the rivers of the southwestern coast of Kamchatka, conducted in the period from August 30 to September 05, 2018, recorded the shortage of salmon spawners in the areas of Opala, Golygina, Koshegochek, Pervaya and Vtoraya Yavinsky rivers. This resulted in the decision to introduce additional escapement days in the fishing plots intended for industrial and coastal fishing in these rivers for the period from 00:00 on September 12 to 24:00 on September 16 (Protocol No. 28 of September 6, 2018).

CHAPTER 6. Report on monitoring improvement measures including analysis of whether the updated monitoring plan is representative for all salmon stock, including recommendations for improvements

One of the methods to assess Pacific salmon spawners escapement level and their distribution in the spawning waters in Kamchatka is aerovisual. Given the poor transport infrastructure and the inaccessibility of research areas, it is hardly possible to use another method that could effectively assess escapement level in the spawning grounds in such a large area in a relatively short time, and allow to use the obtained data for responsive fishery management.

Based on monitoring principles, aerovisual surveys are conducted from July to October. According to the developed plan for monitoring improvement, aerovisual studies should be carried out in all mentioned river systems included in the certification (audit) program.

Pacific salmon reproducing in west Kamchatka rivers have several temporal forms, that determine the time period for the aero-survey work. In all mentioned water basins, early forms of chum and pink salmon predominate. Spawning migration of the early form of chum salmon to rivers is stretched in time and lasts from the third decade of June until the end of September. Based on spawning run dynamics, we can assume the presence of two sub-forms of chum salmon: chum of early form with the spawning peak in the third decade of July, and the chum salmon of middle form, with the peak in the second decade of August. Such a complex temporal structure of chum salmon populations in Western Kamchatka implies additional monitoring work.

Coho salmon ratio of both forms is approximately 2: 1, less often 3: 1 in favor of the early form. The number of late forms of coho salmon is often underestimated due to the extended spawning run. Coho salmon run often goes on even during the freeze-up period, which hinders aerovisual surveys. In addition, there is again a shortage of funding. Since the late form of coho salmon does not have significant peaks of spawning runs into the rivers and does not form large pre-spawning clusters in the main river beds, being distributed relatively quickly over the river, targeted aerovisual surveys to count coho salmon population (late form) require extended aerovisual surveys in the river basins which are quite expensive.

The most optimal time for counting salmon spawners is the period of their mass spawning and its final phase. According to long-term observations, for the early form of chum salmon reproducing in the rivers: Ozernaya, Koshegochek, Golygina, Opala, Kol and Vorovskaya, the mass spawning period starts from the end of the first decade of July and lasts until the end of July-beginning of August. The final phase of spawning occurs in the third decade of August - the first decade of September. Thus, the monitoring should be carried out in two stages - the first flight should be organized in the third decade of July - the first decade of August, the second - in the first decade of September.

In 2018, r. Opala (5 flights) was thoroughly monitored. There were 3 flights in r. Kol and Vorovskaya, in r. Ozernaya, Koshegochek and Golygina - 2 flights (Table 6.1). The escapement of pink salmon and early form of chum salmon was fully monitored; a little more than half of the scheduled time was designated to late chum salmon and coho salmon. In the new season compared to the past ones, it is recommended, if possible, to increase the time for examining the early form of chum salmon in the southern rivers (Ozernaya, Koshechek, Golygina), the late form of chum salmon and coho salmon in all target rivers.

Table 6.1. Flight hours used for monitoring escapement of salmon in the target rivers (as planned and actual data) in 2018

Species	Rivers	Time	Flight hours as planned	Actual time	Actual flight hours
Early form of chum salmon	Ozernaya Koshegochek Golygina Opala	End of July	6 h	- - - 20.07; 06.08	5 h
	Kol, Vorovskaya	End of July – beginning of August	6 h	07.08, -	1 h 40 min
Early form of chum salmon Pink salmon	Ozernaya Koshegochek Golygina Opala	End of August	6 h	04.09 04.09 04.09 04.09	6 h
	Kol, Vorovskaya	End of August	6 h	30.08; 01.09	5 h 30 min
Late form of chum salmon Coho salmon	Ozernaya Koshegochek Golygina Opala	The first decade of September	6 h	- - - 08.09	3 h 30 min
	Kol, Vorovskaya	Middle of September	6 h	-, 27.09	2 h
Late form of chum salmon Coho salmon	Ozernaya Koshegochek Golygina Opala	End of september	6 h	- - - 08.10	3 h 10 min
	Kol, Vorovskaya	End of septermber – Beginning of october	6 h	11.10; 15.10	3 h 20 min
Total hours:			48 h	-	29 h

Red salmon in Ozernaya river

Modern Pacific salmon fisheries management, in particular, of red salmon in r. Ozernaya in the southwest coast of Kamchatka, implies that a special attention is to be paid to sufficient escapement of salmon spawners to the spawning grounds. Earlier studies have shown that for red salmon in Ozernaya river the number of salmon spawners in the spawning grounds is crucial for high stock replenishment (Bugayev, Dubynin, 2002; Bugayev, Dubynin, 2000). Spawning run of red salmon in Ozernaya river is very dynamic. During the mass spawning run, fishermen can catch more than 2.5 thousand tons (1.0 million spawners) of red salmon a day. Mass spawning run usually lasts only about two to three weeks. The Commission of Anadromous Fishery Management in Kamchatka (the Commission) cannot make decisions on fishery regulation without getting the recommendations of specialists from Kamchatka branch of the FSUE 'VNIRO' ('KamchatNIRO') who receive and analyze data on red salmon escapement to the Kuril lake. Our calculations say that it takes about 3-4 (from 2 to 7) days for mature red

salmon to go from the mouth to the river head of Ozernaya river, where the fish-counting weir is located (Bugaev et al., 2009). Given that the mass spawning run is short, 3-4 days for making decisions can cause irreversible negative effects on fish harvest and cause significant economic losses. In this regard, it is important to count red salmon spawners in Ozernaya river, not far from the upper river fishing plot # 760, which will provide very shortly (the next day) data on the number of matured salmon, passed all fishing plots. The idea was supported by the Association of Fishermen of the Ozernovsky Region.

In 2017, the Association financially sponsored the purchase of "BioSonics DT-X" hydroacoustic system. In June 2017 specialists of 'KamchatNIRO' selected a site in r. Ozernaya upstream of the fishing plot No. 760, the most suitable for counting salmon by the DT-X system. It was installed on the territory of the South Kamchatka Sanctuary, 13 km from the mouth of Ozernaya river. The width of the river in this place was 45 m, the bottom had a lower gradient, which is the most suitable for installing the sonar device.

In 2017, studies were conducted in testing mode. The counting results obtained by the DT-X system during the mass spawning run were not at all confirmed by the data obtained at fish counting weir in Ozernaya river. In general, during test studies, specialists saw some positive aspects when working with DT-X, but there were also issues that needed to be addressed. In autumn of 2017, KamchatNIRO specialists met with the developers of the echo sonar in the USA and received the necessary consultations.

In 2018, research at the site continued. To count Pacific salmon Didson imaging sonar was used for the first time in Russia - a device for obtaining images of objects (fish) using ultrasonic waves. The imaging sonar discovered that at a distance of 0–2 m from the left bank there was a constant removal of sand and fine pumice. This negatively affected the records of the DT-X system, but did not affect the imaging sonar. Thus, the entire site in the river (0–45 m) was divided into two sections: at the first (0–10 m) section, the counting was carried out with Didson, at the second (10–45 m) - with a DT-X echo sonar.

Pink salmon was found in catches in the river fishing plots from July 30 and chum salmon – from August 9. Data on by-catch of pink salmon and chum salmon in the river fishing plots was calculated according to the daily catch statistics and regularly reported to the staff by phone. Data on the by-catch of other salmon species was used to identify red salmon in mixed clusters.

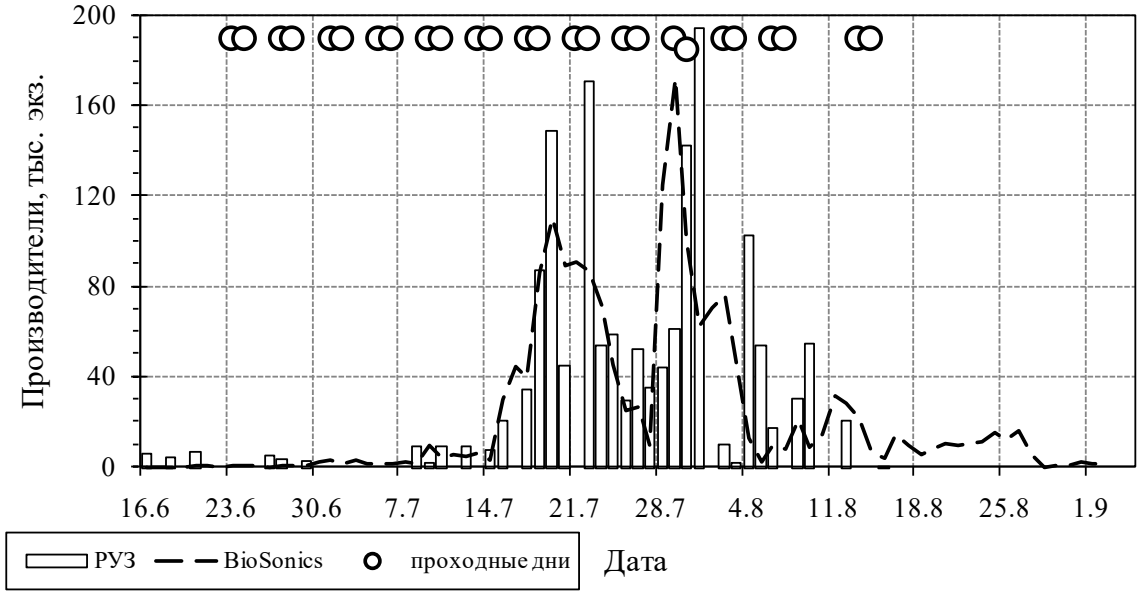
The results of red salmon counting using a hydroacoustic method (DT-X echo sonar and Didson imaging sonar), and direct counting of salmon at the fish counting weir were similar (Fig. 6.1). It is clearly seen in the chart that the schedule of salmon counting at fish counting weir coincides with the schedule of salmon counting with BioSonics at five (15, 19, 27, 21 July and 09 August) points. This survey concluded that the shortest time for a mature red salmon to travel from the test site to fish counting weir is equal to the shift between these graphs - two, and the greatest (by the difference between the 4th and 5th points) - nine days (Fig. 6.1, lower graph) . The graphics shows that counting survey at the fish counting weir was completed on August 21. In 2018, 1542 thousand red salmon spawners were counted at the fish counting weir.

At the test site, mature red salmon spawners were counted until September 3, so counting surveys at the test site in 2018 are more full and complete.

After counting survey at the test site was over, an aerovisual survey by KamchatNIRO specialists were conducted in Ozernaya river on September 4. They registered 2.750 thousand pink salmon spawners, 0.600 thousand chum salmon spawners in the river. 36,000 thousand red salmon

were registered in the area from “Kutkhiny bahty” to “Kultuk” (spawning ground of red salmon).

The number of escaped red salmon spawners to the river Ozernaya (the Kuril lake), obtained in the test site by hydroacoustic method - 1.788 million spawners – was used.



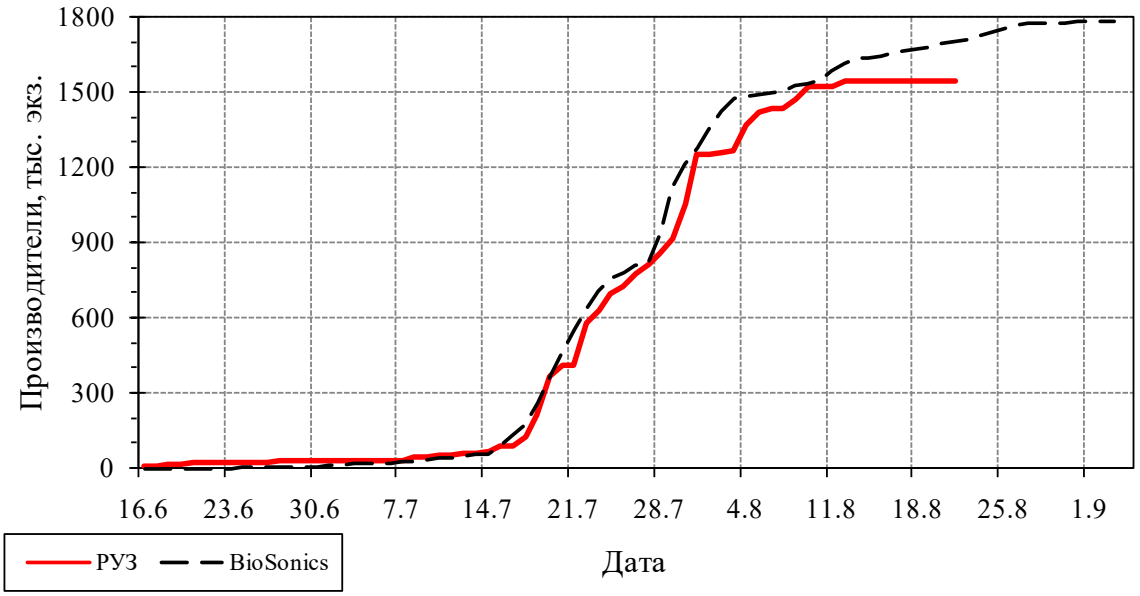


Figure 6.1 — Red salmon spawning run dynamics in Ozernaya river in 2018
(spawning run graphics, obtained in «BioSonics DT-X» and «Didson», is shifted by 1 day, and in fish counting weir — by 3 days to the left, to synchronize with red salmon run to Ozernaya river from the Okhotsk sea; red circles - escapement days)

CHAPTER 7. Description of how red and coho salmon escapement monitoring has been improved in 2018 in relation to salmon stock (except red salmon in Ozernaya river, which is well monitored). Red and coho salmon escapement data in each river in 2018. Table with aerovisual monitoring data (date and places of aero monitoring) in 2018, and comparison with data in 2016 and 2017 to show that the monitoring has been improved

The methodology of aerovisual monitoring surveys, developed in the second half of the XX century by KamchatNIRO specialists, has not undergone significant changes up to the present time (Ostroumov, 1962). However, it was technically upgraded: new aircrafts, satellite receivers, drones, cartographic programs and geo-information systems.

The increasing cost for air freight and the shortage of financing made it necessary to optimize aerovisual surveys. It resulted in the updated methodology of aerovisual research that was supplemented by defining the list of rivers based on their contribution to the reproduction of various species of Pacific salmon in Kamchatka (Shevlyakov, Maslov, 2011). Nevertheless, the basic approach to aerovisual monitoring work remains the same.

Under current conditions, the main parameter that defines improvements in monitoring works is the volume of flight time, which is one of the mandatory criteria for objective assessment. Such species of Pacific salmon as pink salmon, chum salmon and red salmon are assessed fairly objectively. There are only some difficulties with counting of chinook salmon and coho salmon. But, if chinook salmon is not included in MSC certification program, then problem with counting coho salmon remained partially resolved until 2017. In 2018, for the first time in the past 3 years, full-scale survey was carried out to count coho salmon spawners.

In 2018, the geography of flights to assess the escapement level of Pacific salmon spawners in the target rivers was significantly expanded. Rivers Golygina, Koshegochek, Ozernaya were included in aerovisual surveys. The total number of flight time allocated for the survey of West Kamchatka river systems compared with 2016 and 2017. increased twice. In 2018, there were 3 helicopter flights for Kol river (07.08., 30.08., 15.10.), for river Vorovskaya 3 flights (01.09., 27.09., 11.10.), for Golygina river - 2 flights (04.09., 08.10.), for Koshegochek river - 1 flight (04.09.), for Ozernaya river - 1 flight (04.09.).

For the same period in 2016, twi river basins were surveyed once: Vorovskaya river (03.09.) and Kol river (September 06). In 2017, two flights were organized for river Vorovskaya (09.08., 30.08.) and one flight for river Kohl (09.08.).

Aerovisual monitoring surveys are traditionally carried out in the main river beds and tributaries of the first, second, and less often third orders. This flight scheme allows cover up to 60–70% of the river network of watercourses and up to 70–80% of the most significant spawning areas.

Table 7.1. Salmon escapement level in target rivers, thousand spawners

Rivers	PINK SALMON			CHUM SALMON		
	2016	2017	2018	2016	2017	2018
VOROVSKAYA	100,0	231,1	16400,0	0,5	42,6	100,0
KOL	3300,0	625,0	11185,0	7,5	23,5	54,0
GOLYGINA	no data	no data	397,5	no data	no data	4,7
KOSHEGOCHEK	no data	no data	33,5	no data	no data	
OZERNAYA	no data	no data	2,75	no data	no data	0,6
	COHO SALMON			RED SALMON		

VOROVSKAYA						
KOL	no data	no data	13,0			
GOLYGINA						
KOSHEGOCHEK						
OZERNAYA				1826,0	2350,0	1778,5

CHAPTER 8. Report on escapement monitoring improvements in Opala river in 2018 based on information (from MRAG) that in 2017 escapement level was low but monitoring was not conducted

Opala and Golygina rivers have a common estuary, forming a single river system. Therefore, Pacific salmon species reproducing in these rivers are considered as a single stpck.
Dynamics of pink salmon spawning stock after reaching its maximum in the 80-90s of the last century is characterized by a slight decrease. At the same time, this is accompanied by chum salmon sock increase. The spawning part of chum salmon stock in Opala-Golygina river system is characterized by relatively stable population and on average is estimated at the level of 100–110 thousand spawners since 2005, which generally corresponds to the target escapement goals.
In 2017, only early form of chum salmon was assessed. Aerovisual survey flight was carried out on July 18 in the middle course of the main river and tributary - r. Savan, where main spawning grounds of early form of chum salmon are located (Fig. 8.1). According to the obtained data, the number of chum salmon in the basin of Opala river was almost 45 thousand spawners. The format of this monitoring survey does not allow an objective assessment of spawning stock Opala-Golygin rivers. It is obvious that the number of spawners is higher than estimated, but without systematic full-scale studies it is impossible to adequately estimate the number of chum salmon.
In 2018, the monitoring mode in the basin of Opala river was changed. In total, 5 helicopter flights were organized (Fig. 8.2). Five Pacific salmon species: pink salmon, chum salmon, red salmon, coho salmon, chinook salmon were assessed. Multiple aerovisual surveys also provide the necessary statistical material, which allow to apply mathematical calculation models in order to obtain a synthetic escapement indicator.

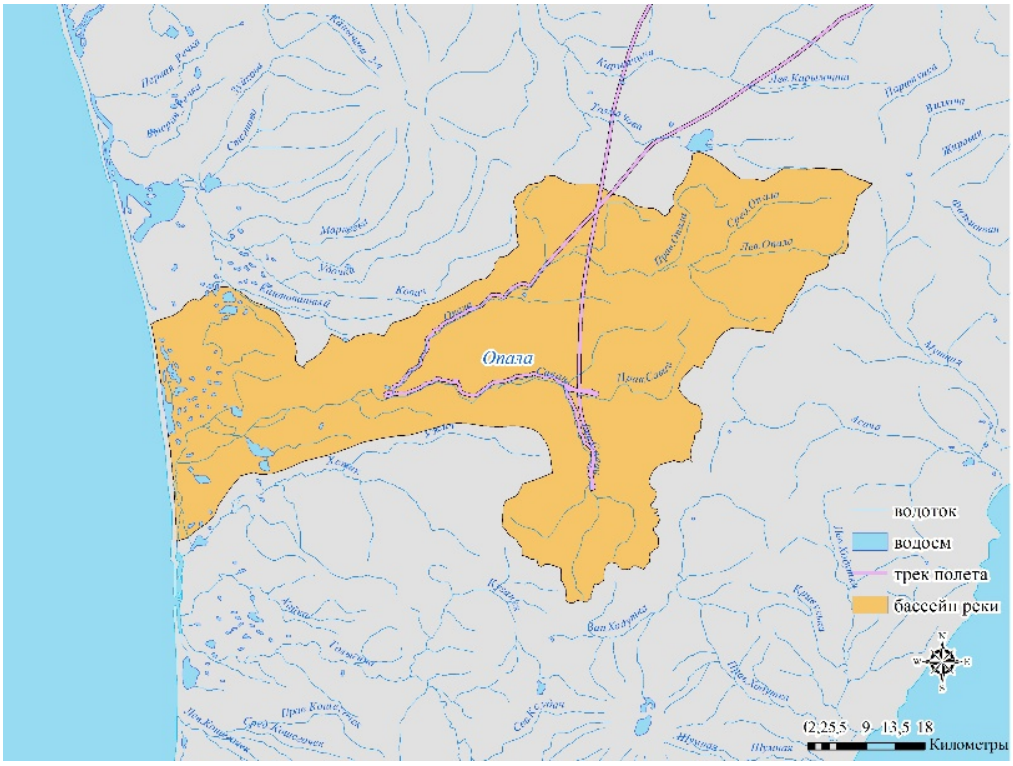


Figure 8.1 — Flight tracks (assessing Pacific salmon stocks) in Opala river in 2017

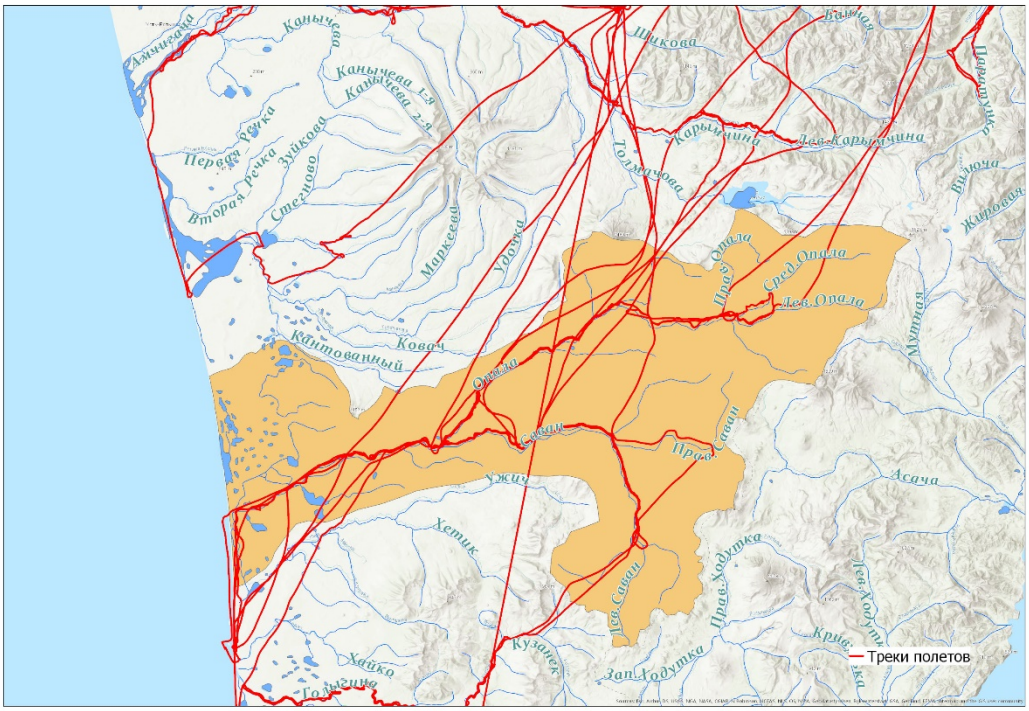


Figure 8.2 — Flight tracks (assessing Pacific salmon stocks) in Opala river in 2018

CONCLUSION

This report provided the analysis of Pacific salmon stock and fisheries management (pink salmon, chum salmon, red salmon, coho salmon) in the basins of Ozernaya and Opala rivers and the adjacent sea areas of the western coast of Kamchatka in 2018 The studies were carried out as scientific support for MSC audit in Delta fishery.

Pacific salmon (pink salmon, chum salmon, red salmon) escapement level in water bodies where Delta fishery occurred in 2018 was at a stable level for red salmon and chum salmon. The escapement level of pink salmon spawners to the spawning grounds in Western Kamchatka was at the maximum level for the entire period of available historical observations. In most cases, escapement level was close to the target reference points. For coho salmon, escapement level calculation is still uncertain, since regular aerovisual surveys are not carried out.

It should be noted that the high escapement level of pink salmon spawners in 2018 made it difficult to assess the escapement level for other Pacific salmon species. Therefore, in some cases, there may be a real undercount of red salmon, chum salmon and coho salmon spawners in the spawning grounds of the target river basins.

Nevertheless, we can claim that Delta fishery management measures and actions indicate the balance between the fishery system and spawning escapement level. However, a thorough monitoring of certain salmon stocks in the target water bodies is required.

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Related Anadromous Fisheries Commission Protocols for 2018

AFC Meeting Protocol-5
5.23.18.
Agenda of the meeting:
1. On the establishment of volumes of catch (catch) of Pacific salmon for the organization of amateur and sport fishing.
2. About the schedule of passing days.
3. On the location of the fishing gear placement for catching Pacific salmon and char in traditional fishing.
4. Miscellaneous.
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1. LISTENED TO:
V.M. Galitsyn - about the received applications of legal entities on the establishment of volumes of catch (catch) of Pacific salmon for the organization of amateur and sport fishing.
SPOKEN BY: N.P. Borodin, Yu.A. Tatarinov.
In accordance with paragraph 5.1 of the Commission's activities, on the basis of the recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Glavrybvod May 24, 2017 No 01-15 / 1581 and statements by legal entities.
SOLVED:
1.1. To establish the volumes of extraction (catch) of Pacific salmon on water bodies and their parts for organizing amateur and sport fishing, as well as the volume of catch (catch) of Pacific salmon to legal entities that have the right to extraction (catch) non-core fish species with which contracts have been concluded on the provision of a fishing area for the organization of amateur and sport fishing in accordance with Appendix 1 to this protocol.
By voting: "for" - unanimously.
1.2. In order to preserve stocks of western Kamchatka and Sims, it is possible to recommend users of river fishing grounds to organize amateur and sport fishing in the Western Kamchatka and Kamchatka-Kuril subareas, which, in accordance with the concluded agreements on the provision of the fishing area, may indicate in fishing applications registration of permits for the extraction (catch) of aquatic biological resources for the period prior to the start of commercial fishing in the rivers of the West Kamchatsk th and Kamchatsko-Kuril subzones exclusively fishing gear (spinning rods, fishing rods).
By voting: "for" - unanimously.
1.3. Install 0.3 tons of char on the fishing ground No 737 (b. Savan) for the organization of amateur and sport fishing Ltd "Mikizha" (TIN 4101171747).
By voting: "for" - unanimously.

1.4. To bring the unallocated volume of possible catch of Pacific salmon for industrial, coastal fishing and the organization of amateur and sport fishing in accordance with Appendix 2 to this protocol.
2. LISTENED TO:
V.M. Galitsyn - on the recommended mode of passing days.

SPOKEN BY: I.R. Shaikhov, A.A. Kopylov, D.D. Danilin, A.V. Khristenko, N.P. Borodin, V.G. Davydov.
In accordance with paragraph 5.2 of the Commission's activities, on the basis of the recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Glavrybvod Federal Agency of April 27, 2017 No. 01-15 / 1321

SOLVED:

2.1. Determine the passing days for industrial, coastal, traditional fishing:
- in Avacha Bay and on RPU No 217 - Monday, Tuesday, Wednesday weekly;
- in the period from June 4 to June 26 (inclusive) in the water area of the Gulf of Olutor - Monday, Tuesday weekly;
- in the Kamchatka Bay in the period from June 18 (inclusive) - Monday, Tuesday weekly;
- on marine RPUs in the West Kamchatka and Kamchatka-Kuril subzones, with the exception of the waters from RPU No 189 (inclusive) south to RPU No 209 (inclusive) from the beginning of the fishery to July 25, and also from September 3 - Monday, Tuesday weekly.
Rivers, lakes:
- in the rivers, lakes of the West Kamchatka and Kamchatka-Kuril subzones (with the exception of the Bolshaya, Ozernaya (western), Vorovskaya rivers) from the beginning of the fishery to July 25 and from September 3 - Monday, Tuesday, Wednesday; in the period from July 26 to September 3 - Monday, Tuesday weekly;
- on the river. Ozernaya (western) - 23, 24, 27, 28 June, 1, 2, 5, 6, 9, 10, 13, 14, 17, 18, 21, 22, 25, 26, 29, 30 July; 2, 3, 6, 7, 10, 11, 14, 15, 18, 19, 22, 23, 26, 27, 30, 31 August; 3, 4, 7, 8, 11, 12, 15, 16, 19, 20, 23, 24 September;
- on the river. Vorovskaya - July 28, 29; 1, 2, 5, 6, 9, 10, 13, 14, 17, 18, 21, 22, 25, 26, 29, 30 August; 23 September;
- on the part of the Bolshaya River water area from its mouth to the fishing area No 721 (inclusive) - Monday, Tuesday, Wednesday weekly;
- in part of the water area of the Bolshaya River from fishing area No 723 (inclusive) and upstream, including its tributaries - Tuesday, Wednesday, Thursday weekly;
- in the rivers, lakes of Karaginskaya and Petropavlovsk-Commander subzones - Monday, Tuesday, Wednesday weekly.
By voting: “for” - 12, “against” - 2.

2.2. Determine that for organizing amateur and sport fishing, passing days are not established:
- on fishing grounds, where, in accordance with the concluded agreements on the provision of a fishing ground, only fishing gear (spinning rods, fishing rods) can be used as fishing gear;
- subject to the issuance of a permit for the extraction (catch) of aquatic biological resources using exclusively fishing gear (spinning rods) on fishing grounds, on which other fishing gear may be used in accordance with the concluded agreements on granting fishing ground.
Determine days passed at fishing sites for organizing amateur and sport fishing using net gear - Monday, Tuesday weekly, except for fishing areas in Avacha Bay and RPU NoNo 218, 219, for which to determine days passed through Monday, Tuesday, Wednesday weekly.
By voting: “for” - unanimously.

2.3. Determine that during the days of passage fishing is not carried out. The fixed seines shall be rendered inoperable until 24.00 hours of the day preceding the passing day. Permanent seines are rendered inoperative by closing the inlet mouth of the fixed seine trap and tying the semi-trailing and coastal (at a distance of up to 150 m from the coastline) the net part of the wing to the central cable. Closing the entrance mouth of the trap is carried out by raising the edge of the bottom of the yard or a special net curtain at the entrance mouth. The net part of the wing is tied up for at least 30 m marked by buoy (yellow, red or orange). Before bringing the seine into an inoperative state, the seam and cages are cleaned up. During the period of passing days it is not allowed to pour the catch out of cages, to bring the net into working condition.
Other tools of catch (catch) in the periods of passing producers, both in sea and river water areas, before 24.00 hours of the day preceding the passing day, are removed completely and are rendered inoperable.

By voting: “for” - unanimously.
2.4. Determine that days passed on fishing areas in the estuary of the Khayryuzov and Belogolovaya rivers are not established.
By voting: “for” - unanimously.
3 LISTENED TO:
V.M. Galitsyn - on the places of production of fishing gear for traditional fishery without a permit for the extraction (catch) of aquatic biological resources and the provision of a fishing area in 2018.
SPOKEN BY: A.V. Khristenko, S.R. Dashevsky.
In accordance with paragraph 5.2 of the Commission’s activities, based on the recommendations of the FSUE “KamchatNIRO”, the Northeast Territorial Administration of the Russian Fishery Agency and the Northeast branch of the Glavrybvod Federal Agency of 05/24/2018 No 01-15 / 1581

SOLVED:
3.1. Determine the location of fishing gear for catching (catching) Pacific salmon and charr (places of catching Pacific salmon and charr) in the implementation of traditional fishing without providing a fishing area and without permission to extract (catch) aquatic biological resources in 2018 according to Appendix 3 to this protocol.
By voting: “for” - unanimously.

3.2. Do not determine the location of fishing gear for catching (catching) Pacific salmon and char in traditional fishery without providing a fishing area and without permission to extract (catch) aquatic biological resources in 2018 in the Aleutian, Karaginsky, Olyutorsky, Tigilsky and Penzhinsky municipal districts of Kamchatka as well as on routes of nomads, temporary stands and intermediate bases of reindeer herders (with the exception of UstBolsheretsky district).
By voting: “for” - unanimously.

3.3. Recommend local governments of municipalities of the Kamchatka Territory and the Northeastern Territorial Administration of the Federal Fishery Agency to work together to identify on the site the boundaries of fishing grounds for Pacific salmon and loach.
By voting: “for” - unanimously.
4. LISTENED TO:
V.M. Galitsyn - about the applications of legal entities received to the address of the commission. About the appeal of deputies of the Council of Deputies of a rural settlement Vyvenka.
SPOKEN BY: A.V. Khristenko, N.P. Borodin, I.R. Shaykhov.
In accordance with clauses 5.1, 5.3 of the Commission’s activity procedure, on the basis of recommendations of the FSUE “KamchatNIRO”, the North-Eastern Territorial Administration of the Russian Fishery Agency and the Northeast branch of the FSBI “Glavrybvod” dated 04/27/2018 No 01-15 / 1321 and received applications of legal entities

SOLVED:
4.1. Introduce amendments to annex 5 to the protocol dated 05.17.2018 No 4, adding to the group of water bodies “Karaginsky Bay, Ossorskaya Lagoon, rr. Ossora, Karaga, Tymlat, Kichiga, Belaya, Anapka, Khi-Anapka ”with the line OOO“ PLOKSAN ”(TIN 8203008909) with fishing plots NoNo 444, 452.
By voting: “for” - unanimously.

4.2. In connection with the technical error, the section “Karaginsky subzone” of Annex 4 to the protocol dated 05.17.2018 No 4 is set out in the new edition in accordance with Appendix 4 to this protocol.
By voting: “for” - unanimously.

4.3. Make changes to paragraph 4.1 of the protocol dated 05.17.2018 No 4, stating a paragraph concerning the establishment of volumes of catch (catch) of Pacific salmon to persons belonging to small indigenous peoples of the North, Siberia and the Far East of the Russian Federation in the water bodies of the Olyutorsky district in the next editions:
“- 200 kg of Pacific salmon per person in the water bodies of the Olyutorsky region, including: those living in the village of Vyvenka and with. Hailino 50 kg of pink salmon, 50 kg of chum, 50 kg of salmon, 50 kg of coho salmon; 50 kg of pink salmon, 50 kg of chum, 50 kg of salmon, 40 kg of coho salmon, 10 kg of chinook; ";
By voting: “for” - unanimously.

4.4. Consider the possibility of changing the start date for the implementation of traditional fisheries in the River Vyvenka at the next meeting of the commission, at the suggestion of the FGBNU "KamchatNIRO" for additional information.
By voting: “for” - unanimously.
V.M. Galitsyn
R.G. Pomegranate
V.G. Davydov
N.P. Borodin
D.D. Danilin
S.R. Dashevsky
Yu.A. Kondratyuk
A.A. Kopylov
S.V. Kryuchkovsky
Yu.A. Tatarinov
A.V. Khristenko
I.R. Shaikhov
D.Yu. Schmidt

AFC Meeting Protocol-18
7.30.2018
Agenda of the meeting:
1. On changing the regime of passing days in Western Kamchatka.
2. On establishing additional volumes of harvest (catch) of Pacific salmon.
3. On determining the additional fishing area for traditional fishing in the Avacha Bay.
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1. LISTENED TO:
V.M. Galitsyna - about the beginning of mass approaches of pink salmon on the western coast of Kamchatka, recommendations for changing the previously established regime of days in transit in Western Kamchatka.
SPOKEN BY: N.YU. Shpigalskaya, I.R. Shaikhov, R.G. Pomegranates.
In accordance with paragraph 5.2 of the Commission’s activities, based on the recommendations of the FSUE “KamchatNIRO”, the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Glavrybvod FSBU dated July 30, 2017 No 01-15 / 2245

SOLVED:
1.1. Cancel earlier established days in rivers, lakes of Sobolevsky and Ust-Bolsheretsky districts (except for the Ozernaya river) from 12.00 on July 30 until special order of the commission.
By voting: “for” - unanimously.

1.2. Cancel on p. Lake (western) day of passage on July 30 (from 12.00 hours).
By voting: “for” - unanimously.

2. LISTENED TO:
V.M. Galitsyna - on the dynamics of the fishery, recommendations for establishing additional volumes of catch (catch) of Pacific salmon.
In accordance with paragraphs 5.1-5.3 of the Commission’s activities, on the basis of recommendations of the FSUE “KamchatNIRO”, the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-East branch of the FSBI “Glavrybvod” of 07/30/2018 No 01-15 / 2245

SOLVED:
2.1. To establish additional volumes of catch (catch) of Pacific salmon for industrial, coastal fisheries in water bodies of the Kamchatka Territory and their parts, as well as volumes of catch (catch) of Pacific salmon for legal entities that have the right to extract (catch) nonfishing fish species, which concluded agreements on the provision of a fishing area for the implementation of industrial, coastal fishing in accordance with Annex 1 to this protocol.
By voting: “for” - unanimously.

2.2. Bring the unallocated potential catch of Pacific salmon for industrial, coastal fisheries and amateur and sport fishing in accordance with Appendix 2 to this protocol.

3. LISTENED TO:
V.M. Galitsyn - on the definition of an additional fishing position for the traditional fishery in the Avacha Bay (boo Zavoyko) within the boundaries of the non-fixed fishing area No 236 by the appeal of the Association of Indigenous Minorities of the North of the Kamchatka Territory.

SPOKEN BY: I.R. Shaykhov.
In accordance with paragraph 5.2 of the Commission’s activities, on the basis of the recommendations of the FSUE “KamchatNIRO”, the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Glavrybvod Federal Register of 07/30/2018 01-15 / 2245

SOLVED:
Determine the additional location of fishing gear for catching (catching) Pacific salmon and charr (place of catching Pacific salmon and charrrh) in the implementation of traditional fishing without providing a fishing area and without permission to extract (catch) aquatic biological resources in 2018 within the following limits:
- Avacha Bay, Zavoyko Bay - 300 m from the base point (coordinates: latitude 52 ° 56'47 ”, longitude 158 ° 40'26) along the coastline to the east, 200 meters into the water area of the Avacha Bay.
By voting: “for” - unanimously.
V.M. Galitsyn
R.G. Pomegranate
V.G. Davydov
N.P. Borodin
YES. Ginzburg
D.D. Danilin
S.V. Kryuchkovsky
I.R. Shaikhov
N.Y. Shpigalskaya

AFC Meeting Protocol-21
8.7.18.

Agenda of the meeting:
1. On changing the mode of passing days.
2. On the establishment of additional volumes of catch (catch) of Pacific salmon.
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1. LISTENED TO:
N.Y. Shpigalskaya - on the achievement of the lower limit of the optimum for the passage of salmon in the lake. Kuril, the expediency of changing the regime of passing days on the river. Lake.
About recommendations on the cancellation of days on the rivers of the Tigilsky district for the period of the mass progress of pink salmon due to the high size and latitudinal distribution of its approaches to the western coast of Kamchatka.

SPOKEN BY: V.M. Galitsyn, DD Danilin.
in accordance with clause 5.2 of the Commission's activities, on the basis of the recommendations of the FSUE "KamchatNIRO", the Northeast Territorial Administration of the Russian Fishery Agency and the Northeast Branch
FSBI "Glavrybvod" from 06.08.2018 No 01-15 / 2324

SOLVED:
1.1. In changing the previously established mode of passing days to determine the passing days on the river. Lake (western) - Monday, Tuesday, weekly.
By voting: "for" - unanimously.

1.2. Cancel earlier established days on the rivers of the Tigilsky district from 5:00 pm on August 7 until the special order of the commission.
By voting: "for" - unanimously.

1.3. To amend clause 2.2 of Protocol No. 5 of 05/25/2018 from 5:00 pm on August 7 To cancel passing days at fishing grounds for organizing amateur and sport fishing using net fishing gear in the Kamchatka-Kuril and West-Kamchatka subzones, until a special commission decree.
By voting: "for" - unanimously.

2 .LISTENED TO:
V.M. Galitsyn - on the dynamics of the fishery, recommendations on establishing additional volumes of catch (catch) of Pacific salmon, on combining groups of water bodies for the rational development of resources.

SPOKEN BY: N.YU. Shpigalskaya, DD Danilin.
In accordance with paragraphs 5.1-5.3 of the Commission's activities, on the basis of recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-East branch of the FSUE "Glavrybvod" of 06.08.2018 No 01-15 / 2324

SOLVED:

2.1. Combine the water body groups of the Petropavlovsk-Komandorsky subzone around pink salmon and install 2,816.0 tons of pink salmon (including an additional volume of 400 tons) to the combined water body group.
By voting: “for” - 16, “against” - 1 (A. Kopylov).
-
2.2. Combine the water body groups of the West Kamchatka subzone in a pink salmon and keta and install it on the combined water body
objects 52,965.0 tons of pink salmon (including an additional volume of 15,000 tons) and 4402.0 tons of chum salmon (including an additional volume of 400 tons).
By voting: “for” - unanimously.

2.3. Combine the Ketka water bodies of the Kamchatka-Kuril subzone and install 5,228.0 tons of chum into the combined group of water bodies (including an additional volume of 300 tons).
By voting: “for” - unanimously.

2.4. Allow users to fish for the total established volumes in accordance with clauses

2.1-2.3 of this protocol after making appropriate changes in the issued permits for the harvest (catch) of aquatic bioresources in terms of increasing the established volumes of catch (catch) of Pacific salmon in fishing areas in accordance with the production needs .
By voting: “for” - unanimously.

2.5. To establish additional volumes of catch (catch) of Pacific salmon for industrial, coastal fisheries in water bodies of the Kamchatka Territory and their parts, as well as volumes of catch (catch) of Pacific salmon for legal entities that have the right to extract (catch) nonfishing fish species, which concluded agreements on the provision of a fishing area for industrial, coastal fishing in accordance with Annex 1 to this protocol, as well as:
- 15 000 torgbushy for the group of water bodies of the Kamchatka-Kuril subzone united in a pink salmon.
By voting: “for” - unanimously.

2.6. To establish additional volumes of catch (catch) of Pacific salmon on water bodies and their parts for the organization of amateur and sport fishing, as well as the volume of catch (catch) of Pacific salmon to legal entities that have the right to catch (catch) andadromic species of fish with which agreements on the provision of a fishing area for the organization of amateur and sport fishing in accordance with Annex 2 to this protocol.

By voting: “for” - unanimously.
2.7. Bring unallocated potential catch of Pacific salmon for industrial, coastal fisheries and amateur and sport fishing
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AFC Meeting Protocol-22
8.9.18
Agenda of the meeting:
1. On establishing additional volumes of catch (catch) of Pacific salmon.
2. Miscellaneous.
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1. LISTENED TO:

V.M. Galitsyn - the dynamics of the fishery, recommendations to establish additional volumes of catch (catch) of Pacific salmon. on the increase in the Bureau of the Sectoral Council for Commercial Forecasting at the Federal Agency for Fisheries of recommended volumes of pink salmon and chum salmon on the coast of western Kamchatka in the West Kamchatka subzone by 50,000 tons and 2,670 tons, in the Kamchatka-Kuril subzone by 50,000 tons and 3279 tons respectively.

SPOKEN BY: N.YU. Shpigalskaya, DD Danilin.
In accordance with paragraphs 5.1-5.3 of the Commission's activities, on the basis of recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-East branch of the FSUE "Glavrybvod" dated 08.08.2018 No 01-15 / 2370

SOLVED:
1.1. Establish additional volumes of harvest (catch) of Pacific salmon for the implementation of industrial, coastal of fisheries in water bodies of the Kamchatka Territory and their parts, as well as the volume of catch (catch) of Pacific salmon to legal entities that have the right to extract (catch) non-standard fish species that have been contracted to provide a fishing area for industrial, coastal fishing according to Annex 1 to this Protocol, as well as:
- 25,000 tons of pink salmon and 1500 tons of chum salmon per combined group of water bodies of the West Kamchatka subzone.
- 25,000 tons of pink salmon and 1500 tons of chum salmon per combined group of water bodies of the Kamchatka-Kuril subzone.
By voting: "for" - unanimously.
1.2. Bring the unallocated potential catch of Pacific salmon for industrial, coastal fisheries and amateur and sport fishing in accordance with Appendix 2 to this protocol.

2. LISTENED TO:
N.Y. Shpigalskaya - on the results of the conducted air inspection of the basins of the Opala, Kikhchik, Pymta, Kohl rivers, the insufficient pace at which the pink salmon producers and the late form of chum salmon were passing in river Opala
SPOKEN BY: V.M. Galitsyn.
in accordance with paragraph 5.2 of the Commission's activities, on the basis of the recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Federal State Budgetary Enterprise "Gla Ybvod" of 08.08.2018 No 01-15 / 2370
SOLVED:
Determine the two passing days in the fishing areas of industrial fishing on the river Opala - from 00 hours on August 11 to 24 hours on August 12.
voting: "for" - unanimously.
V.M. Galitsyn
V.G. Davydov
YES. Ginzburg
D.D. Danilin
A.A. Kopylov
A.V. Khristenko
D.Yu. Schmidt
N.Y. Shpigalskaya

AFC Meeting Protocol-23

8.15.18.
Agenda of the meeting:
1. On establishing additional volumes of catch (catch) of Pacific salmon.
2. On the cancellation of passing days on the Ozernaya river
3. On the resumption of fishing on the river RPU in the Ust-Kamchatka region.
4. Miscellaneous.
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1. LISTENED TO:
V.M. Galitsyn - on the dynamics of the fishery, recommendations for establishing additional volumes of catch (catch) of Pacific salmon.
SPOKEN BY: N.YU. Shpigalskaya, A.V. Khristenko, A.A. Kopylov.
In accordance with paragraphs 5.1-5.3 of the Commission's activities, on the basis of recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-East branch of the FSUE "Glavrybvod" of 13.08.2018 No 01-15 / 2398
SOLVED:
1.1. To establish additional volumes of catch (catch) of Pacific salmon for industrial, coastal fisheries in water bodies of the Kamchatka Territory and their parts, as well as volumes of catch (catch) of Pacific salmon for legal entities that have the right to extract (catch) nonfishing fish species, which concluded agreements on the provision of a fishing area for industrial, coastal fishing in accordance with Annex 1 to this protocol, as well as:
- 40 tons of pink salmon in the group of water objects of the Petropavlovsk-Commander subzone united in a pink salmon;
- 10,000 tons of pink salmon and 1000 tons of chum salmon per combined group of water bodies of the West Kamchatka subzone;
- 15,000 tons of pink salmon and 1000 tons of chum salmon per combined group of water bodies of the Kamchatka-Kuril subzone.
By voting: "for" - unanimously.
1.2. Establish additional volumes of catch (catch) for the organization of amateur and sport fishing:
- 10.0 tons of kets at RPU No 689 (r. Vorovskaya) 000 "Andar" (TIN 4108002628);
- 2.0 t of kets for each of the RPU No 766 (the Avacha River) and No 280 (the Kamchatka Bay) Northeast branch of the FSBI Glavrybvod (TIN 7708044880);
- 5.0 tons of pink salmon at RPU No 722 (b. Large) 000 "Fish Tour" (TIN 4101182072).
By voting: "for" - unanimously.
1.3. Bring the unallocated potential catch of Pacific salmon for industrial, coastal fisheries and amateur and sport fishing in accordance with Appendix 2 to this protocol.
2. LISTENED TO:
N.Y. Shpigalskaya - on the achievement of the optimum for the passage of sockeye salmon. Kuril, the expediency of canceling days passing on the river. Lake.
SPOKEN BY: V.M. Galitsyn, DD Danilin.
In accordance with paragraph 5.2 of the Commission's activities, based on the recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Glavrybvod Federal Agency of August 13, 2017 No 01-15 / 2398
SOLVED:
Cancel previously established days of passage on the river. Lake (western).
By voting: "" for "; - unanimously.
3. LISTENED TO:
N.Y. Shpigalskaya - on the completion of the course of the late form of sockeye p. Kamchatka, recommendations to resume fishing on the river RPU Ust-Kamchatka region.
SPOKEN BY: V.M. Galitsyn, V.G. Davydov, A.A. Kopylov, A.V. Khristenko.

in accordance with paragraph 5.2 of the Commission's activities, on the basis of recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch of the Glavrybvod Federal Agency of August 13, 2017 No. 01-15 / 2398
SOLVED:
Resume fishing in fishing areas p. Kamchatka within the boundaries of the Ust-Kamchatka region from 00.00 o'clock on August 16 with preservation of the days of passage established by clause 2.1 of protocol No. 5 of 05/25/2018 - Monday, Tuesday, Wednesday weekly.
By voting: "for" - unanimously (the special opinion of DD Danilin is attached to the protocol).
4. LISTENED TO:
V.M. Galitsyn - on the appeal of the Association of Indigenous Minorities of the North of the Kamchatka Territory on 08/08/2018 with a proposal to allow the implementation of traditional fishing outside the places of production of fishing gear in the marine area of the Ust-Bolsheretsk region.
SPOKEN BY: A.V. Khristenko.
SOLVED:
Recommend FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-Eastern Branch
FSBI Glavrybvod to speed up the consideration of the appeal of the Association of Indigenous Minorities of the North of the Kamchatka Territory from 08.08.2018.
By voting: "for" - unanimously.
V.M. Galitsyn
R.G. Pomegranate
V.G. Davydov
YES. Ginzburg
D.D. Danilin
A.A. Kopylov
S.V. Kryuchkovsky
A.V. Khristenko
D.Yu. Schmidt
N.Y. Shpigalskaya

AFC Meeting Protocol-25
8.22.18
Agenda of the meeting:
1. On establishing additional volumes of catch (catch) of Pacific salmon.
2. On the introduction of the regime of passing days.
3. On consideration of the appeal of the Association of Indigenous Minorities of the North of the Kamchatka Territory.
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1. LISTENED TO:
V.M. Galitsyn - on the dynamics of the fishery, recommendations to establish additional volumes of catch (catch) of Pacific salmon.
On the increase in the Bureau of the Sectoral Council for Fisheries Forecasting at the Federal Agency for Fisheries of the recommended volumes of pink salmon in the West Kamchatka subzone by 25,000 tons, in Kamchatka-Kuril by 25,000 tons.
In accordance with paragraphs 5.1-5.3 of the Commission's activities, on the basis of recommendations of the FSUE "KamchatNIRO", the North-Eastern Territorial Administration of the Russian Fishery Agency and the North-East branch of the FSBI "Glavrybvod" of 08/21/2018 No 01-15 / 2474, of 08/22/2018 0 01-15 / 2488

SOLVED:
1.1. To establish additional volumes of catch (catch) of Pacific salmon for industrial, coastal fisheries in water bodies of the Kamchatka Territory and their parts, as well as volumes of catch (catch) of Pacific salmon for legal entities that have the right to extract (catch) nonfishing fish species, which concluded contracts for the provision of fishing
site for industrial, coastal fishing in accordance with Annex 1 to this Protocol, as well as:
- 19,000 tons of pink salmon per combined group of water bodies of the West Kamchatka subzone;
- 24,000 tons of pink salmon per combined group of water bodies of the Kamchatka-Kuril subzone.
By voting: “for” - unanimously.
1.2. To establish additional volumes of catch (catch) of Pacific salmon for water bodies and their parts for the organization of amateur and sport fishing, as well as the volume of catch (catch) of Pacific salmon for legal entities that have the right to catch (catch) andadromic species of fish with which agreements on the provision of a fishing area for the organization of amateur and sport fishing in accordance with Annex 2 to this protocol.
By voting: “for” - unanimously.
1.3. To bring the unallocated volume of possible catch of Pacific salmon for industrial, coastal fishing and the organization of amateur and sport fishing in accordance with Appendix 3 to this protocol.
2. LISTENED TO:
V.M. Galitsyn - on the appeal of the Administration of the Ust-Bolsheretsky Municipal District of the Kamchatka Territory of July 12, 2017 on the establishment of passing days on the r. Great for August 24-26, the VII Kamchatka regional festival "Let's save salmon TOGETHER!".
On the organization of the festival, on the inexpediency of introducing passing days in the specified period due to the intensity of the pink salmon.
N.Y. Shpigalskaya - on the recommendations set on the rivers from the river. Great to the south (with the exception of the Ozernaya River) from August 27, two passing days a week based on operational information about a significant reduction in the intensity of spawning approaches of pink salmon in the rivers of the southwestern coast of Kamchatka and to ensure a uniform flow of silver salmon throughout the spawning run.
SPOKEN BY: A.V. Khristenko, I.R. Shaykhov, D.D. Danilin, V.G. Davydov.
in accordance with paragraph 5.2 of the Commission’s activities, on the basis of the recommendations of the FSUE “KamchatNIRO”, the Northeast Territorial Administration of the Russian Fishery Agency and the Northeast branch of the Glavrybvod Federal Agency of 21.08.2018 No 01-15 / 2474
SOLVED:
Determine for the period from August 27th the passing days for industrial, traditional fishing:
- on the rivers Opala, Golygina, Koshegochek, Second Yavinsky, First Yavinsky - Monday, Tuesday weekly;
- on the part of the Bolshaya River water area from its mouth to RPU No 721 (inclusive) - Monday, Tuesday weekly;
- in part of the water area of the Bolshaya River from RPU No 723 (inclusive) and upstream, including its tributaries - Tuesday, Wednesday weekly.
By voting: “for” - unanimously.
3. LISTENED TO:
V.M. Galitsyn - on the appeal of the Association of Indigenous Minorities of the North of the Kamchatka Territory on 08/08/2018 with a proposal to allow the implementation of traditional fishing outside the places of production of fishing gear in the marine area of the Ust-Bolsheretsk region.
on the position of the North-Eastern Territorial Administration of the Federal Agency for Fishery on the specified issue, sent to the address of the commission by letter No 07-02-08 / 6350.
SPOKEN BY: A.V. Khristenko, I.R. Shaikhov, V.G. Davydov.
SOLVED:

3.1. Do not alter the previously adopted decision of the commission to implement traditional fishing in the Ust-Bolsheretsky region in relation to Pacific salmon without permits for harvesting (catching) aquatic bioresources and providing a fishing area exclusively within the limits of the places for putting fishing gear.
By voting: “for” - unanimously.
3.2. To consider the issue of determining the additional place of putting fishing gear for catching (catching) Pacific salmon and loaches in the UstBolsheretsky district in the event of receipt of relevant proposals from local governments of municipalities, associations of indigenous peoples, as well as recommendations of the FSUE “KamchatNIRO”, the Northeast Territorial Administration
FSBI Glavrybvod,
Rosrybolovstvo and the North-Eastern branch provided for in the Commission’s activities.
By voting: “for” - unanimously.
V.M. Galitsyn
V.G. Davydov
D.D. Danilin
A.V. Khristenko
I.R. Shaikhov
N.Y. Shpigalskaya

Sociological estimation of illegally harvested fish in Western Kamchatka and preliminary model of illegal fisheries of in a quantitative regime

A reporting document by Dr. Veronika V. Simonova for MSC certification action plan, 'Vitiaz Avto' LLC and 'VA DELTA' LLC

Dr. Veronika V. Simonova, 2019

Introduction

This document is the second preliminary report for the analysis of illegal fisheries as a social phenomena and the issue for the estimation of the quantity of illegally harvested fish in Western Kamchatka. This document is the outcome of the expedition by Alexandra Terekhina and Alexandr Volkovitskii who were supposed to work with a structured questionnaire and gather data on a quantitative character.

The questionnaire emerged after series of discussions concerning qualitative results and ethnography gathered during previous expeditions, and we also elaborated this questionnaire for a purpose of getting the structured information on key issues we found out via working with interviews and ethnography. The main task was to find out how the quantity of illegally harvested fish by local fishermen correlates with those of external brigades on a discursive level and how can we elaborate a model of estimation of illegal salmon catch in the target region. If narratives coincide in number, we may accept this data as systematic and related to actual state of affairs.

This document consists of paragraphs as follows: the context of the expedition and data gathering by researchers Alexandra Terekhina and Alexandr Volkovitskii, communal ether around fisheries, geography and logistics, topography, illegal fisheries and its specific character, comments on the information from questionnaire, graphs of key tendencies reflected in the questionnaire, interpretation, airport or 'red traffic' statistics, and a preliminary explanatory model of a quantitive nature.

The context of the expedition by Alexandra Terekhina and Alexandr Volkovitskii, Fall 2018

This research was conducted from 11 October till 3 of November 2018. We spent several days in Petropavlovsk-Kamchatskii where started getting acquainted with the region and its dynamics. The main task of that expedition was to question people in Sobolevo and Oktiabrskii settlement of Western Kamchatka. Questionnaire were created on the basis of previous two expeditions where qualitative data was gathered and analyzed. The main purpose was to find out the amount of illegally caught salmon. We realized that this topic is very sensitive for local fishermen and also potential difficulties we would encounter in our anonymous research.

Our worries became stronger once we knew that the year of our fieldwork was a record for a pink salmon along with the cruel fight against poaching from the side of fishing police. Indeed, we encountered the fact that people talked to us freely: they were ready ti

discuss fisheries and problems related to it; yet, once they saw a printed questionnaire they refused continue speaking immediately. The same thing happened with a voice recorder.

Nevertheless, the situation differed depending on a settlement. An important role in the process of research belongs to so-called local guides [provodniki], who are to introduce a researcher to the social environment of a place. They are a sort of bridge of trust between a scholar and poachers. Unfortunately, in Sobolevo we did not have such a person. Though we tried to find a one in a local museum. And we had an experience before, that representatives of local intelligent strata are usually

very helpful, at least from the first steps of a research. Alas, co-workers in the local museum [kraevedcheskii muzei] expressed their serious doubts that anyone from local poachers will wish to answer our questions. Moreover, other days, fishing police checked almost every house severely and in detail: they even crashed floors and took all the fish and caviar without any scrutinized investigation. Furthermore, that year a new method of fight was introduced: they checked the electricity bills and if they are above a middle ones, this is a precedent for suspicion of illegal caviar and fish storage.

Despite all of the tension narratives, the director of the museum introduced us to her retired parents who helped us to find a couple of informants. Due to the fact that all males were fishing, we interviewed people in administration and a house of culture, and regrettably, we did not manage to interview any poachers. Therefore, we only briefly understood the context of fishing and made initial networking. Therefore, different informants spoke systematically about the number of poaching brigade (retired informants or amateur fishermen), and this fact can make a preliminary impression about the scale of illegally harvested salmon.

In Oktiabrskii settlement we stayed in a flat, not in a hotel as before, and we lived in the village center. Furthermore, our colleague previously managed to establish good relationships with local fishermen, and one of them agreed to help in organization of fieldwork. Regrettably, he had to move and we were obliged to start from ex nihilo.

The head of the settlement helped us and we talked to municipal workers, but we also contacted fire workers and ambulance drivers by ourselves since other 'power resources' did not work well enough. Mainly, a social researcher cannot fully rely on power holders due to an epic an epic story which gained a kind of popularity in the region: a sociologist studying illegal fisheries had a brother who worked as a prosecutor in Sobolevo and interviews were organized very quickly; yet, this situation is judged negatively by local people and the information a researcher finally obtained should be critically approached

Finally, our informants are people from the following categories:

- fishers with licenses who fish more than allowed;
- Fishers who fish without license for meal or small retail
- illegal fishermen working in brigades

Questionnaire we worked with as a tool turned into a supportive set of questions for structured interviews.

Communal ether around fisheries

In both settlements we faced a sharp sense of offense relevant for local residents: 'we live with fish [zhivem na rybe], but cannot fish'. One group of narratives is devoted to relations with fishing industries, which are seen as the key reason of fish decrease. Generally, local people view that fish industries fish too much than they should, and the amount which local fishermen fish is a true minimum which cannot influence fish population at all.

External poachers visiting the region in summer is another thing. Local residents consider the latter have connections with fishing police and therefore they do not 'swallow' [lopaiut] visiting poaching brigades. The plan which fishing police have, is being realized for the sake of local illegal fishermen. Often, people fishing with rods are arrested as poachers. One tragedy happened within a family where an elderly

retired man was arrested by his own san-in-law and finally, a small fishing turned into a criminal case and family disaster.

Not every local person can afford a license: they are not unlimited, fishing areas are far away from the settlement, hard to reach without private transport, licensed fishing is possible only within a particular dates. Furthermore, fish can be sold for lower price at the same places only. Sea coast, at the same time, is not for fishing; yet, it is the most comfortable place for this activity.

Criminalization of small scale illegal fisheries have a deep social consequences: many males have criminal cases and as result they cannot get a good job in state organs or a police. Nevertheless, all our informants explained they are motivated by illegal fishing as the only way of getting income for gaining better education for their children. Settlements are full of unemployed residents and living costs are extremely high. Though for some, it is an annual adventure and sense of hazard.

Fieldwork in the region demonstrated specific differences between Sobolevo and Oktiabr'skii settlement. Those differences are crucial for life strategies of population in relation to illegal fisheries. Hence, the differences directed research tactics in that locales.

Geography and logistics

Two settlements are located in the West coast of Kamchatka Peninsula but are connected to Petropavlovsk-Kamchatskii town by different logistic trails. Oktiabrskii settlement has a road which sometimes closes down due to sea storms, but most of the time it remains available for passengers and cargo.

Sobolevo is, by way of contrast, is an isolated settlement. No regular transport, airways mainly. Traffic is only represented by a semi-closed Gazprom road. Accordingly to informants, only those who are residents of the settlements can use this road. Other visitors had to be legally allowed to use it by administration in PK town. Nevertheless, the road has certain 'back-paths' [otvetvlenia] which are used by illegal transits and fishermen (whom we observed nearby the river).

Different logistics condition an attitude to newcomers: Sobolevo (despite seasonal fluctuations, spawning time first) is more closed. We did not manage to find any big poaching band, although local residents who fish for themselves and do not sell neither fish, nor caviar, were very social and spoke freely with us. Furthermore, according to media statistics Kamchatka is at the fifth place of most criminal and socially problematic regions of the Russian Federation, and Sobolevo is counted as one of its worst edges since 'people from PK go to Sobolevo to do crime' (the newspaper article devoted to massive driving under alcohol impact. https://pressa41.ru/auto/zhiteli-petropavlovska-sovershat-prestupleniya-ezdyat-v-sobolevo/?print=Y).

Oktiabrskii dwellers are more familiar with visitors whose number grows enormously in a summer time. Some of local residents as well as municipals formulates quite clearly from their own viewpoint a very well known sociological theory of resource curse. Namely, it is said that not only fish as a resource but also supporting infrastructure - road and communication constitute what is known by scholars as resource curse - the population of the region rich in resource suffer from the lack of economical opportunities and human rights.

The paradox of local infrastructure and combination of opportunities and problems it causes is in the existing tax system. As local municipals consider, infrastructure and mainly the road are vital for the settlement, and this fact made fishing companies pay less taxes for road exploitation (though recently

local administration found a way for fishing business to be also responsible for the road and its normal functioning). Yet the perspective of the settlement relocation (which we discussed in a previous report) is also a danger of sky rocketing road taxes for a fishing business. If the settlement ceases to exist - only fishing companies will need a road - thus they will have to pay for them. Therefore, local residents transfer a narrative with a negative connotation: 'we have to stay here for them to get more income'. Thus in both settlements negative social ether creates challenges not only for administration and business, but also for a social research.

Topography

Topography and the character of buildings constitute a totally different character of fields in Sobolevo and Oktiabrskii. Sobolevo, from the first glance, is a non-systematic set of buildings combining old houses oriented at the stream of the Vorovskaia river. Today the private sector dominates, and this type of architecture (isolated houses surrounded by high fences) built within the vast and spacious territories, from our viewpoint, do not facilitate an easy way for communication, contact making, and dialogue.

Oktiabrskii settlement, by way of contrast, represent a totally different spacial structure. Hence, constantly functioning road divide streets with block houses. The population thus is more concentrated, and easy to approach. A number of local shops are at service for a big number of people coming during spawning times and are a sort of hubs for communication between locals and visitors.

This spatial difference in comparison with Sobolevo, in our case, led to a very different communicative situations: in Oktiabrskii we quickly started greeting people and recognise familiar faces and no doubt we became very fast the object of discussion for elderly ladies sitting on the benches.

So called 'effect of mutual recognition' in Oktiabrskii comes principally quickly, what facilitate social investigation, quality and quantity of obtained data.

Illegal Fishing and its specific character

The topography of settlements to a certain extent defines the difference in fishing for all categories o local dwellers - from 'little poachers', fishing for only themselves, to 'large illegal fishermen' fishing at industrial scale.

A part of respondents in Sobolevo fish only at the Vorovskaia river, mainly within the borderlines of the settlement. There are some brigades who fish in the sea, not far away from the mouth of the river. Unfortunately, we did not manage to make a contact with any of these brigades. Our respondents in Sobolevo are local dwellers, who fish with license (yet trying to fish more than allowed), or without. The majority of them are caviar oriented. Indicatively, during conversations many of our respondents paid a lot of attention to ethical issues devoted to fishermen's behavior on the river as well as river natural changes across times. Regrettably, many of respondents refused speaking once they saw a questionnaire.

As they said, during the Soviet period, administrators controlled spawning places - when they were full, everyone knew that it was the token for the beginning of a fishing season, because then the moving up fish will only be deleting the caviar. They showed us a traditional orientation mark which emphasized the end of fishing spaces, and fishing after that borderline considered socially as entirely unethical.

Today, according to our informants, this rational traditional orders are in the past and they, unfortunately, are 'forced' moving upper the river stream. A part of poachers, or external poachers fish

strait at the spawning point [nerestilishche]. The reason of such an outcome they see in unfair distribution of fishing sectors [rybopromyslovykh uchastkov] and pressure of well organized and 'under-the-shelter' [podkryshovannykh] brigades and, finally, actions of a fishing police.

The specific location of Oktiabrskii settlement (narrow space between a spawning Bol'shaia river and the coastal line of the Sea of Okhotsk) allows the variety of fishing tactics relevant for local illegal fishermen. Accordingly to our interview, the mass of illegal fisheries (industrial brigades) is connected to the sea. In particular, the sea ribbon is near 2 kilometers and is in front of Oktiabrskii settlement and is considered as a fishing territory for local poachers. At the same time, local poachers, keep fishing with a special tackle called 'tube', and external brigades estimated the changes in fishing and now put nets pretty far from the sea shore -2-3 km.

In accordance with the results of our questionnaire survey as well as numerous conversations in the settlement, it becomes clear that the number of such brigades do not surpass ten, and their mid number of members is 3-4 people (this data coincide with the previous one documented in the first report).

Moreover, we interviewed three members of such brigade what allows giving a particular scale of catch in even and odd year and in even-record year of 2018 for pink salmon. Thus, we have data about 30 % of poachers what allows to make a conclusion and estimate the scale of settlement catch.

Sea poachers in Oktiabrskii contrary to river fishermen in Sobolevo are stably oriented on fish catch, not caviar (this fact was also reflected in a previous report). They sell so called 'round fish' [krugliak], they do not extract caviar. The reason is time management, and the low quality of caviar which is not matured enough [ne naguliana].

Comments on information from the questionnaire:

Q1. When a fishing season starts and ends for king salmon, coho salmon, red salmon, chum salmon, pink salmon, char, and smelt? Fishing season for king salmon varies from the end of May till end of August. The majority of respondents in Oktiabrskii settlement marked end of May till July as a period for this type of fish. For red salmon it is more or less similar, only one respondent thinks that June is a month for red salmon fishing season. Chum salmon is mid July till September, one respondent consider June and one considers November as the end for chum salmon season. Coho salmon starts mid August and ends in November, two informants consider mid July - mid August, one - mid September till mid October. Pink salmon go July-September, one states August September (one said this is relevant for even-numbered years), and one states July - November. Fishermen go for char from July, August till September, but they also fish it by rod in rivers in March and April. Two respondents are disinterested in fishing char. Smelt go from end December till April, or March till February. In December people fish it by rod. This type of fishing is relevant for the whole year.

The best coincidence in answers relating period of seasons of different type of fish we find for pink salmon. We may preliminary conclude, that this type of salmon is the most important for Oktiabr'skii fishermen.

Q2. Do you think the quantity of fish changed over the past 5,10, 15, and 20 years? If yes, please, indicate how if the past year is taken as 100%? King salmon decreased or remain the same - half to half respondents declared in comparison for the past 5 or 10 years. They did not remember more distant times. Only one confirmed that King salmon increased in number approximately for 5 times and five years ago it was twice less. One considers the 80s were rich for King salmon. In 1990s started fishing before it was not in the focus of interest. One considers it became smaller in size. Red salmon's quantity

decreased for 50% in comparison with past 5 years, three respondents state that it did not changed and only one declared it increased. 15 years ago it was bigger in size and larger in number. One indicates that red salmon is not 'our fish' and it just come through. Chum salmon do not change, or go up 50% according to one opinion, the rest consider it is gradually decreasing. 10 years ago it was five times more. 15 years ago it was a very good time for this fish. 20 years ago it was similar to this year as one respondent remembers. One also states that Chum salmon is 'not our fish' similar to red salmon. Coho salmon decreased or remain the same accordingly to the majority of respondents. Two respondents state it increased (100% and 20%). In the past its number was higher: '30 years ago one could catch a tone of coho salmon in one minute'. One consider 5 years ago it was twice more coho salmon, and 10 years ago - five times more. One opinion states that the number is stable and 5 and 10 years ago it was little less.

Pink salmon represents close to a consensus situation. All respondents state that it is huge in number this year. And in the past it was a lot as well, rather it was more than today. However, fishermen consider it became 'small in size' and again, 'not our' and came from fish factories. Only one respondent thinks that 'pink salmon was not at all this year' [voobshche ne bylo] and pretty similar situation appeared several years ago. Char seems to be unpopular among Oktiabrskii fishermen. Almost all respondents declared they are disinterested in catching it [ne loviat, ne schitaetsia, eto prilov]. Its quantity remains the same, and this year it was quite a lot accordingly to the answers. Smelt decreased as the majority of answers show. Two respondents say that it is the same. One thinks that 30 years ago it was big in size and fat, and today it became smaller and furthermore, its smell changed [ne takoi]. One hypothesizes that it must be more this year.

To conclude, similar to Q1, fishermen represent a sort of consensus while speaking about pink salmon. Even one contradictory opinion may testify that we encounter subjective evaluation of how a proper number of pink salmon must be. So, pink salmon remain most important for local fishermen.

Q3. Do the quantity of fish changed in general accordingly to your memories and memories of your parents? 9 respondents consider it decreased a lot (only one corrected 'if pink salmon is not taken'), 2 respondents think it does not change, and 1 - it decreased, but not much.

Q4. How much is the fish? (prices for one kilo for fish factory [skupka] and retail). All informants represent a consensus in relation to fish prices which local fishermen bring to fish factories [skupka]. Retail is not practiced in a similar level, and only two respondents generated income from that activity. The average prices are: King salmon - 390 rubles, coho salmon - 105 rubles, red salmon - 140 rubles, chum salmon - 105 rubles, pink salmon - 45 rubles, char - 47,5 rubles, smelt - 250 rubles.

Q5. What were the prices for fish in the last year? Average prices are: King salmon - 500 rubles, coho salmon - 75 rubles, red salmon - 150 rubles, chum salmon - 160 rubles, pink salmon - 27,5, smelt - 110 rubles. Again, retail is not practiced a lot. Only two respondents indicated they sold king salmon for 300 rubes and smelt for 300 rubles as well. Pink salmon was not very much accepted by fish factories that year.

Q6. What are the prices for caviar for fish factories [skupka] and retail in this year? The results demonstrate the fact that fish factories [zavody] are interested in pink salmon and chum salmon caviar. Red salmon and coho salmon are rarely asked for. Only two respondents said they sold caviar of coho salmon for the average price 1750 rubles. Pink salmon's caviar in retail costs 1500 rubles. By retail local fishermen imply shops, not social networking as it usually appears in informal trading as an ordinary practice. Retail is not a typical strategy for Oktiabrskii settlement and local fishermen rely on skupka at

large. King salmon stays outside of local caviar market at all. Red salmon has a similar to king salmon position, as only one said that its caviar price could be around 600 rubles, but commented, that fishermen do not harvest it [ne rezhut] similar to char, king salmon, and coho salmon. So, local caviar market in its first chain consists of coho salmon and pink salmon mostly.

Q7 What were the prices for caviar for fish factories [skupka] and retail last year? Last year local fishermen sold only chum salmon caviar for average price 1000 rubles. Retail 1900 rubles. Factories did not accept much of pink salmon for the year was extremely rich. Only two respondents said they sold it for 650 rubles, average price, but commented that factories bought it very rarely. They also accept coho salmon, but not caviar just fish.

Q8 How much of fish local fishermen harvest in general by in your settlement if we consider this and last year? Respondents insists they catch king salmon - 30 tones, coho salmon 100 tones. Some consider 30 tones totally local fishermen watched last year.

Q9 How much of fish do external illegal fishermen usually catch? Respondents state that external brigades are from four to ten times larger, or they are 'uncountable', 'thousand times more'. One consider they constitute thirty brigades. One camp is approximately 2 tones a day. This data stay outside so called 'indigenous' mask of poachers. If we follow them also - this realm is out of any accountability in accordance with the respondents. If we have 30 brigades and one brigade take 2 tones of fish a day, so all external poachers take 60 tones of fish a day. So from Oktiabrskii which is 5 400 tones for a spawning season.

Q10 How much of caviar do local fishermen catch? All respondents state that caviar business is not actually in the focus of local fishermen. 12-15% is the amount of caviar in relation to fish bodies. One boat accommodates around 700 kilo of fish, so it is around 20 kilo of caviar. 1 tone of fish implies 100 kilo of caviar. Pink salmon - 1 tone of caviar from 10 tones of fish, not more. From 2% to 5% of catch is for caviar trade approximately.

Q11 How much of caviar do external fishermen catch? Accordingly to respondents, 4,5% - 8% is raw caviar [syrets]. Chum salmon - 6-7% of their catch is for caviar market, red salmon - 5%. In the region only 5 or 6 merchants [skupschiki] operate for caviar. One brigade (5-6 fishers) work with 1 merchant. 9 tones of caviar is for 5-6 brigades in total. (If we consider number 30 as the amount of brigades so we get 54 tones of caviar in total).

Q12 How much of fish was sold by local fishermen to fish factories in total this year? Respondents were not handsome in granting information for this question.Apart from answers such as 'impossible to evaluate', or 'merchants take and then they deliver it to factories', a number 1000 tones of pink salmon, and 50 tones in general emerged.

Q13 How much of fish dis tour family sell to factories this year? Approximately, King salmon - 450 tones, Chum salmon - 10 tones, red salmon - 30 tones, coho salmon - 25 tones, pink salmon - no catch, smelt - 1 tone. This and the last year are comparatively similar.

Q14 How much of fish did yourself and your family sell for retail and via kinship and social networks? Answers are diverse and vary from several fishes [khvosty] to tones. Thus, approximately Chum salmon - 2 tones, red salmon - 1,5 tones, coho salmon - 1,5 tones, king salmon - 3 tones (last year 2,6 tones) coho salmon 300 kilos, coho salmon - 300 polis. Pink salmon emerges in 50 fishes only. Some insisted that they sold only 10 fishes of chum salmon and 20 fishes of coho salmon.

Q15 How much of fish do your family consumes for meal annually? The logic of kilos and khvosty appears here again. Thus, respondents decides into to main groups - those who consumes fish annually in kilos, and those consumers in 'fish' units. The last group is the minority, and more relevant for retired people. Thus average amount: 400 kilo of all fish including flounder and navaga. King salmon - 50 kilos, Chum salmon - 40 kilos, coho salmon - 40 kilos, smelt - 20 kilos, red salmon - 25-30 kilos. Those who consume modestly say 2-3 fishes of all types, char - 20 fishes.

Q16 How much of the fish do you and your family consume for treating your relatives and friends? Approximately all types of fish apart from char - 150 kilos, smelt - 40 kilos. Those who have a modest consumption give the number of 5 kilos or not more that 2 items of approximately for all types of fish. One informant state that 70% of all his catch go to treats.

Q17 Which is the general quantity local fishermen sold to factories? This question was primarily ignored, though the positive answers was an advice just to count from the same question related to fish. This might mean that an informant considered his words to be true.

Q18 What is the quantity of caviar you and your family sold for factories? An average amount was 200 kg of fresh caviar [syrets] and mainly of pink salmon, and around 100 kg of salted caviar.

Q19 What is the quantity of caviar you and your family sold in retail? Chum salmon - 10 kg, coho salmon - 20 kg, pink salmon 50 kg. Average amount 50-80 kg.

Q20 How much of caviar do you and your family consume annually? Chum salmon - 5kg, Red salmon - 15 kg, pink salmon - 3 kg. Varies from 5 to 15 kg in total. This and last year are equal in local views.

Q21 How much caviar did you give to you relatives and resends as a gift? Pink salmon - 10 kg, coho salmon - 25 kg. Average amount per family is 20 kg.

Q22 Estimate, please, your average income earned from fishing? Varies from 100 000 Rub till 1 700 000 Rub (1400 USD till 24 000 USD) Average 1 000 000 rub.

Q 23 Where do you and other fishermen do fishing and why? Typically informants indicated sea, the Bol'shaia river and Plotnikovo (for char)

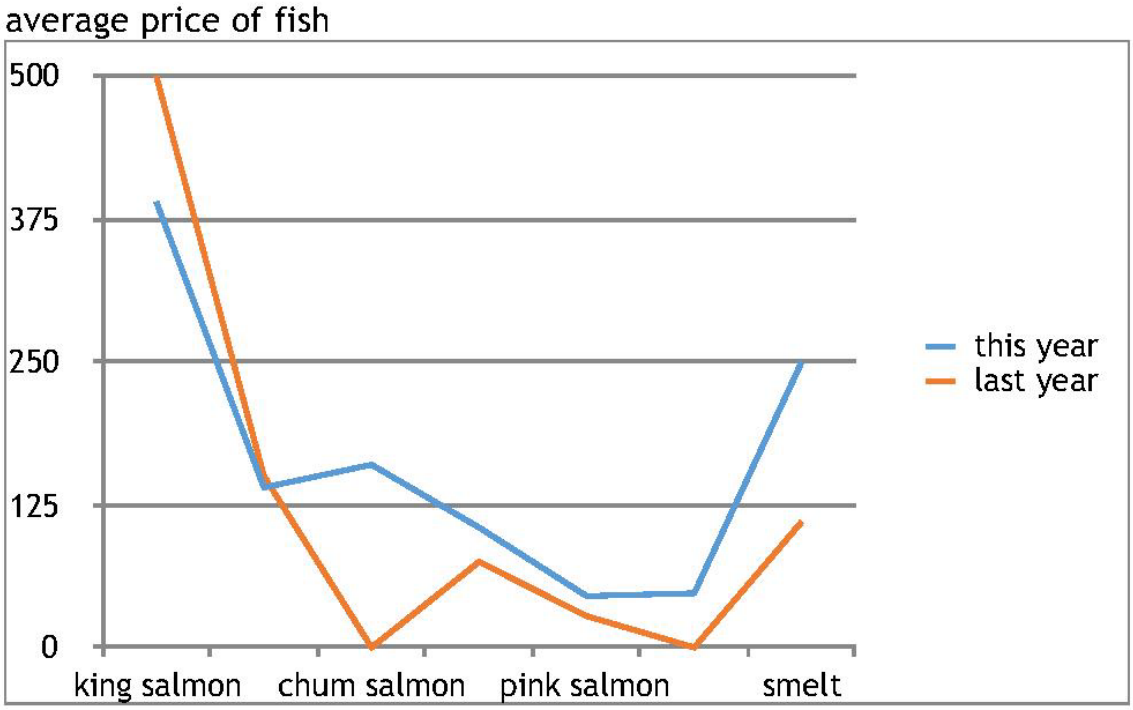
Q24 As you think, how much of incorrect quantity of illegally harvested fish is recorded by fishing police? Apparently, the opinion of respondents was 5% from a real catch goes to a real statistics since fishing police is sensitive to locals and minimize their catch. It can be vice versa in a rare cases.

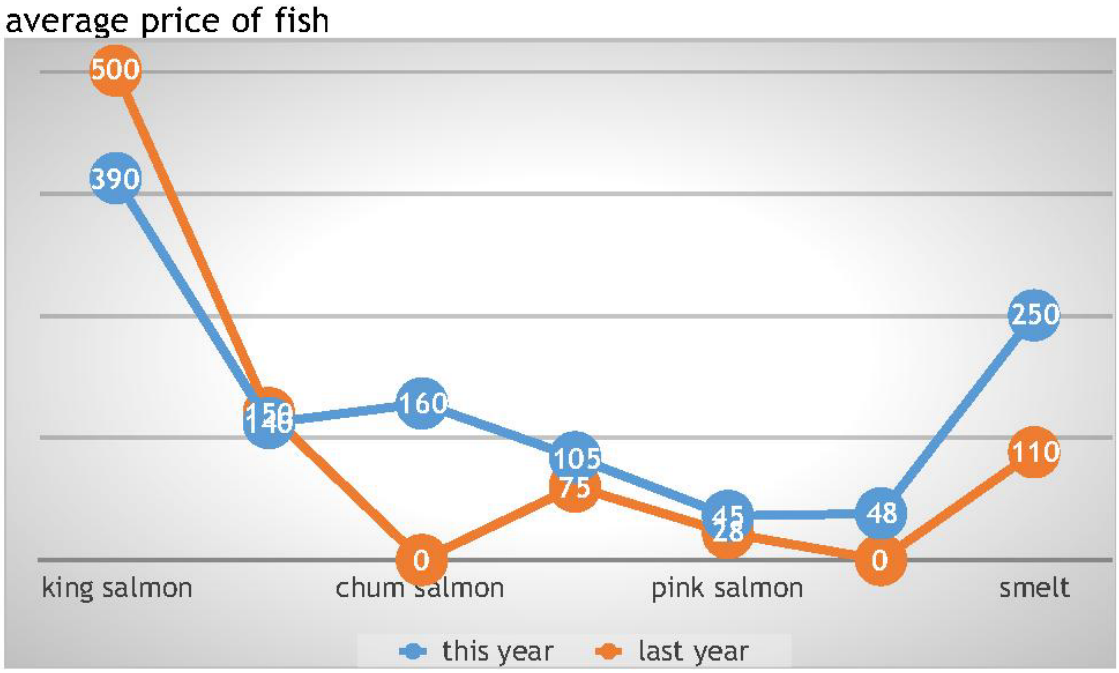
Q25 How much of fish do you need to live normally? The average number is 10 tones minus family supplies. This means that respondents include income in their perception of fishing and not only subsistence. Living 'normally' respondents interpreted as a 'normal income' from a subjective viewpoint. This question exemplifies the dynamic of small scale market economy.

Q26 How much of fish should be fished for eco-system to recover normally? Answers declare from not more than 30 tones to 'unlimited' quantity since everything what humans harvest is a 'dust' and nature itself kills fish, for example, fish dies mostly from jellyfish's burns. This question was included to see the environmental perception of those who live with the sea, and how they understand their fishing as a harmful action for the environment.

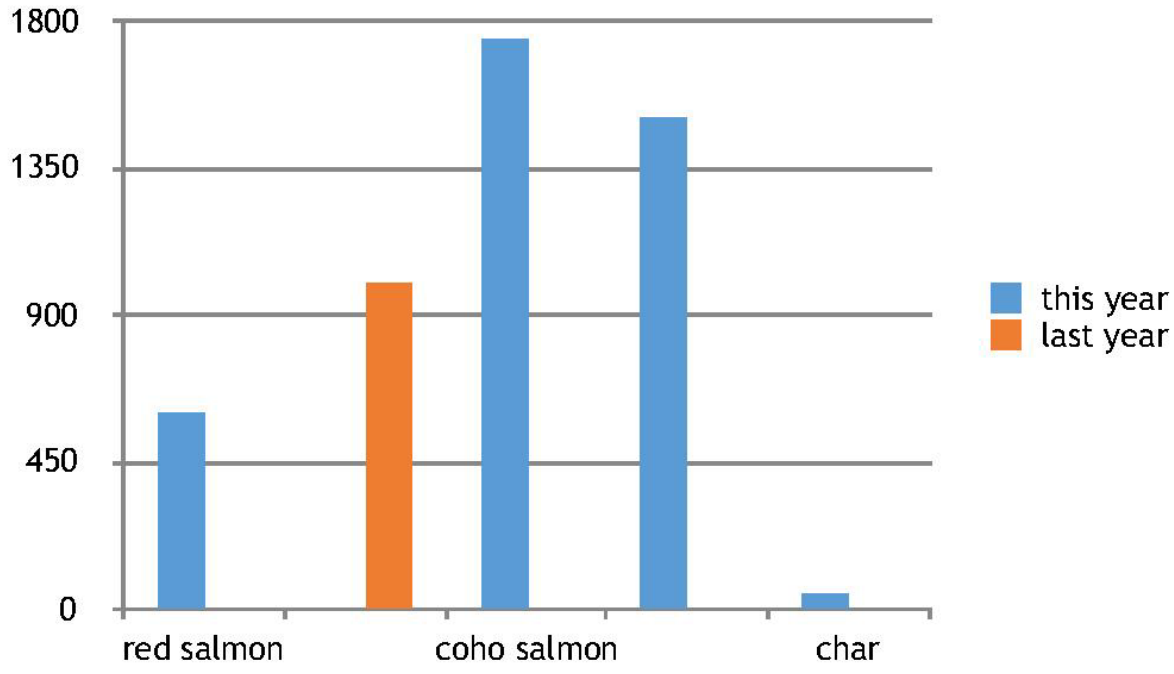
Q27 Personal data

Graphs on key tendencies reflected in questionnaire:

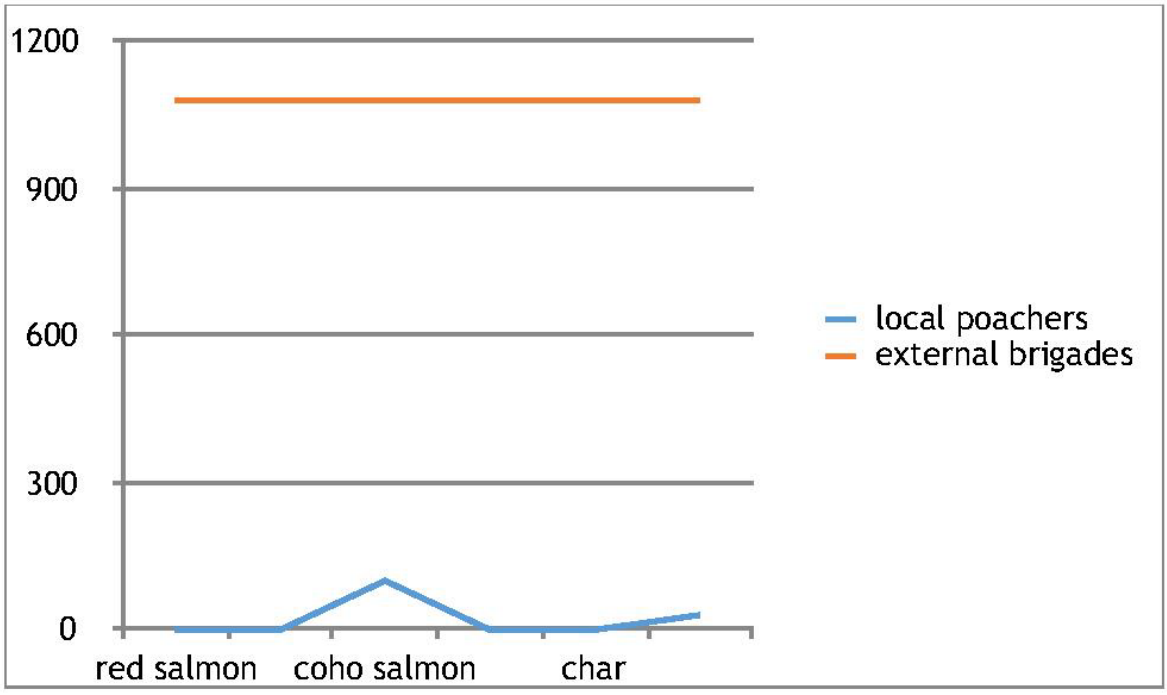




Average price for caviar (vertical - rubles; horizontal - type of fish)

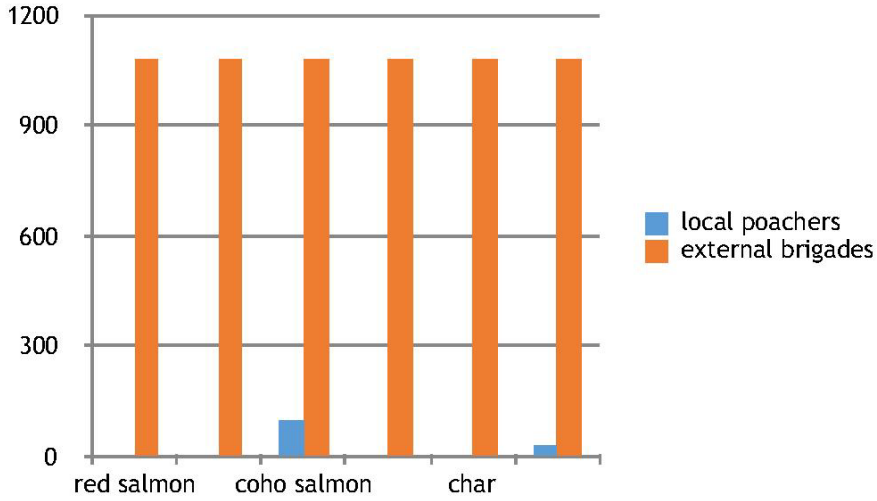


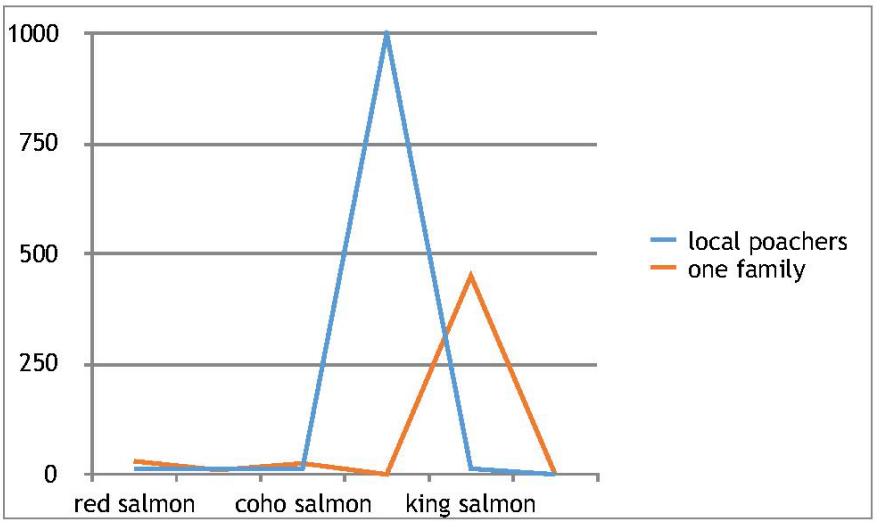
Catch in tones



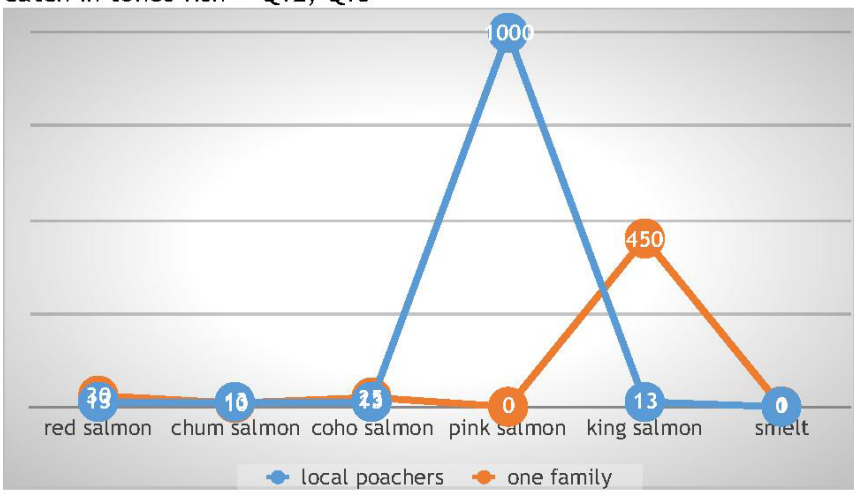
catch in tones

catch in tones

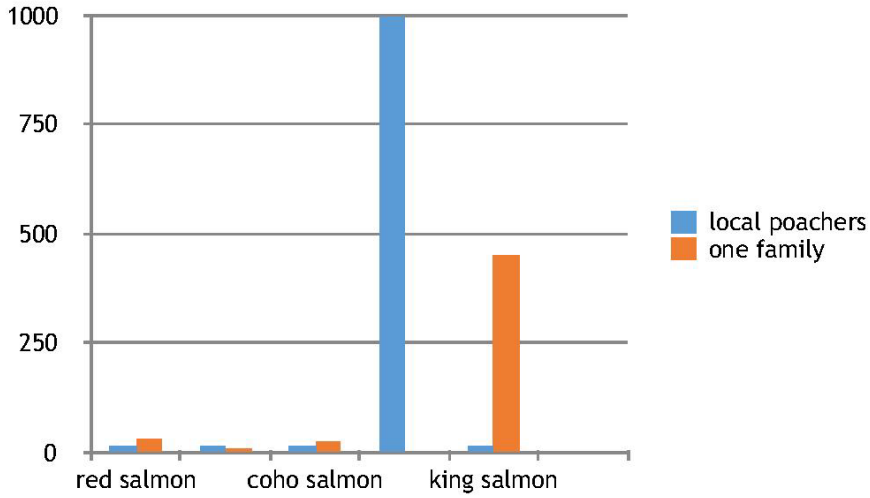




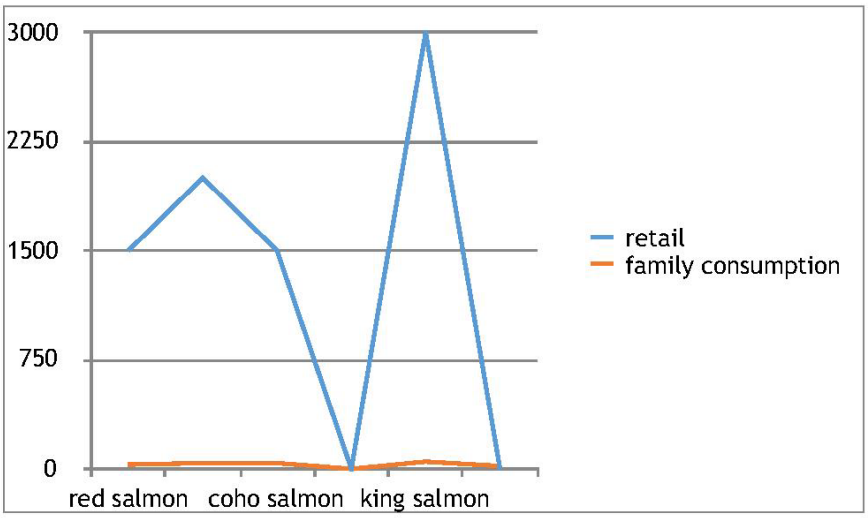
catch in tones fish - Q12, Q13



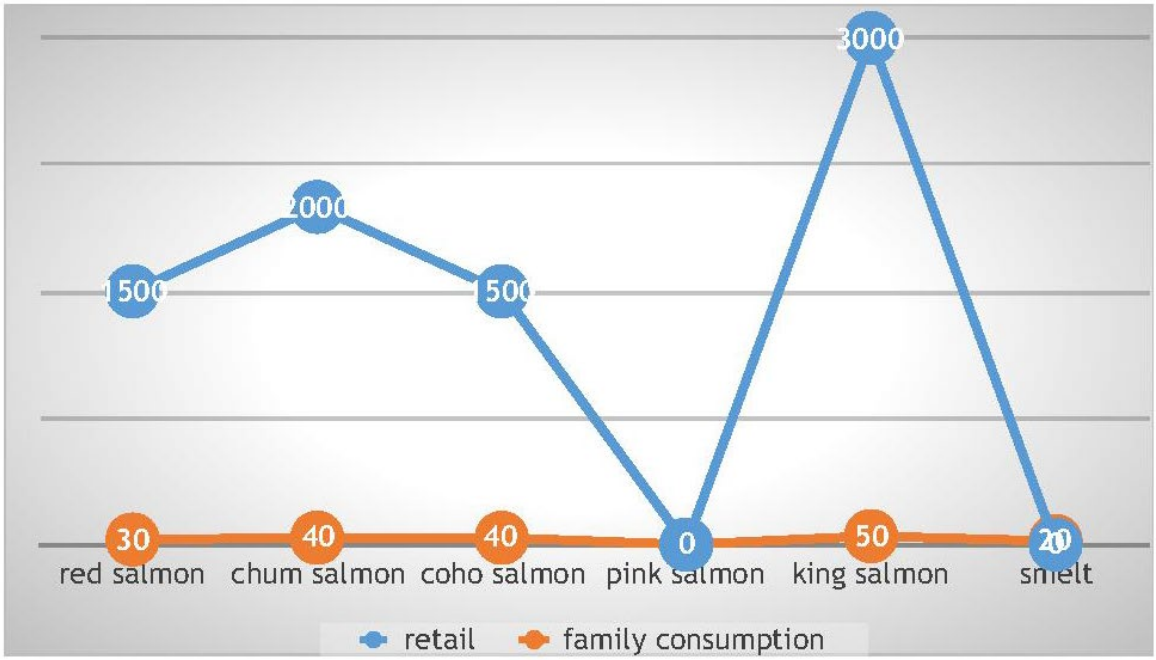
catch in tones fish - Q12, Q13



Social networks consumption and trade - Q14, Q15



Social networks consumption and trade - Q14, Q15



Social networks consumption and trade – Q14, Q15

Interpretation

If we consider in a very brief average level the data from the questionnaire, we can try to figure out the quantity of illegally harvested fish from Oktiabrskii settlement as well as the real value of data declared. 40 people (local fishermen) fish 130 tones in total (mainly pink salmon and chum salmon). Average price for these type of fish is 105 rubles per kilo. If we calculate 130 tones X 105 we shall get an income of 40 fishermen - 13 650 000, and then, if we divide it between 40 we get 341 250 a middle income of a one fishermen. According to our data, income varies from 100 000 per a season to 1 700 000. So, the average income is 900 000 rub. This means that answers in relation to catches and prices are actual at average level. Tough, there were a 'silent paradox' in relation to pink salmon. Respondents consider the price of pink salmon and also expressed their opinion in a consensus like manner, so pink salmon is a key fish; yet, they stated they did not sell it and did not fish it. We may presume, that this year pink salmon quantity was extraordinary huge, so as we learned from ethnographic research, 'if a year is rich in fish, it is bad for poachers'. So, factories simply did not need extra fish from local fishermen. This 'silent paradox' is not a lie, as we might think from the first glance, but a supportive argument for the previously got data, or the evidence of relevancy of information given by informants.

If external brigades catch 5 400 tones per season (minimum), and locals catch 130 tones, all together will be 5 530 tones. This figure does not include family consumption and retail, and also social network local reciprocal agencies. Also, it is very important to consider 'imagined' social norms in relation to how much fish should be fished for having a 'normal life' and sustainable marine environment.

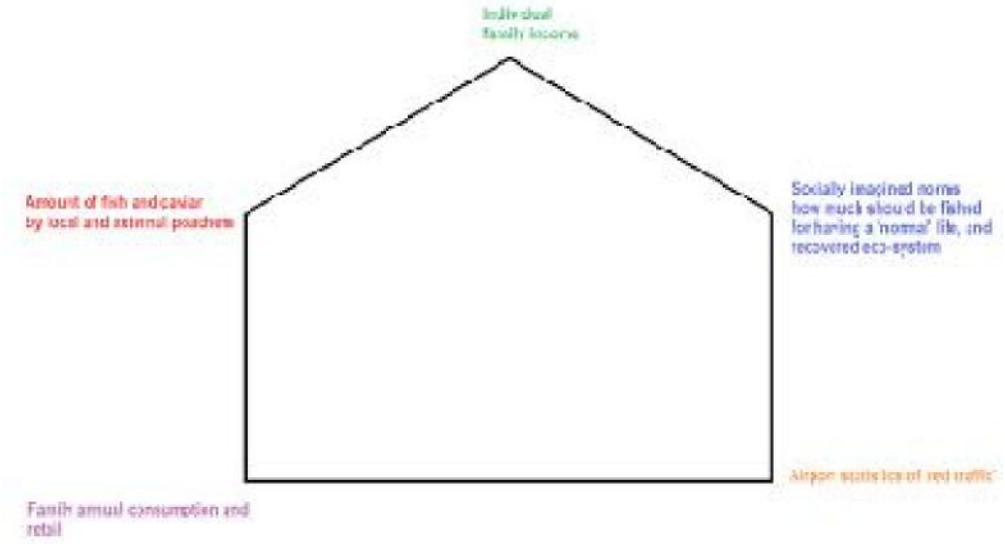
Airport statistics

In a previous report the importance of airport analysis was declared since it is seen as a good tactic of estimation of a quantity of harvested fish via traffic to central parts of the country. There is no law which

somehow forbids caviar transportation, though, from the first glance of a neophyte it might seem illogical and shocking that one can simply 'take and transport' as informants indicated.

I conducted a focus group and interviews with airport workers including those responsible for check in. Opinions of my informants coincided in many respects hence I can presume that a systematic figures might be considered from this data. Contextually, it is important to provide an excerpts from their conversation to indicate how easy, open, and obvious a part of the method of calculation of illegally harvested salmon might be. 'The obvious thing is here [na poverkhnosty] Yesterday you could see weird people asking passengers to tale their luggage...some passengers can earn some money for this service, if they are sure that someone will take caviar in the final destination. Even though a bucket of caviar will get more weight it is beneficial. For example, some passengers are from companies who pays for their business visit. They do a round trip for a day, and buy caviar. I remember, I was flying by Saratov airlines and many said they had to be fast and take caviar. They are connected'. The origin of this caviar is of illegal nature, since 'legal caviar is not being transported in plastic boxes [v plastic nitro legal'no ne fasuet]'.

Apparently, this enterprise is beneficial not only for traffickers, but also for air companies - the more weight - the more income they get. Airports though do not get anything since only 'the herd of passengers' brings income accordingly to state rates. Finally: 'Ha-ha, if possible, I would transport caviar everyday myself, any cargo is possible', therefore, there is no legal obstacles for caviar transportation. Destinations are primarily Moscow - Sheremet'evo and Vnukovo airports. Also, caviar is being transported to any other destination, including Khabarovsk.



Preliminary pentatonic quantitative model of method of estimation of illegal fisheries

In order to have a more precise knowledge about quantity of illegal salmon catches, we need to consider the dynamics and correlation between five main points:

Amount of fish and caviar catches by local and external poachers in their narrative correlation;

- Individual and family income earned from fishing;
- Family annual consumption and reciprocity;
- Socially imagined norms in relation to how much of fish should be fished;

- Airport statistics of caviar transportation

This model is a continuation of preliminary qualitative model presented in a previous ethnographic report. For the final step of analysis a data on combination of two models as well as the development of the method should be gathered. It is needed to experiment with different correlations between those five points. In the end, a sort of 'formula' of estimation of illegal fisheries in Western Kamchatka must emerge.

A research plan for July - October, 2018

Gather a combined data (questionnaire and interview) in July 2018 in order to try two models in action as a method of social anthropological expertise and sociological survey, investigate and test their opportunities and limitations; correlate ethnography and statistics, write a united report with a precise 'formula' of estimation of illegally harvested salmon, and demonstrate how it can be applied to understand poaching as a social phenomena. Based on testing these model in the field, the result will also be a practical recommendation regarding how illegal fisheries should be approached in order to be minimized.