8950 Martin Luther King Jr. Street N. #202
St. Petersburg, Florida 33702-2211
Tel: (727) 563-9070
Fax: (727) 563-0207
Email: MRAG.Americas@mragamericas.com

President: Andrew A. Rosenberg, Ph.D.

Karaginsky Bay Salmon Fisheries

Kolkhoz im Bekereva, Ukinskij Liman, Belorechensk & Vyvenskoe

Public Comment Draft Report

15 April 2020

Conformity Assessment Body (CAB)	MRAG Americas
Assessment team	Amanda Stern-Pirlot, Raymond Beamesderfer, Dmitry Lajus
Fishery client	Kolkhoz im. Bekereva JSC, Ukinskij Liman LLC, Vyvenskoe Ltd, Belorechensk Ltd
Assessment Type	Initial Assessment

Document Control Record

Document Draft	Submitted By	Date	Reviewed By	Date
ACDR	DL, RB	4/30/19	ASP, MC	5/1/19
CDR/PRDR	RB, DL, ASP	2 Jan 20	ASP	15 Jan 20
PCDR	RB, DL, ASP	14 April 2020	ASP	14 April 2020

Table of Contents

1 Executive summary 6

2 Report details 7

2.1 Authorship and peer review details 7

2.2 Version details 9

3 Unit(s) of Assessment and Certification and results overview 9

3.1 Unit(s) of Assessment and Unit(s) of Certification 9

3.1.1 Scope of assessment in relation to enhanced or introduced fisheries 11

3.2 Assessment results overview 12

3.2.1 Determination, formal conclusion and agreement 12

3.2.2 Principle level scores 12

3.2.3 Summary of conditions 12

3.2.4 Recommendations 13

4 Traceability and eligibility 13

4.1 Eligibility date 13

4.2 Traceability within the fishery 13

4.3 Eligibility to enter further chains of custody 15

4.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) 16

5 Scoring 17

5.1 Summary of Performance Indicator level scores 17

5.2 Principle 1 18

5.2.1 Principle 1 background 18

Overview of the fishery 18

Pink Salmon 47

Chum Salmon 56

5.2.2 Catch 65

5.2.3 Principle 1 Performance Indicator scores and rationales 68

PI 1.1.1 – Stock status 68

PI 1.1.2 – Stock rebuilding 73

PI 1.2.1 – Harvest strategy 75

PI 1.2.2 – Harvest control rules and tools 79

PI 1.2.3 – Information and monitoring 82

PI 1.2.4 – Assessment of stock status 85

PI 1.3.1 – Enhancement outcomes 89

PI 1.3.2 – Enhancement management 91

PI 1.3.3 – Enhancement information 92

5.3 Principle 2 94

5.3.1 Principle 2 background 94

Primary Species 94

Secondary Species 109

ETP Species 110

Habitats ... 112
Ecosystem Structure and Function ... 116
5.3.2 Principle 2 Performance Indicator scores and rationales ... 118
PI 2.1.1 – Primary species outcome ... 118
PI 2.1.2 – Primary species management strategy ... 120
PI 2.1.3 – Primary species information ... 122
PI 2.2.1 – Secondary species outcome ... 124
PI 2.2.2 – Secondary species management strategy ... 126
PI 2.2.3 – Secondary species information ... 129
PI 2.3.1 – ETP species outcome ... 130
PI 2.3.2 – ETP species management strategy ... 133
PI 2.3.3 – ETP species information ... 135
PI 2.4.1 – Habitats outcome ... 137
PI 2.4.2 – Habitats management ... 139
PI 2.4.3 – Habitats information ... 141
PI 2.5.1 – Ecosystem outcome ... 143
PI 2.5.2 – Ecosystem management ... 145
PI 2.5.3 – Ecosystem information ... 147
5.4 Principle 3 ... 151
5.4.1 Principle 3 background ... 151
Legal & Customary Framework ... 151
Management Structure - Consultation, Roles & Responsibilities ... 152
Fishery Objectives & Measures ... 158
Enforcement ... 161
International Management ... 163
5.4.2 Principle 3 Performance Indicator scores and rationales ... 165
PI 3.1.1 – Legal and/or customary framework ... 165
PI 3.1.2 – Consultation, roles and responsibilities ... 167
PI 3.1.3 – Long term objectives ... 169
PI 3.2.1 – Fishery-specific objectives ... 170
PI 3.2.2 – Decision-making processes ... 171
PI 3.2.3 – Compliance and enforcement ... 174
PI 3.2.4 – Monitoring and management performance evaluations ... 177
6 References ... 179
7 Appendices ... 184
7.1 Evaluation processes and techniques ... 184
7.1.1 Site visits ... 184
7.1.2 Stakeholder participation ... 185
7.1.3 Evaluation techniques ... 185
7.2 Peer Review reports ... 187
7.3 Stakeholder input ... 223
7.4 Conditions ... 225
Condition 1 – PI 1.1.1 Stock Status ... 225
Condition 2 – PI 1.2.3 Information & Monitoring ... 226
Condition 3 - 1.2.4. Assessment of stock status ... 227
Condition 4 - 3.2.2. Decision-making processes ... 228

Condition 5 - 3.2.3. Compliance and Enforcement..... 229
7.5 Client Action Plan.....230
7.6 Surveillance 242
7.7 Harmonised fishery assessments.....243

1 Executive summary

This assessment was conducted by Amanda Stern-Pirlot, Ray Beamesderfer and Dmitry Lajus using CR v2.0 (1 October 2014), with modifications to the default assessment tree for salmon fisheries as defined by the Marine Stewardship Council (MSC). The units of assessment and certification on the northeast coast of the Kamchatka Peninsula included: Pink Salmon and Chum Salmon harvested in Karaginsky Bay and adjacent rivers (including Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka, Virovayam, Anapka, Khai-Anapka), and Pink Salmon, Chum Salmon and Sockeye Salmon harvested in Korfa Bay and adjacent rivers (including Vyvenka, Lingenmyvayam and Gatymnvayam) whose populations can be intercepted by the fishery. These species are caught in the sea and target rivers with set (trap) nets and set gillnets.

The site visit was conducted on site in Petropavlovsk Kamchatka on June 24 – July 5, 2019. The materials for the report were provided by the Client, included in a preassessment completed by the client's consultant (ForSea Solutions), obtained from KamchatNIRO and from Internet search.

Pacific salmon are at historically high levels of production throughout Kamchatka including Karaginsky Bay. High productivity results from near-pristine habitat conditions in salmon production areas, which experience only quite low anthropogenic stress, favorable climate in freshwater and the ocean, curtailment of drift gill netting in the Russian Economic Exclusion Zone and effective management to protect spawning escapements. Changes in the commercial fishery management system in the 2000s have largely eliminated industrial scale illegal commercial fishing. Long-term lease agreements for fishing sites have provided strong incentives for fishing companies to protect spawning escapements and participate in stock assessment and enforcement programs. Transportation difficulties due to the remote location of the fishery preclude significant levels of other types of Illegal or unregulated harvest in this area.

The fishery is effectively regulated with a well-developed harvest reporting and management system. Catches, run composition and spawning escapement are assessed in-season and used as a basis for regulating effort and harvest according to abundance. Annual spawning escapements have long been monitored throughout the fishery area using aerial surveys. These stock assessments have demonstrated that current fisheries consistently produce significant spawning escapements. Continuing high annual harvests demonstrate the efficacy of the current system. The use of terminal fisheries and scheduled weekly "passing days" when the fishery is closed is central to the effectiveness of the harvest control rules. This system ensures significant escapement even in the absence of intensive in-season stock assessment and management such as is typically practiced in North American commercial salmon fisheries. The scale of the stock assessments is generally appropriate to the extensive management practice of the fishery.

While historical monitoring and sustainable harvest outcomes has demonstrated that current fishery strategies are effective, stock assessments have suffered reductions in recent years due government funding cutbacks. In particular, spawning surveys are much reduced. Historical information is sufficient to support the sustainability of the fishery under conditions of continuing high salmon productivity and consistent levels of fishing effort. However, the recent lack of information coupled with the ongoing impacts to spawning habitat from mining (in Korfa Bay UoAs) will risk future sustainability in the event of changes from the current equilibrium, necessitating several conditions on this assessment.

All principle scores exceeded 80 but five performance indicators scored between 60 and 80. As a result, five conditions were identified. On the basis of this assessment of the fisheries, the Assessment Team recommends that the fisheries be certified.

2 Report details

2.1 Authorship and peer review details

Ms. Amanda Stern-Pirlot (Team Leader) is an M. Sc. graduate of the University of Bremen, Center for Marine Tropical Ecology (ZMT) in marine ecology and fisheries biology. Ms. Stern-Pirlot joined MRAG Americas in mid-June 2014 as MSC Certification Manager (now Director of the Fishery Certification Division) and is currently serving on several different assessment teams as team leader and team member. She has worked together with other scientists, conservationists, fisheries managers and producer groups on international fisheries sustainability issues for over 15 years. With the Institute for Marine Research (IFM-GEOMAR) in Kiel, Germany, she led a work package on simple indicators for sustainable within the EU-funded international cooperation project INCOFISH, followed by five years within the Standards Department at the Marine Stewardship Council (MSC) in London, developing standards, policies and assessment methods informed by best practices in fisheries management around the globe. Most recently she has worked with the Alaska pollock industry as a resources analyst, within the North Pacific Fisheries Management Council process, focusing on bycatch and ecosystem-based management issues, and managing the day-to-day operations of the offshore pollock cooperative. She has co-authored a dozen publications on fisheries sustainability in the developing world and the functioning of the MSC as an instrument for transforming fisheries to a sustainable basis.

Mr. Ray Beamesderfer, M.Sc., Senior Fish Scientist, Fish Science Solutions, USA. Mr. Beamesderfer holds a bachelor's degree in Wildlife and Fisheries Biology from the University of California, Davis, and a Master's in Fishery Resources from the University of Idaho. As a consultant, Ray has completed a wide variety of projects in fishery management, biological assessment, and conservation/recovery planning. He is the author of numerous reports, biological assessments, management plans, and scientific articles on fish population dynamics, fish conservation, fishery, and hatchery management, sampling, and species interactions. Ray has served on MRAG and other fishery assessment teams for salmon fisheries in Alaska, Japan and Russia and brings perspective and harmonization between salmon fishery assessments in the Pacific.

Dr. Dmitry Lajus, Associate Professor in the Department of Ichthyology and Hydrobiology of St Petersburg State University. Dmitry holds a BS and MS from St. Petersburg University, and a PhD from the Zoological Institute of the Russian Academy of Sciences. Dr. Lajus has conducted multiple MSC pre-assessments and full assessments for a number of fisheries in the European and Asian parts of Russia. He also provides consultations to fisheries in their MSC certification projects in Russia and EU. Dmitry's research interests include population biology of marine fish and invertebrates, population phenogenetics, stress assessment, history of fisheries, fisheries management, historical ecology, and population dynamics. He authored numerous peer-reviewed research articles and book chapters.

Peer Reviewers

Two peer reviewers were assigned to this assessment, and for anonymity, the peer reviewers were not confirmed. Below is the list of proposed peer reviewers form the MSC Peer Review College:

<u>Al Cass</u>
Al Cass has almost 50 years of experience in fisheries stock assessment in British Columbia, Canada. Key stocks include Pacific groundfish species, BC salmon and recently as a member of

a Pacific herring technical working group to advise on technical issues related to a management strategy evaluation of BC herring fisheries. Nearly 35 years of experience was with Fisheries and Oceans Canada (DFO). In addition to extensive fisheries stock assessment experience, Mr Cass was head of the regional DFO peer-review science advisory process (2002-2009) in support of fisheries management in Canada (Canadian Science Advisory Secretariat (CSAS). During 2009-2011 he also participated as the science lead and member of the DFO Pacific Cohen Commission of Inquiry into the decline of Fraser sockeye to: 1) coordinate Science sector staff contributions to the Inquiry; 2) participate in Team activities in an advisory capacity on Science and Department activities related to the Inquiry. Mr Cass retired from DFO in 2011 and has participated in fisheries science and management issues as a private fisheries consultant since then including as a team member of the MSC assessment of BC salmon fisheries (certified in 2016). He has also contracted with the Fisheries Sustainability Partnership Foundation (BC salmon) and Global Trust (Alaska salmon).

Hal Michael

Hal Michael retired in 2010 from the Washington Dept of Fish and Wildlife, following 34 years in life history and population dynamics research, front-line commercial and recreational fisheries management, environmental law compliance, and design and implementation of restoration programs primarily focused on Pacific salmon primarily in the eastern Pacific with an emphasis on Washington and British Columbia. The primary focus of research and program development in the later years was examination of the ecological relationships between spawning salmon and ecosystem (terrestrial and aquatic) that they affected. Fisheries management activities were primarily development and implementation of mathematical models to estimate stock size and then participate in the scheduling of fisheries. Management was complicated by the need to meet both International and Internal sharing of catch in addition to meeting spawner escapements that maintained the longterm productivity of each stock. Hal worked extensively in salmonid aquaculture, particularly in the environmental siting and management of facilities. He produced and edited journal articles, reviews and book chapters on fisheries and ecosystem publications. In recent years, Hal has been working with the Sustainable Fisheries Foundation and Ecologists Without Borders on various projects.

Rob Blyth-Skyrme

Dr Rob Blyth-Skyrme has worked in aquaculture and then in marine fisheries science, management and policy since 1996. Following his PhD which focussed on fisheries management and the environmental effects of fishing, he worked at the Eastern Sea Fisheries Joint Committee, the largest inshore fisheries management organization in England, where he became the Deputy Chief Fishery Officer. He then became a senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries and environmental casework. Rob now runs Ichthys Marine Ecological Consulting Ltd., a marine fisheries and environmental consultancy. As well as working for Government and industry on fisheries science and management issues, he has undertaken all facets of MSC work as a Lead Assessor, expert team member and peer reviewer across a wide range of fisheries.

Steve Nelson

Steve Nelson has about 25 years of experience in coastal and fishery management. During this time, he has worked in management, scientific, and communication roles for US and international programs sponsored by federal, state, and local governments, academic institutions, NGOs, and private companies. He has technical expertise in fishery management, stock assessment, coastal ecology, biodiversity conservation, GIS and spatial analysis, climate change adaptation and resource economics. He is competent using state-of-the art methods, models and tools relevant

to these disciplines and stays current with ongoing learning. He has experience working in the seafood industry with expertise in sustainability certification and product traceability. He was the fishery team leader for the MSC full assessment of the Bratsk Reservoir perch fishery. He also served as client advisor for MSC certifications of the Russian Alaska pollock fisheries in the Bering Sea and Sea of Okhotsk and a reviewer of the Lake Peipus perch and pike perch fishery in Estonia. Moreover, he assessed and peer reviewed numerous fisheries certified under the FAO Responsible Fishing Management label for stocks in Alaska, Iceland, and Gulf of Mexico. He earned a BA in economics from the University of Virginia and an MS in environmental biology (estuarine ecology) from George Mason University plus additional training in stock assessment.

Version details

Table 1. Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	Version 2.1
MSC Fisheries Standard	Version 2.01
MSC General Certification Requirements	Version 2.3
MSC Reporting Template	Version 1.1

3 Unit(s) of Assessment and Certification and results overview

3.1 Unit(s) of Assessment and Unit(s) of Certification

The MRAG Americas assessment team determined that the fishery is within scope as required by the MSC. Units of assessment were identified by species (Pink Salmon, Chum Salmon, Sockeye Salmon) and production areas (Karaginsky Bay, Korfa Bay). Five units of assessment are identified in this certification (Table 2). Karaginsky Bay Sockeye were also initially considered for inclusion but the available information was not sufficient to meet the Principle 1 standard.

Table 2. Unit(s) of Assessment (UoA) and Certification (UoC).

UoA 1	**Description**
Species	Pink (humpback) salmon *Oncorhynchus gorbuscha*
Stock	Populations of pink salmon reproducing in the target rivers of the Karaginsky Bay on the northeast coast of the Kamchatka Peninsula (Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka, Anapka, and Khai-Anapka)
Geographical area	Karaginsky Bay of the Bering Sea, the northeastern coast of the Kamchatka Peninsula (FAO Major Fishing Area 61, Karaginskaya fishery subzone 61.02.1, Karaginsky administrative district of the Kamchatka Krai)
Harvest method / gear	Trap net, set gillnet
Client group	Kolkhoz im. Bekereva JSC [АО “Колхоз им. Бекерева”] Ukinskij Liman LLC. [ООО “Укинский Лиман”] Contact: Mr. Dmitry Lavrentyev, pd@bekerev.ru

	Ukinskij Liman LLC. [ООО “Укинский Лиман”], RA Belorechensk LLC, Vyvenskoe, LLC
Other eligible fishers	Tymlatsky Rybokombinat LLC, Vostochny Bereg LLC, Maksimovsky RPZ LLC, KMP-Khaylyulya LLC, Koryakmoreproduckt LLC, Nachinkinskoe, LLC; Rybnye Resursy LLC, Ploksan LLC, RK Rybak, Kama LLC, OJSC Koryakryba, AgCoop Zaliv Korfa, OJSC Korfsky Rybokombinat
UoA 2	**Description**
Species	Chum (dog) salmon *Oncorhynchus keta*
Stock	Populations of chum salmon, reproducing in the target rivers of the Karaginsky Bay on the northeast coast of the Kamchatka Peninsula (Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka, Anapka, Khai-Anapka) and potentially intercepted populations.
Geographical area	Karaginsky Bay of the Bering Sea, the northeastern coast of the Kamchatka Peninsula (FAO Major Fishing Area 61, Karaginskaya fishery subzone 61.02.1, Karaginsky administrative district of the Kamchatka Krai)
Harvest method / gear	Trap net, set gillnet
Client group	Kolkhoz im. Bekereva JSC [АО “Колхоз им. Бекерева”] Contact: Mr. Dmitry Lavrentyev, pd@bekerev.ru Ukinskij Liman LLC. [ООО “Укинский Лиман”], RA Belorechensk LLC Vyvenskoe LLC
Other eligible fishers	Tymlatsky Rybokombinat LLC, Vostochny Bereg, LLC, Maksimovsky RPZ, LLC, KMP-Khaylyulya, LLC, Koryakmoreproduckt LLC, Nachinkinskoe, LLC Rybnye Resursy LLC, Ploksan LLC, RK Rybak, Kama LLC, OJSC Koryakryba, AgCoop Zaliv Korfa, OJSC Korfsky Rybokombinat
UoA 3	**Description**
Species	Pink (humpback) salmon *Oncorhynchus gorbuscha*
Stock	Populations of pink salmon reproducing in the target rivers of the Korfa Bay on the northeast coast of the Kamchatka Peninsula (Vyvenka River)
Geographical area	Korfa Bay of the Bering Sea, the northeastern coast of the Kamchatka Peninsula (FAO Major Fishing Area 61, Karaginsky fishery subzone 61.02.1, Olyutorsky administrative district of the Kamchatka Krai)
Harvest method / gear	Trap net, set gillnet
Client group	Kolkhoz im. Bekereva JSC [АО “Колхоз им. Бекерева”] Ukinskij Liman LLC. [ООО “Укинский Лиман”] Contact: Mr. Dmitry Lavrentyev, pd@bekerev.ru Ukinskij Liman LLC. [ООО “Укинский Лиман”], RA Belorechensk LLC, Vyvenskoe, LLC
Other eligible fishers	Tymlatsky Rybokombinat LLC, Vostochny Bereg LLC, Maksimovsky RPZ LLC, KMP-Khaylyulya LLC, Koryakmoreproduckt LLC, Nachinkinskoe, LLC;

	Rybnye Resursy LLC, Ploksan LLC, RK Rybak, Kama LLC, OJSC Koryakryba, AgCoop Zaliv Korfa, OJSC Korfsky Rybokombinat
UoA 4	**Description**
Species	Chum (dog) salmon *Oncorhynchus keta*
Stock	Populations of pink salmon reproducing in the target rivers of the Korfa Bay on the northeast coast of the Kamchatka Peninsula (Vyvenka River)
Geographical area	Korfa Bay of the Bering Sea, the northeastern coast of the Kamchatka Peninsula (FAO Major Fishing Area 61, Karaginsky fishery subzone 61.02.1, Olyutorsky administrative district of the Kamchatka Krai)
Harvest method / gear	Trap net, set gillnet
Client group	Kolkhoz im. Bekereva JSC [АО “Колхоз им. Бекерева”] Contact: Mr. Dmitry Lavrentyev, pd@bekerev.ru Ukinskij Liman LLC. [ООО “Укинский Лиман”], RA Belorechensk LLC Vyvenskoe LLC
Other eligible fishers	Tymlatsky Rybokombinat LLC, Vostochny Bereg, LLC, Maksimovsky RPZ, LLC, KMP-Khaylyulya, LLC, Koryakmoreproduckt LLC, Nachinkinskoe, LLC Rybnye Resursy LLC, Ploksan LLC, RK Rybak, Kama LLC, OJSC Koryakryba, AgCoop Zaliv Korfa, OJSC Korfsky Rybokombinat
UoA 5	**Description**
Species	Sockeye salmon *Oncorhynchus nerka*
Stock	Populations of pink salmon reproducing in the target rivers of the Korfa Bay on the northeast coast of the Kamchatka Peninsula (Vyvenka River)
Geographical area	Korfa Bay of the Bering Sea, the northeastern coast of the Kamchatka Peninsula (FAO Major Fishing Area 61, Karaginsky fishery subzone 61.02.1, Olyutorsky administrative district of the Kamchatka Krai)
Harvest method / gear	Trap net, set gillnet
Client group	Kolkhoz im. Bekereva JSC [АО “Колхоз им. Бекерева”] Ukinskij Liman LLC. [ООО “Укинский Лиман”] Contact: Mr. Dmitry Lavrentyev, pd@bekerev.ru Ukinskij Liman LLC. [ООО “Укинский Лиман”], RA Belorechensk LLC, Vyvenskoe, LLC
Other eligible fishers	Tymlatsky Rybokombinat LLC, Vostochny Bereg LLC, Maksimovsky RPZ LLC, KMP-Khaylyulya LLC, Koryakmoreproduckt LLC, Nachinkinskoe, LLC; Rybnye Resursy LLC, Ploksan LLC, RK Rybak, Kama LLC, OJSC Koryakryba, AgCoop Zaliv Korfa, OJSC Korfsky Rybokombinat

3.1.1 Scope of assessment in relation to enhanced or introduced fisheries

The stocks under the assessment are not enhanced. The stocks under the assessment are native.

3.2 Assessment results overview

3.2.1 Determination, formal conclusion and agreement

To be included in the FRD

3.2.2 Principle level scores

Table 3. Principle level scores

Principle	Karaginsky Bay		Korfa Bay		
	1: Pink	2: Chum	3: Pink	4: Chum	5: Sockeye
Principle 1 – Target Species	82.5	82.5	82.5	82.5	83.7
Principle 2 – Ecosystem	85.3				
Principle 3 – Management System	81.7				

3.2.3 Summary of conditions

Condition number	Performance Indicator	Condition	Timeline for compliance
1	1.1.1	Demonstrate that Pink and Chum Salmon in the Karaginsky and Korfa stock management units (SMU) are at a level which maintains high production consistent with escapements at or fluctuating around its TRP.	4th Annual Surveillance
2	1.2.3	Regularly monitor spawning escapement of Karaginsky and Korfa Pink and Chum in area rivers at a level of accuracy and coverage sufficient to ensure effective harvest controls and precautionary management in light of impact of mining activities on habitat quality in Korfa Bay UoAs.	4th Annual Surveillance
3	1.2.4	Estimate stock status of Karaginsky and Korfa Pink and Chum Salmon and Korfa Sockeye in area rivers relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.	3rd Annual Surveillance
4	3.2.2	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.	3rd Annual Surveillance
5	3.2.3	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	4th Annual Surveillance

		relevant management measures, strategies and/or rules.	

3.2.4 Recommendations

Recommendation 1 for PI 2.4.3 (habitat information). The assessment team recommends improving information related to spawning habitat quality in areas where mining discharges are present as described in P2. This is important to understanding risks to spawning success to better inform appropriate escapement goals in these streams.

4 Traceability and eligibility

4.1 Eligibility date

The eligibility date will be upon publication of the Public Comment Draft Report, or the beginning of the 2020 salmon season, whichever is later, assuming the necessary traceability is in place.

4.2 Traceability within the fishery

The joint-stock company Kolkhoz im. Bekereva JSC and Ukinskij Liman LLC fish for salmon, char, and several other demersal species of fish (cod, pollock). Both companies have their own processing facilities – fish processing plant Khaylyulinsky and Ukinsky, providing up to 350 and 200 mt per day of product respectively. Kolkhoz im. Bekereva JSC produces frozen salmon hard roe, frozen headed or whole frozen char, pink, chum, sockeye and coho salmon, frozen pollock and headed cod, frozen pollock caviar. Ukinskij Liman LLC produces frozen salmon hard roe, whole frozen, frozen headed, filet and minced char, pink, chum, sockeye and coho salmon. The company Kolkhoz im. Bekereva descends from two Soviet fishing collectives dating back to the 1930s - Rybak and Imeni XII godovschiny Oktyabrya, which united in 1959. The new company was named after the leader of local executive committee of the Communist Party, G.I. Bekerev. Now the society is among the top five leaders of fishing companies in Kamchatka Krai and continues to invest in further modernization of the processing of plant and fleet, increasing the range, volume and quality of finished fish products. Salmon fishing is conducted in the summer-autumn period (July-early September) primarily using marine trap nets. Raw salmon is processed at the plant, on Nikko's (Japan) automated lines, after which it is sorted, washed and frozen. After freezing, the products are packed. Demersal species of fish (cod, pollock) are caught and processed at sea onboard the freezer trawler Kamchatka Harvest. The staff consists of 273 employees, including 148 fishermen and 102 processors. The fleet consists of 6 small fishing seiners, 1 freezer trawler and 10 tugboat vessels.

The company Ukinskij Liman was separated from Kolkhoz im. Bekereva in 2014. In the period of 2015-2018 the company finished the construction of its own processing facility located on the bank of the river Uka. The plant is equipped with Nikko's (Japan) automated cutting lines and high-end modern funnel freezers MYCOM Thermo-Jack freezers. The staff consists of 250 employees, including 35 fishermen and 134 processors. The fleet consists of 4 small longboats for salmon fishing.

Table 4. The composition of the fleet of the "Kolkhoz im. Bekereva."

Vessel class/name	Assignment	Max. length	Number of units
MRS-150	Small seiner	21.4 m	5
MRS-225	Small seiner	23.14 m	1
SRTM “Kamchatka Harvest”	Freezer trawler	54.2 m	1
G, KG-type	Tugboat	16.16 – 18.17 m	10

Table 5. The composition of the fleet of the "Ukinskij Liman"

Vessel class/name	Assignment	Max. length	Number of units
PK-1759	Fishing longboat	19.20 m	1
PK-1760	Fishing longboat	19.20 m	1
“Uka”	Fishing longboat	16.15 m	1
“Nachika”	Fishing longboat	16.15 m	1

RA Belorechensk, LLC and Vyvenskoe, LLC operate in the northern portion of Karaginsky Bay coast from the Virovayam River near Uala Bay, east to the Vyvenka River in Korfa Bay and one fishing parcel in the Ilpi River in Anastasia Bay. The companies process their catches at their own factories. Production goes to the Russian market and is also sold to international markets.

Daily catch of salmon from traps is delivered by boats in live fish containers to the shore, where it is reloaded to the processing facility with help of fish pumps. Catch from nets is brought ashore by the nets, where it is extracted. The catch it is accompanied by a document specifying the place and the crew that captured it, the gear type, the weights of the transported fish, and the processing facility where the catch is being delivered. The catch is weighted again by the processing facility. The processing plants track numbers of salmon by species by day for each fishing parcel. Transhipment does not occur.

Arriving catch is recorded in the log of the processing facility. The record contains the location of the catch and company which submits catch. Both the companies' logs and the processing facilities' logs are regularly checked by SVTU inspectors, sanitary-epidemiological control and territorial branch of RosPrirodNadzor. The facts of such inspections are also being recorded in appropriate logs.

All fish delivered from landing sites have documentation that shows date, location, volumes, species, and fishing operator. Since each operator has a commercial fishing permit that also identifies gear type, documentation of the different gear types and operators would prevent substitution at delivery. Subsequent chain of custody would assure separation after the initial delivery.

Some risk occurs that illegally harvested fish or fish harvested by a company not under the certificate sharing agreement could be accepted at a processing facility as certified. Substantial efforts by companies to enhance enforcement activities by supplying personnel, equipment, and funding to the authorities minimizes the opportunity for illegal harvest in the beach regions where legal fishing occurs. The client companies also support enforcement activities in rivers to minimize the opportunity of illegal harvest of roe. Therefore, the likelihood is low of illegal product entering the processing facilities with the proper documentation and weights that would pass inspections by the authorities.

MSC traceability requirements are checked only as far as salmon landed at authorized fishing parcels by the legally permitted and certificate-holding fishing company in the Unit of Certification and delivered to processing facilities, where the landings can be monitored in accordance with MSC chain of custody requirements. The certified fishing company in the Unit of Certification may use the certificate and apply the MSC logo if they deliver to a processing facility that holds MSC chain of custody certification.

The occurrence of illegal fishing in the Russian Far East suggests a need for robust chain of custody to mitigate the risk of product from a non-certified source entering the supply chain (Table 6). Chain of custody would begin at the point of delivery of product from the certified company in the Unit of Certification to a processing facility, whether the facility is owned by the participating company or by another entity.

Table 6. Traceability within the fishery

Factor	Description
Will the fishery use gear that are not part of the Unit of Certification (UoC)?	Not present (never) – all gears employed in the fishery are included in the unit of certification. The gear is all trackable in the log of fishery crew
Will vessels in the UoC also fish outside the UoC geographic area?	Not present (never) – vessels are owned by the companies and are assigned to the active fishing parcels. Vessels could not obtain fish from beyond company fishing activities without detection because the plants and the government inspectors compare logbook records from a parcel with landing at the plant.
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate?	Not present – all covered by chain of custody. All fish delivered from landing sites have documentation that shows date, location, volumes, species, and fishing operator. Since each operator has a commercial fishing permit that also identifies gear type, documentation of the different gear types and operators would prevent substitution at delivery.
Does transhipment occur within the fishery?	Not present - appropriate systems and records are in place at: (1) the point of landing, (2) reloading, (3) boxing into container and (4) transport to processing facility to ensure traceability back to UoC. Further while there is no transhipment prior to point of landing, there is also no transhipment from point of reloading to the start of CoC (i.e. processing facility). Only salmon harvested in the UoC are processed in plants operated by the fishing companies in Karaginsky Bay.
Are there any other risks of mixing or substitution between certified and non-certified fish?	Not present (never)

4.3 Eligibility to enter further chains of custody

The product of the fishery is eligible to be sold as MSC certified or carry the MSC ecolabel. Kolkhoz im. Bekereva JSC, Ukinskij Liman LLC, Ukinskij Liman LLC, RA Belorechensk LLC, and Vyvenskoe LLC are eligible to use the fishery certificate, and sell product as MSC certified. These companies process their catches at their own factories. Production goes to the Russian market and is also sold to international markets.

Acting as a client for the current certification, these companies may share certification with another fishing company or companies operated in the UoC on terms of Certificate Sharing Agreement. The current list of companies and their fishing parcels eligible for the current fishery

certification will be published at the MSC website and may be changed. Salmon species specified in the UoC of the assessment, harvested by the companies of the Client Group with gears allowed in the Fishing Rules (as specified in this unit of certification), and landed from authorized parcels in the rivers of the Karaginsky Bay are eligible to enter further chains of custody.

The landing points are fish-processing facilities belonging to the Clients of the certification and are situated in the Karaginsky and Olyutorsky administrative districts of Kamchatka Kray. This is a point from which subsequent Chain of Custody certification is required. Chain of custody begins at delivery of salmon to a processing facility in the client group or at a point of change in ownership of the fish, whichever comes first.

Members of the Client Group own the fish they catch, commencing at the point of fish catch. Fishing sites are leased and operated by the members of the Client Group, which also operate the processing plants. Documentation of the fish is sufficient such that chain of custody is not necessary for transport of wholly-owned fish from the point of catch to delivery at the processing plant. Should other companies share the certificate at some point in the future and sell fish to the client group or other companies holding chain of custody, chain of custody would start at the point of sale, but no later than delivery to a processing plant. Any companies buying from processing facilities that receive certified product are required to have chain of custody certification for further sale and distribution. This certification did not evaluate other landing sites that are not part of the certification determination or subsequent distribution for chain of custody. To use the MSC logo, subsequent links in the distribution chain must enter into a separate chain of custody certification that proves they can track the salmon product to a chain of custody holder or the certified fishery.

4.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s)

No IPI stocks are identified in this assessment.

5 Scoring

5.1 Summary of Performance Indicator level scores

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Karaginsky Pink	Karaginsky Chum	Korfa Pink	Korfa Chum	Korfa Sockeye
One	1	Outcome	0.333	1.1.1	Stock status	0.5	0.167	70	70	70	70	80
				1.1.2	Stock rebuilding	0.5	0.167	85	85	85	85	na
		Management	0.333	1.2.1	Harvest strategy	0.25	0.083	80	80	80	80	80
				1.2.2	Harvest control rules & tools	0.25	0.083	80	80	80	80	80
				1.2.3	Information & monitoring	0.25	0.083	75	75	75	75	80
				1.2.4	Assessment of stock status	0.25	0.083	70	70	70	70	70
		Enhancement	0.333	1.3.1	Enhancement outcome	0.333	0.111	100	100	100	100	100
				1.3.2	Enhancement management	0.333	0.111	100	100	100	100	100
				1.3.3	Enhancement information	0.333	0.111	100	100	100	100	100
Two	1	Primary Species	0.2	2.1.1	Outcome	0.333	0.067	100				
				2.1.2	Management	0.333	0.067	80				
				2.1.3	Information	0.333	0.067	95				
		Secondary Species	0.2	2.2.1	Outcome	0.333	0.067	90				
				2.2.2	Management	0.333	0.067	80				
				2.2.3	Information	0.333	0.067	80				
		ETP species	0.2	2.3.1	Outcome	0.333	0.067	80				
				2.3.2	Management	0.333	0.067	80				
				2.3.3	Information	0.333	0.067	80				
		Habitats	0.2	2.4.1	Outcome	0.333	0.067	95				
				2.4.2	Management	0.333	0.067	95				
				2.4.3	Information	0.333	0.067	80				
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.067	90				
				2.5.2	Management	0.333	0.067	90				
				2.5.3	Information	0.333	0.067	80				
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.3	0.150	95				
				3.1.2	Consultation, roles &	0.3	0.150	85				
				3.1.3	Long term objectives	0.3	0.150	80				
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	0.125	80				
				3.2.2	Decision making processes	0.25	0.125	75				
				3.2.3	Compliance & enforcement	0.25	0.125	75				
				3.2.4	Management performance	0.25	0.125	80				

5.2 Principle 1

5.2.1 Principle 1 background

Overview of the fishery

The fishery occurs in the northeastern part of Kamchatka Peninsula primarily in Karaginsky Bay on the Bering Sea. The region is remote without road connection to city of Petropavlovsk-Kamchatsky, the administrative center of Kamchatka Kray, and largely undeveloped.

Watersheds are in excellent condition and salmon habitat diverse and highly productive. The climate on the peninsula is harsh and seasonally uneven, with cool summers and strong snowy winters. The human populations are concentrated in small remote communities such as Ivashka and Ossora located along the coast.

The area of the Karaginsky administrative district of the peninsula is 40,641 km^2, population – 3,623 people (2018), among them 1,993 inhabitants live in the village of Ossora. The national composition of the territory consists of about 40% indigenous people of the North. Historically, the district was founded in 1926, with the administrative center located in the Karaga Village. Since 1942, the administrative center was moved to Ossora. There are no other significant settlements here. Local populations have been declining in the post-Soviet period due to limited economic opportunity in the region. Fishing companies bring in workers from other parts of Russia to support their operations during the fishing season. The rivers in this area are all considered remote as they are not accessible by main roads.

<u>Historical Development of the Fishery</u>

Fishing is and has long been the primary occupation of people of Kamchatka including indigenous peoples. Industrial salmon fisheries have operated in Kamchatka since the beginning of 20th century. The fishing industry expanded during the Soviet period, although catches began to decrease in the 1950s due to Japanese driftnet fishing and unfavorable ocean conditions for salmon production (MRAG 2019).

A series of events fundamentally changed the fishery situation by the early 1990s. The collapse of the Soviet Union led to economic crisis. At the same time, salmon returns increased considerably following improvements in ocean conditions for salmon throughout the North Pacific during the 1980s and an international ban in 1993 on unregulated high seas drift net fishing outside of the Russian Exclusive Economic Zone. Fishing parcels and fishing rights were also redistributed during the economic crisis. Until the economic crisis, fishing was conducted by very few governmental enterprises. After 1990, commercial fishery access was leased to small private companies. Eventually, number of owners and companies reduced, and redistribution of fishing parcels took place in 2008. Before this time salmon fisheries were under TAC regulation, but after that they are regulated with recommended catch (RAC) which made the management more time-efficient (MRAG 2019).

<u>Fishing methods</u>

The fishery is prosecuted primarily with coastal trap nets in nearshore marine waters. Beach seines and gillnets are sometimes used in area rivers, although the yield from river fishing sites is typically small. Gillnet use is prohibited in marine waters of Karaginsky and Korfa Bays.

Coastal trap net resembles of a fishing weir, but it is more compact and mobile. Trap nets are open from above and have mesh on all four sides and the bottom. Trap nets have a wing of great length (sometimes several hundred meters), which is exposed perpendicular to the shoreline. The fish, moving along the shore, stumbles on the wing and moves along it to the sea side. At the end of the wing is a trap with an input device, i.e. two small wings installed at an angle to the main

wing and forming a funnel. After the entrance device goes the court, fenced with nets on all sides (Figure 1). The court should be of such large dimensions that the fish from the entrance could not see the opposite wall. If the course of fish is intense, then there is a single entrance and the yield is repeated often (several times a day). If the course of the fish is weak, then from the court there may be two more entrances into the recipient cauldron, in which case the yield is conducted once a day or even once every two days. The wing, court, cages are fixed with the help of anchors and ropes. The frame can be rigid (on pillars) or flexible. Cauldrons might be closed from all sides, including from above.

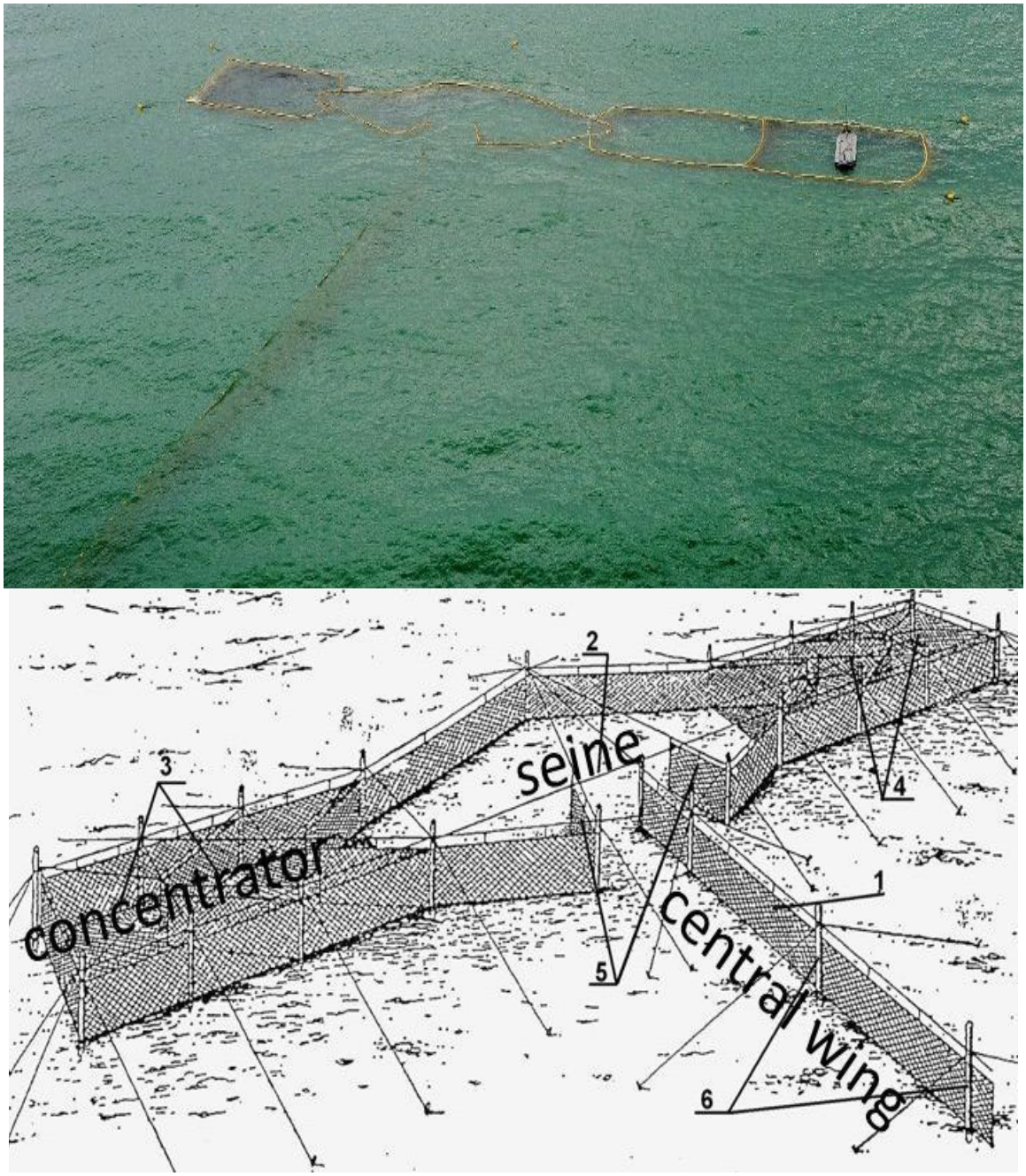


Figure 1. Visual appearance and the scheme of trap net. On the scheme: 1 – mesh wall of the wing, 2- court, 3,4 – recipient cauldron (concentrators), 5 – the entrance mesh wall, 6 – supporting pillars. Source: http://textarchive.ru/c-1661274-pall.html.

Set gill nets (Figure 2) employ a heavily weighted footrope and have few floats on the headrope, so that the bottom of the net rests firmly on the sea bed and the net forms a loose, upright wall. Each end of the net is attached to an anchor, weight or stake to prevent the net moving with the current, and one or both ends are marked with a buoy. Such nets, often termed tangle nets, are particularly suitable for species such as rays, turbot and monkfish, although they are widely used for other fish because, for a given mesh size, they will catch a larger size range of fish than conventional gill nets. When a net is fixed to the sea or river bed, fish may still swim actively towards it, but they may also be brought into the vicinity of the gear by drifting passively with the current. Set gill nets are generally set along the tidal axis in order to reduce the amount of debris that is caught, and those fish swimming actively across the tidal stream are more likely to be caught. These nets fish most effectively on the slack part of the tide when their headropes are not being pushed down by the force of the current. Set net fisheries for migrating fish exploit both active and passive movements. Salmon and sea trout, returning to fresh water on their spawning migrations, often follow the shoreline very closely and are therefore vulnerable to nets set at right angles to the beach. At times, they also move passively with the tides, which once again makes them vulnerable to fixed gear (Potter, Pawson, 1991). According to the fishing rules, gillnets are now prohibited in the coastal zone of East Kamchatka and West Kamchatka south of 54th latitude. Thus, they are legal only in the coastal area of West Kamchatka north of 54 latitude subjected to a number of limitations. They can be used in rivers along with beach seines in some areas.

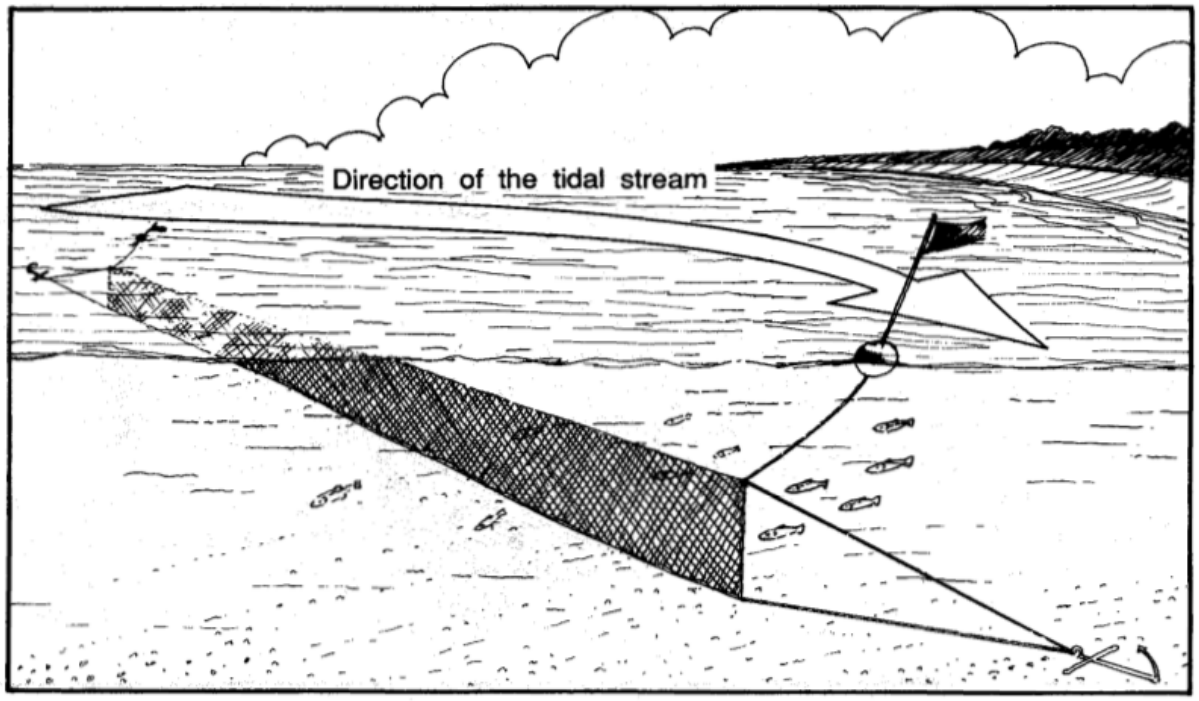


Figure 2. Operation of a set gill net. Source: Potter, Pawson, 1991.

Fishery Location

The fishery takes place in the coastal region of Karaginsky Bay and adjacent rivers (including Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka, Anapka, Khai-Anapka) and in Korfa Bay and adjacent rivers (Vyvenka). Administratively, the fishing areas are parts of Kamchatka Kray of Far East Federal Region of the Russian Federation. For management purposes, the Kamchatka peninsula coastal zone is subdivided into several subzones. The fishery is covered by the Karaginsky Fishery Subzone (Figure 3). This area includes portions of the Karaginsky and Olyutorsky Administrative Districts,

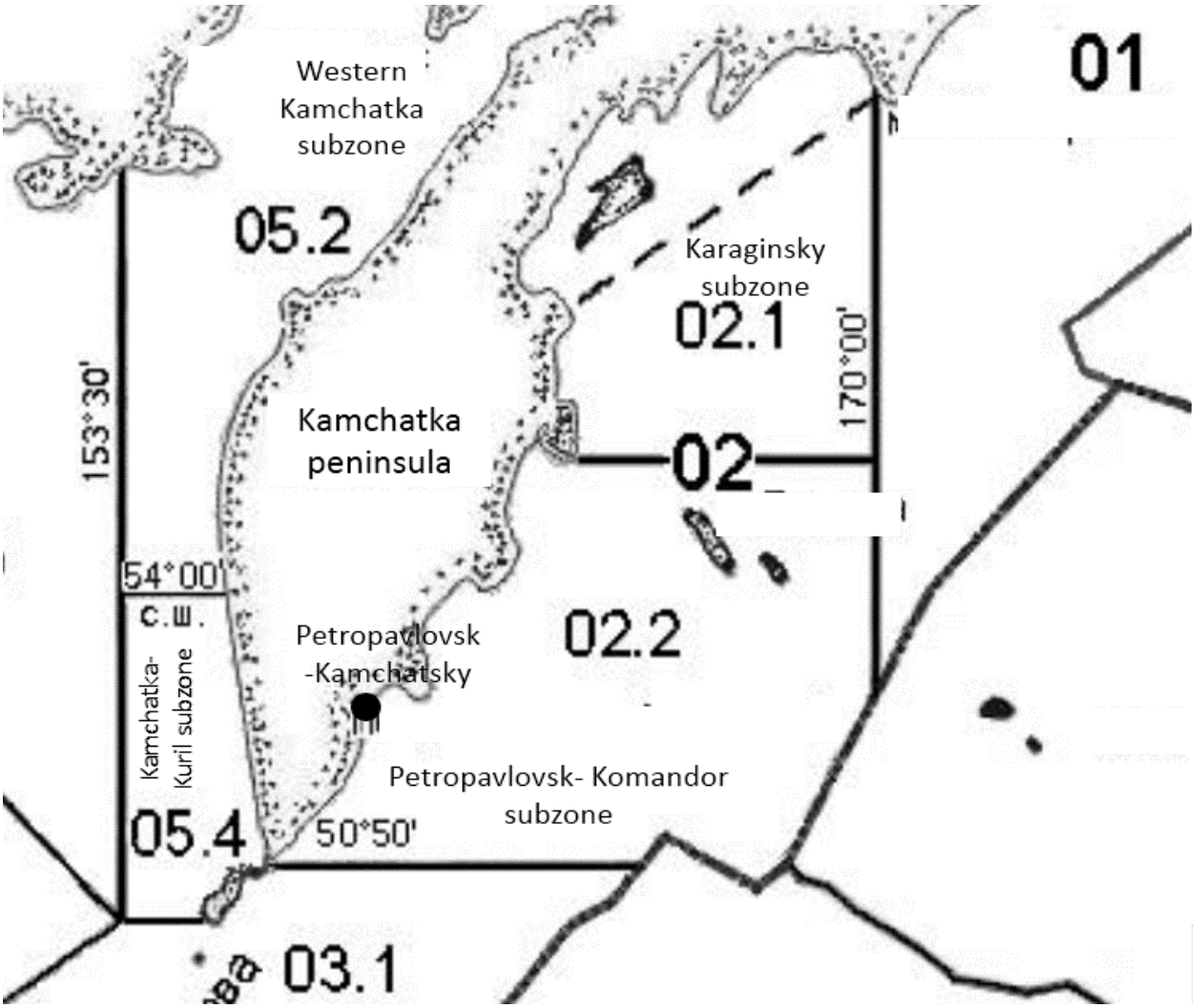


Figure 3. Administrative units (subzones) for Kamchatka peninsula fishery management.

Salmon resources in this area are commercially harvested at 73 fishing sites, of which 64 are marine areas and 9 river sections (2 sites are located in the rivers Uka and Rusakova, 1 – in the Dranka River, 4 – in the Khaylyulya river) (Bugaev et al. 2018). For the last 10 years, fishing in the southern Karaginsky assessment rivers (rivers Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka) was carried out by 12 companies. In 2009, 2011, 2013 5 companies worked in the region annually, and in 2010, 2012 and 2014 4 companies worked in the region each year. Since 2015, salmon resources in the area have been fished by 9 companies.

For target salmon species, the four companies included in this assessment combined lease 56 commercial fishing parcels in the Karaginsky subzone and one in the Western Bering Sea Zone (Figure 4, Figure 5, Table 7, Table 8).

- The joint-stock company Kolkhoz im. Bekereva has 19 marine fishing parcels within the Karaginsky subzone (Karaginsky Unit of Certification).
- The Ukinskij Liman Co. Ltd has 6 marine and 2 river fishing parcels within the Karaginsky subzone (Karaginsky Unit of Certification).
- RA Belorechensk LLC has 17 (16 marine and 1 river) commercial fishing parcels within the Karaginsky subzone (Karaginsky Unit of Certification).
- Vyvenskoe, LLC has 12 (11 marine and 1 river) commercial fishing parcels within the Karaginsky subzone (Korfa Unit of Certification) and one river parcel located in the Western Bering Sea Zone.

Sea fishing parcels are typically 300 m wide and 2 km in length (set perpendicular to shore) unless otherwise noted. In river fishing parcels vary in size and may include one or both shores. The parcel permit is leased to fishing companies under a twenty-year lease starting in 2008-2011 depending on the parcel. Fishermen are hired by contract – they receive a salary and then receive extra pay based on their catch. In addition to employing the local inhabitants in fish processing factories, the companies also pay considerable attention to investing in community development projects of the settlements where they are based.

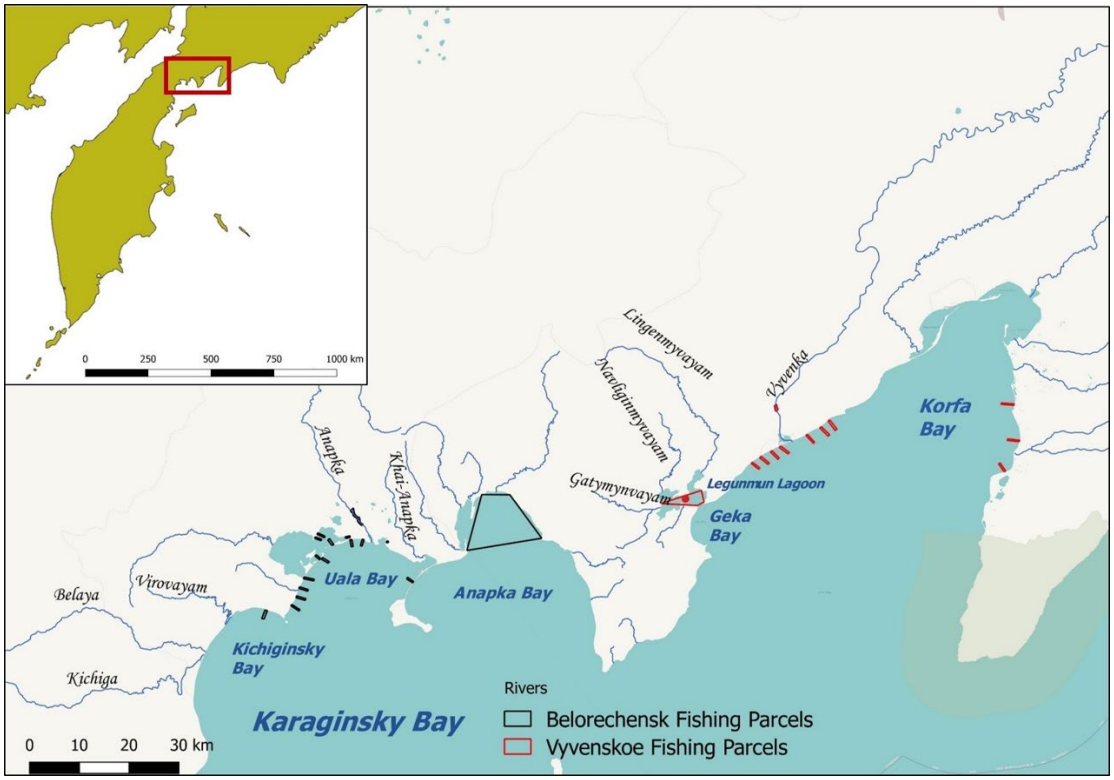


Figure 4. Northern Karaginsky Bay and Korfa Bay showing location of fishing parcels leased to the Belorechensk and Vyvenskoe fishing companies and target rivers.

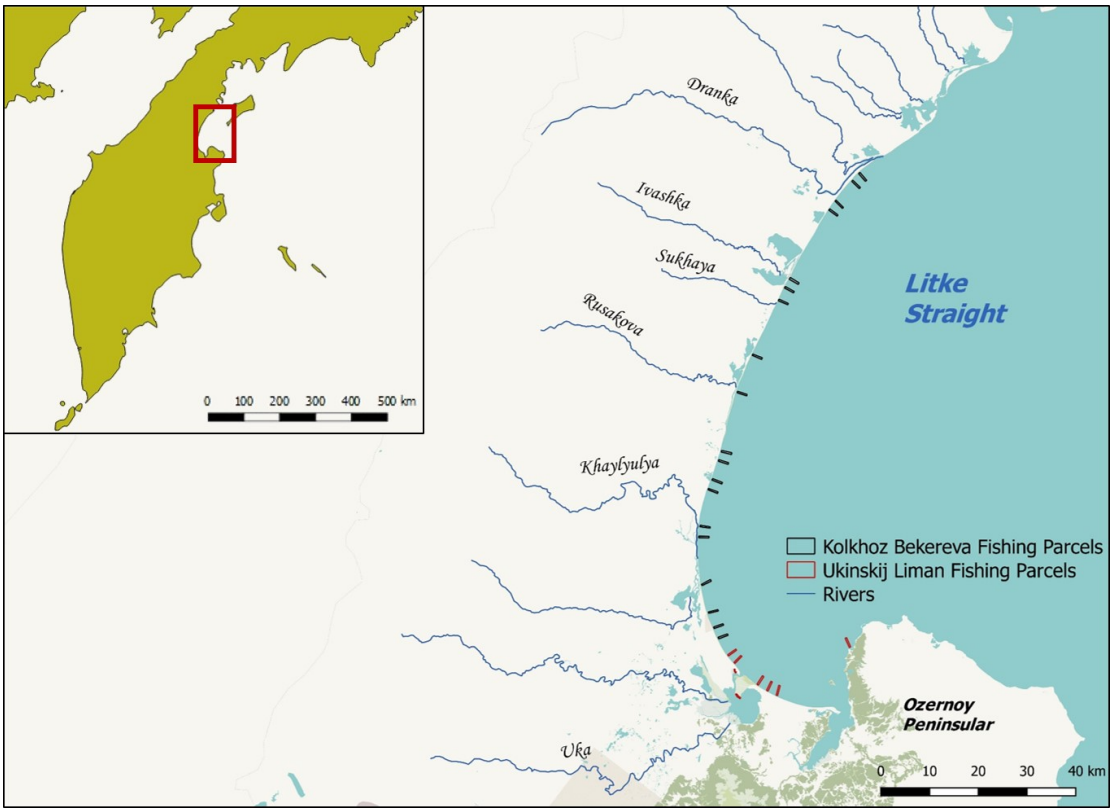


Figure 5. Southern Karaginsky Bay showing location of fishing parcels leased to the Kolkhoz Bekereva and Ukinskij Liman fishing companies and target rivers.

Table 7. Fishing parcels leased by Kolkhoz im. Bekereva JSC and Ukinskij Liman LLC in the Karaginsky subzone (see Figure 5).

Parcel #	Parcel type	Latitude	Longitude	Location description
Leased by JSC KOLKHOZ IM BEKEREVA				
314	sea	57° 54′ 52″ N	162° 03′ 07″ E	Karaginsky Bay
315	sea	57° 56′ 01″ N	162° 02′ 14″ E	Karaginsky Bay
316	sea	57° 57′ 32″ N	161° 01′ 08″ E	Karaginsky Bay
318	sea	58° 00′ 13″ N	162° 00′ 04″	Karaginsky Bay
321	sea	58° 05′ 35″ N	161° 59′ 31″ E	Karaginsky Bay
322	sea	58° 06′ 40″ N	161° 59′ 43″ E	Karaginsky Bay
326	sea	58° 10′ 56″ N	162° 01′ 37″ E	Karaginsky Bay
327	sea	58° 11′ 59″ N	162° 04′ 12″ E	Karaginsky Bay
329	sea	58° 13′ 58″ N	162° 03' 42″ E	Karaginsky Bay
330	sea	58° 14′ 59″ N	162° 04′ 20″ E	Karaginsky Bay
335	sea	58° 21′ 23″ N	162° 07′ 36″ E	Karaginsky Bay
338	sea	58° 25′ 15″ N	162° 10′ 38″ E	Karaginsky Bay
343	sea	58° 31′ 07″ N	162° 16′ 01″ E	Karaginsky Bay
344	sea	58° 32′ 35″ N	162° 17′ 18″ E	Karaginsky Bay
345	sea	58° 33′ 30″ N	162° 18′ 21″ E	Karaginsky Bay
354	sea	58° 40′ 47″ N	162° 26′ 32″ E	Karaginsky Bay
355	sea	58° 41′ 44″ N	162° 27′ 43″ E	Karaginsky Bay
357	sea	58° 43′ 54″ N	162° 31′ 06″ E	Karaginsky Bay
358	sea	58° 44′ 43″ N	162° 32′ 31″ E	Karaginsky Bay
Leased by LLC UKINSKIJ LIMAN				
906	river	57° 53′ 16″ N	162° 30′ 32″ E	Left shore
907	river	57° 48′ 19″ N	162° 15′ 16″ E	Right shore
307	sea	57° 48′ 47″ N	162° 13′ 28″ E	Karaginsky Bay
308	sea	57° 49′ 22″ N	162° 11′ 45″ E	Karaginsky Bay
309	sea	57° 51′ 58″ N	162° 06′ 28″ E	Karaginsky Bay
310	sea	57° 52′ 52″ N	162° 05′ 09″ E	Karaginsky Bay
311	sea	57° 53′ 16″ N	162° 30′ 32″ E	Karaginsky Bay
312	sea	57° 48′ 19″ N	162° 15′ 16″ E	Karaginsky Bay

Table 8. Fishing parcels leased by RA Belorechensk LLC and Vyvenskoe LLC. All are located in the Karaginsky subzone unless specified otherwise.

Parcel #	Parcel type	Latitude	Longitude	Location description
Leased by RA Belorechensk, LLC				
443	sea	59º53’36’’N	163º37’31’’E	Kichiginsky Bay
444	sea	59º54’01’’N	163º43’03’’E	Uala Bay
445	sea	59º54’56’’N	163º44’08’’E	Uala Bay
446	sea	59º55’57’’N	163º44’53’’E	Uala Bay
447	sea	59º56’55’’N	163º45’46’’E	Uala Bay
448	sea	59º59’04’’N	163º49’26’’E	Uala Bay
449	sea	59º59’02’’N	163º48’55’’E	Uala Bay, Annuyangvyn lagoon
451	sea	60º01’08’’N	163º48’01’’E	Uala Bay, Annuyangvyn lagoon
452	sea	60º01’19’’N	163º48’01’’E	Uala Bay, Annuyangvyn lagoon
453	sea	60º01’26’’N	163º55’51’’E	Uala Bay, Annuyangvyn lagoon
454	sea	60º00’37’’N	163º52’21’’E	Uala Bay, Annuyangvyn lagoon
457	sea	60º01’07’’N	163º56’19’’E	Uala Bay
458	sea	60º01’06’’N	163º58’27’’E	Uala Bay
460	sea	60º01’00’’N	164º03’09’’E	Uala Bay
464	sea	59º56’37’’N	164º09’08’’E	Uala Bay
466	sea	59º59’47’’N	164º20’56’’E	Anapka Harbor, within specified coordinates
		60º05’48’’N	164º23’34’’E	
		60º05’49’’N	164º29’21’’E	
		60º01’11’’N	164º36’08’’E	
933	river			Anapka River 5500 m from mouth & 3000 m upstream, both banks
Leased by Vyvenskoe, LLC				
468	sea	60º04’40’’N	165º09’58’’E	Korfa Bay, Gek harbor, Legunmun lagoon, within specified coordinates
		60º04’47’’N	165º02’07’’E	
		60º06’14’’N	165º10’44’’E	
		60º04’57’’N	165º11’20’’E	
470	sea	60º09’14’’N	165º21’01’’E	Korfa Bay
471	sea	60º09’56’’N	165º22’56’’E	Korfa Bay
472	sea	60º10’36’’N	165º25’12’’E	Korfa Bay
473	sea	60º11’04’’N	165º27’15’’E	Korfa Bay
474	sea	60º12’20’’N	165º33’12’’E	Korfa Bay
475	sea	60º13’03’’N	165º35’59’’E	Korfa Bay
476	sea	60º13’49’’N	165º37’44’’E	Korfa Bay
488	sea	60º15’25’’N	166º17’22’’E	Korfa Bay
489	sea	60º11’36’’N	166º18’31’’E	Korfa Bay
490	sea	60º08’20’’N	166º15’22’’E	Korfa Bay
936	river			Vyvenka River 7000 m from mouth & 1000 m upstream, right bank

Fisheries

There are three legal categories of salmon fishing that take place in the Karaginsky Subzone: commercial fishing by fishing companies (which are also processing companies); recreational (sport and amateur fishing) and indigenous fishing for traditional economic activities by communities, clan associations and personal consumption by individual representatives of indigenous populations of the North, Siberia and the Far East (SIPN). The large majority of the salmon harvest occurs in the commercial fishery.

Commercial Fishery

In 2009–2018, on average, commercial fishing accounted for 99.2% of all harvested Pacific salmon in the surveyed area. Pink salmon is the main commercial species harvested from the target rivers, followed by chum salmon (Figure 6). Pink salmon account for about 98% of the entire number of spawners reproduced in these rivers. Other species make up a very small percentage of the catch. The ratio of other species (chum, sockeye, coho) in each of the watersheds varies, but on average chum and coho do not exceed 0.8% each, and the proportion of sockeye is about 0.4%.

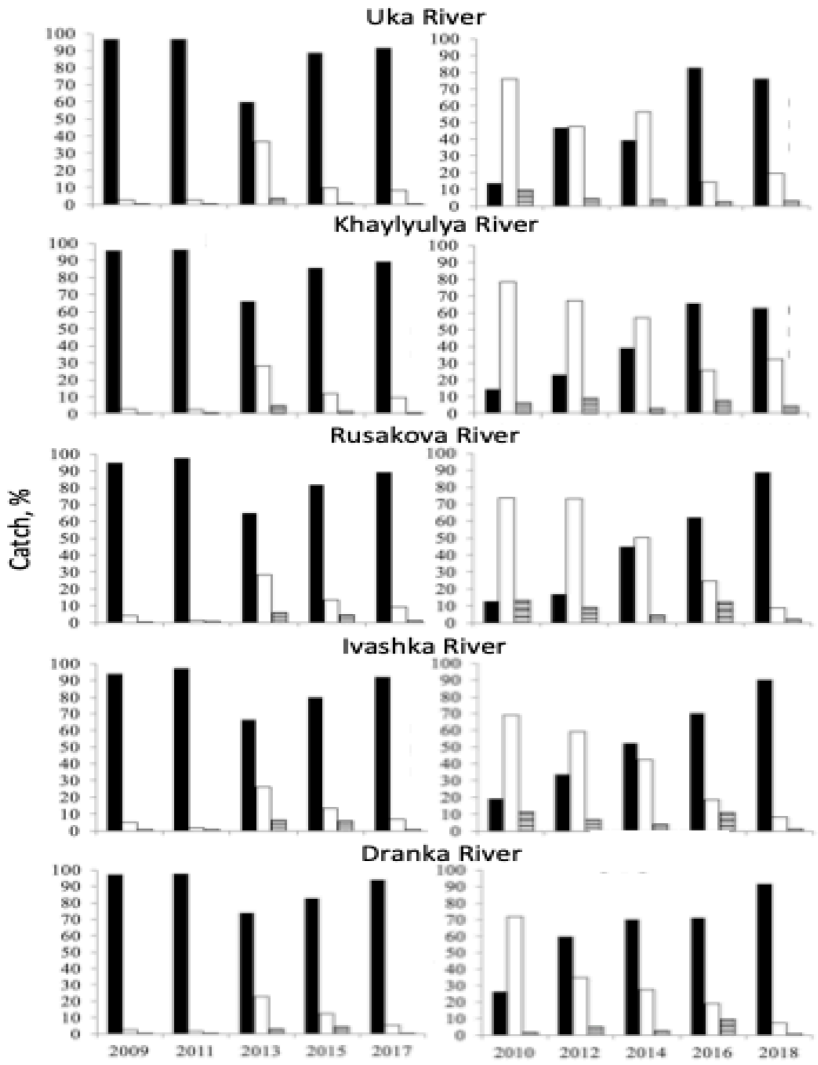


Figure 6. Percentage of commercial catch by species in the UoA (set of target rivers), 2009-2018. Left column of graphs represents odd years, right column – even years. Black – pink, white – chum, light grey – sockeye. Source: Bugaev et al. 2018a.

Target species are harvested in broadly overlapping patterns throughout the migration period (Figure 7). The timing of spawning migration slightly varies for different salmon species. As for the client companies, the fishing operations begin in July and are over by mid-September.

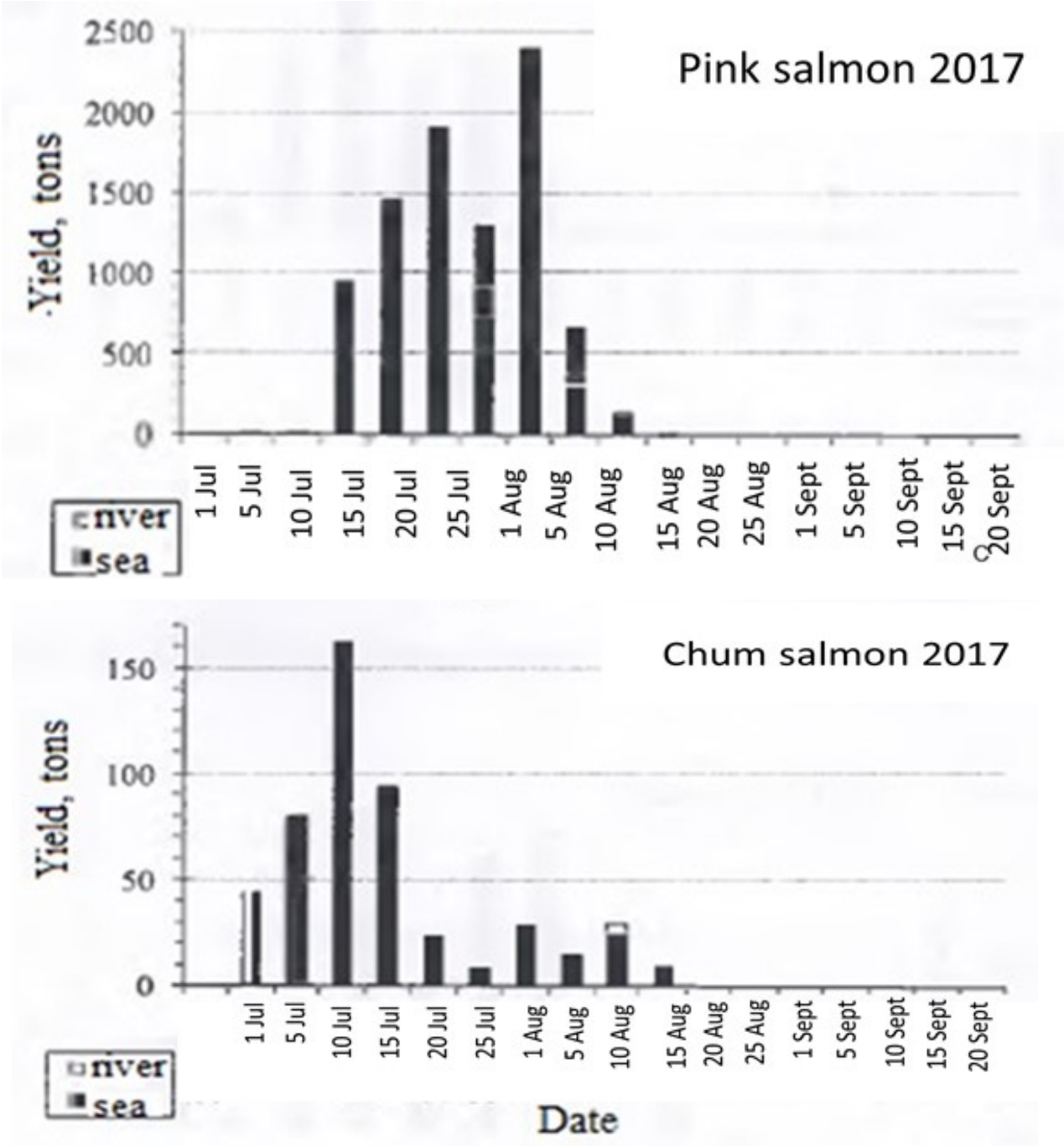


Figure 7. The overlapping timing of salmon harvests by example of Pink and Chum salmon in the Dranka River of Karaginsky Bay, 2017. Source: Bugaev et al. 2018a.

The main share of catch of Pacific salmon and char in southern Karaginsky Bay belongs to three fishing companies (Figure 8). In the period from 2009 to 2018 Kolkhoz im. Bekereva JSC fished out an average 36.2% from 24.9% (2010) to 43.2% (2009), Vostochniy Bereg LLC. - 32.2% from 25.7% (2017) to 40.2% (2012) and Koryakmoreprodukt LLC — 21.5% from 10.6% (2018) to 36.2% (2010). The share of other enterprises in 2009-2014 on average, accounted for 4.2%, from 2015 - 19.8%. The share of fishing by a group of 3 main companies in 2009-2018 on average accounted for 36.3% of the total catch of all the Pacific salmon in the Karaginsky subzone and varied from 15.0% in 2010 to 53.0% in 2013 (Figure 9).

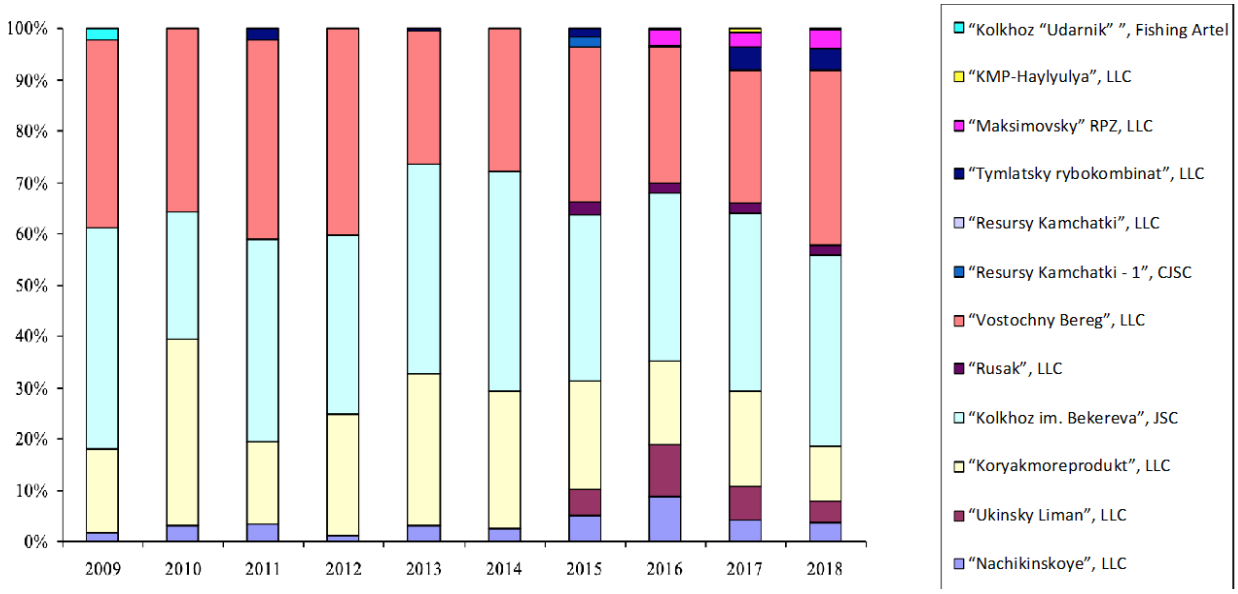


Figure 8. Percent of total catch of salmon and char in Karaginsky subzone by company and year. Source: Bugaev et al. 2018a.

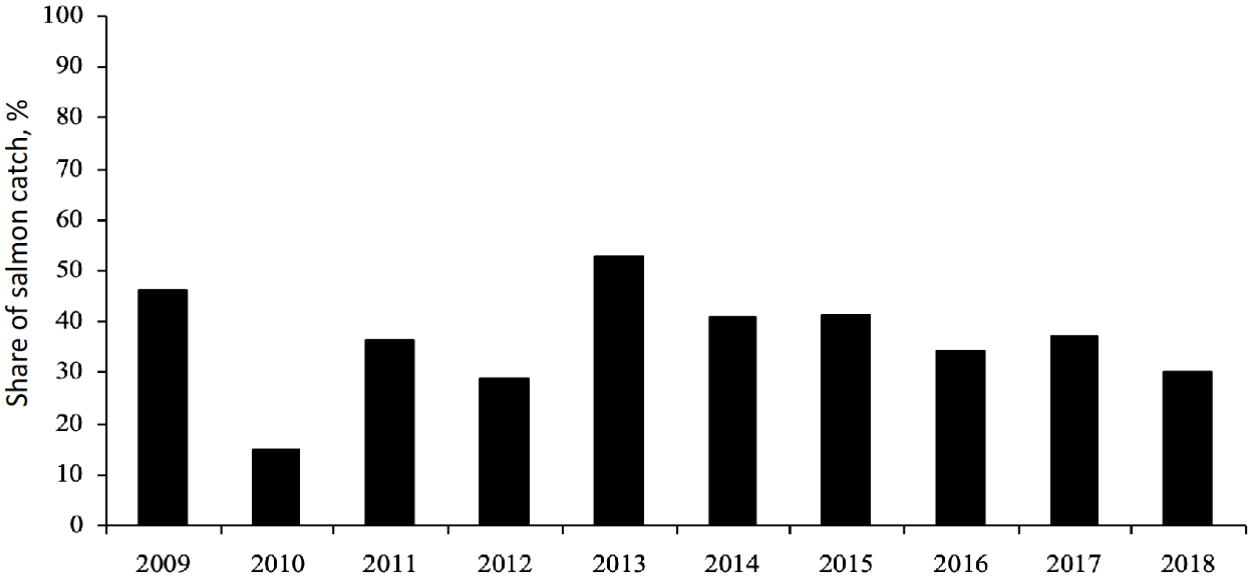


Figure 9. Percent of the total catch of salmon in the Karaginsky subzone caught by three leading companies – "Vostochny Bereg" LLC, "Kolkhoz im. Bekereva" JSC and "KoryakmoreproduKt" LLC, 2009-2018. Source: Bugaev et al. 2018a.

Commercial fishing in Uala Bay, Anapka River and Khai-Anapka River has been undertaken by six fishing companies over the past ten years (Figure 10). On average, FG Belorechensk, LLC accounted for 66.5% of the catch in this area, ranging from 42.6% in 2010 to 85.2% in 2018. Commercial fishing in Korfa Bay and the Vyvenka River has been conducted by four fishing companies over the past ten years (Figure 11). On average, Vyvenskoe LLC accounted for 75.9% of the catch in this area ranging 65.0% in 2018 to 83.7% in 2012.

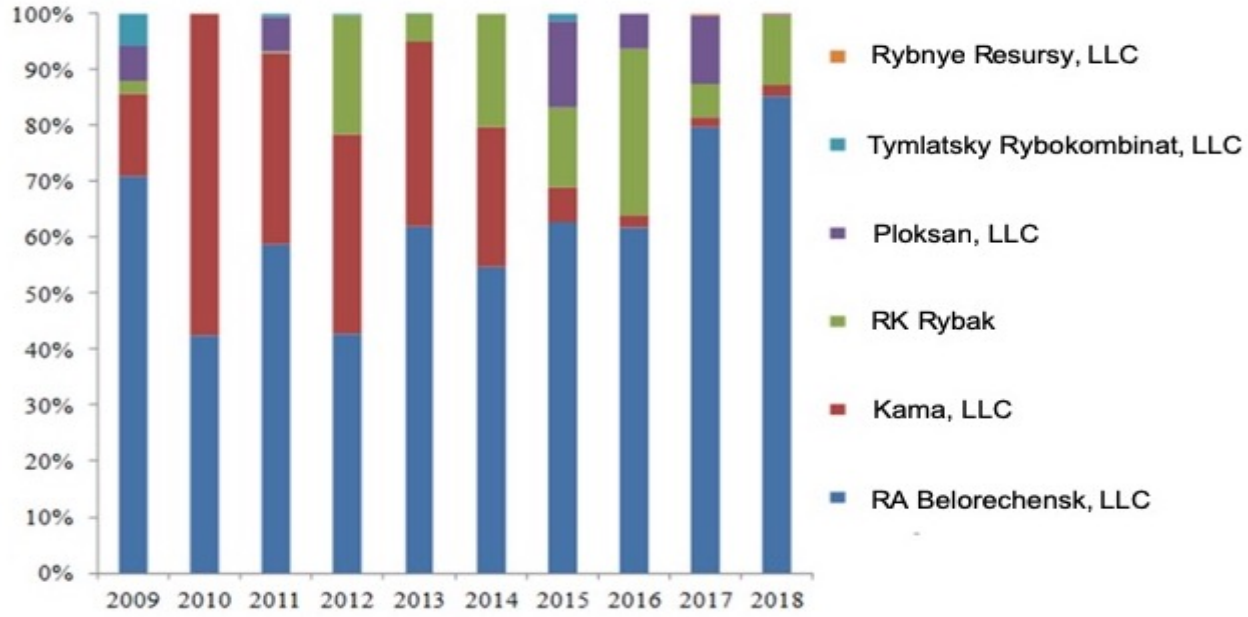


Figure 10. Percent of total catch of salmon and char in the Uala Bay and Anapka Bay area by company and year, 2009-2018. Source: Bugaev et al. 2019a.

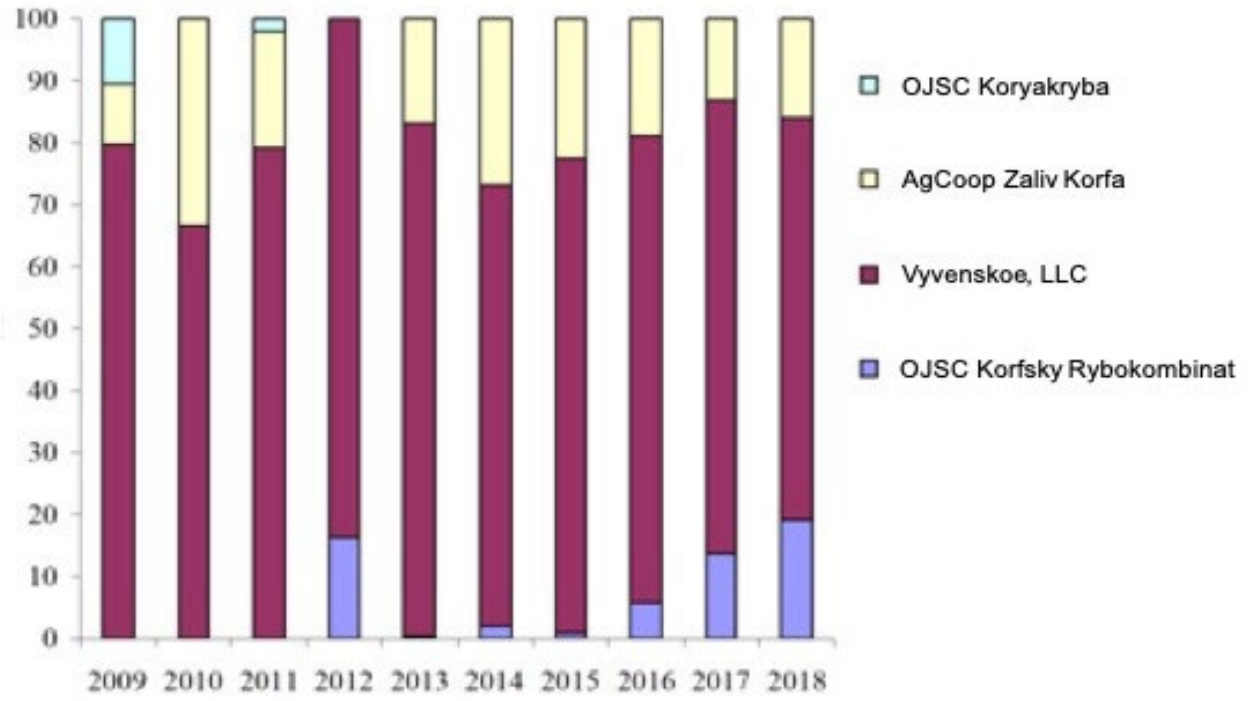


Figure 11. Percent of total catch of salmon and char in the Geka Bay and Korfa Bay area by company and year, 2009-2018. Source: Bugaev et al. 2019b.

Although the salmon catch in a coastal trap net is typically assigned to the closest river, they likely intercept other stocks transiting to other rivers in the Karaginsky subzone. This circumstance does not allow unambiguous attributing of catches to certain salmon populations. Nevertheless, the catches attributed to individual stocks are informative. Commercial salmon catches adjacent or in each river are shown in Figure 12 through Figure 22.

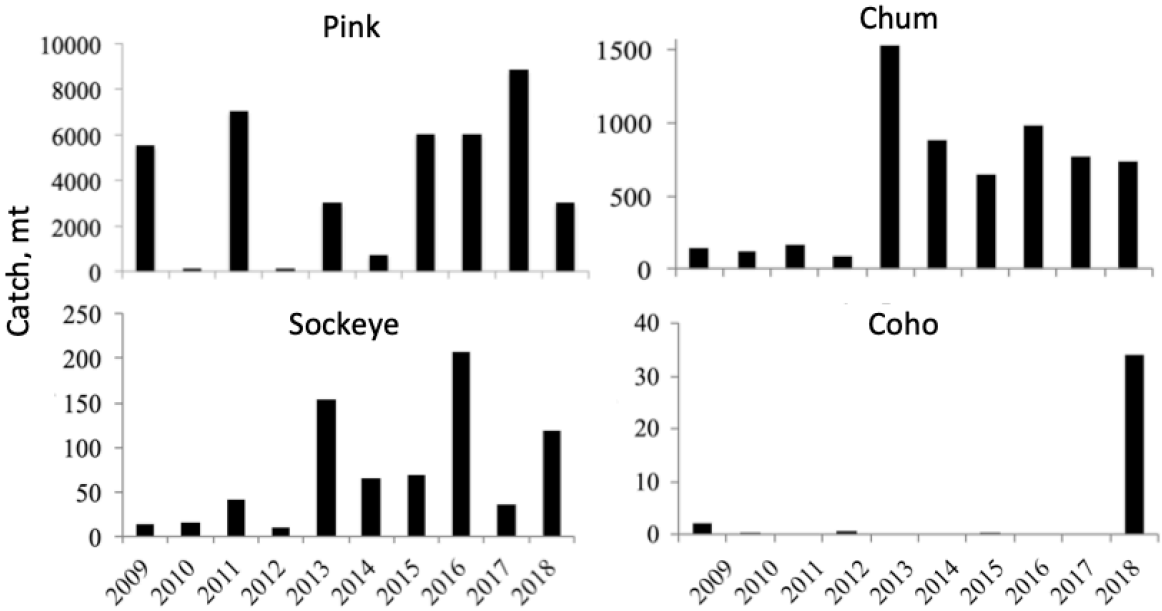


Figure 12. The commercial salmon catches (mt) in and adjacent to the Uka River, 2009-2018. Source: Bugaev et al. 2018a.

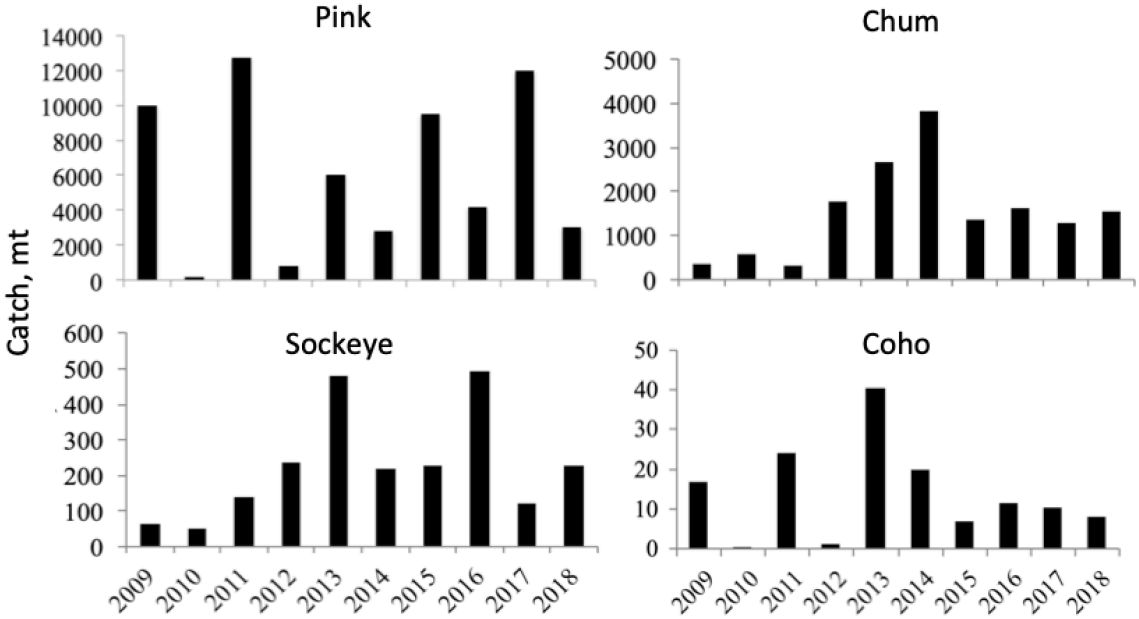


Figure 13. The commercial salmon harvest (mt) in and adjacent to the Khaylyulya River, 2009-2018. Source: Bugaev et al. 2018a.

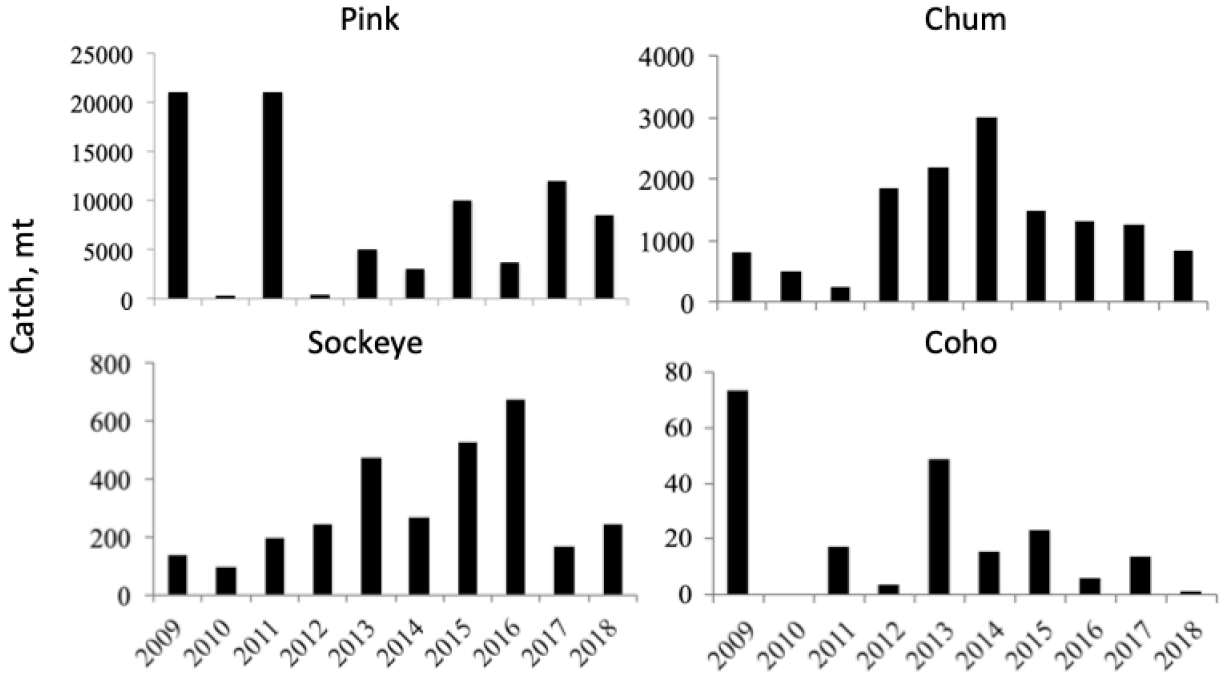


Figure 14. The commercial salmon harvest (mt) in and adjacent to the Rusakova River, 2009-2018. Source: Bugaev et al. 2018a.

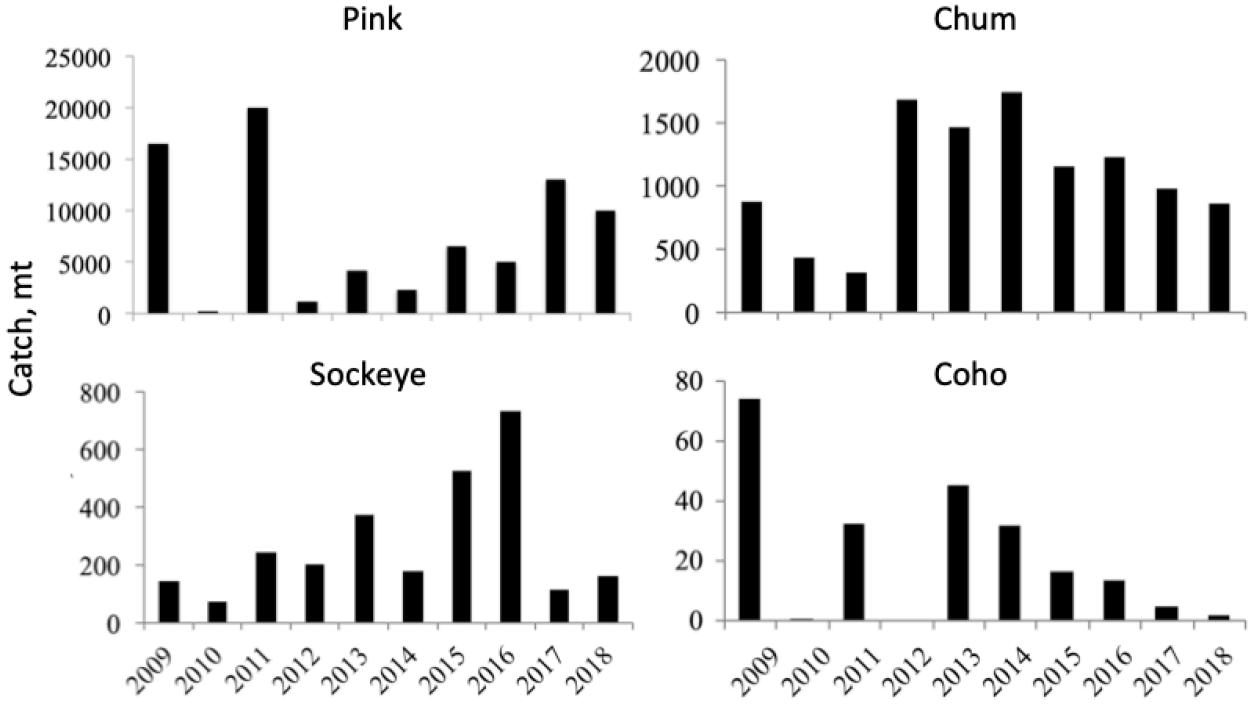


Figure 15. The commercial salmon harvest (mt) in and adjacent to the Ivashka River, 2009-2018. Source: Bugaev et al. 2018a.

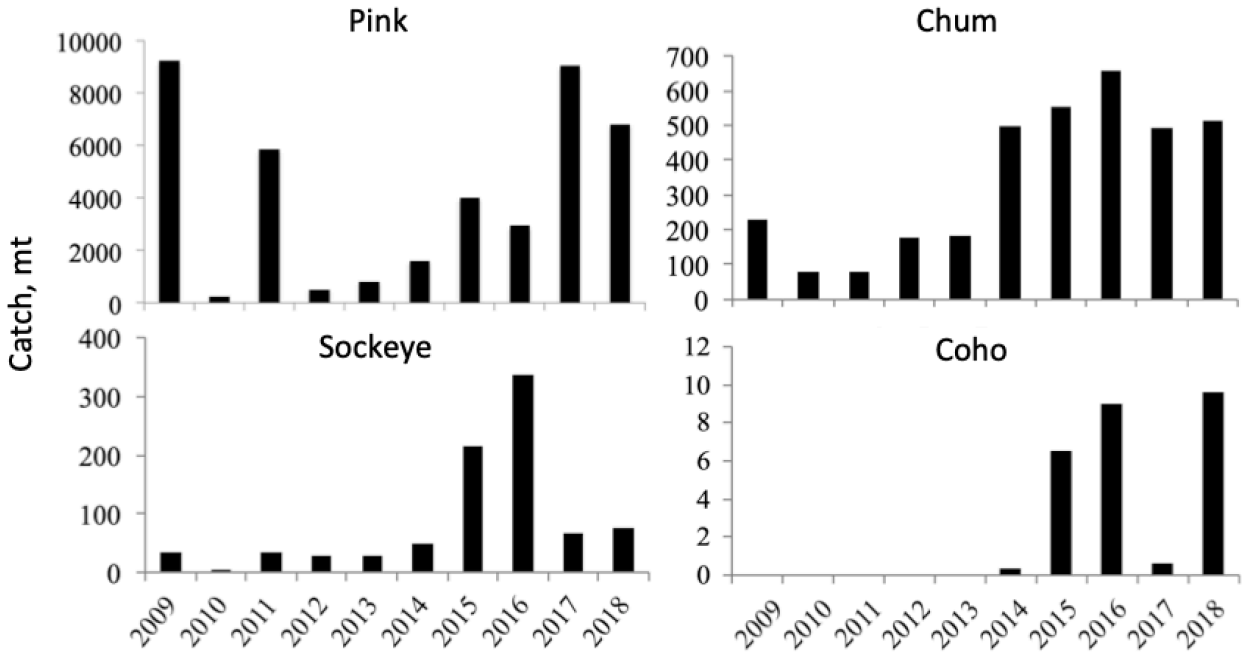


Figure 16. The commercial salmon harvest (mt) in and adjacent to the Dranka River, 2009-2018. Source: Bugaev et al. 2018a.

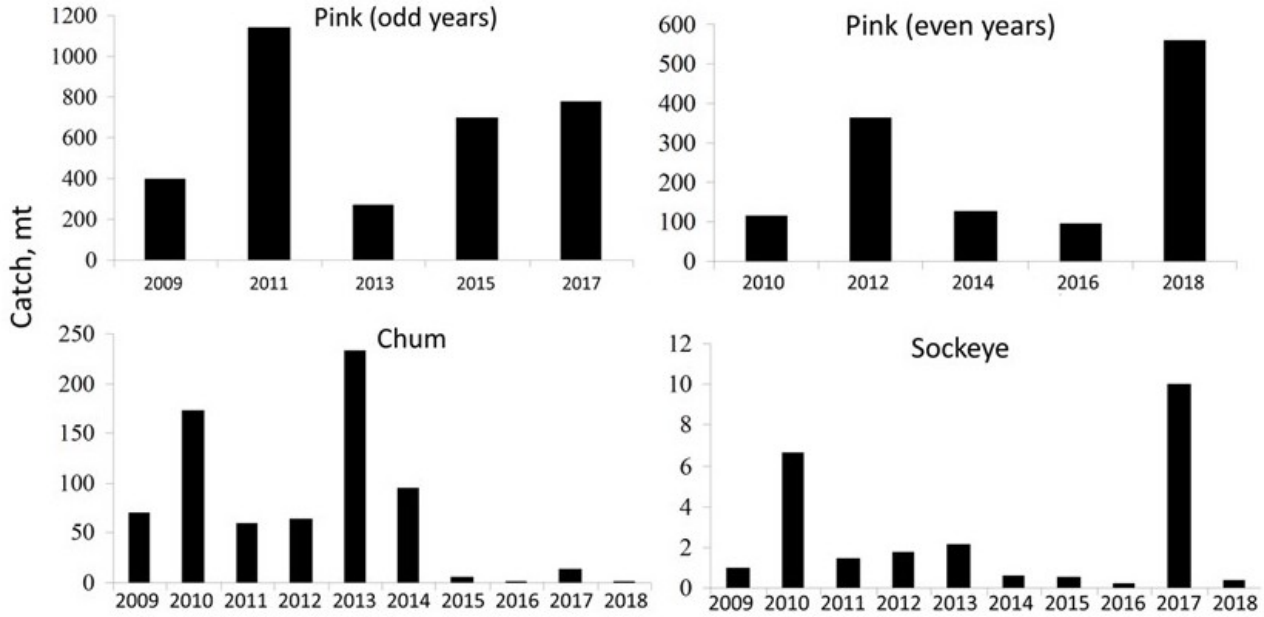


Figure 17. The commercial catch (mt) of pink, chum and sockeye salmon in Kichiginsky Bay (fishing parcel 443), 2009-2018. Source: Bugaev et al. 2019a.

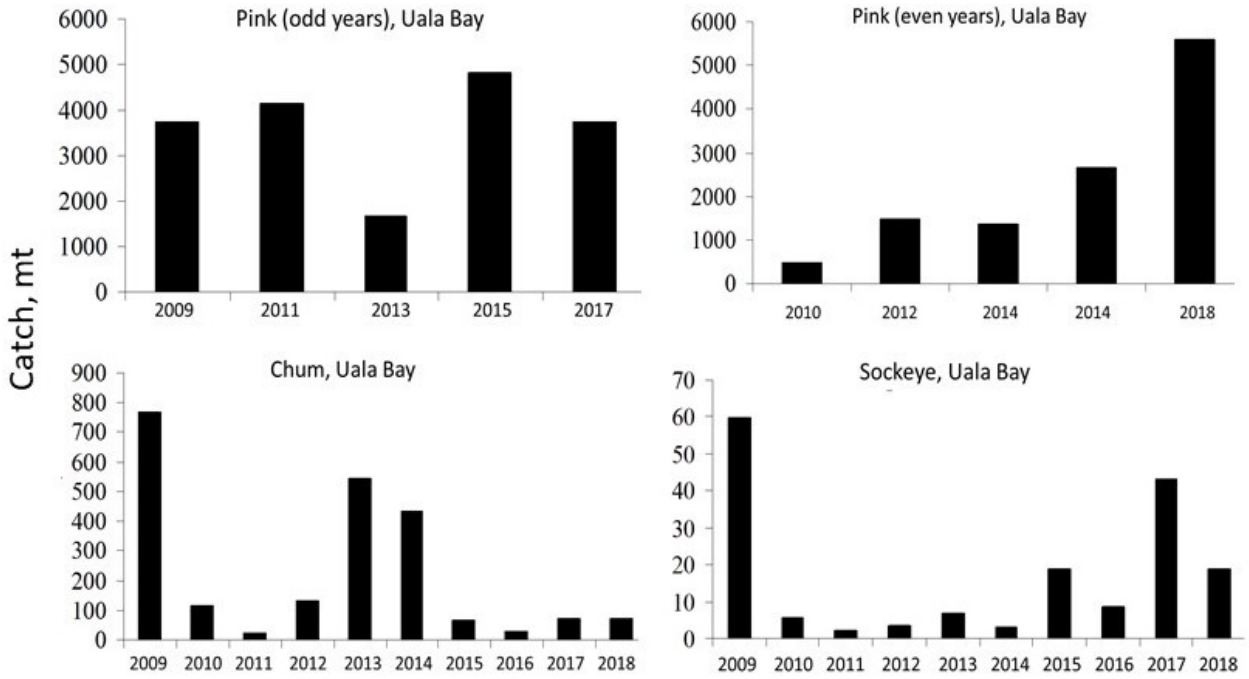


Figure 18. The commercial catch (mt) of pink, chum and sockeye salmon in Uala Bay, 2009-2018. Source: Bugaev et al. 2019a.

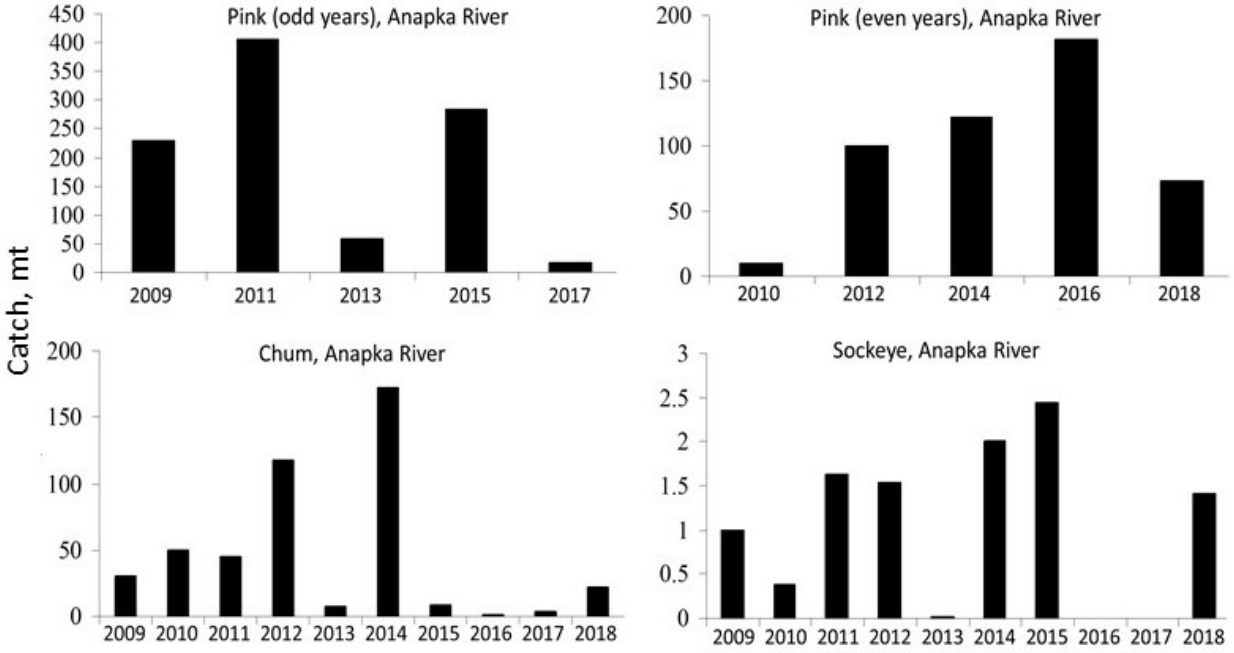


Figure 19. The commercial harvest (mt) of pink, chum and sockeye salmon in and adjacent to the Anapka River, 2009-2018. Source: Bugaev et al. 2019a.

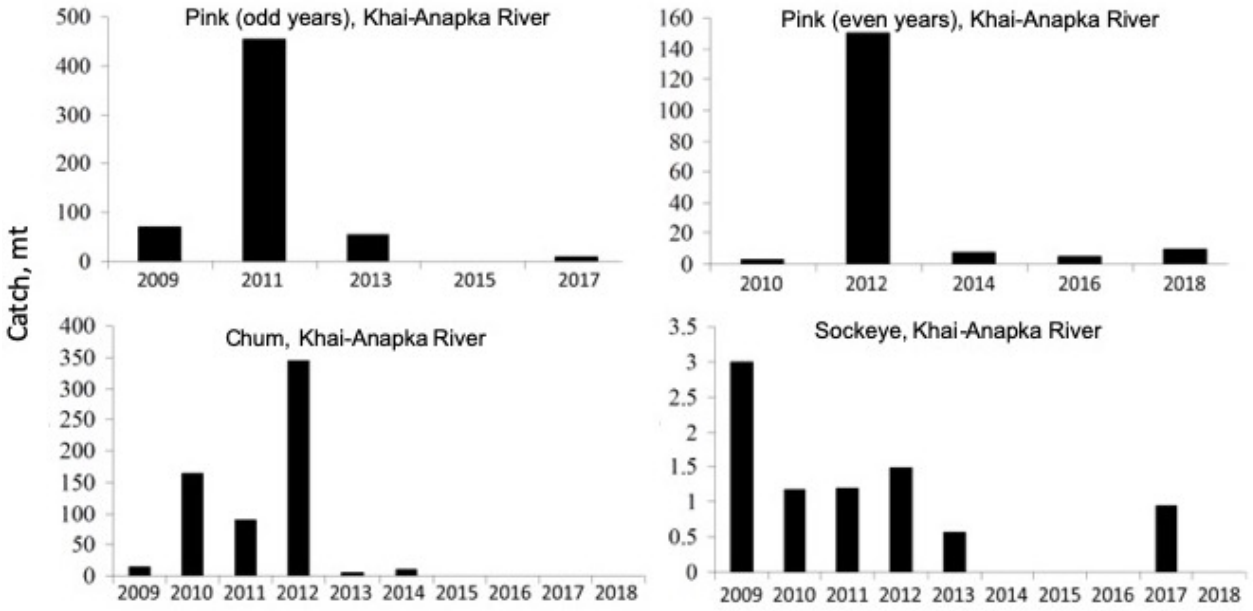


Figure 20. The commercial harvest (mt) of pink, chum and sockeye salmon in and adjacent to the Khai-Anapka River, 2009-2018. Source: Bugaev et al. 2019a.

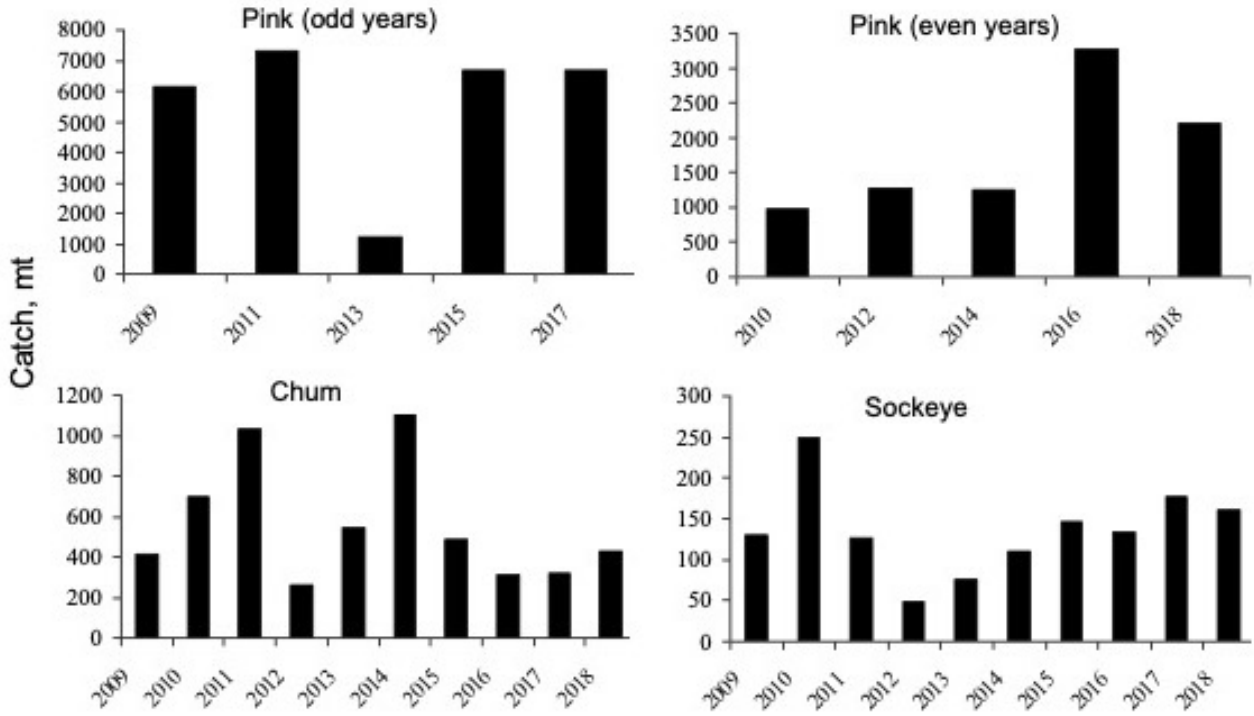


Figure 21. The commercial catch (mt) of pink, chum and sockeye salmon in Korfa Bay, 2009-2018. Source: Bugaev et al. 2019b.

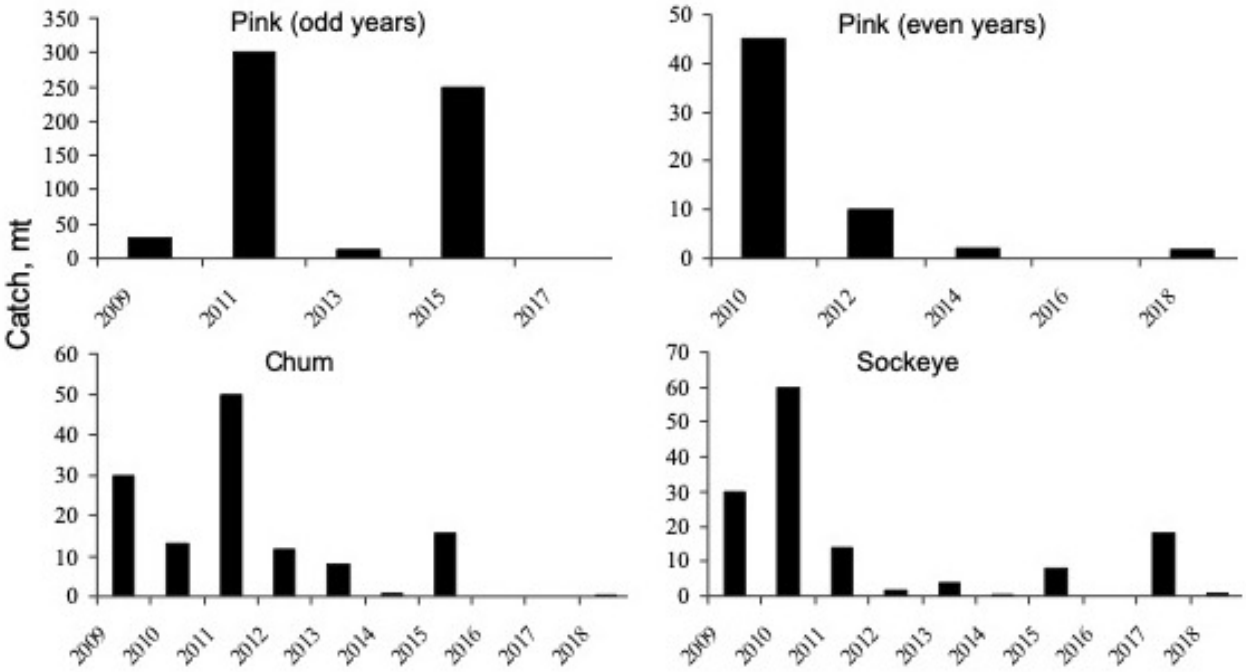


Figure 22. The commercial harvest (mt) of pink, chum and sockeye salmon in and adjacent to the Vyvenka River, 2009-2018. Source: Bugaev et al. 2019b.

Recreational Fishery

Recreational fishing occurs in the Dranka, Karaga, Ossora and Tymlat-Vytvirovayam Rivers in the UoA. Recreational fishing does not occur on these rivers every year and the harvest is typically small (less than 1 mt) of any species for a given river (Shevlyakov et al., 2017). However, the Ossora River is the most popular site for recreational fishing and annual harvests often exceed those of the other rivers. Recreational harvests on the Ossora averaged 3.49 mt (0 - 19.2 mt) of Pink salmon, 1.41 mt (0 - 1.0 mt) of chum salmon, 0.26 mt (0 - 1.58 mt) of sockeye salmon and 0.17 mt (0 - 1.0 mt) of coho salmon between 2003 and 2017 (Figure 23).

Sport fishing also occurs, when designated fishing parcels are leased to fishing companies. For example, such fishing operations in the pre-assessment area are carried out by “Vostochny Bereg” Ltd. in one marine location in the Karaginsky Bay in the Yuzhny Liman. The following species of Pacific salmon are harvested by this type of fishing: coho, chum and sockeye salmon (Figure 24).

Judging by official statistics, licensed fishing of Vostochny Bereg LLC on the site began in 2015. The catch in 2015–2018 on average was: coho salmon - 0.171 (0.097–0.295) mt, chum salmon - 0.126 (0.045–0.158) mt, and sockeye salmon - 0.095 (0.037–0.150) mt.

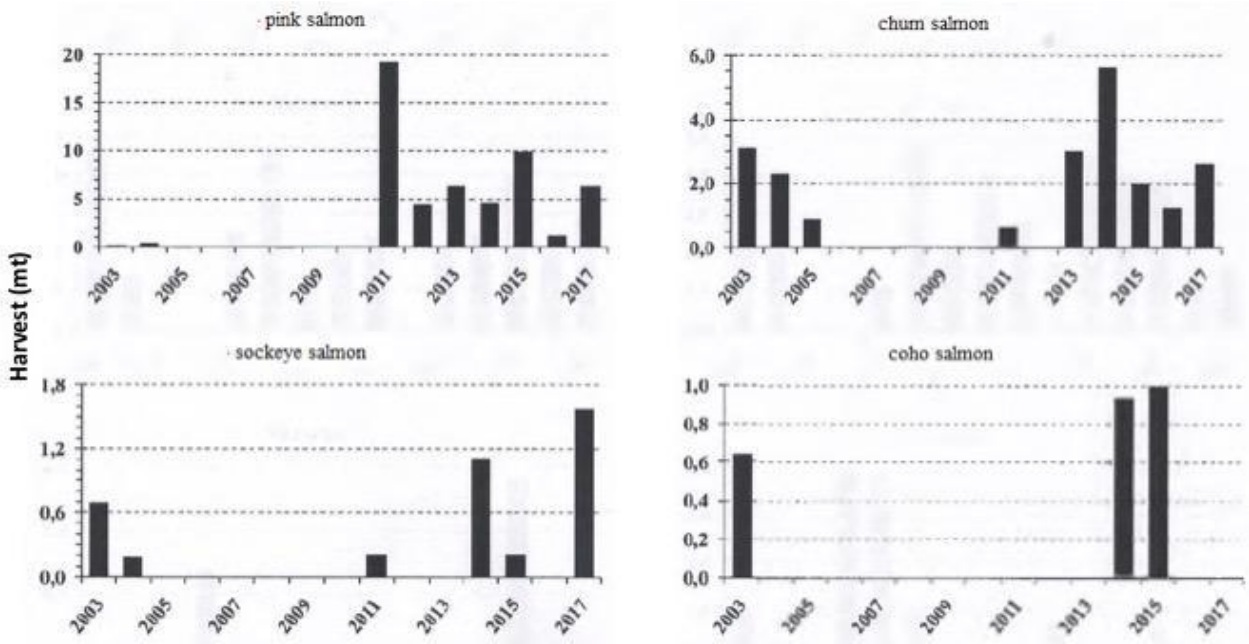


Figure 23. **Recreational salmon harvest on the Ossora River by species, 2003-2017. Source: Shevlyakov et al., 2017.**

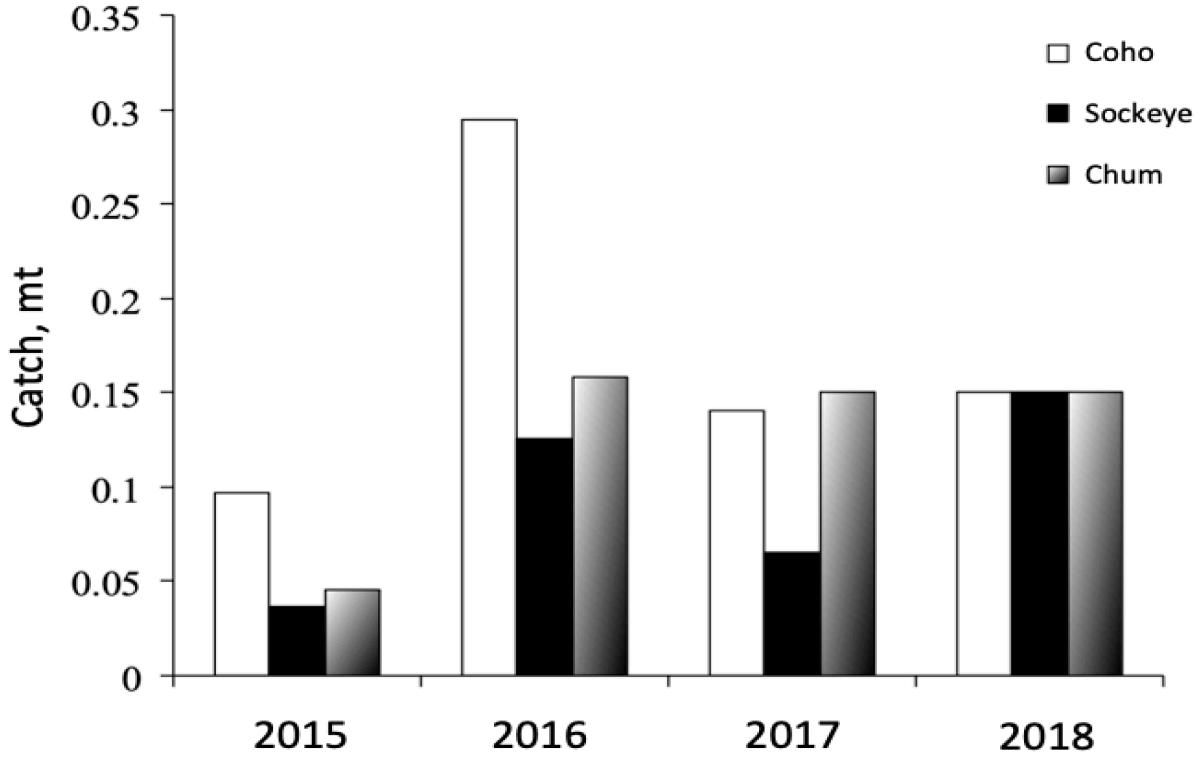


Figure 24. Recreational salmon harvest (mt) from the Yuzhny liman (Ivashka estuary) by species and year, 2015-2017. Source Bugaev et al. 2018b.

Indigenous fishery

All species of salmon are harvested for consumption by communities, families and individual representatives of indigenous peoples (officially called as Small Indigenous Peoples of the North, Siberia and Far East, abbreviation - SIPN). In 2009, the government decreed in Document №631 that the indigenous peoples of Kamchatka territory were allowed to fish for personal consumption without written permits/documents. A personal limit of 50 kg per year is allocated for indigenous people. Indigenous communities may also be provided with a specific allocation which varies from river to river. Indigenous quota has priority relative to industrial quota. Indigenous catch may be retained for subsistence and personal use or sold.

In 2009–2018 indigenous fishery was carried out by 5 communities on 3 marine sites and on 2 riverine sites (in the rivers Khaylyulya and Ivashka). At the marine sites, 5 species of Pacific salmon (Figure 25) and char were harvested. The main target at marine sites was pink salmon, with average catch for 10 years of 62.6 mt (0.01–141.2mt), in even years - 98.9 mt, and in odd years - 26.2 mt. For chum salmon, average catches were 27.3 mt (7.1–41.6 mt), sockeye salmon - 7.4 mt (3.1–14.9 mt), coho - 2.6 mt (0.7 – 4.3 mt). Since 2015, on average, 1.1 mt (0.7–1.7mt) of chinook salmon were caught. Catch of char was carried out only in 2015 and amounted to 0.800 metric tons. The total catch varied from 13.9 to 187.0 mt, on average - 100.4 metric tons.

Within the river parcels, four species of Pacific salmon were harvested: pink, chum, sockeye and coho salmon. Pink salmon are the main target of the in-river fisheries (except in 2016). Between 2014-2018 the average catch was 93.4 mt pink (17.4–202.6 mt), 34.7 mt chum (20.0-46.2 mt), 10.4 mt sockeye (4.2–16.0 mt) and 3.7 mt coho salmon (2.0-7.8 mt. The Khaylyulya River SIPN fishery was conducted in 2015, 2016 and 2018 (Figure 26). The average catch over the three years was: 2.68 mt of chum salmon (0.3- 4.6 mt); 2.2 mt of sockeye salmon (0.9-4.0 mt); and 0.6 mt of coho salmon (0.4-1.0 mt). Pink salmon were only caught in 2016 at 0.16 mt. The catch in the Ivashka River SIPN fishery between 2014 and 2018 (Figure 27) averaged 40.2 mt pink salmon (9.20-74.3 mt), 16.2 mt chum salmon (11.6-20.0 mt), 5.0 mt sockeye salmon - (3.0-6.7 mt) and 2.2 mt coho salmon (1.0-4.6 mt).

Within Uala Bay two to three indigenous villages participate in SIPN salmon fisheries two marine locations and one location in the Anapka River in 2010-2012 and 2017 fishing has been performed in two marine locations and one on Anapka river. The total catch of salmon in the marine SIPN fisheries in Uala Bay averaged 89.1 mt aver the past ten years (Figure 28, Bugaev et al. 2019a). Pink salmon represent the majority of the marine catch, averaging 80% of the catch in odd years and 60% in even years. The pink salmon catch averaged 65.2 mt overall (35.7 mt in even years and 94.7 in odd years). Chum salmon averaged 24% of the marine catch or 21.4 mt (range 5-32 mt). Sockeye and coho represent less than 2% of the catch: both averaging 1.5 mt over the past ten years. Char were reported in 2009 (0.2 mt) and 2010 (2.0 mt).

In the Anapka River, SIPN fisheries harvest four salmon species (Figure 30) as well as chars. Over the past ten years the total catch in the Anapka River averaged 78.3 mt, ranging from 20.6 mt in 2013 to 159.5 mt in 2011(Bugaev et al. 2019a). Pink salmon are the main species caught, averaging 69% over the past ten years (77% odd years and 52% in even years). The pink salmon catch averaged 54.4 mt overall (83.8 mt in odd years and 25.0 mt in even years). Chum salmon averaged 19.7 mt (10 – 25 mt); sockeye salmon 3.0 mt (0.4–5.5 mt); and coho salmon 1.6 mt (0.9–3.0 mt). Chars were reported in the catch in 2009 (0.5 mt); 2010 (1.0 mt); and 2018 (1.1 mt).

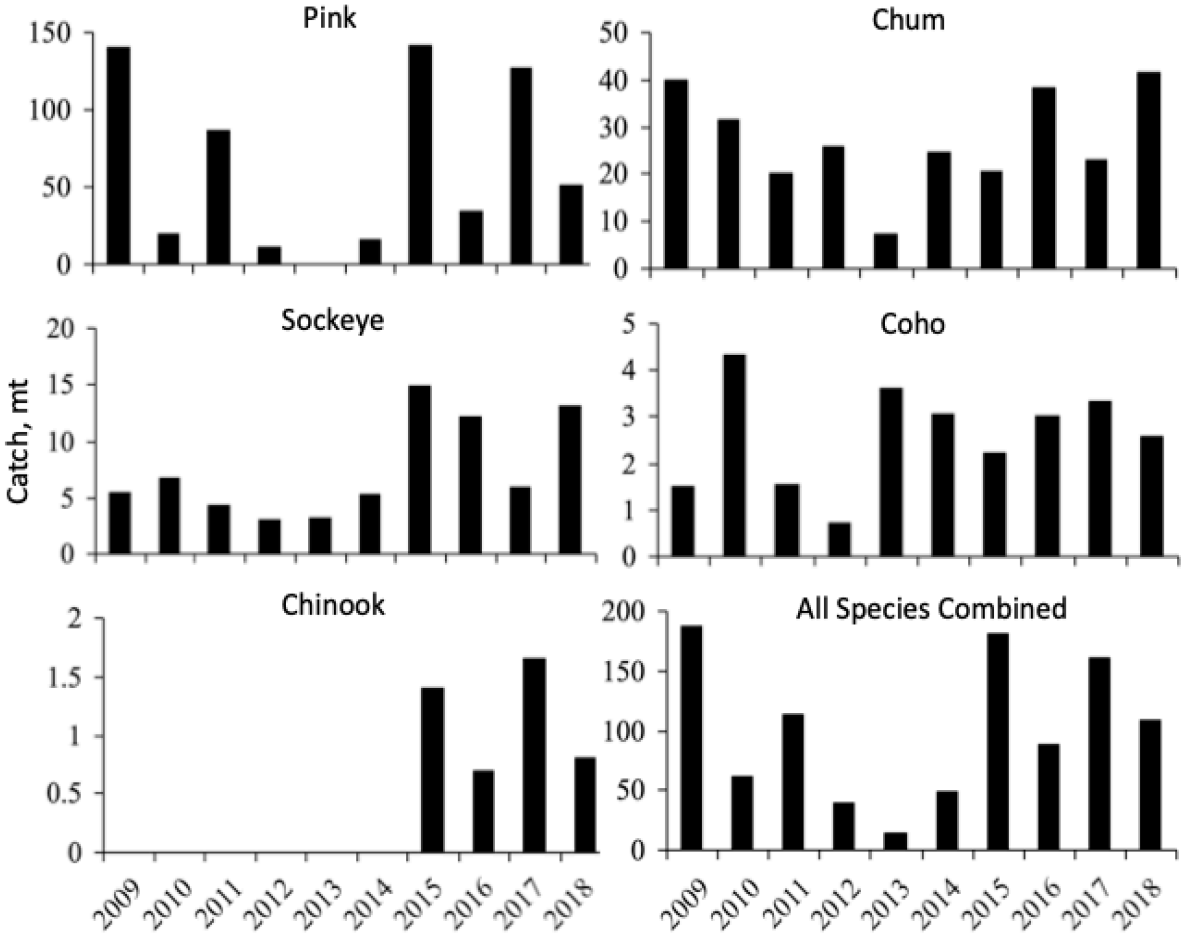


Figure 25. Dynamics of catch of Pacific salmon in the Karaginsky Bay (3 marine sites) by indigenous people in 2009–2018. Source: Bugaev et al. 2018a.

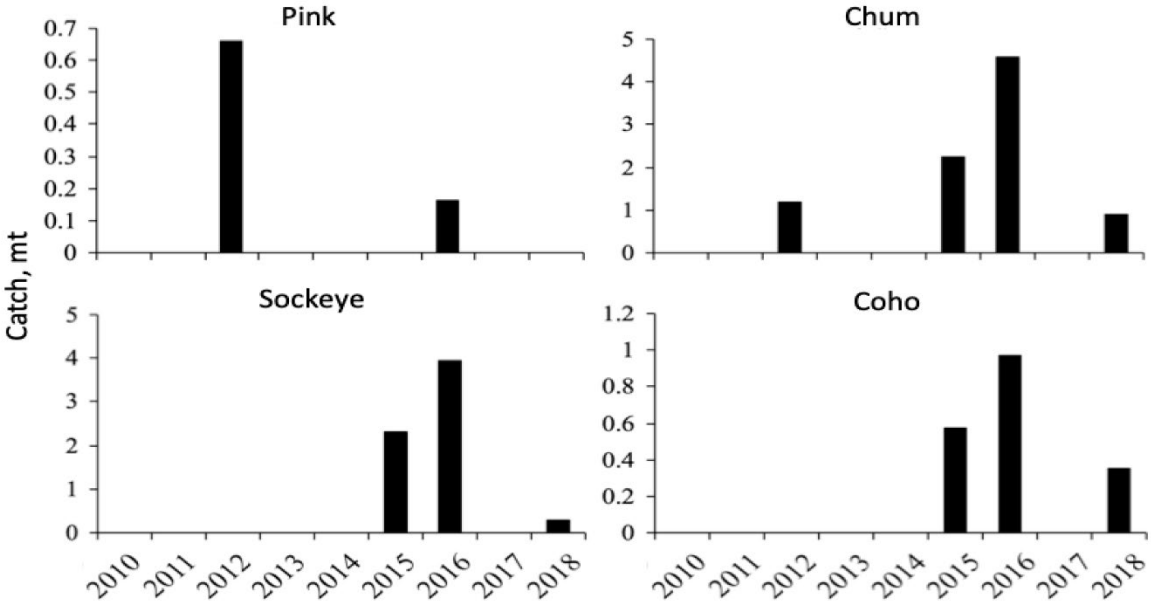


Figure 26. The indigenous harvest of salmon from the Khaylylulya River, 2010-2018. Source: Bugaev et al. 2018a.

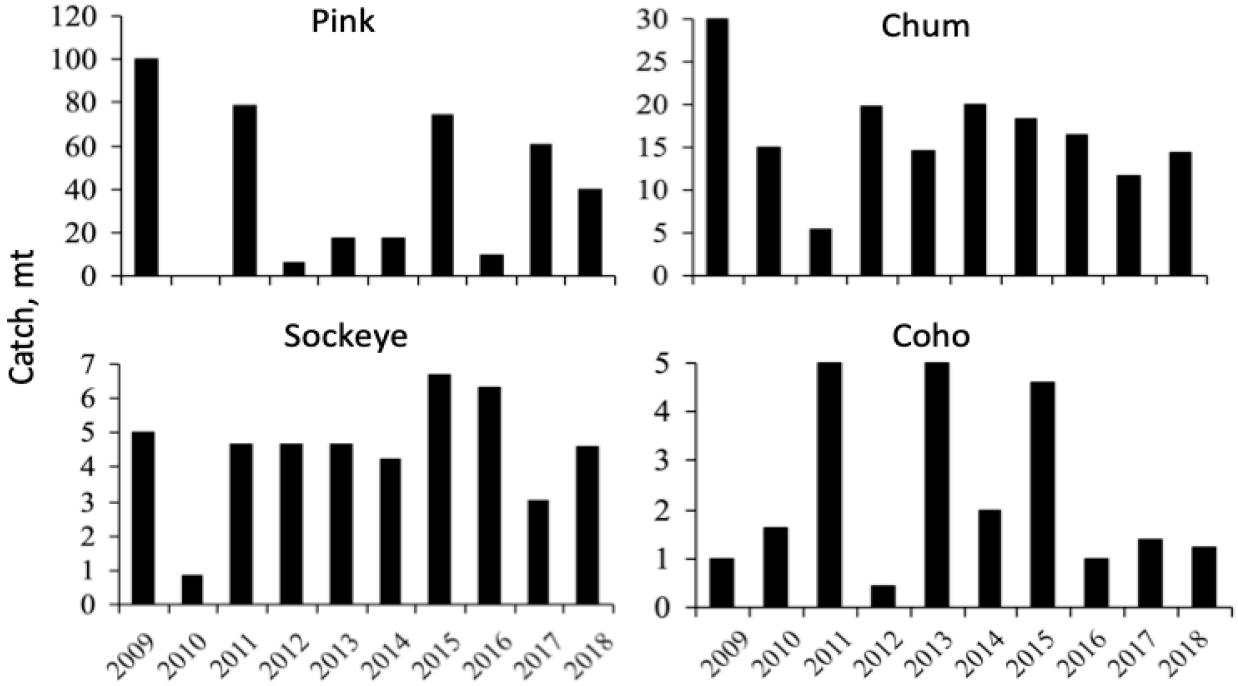


Figure 27. The indigenous harvest of salmon from the Ivashka River (Korzhavina Duct), 2009-2018. Source: Bugaev et al. 2018a.

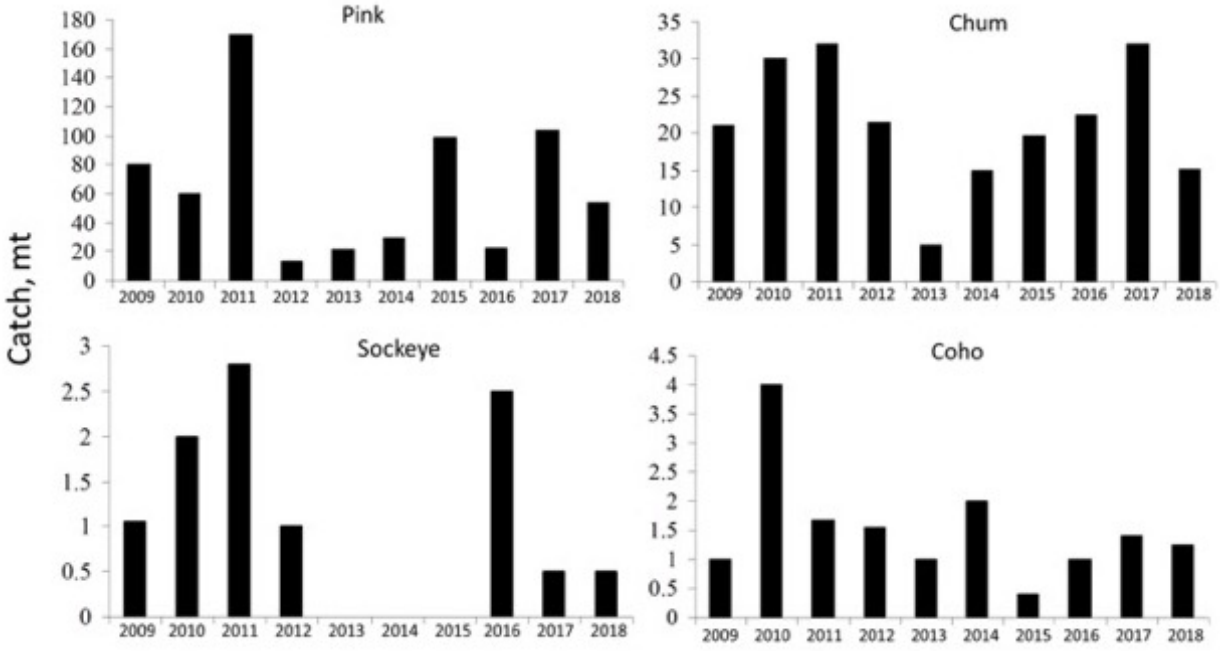


Figure 28. The indigenous catch of salmon from sea fishing parcels in Uala Bay, 2009-2018. Source: Bugaev et al. 2019a.

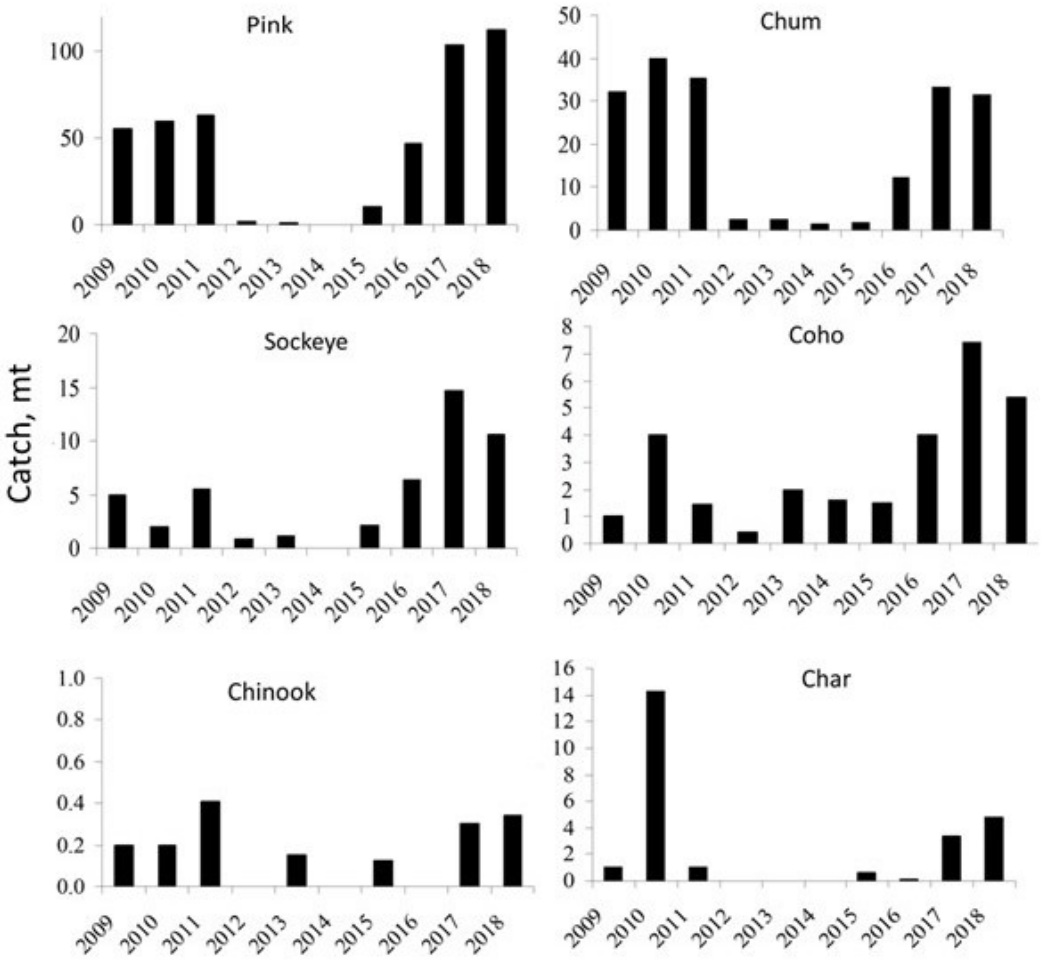


Figure 29. The indigenous catch of salmon and char from sea fishing parcels in Korfa Bay, 2009-2018. Source: Bugaev et al. 2019b.

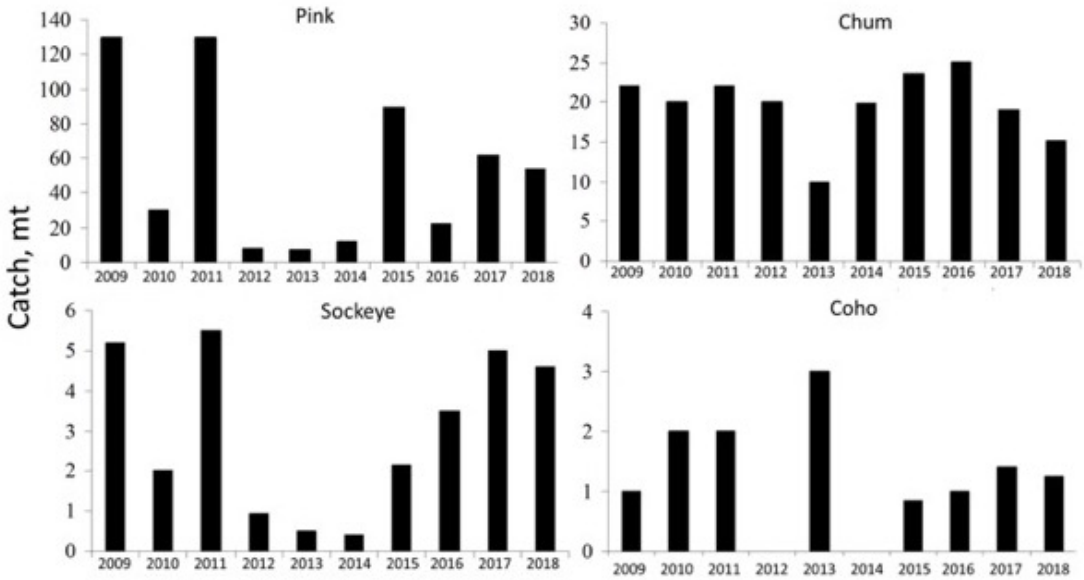


Figure 30. The indigenous harvest of salmon from the Anapka River, 2009-2018. Source: Bugaev et al. 2019a.

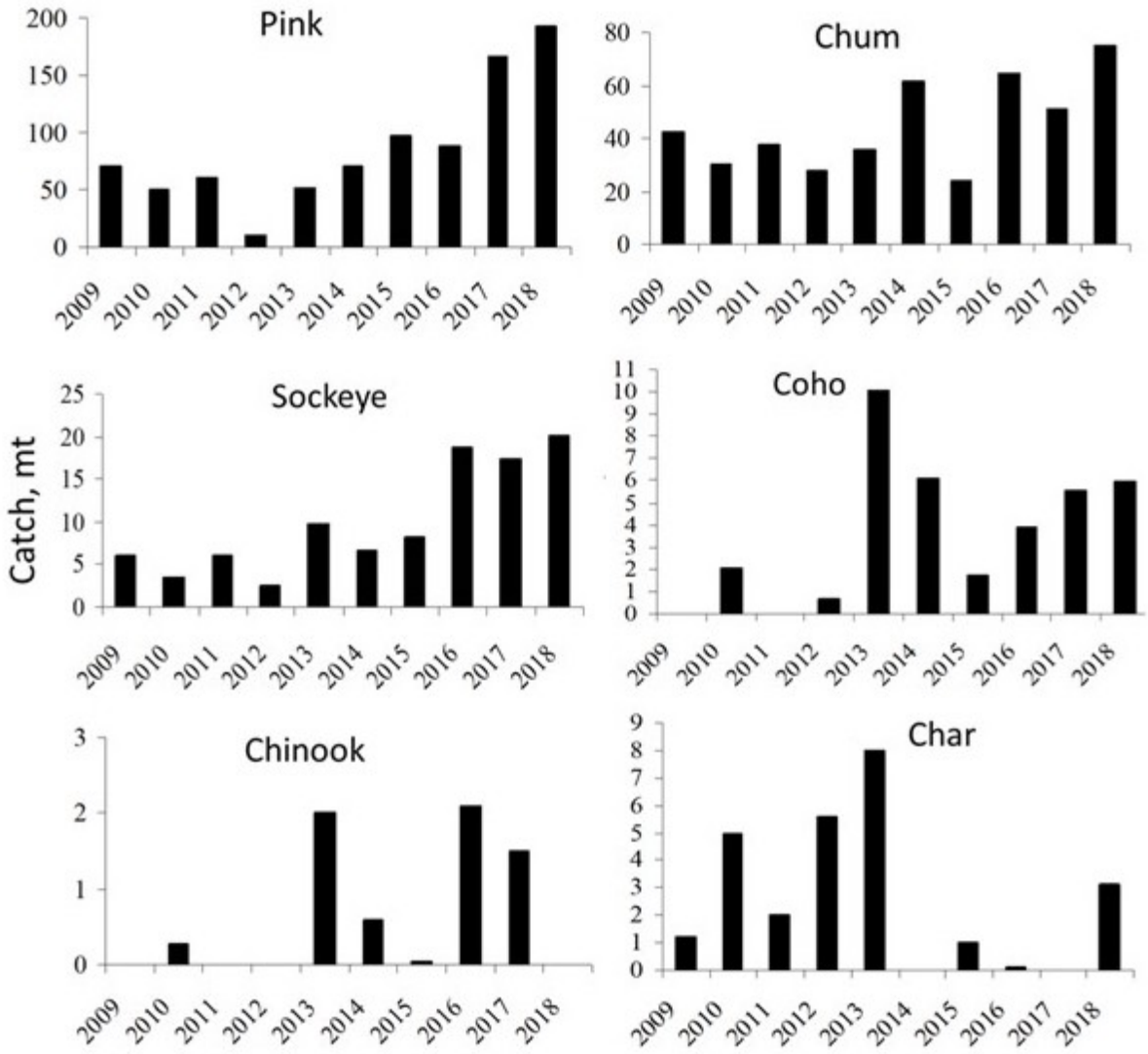


Figure 31. The indigenous harvest of salmon and char from the Vyvenka River, 2009-2018. Source: Bugaev et al. 2019b.

Management

Aerial escapement surveys **-** Spawning escapement of salmon is assessed based on aerial surveys in index rivers done by KamchatNIRO, often with financial support from fisheries. Escapements in other areas are inferred from historical distribution patterns. To determine the size of the spawning migration of Pacific salmon and their distribution in the spawning waters of Kamchatka krai, starting from 1951 aerial surveys are carried out annually. Until 2002, local aerial surveys were carried out in 200 river systems, with a total length of watercourses of more than 80,000 km. The amount of flight time spent was more than 500 hours. By 2018, the number of hours spent on conducting aerial monitoring work decreased almost twice, and in 2015 it did not even reach 50 hours (Figure 32). With a high financial support for organization of flights, up to 65-70% or from 200 to 350 hours of the total flight time were allocated annually for inspection of the river systems of the eastern coast of Kamchatka. In the period from 2008 to 2017, when the flight time number of hours dropped below 200 hours, the survey of the rivers of the Eastern Kamchatka took from 30 to 130 hours of the flight time, which in relative terms corresponds to 55-72%. In 2018, the amount of the flight time increased to 73 hours, which made it possible to expand the geography of aerial surveys in the rivers of the Northeast Kamchatka.

The index rivers in Karaginsky Bay - Dranka, Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Anapka and Khai-Anapka, are surveyed annually and that information is expanded to the other rivers based on historical data. The efficiency of monitoring of spawner escapement is checked by KamchatNIRO, the estimates on filling of spawning grounds obtained from aerial surveys are compared with the model forecasts. The description of program and its evaluation is provided for pink, chum, sockeye and coho salmon in KamchatNIRO report (Bugaev et al. 2018a)

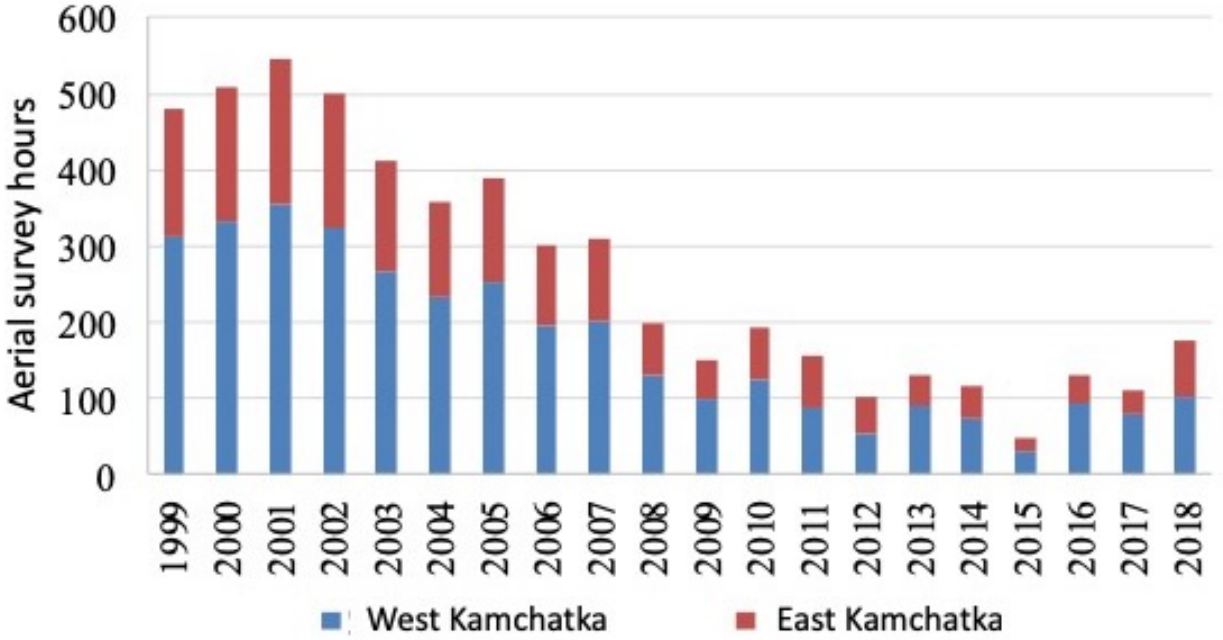


Figure 32. Annual aerial survey escapement monitoring effort (flight hours) conducted by KamchatNIRO, 1999-2018. Source: Bugaev et al. 2018a.

Target reference points - Justifying of the target escapement values for the main stock units is one of the key conditions for the rational use of salmon resources. In Kamchatka krai, the FSBSI "KamchatNIRO" employees have been carrying out such work for more than a decade. At present, escapement targets have been defined for the most commercially significant stocks for each species.

The number of spawners needed to achieve maximum sustained yield (MSY) for populations of Pacific salmon in the northeastern Kamchatka (Karaginsky district) was estimated using modeling and historical data on parental salmon escapements (S) and the recruitment of adults (R) in following years using the methodology of Feldman and Shevlyakov (2015):

$$\frac{aS^2}{\sqrt{(S_0^2 - S^2)^2 + b^2 S^2}}$$

where parameters meaning is the following:

a is the recruitment limit of R with unlimited spawning stock S,
b is the spawning stock necessary for producing replenishment *a* with maximum survival,
S_O – spawning stock, ensuring maximum survival of the descendants.

Parameter *a* is measured in the same units as replenishment R, and parameters *b* and S_0 have the same dimension as the parent stock S (Figure 33).

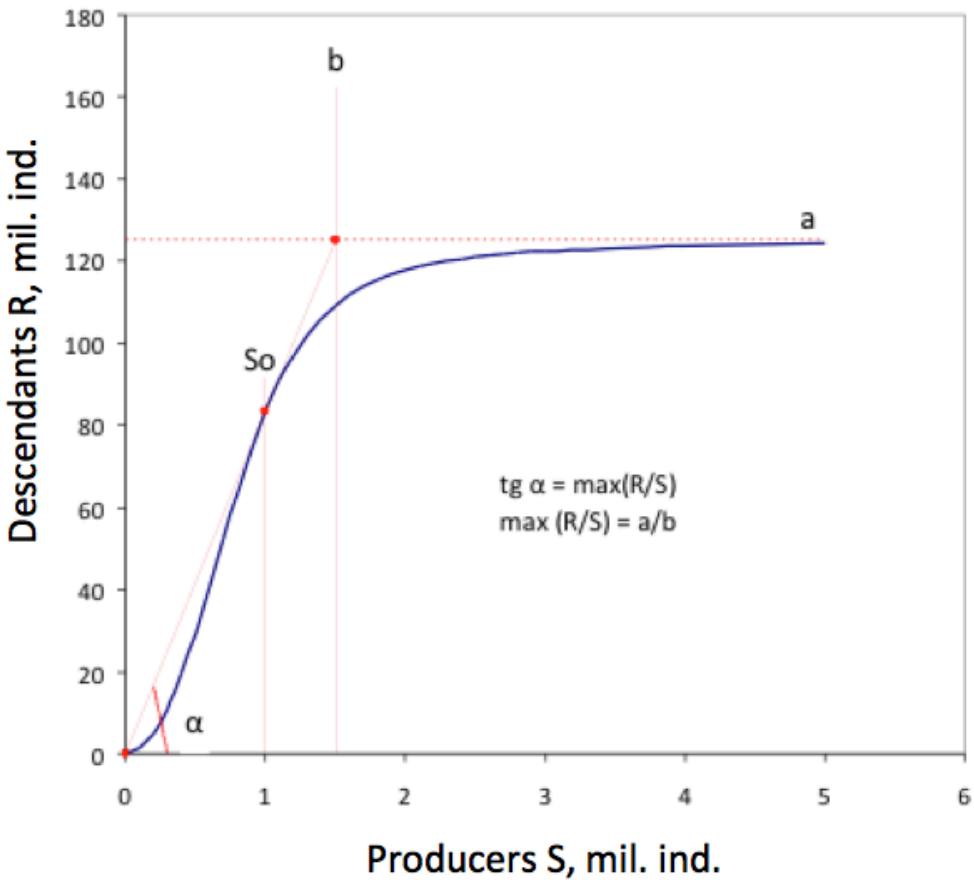


Figure 33. Graphic interpretation of parameters a, b and S_o of model. Source: Bugaev et al. 2018a.

Due to a fairly wide spread of data on parents and descendants, the parameters of the resonant model of the dependence of the replenishment from the stock are determined at a very low level of statistical significance. Therefore, for a more reliable determination of the parameters, it was decided to stratify the model into three levels: maximum, average (mostly observations of odd years) and minimum values (mainly observations of even years). The rules are determined as follows:

1) Separate strata should not intercept except for the start point at *S = 0*;
2) Strata are self-similar and have the common parameter S_o, i.e. maximum survival R / S should be with the same number of producers S for any of the levels of the model. This suggests that the optimal area of the spawning grounds is a parameter either stationary or slightly variable in time.

The filling level of spawning grounds by producers, providing the maximum steady catch SMSY is estimated for the entire set of northeastern populations of each species. SMSY levels for populations of specific water bodies studied (Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka) were determined using models, the parameters of which were obtained in proportion to the average multiyear shares of producers and descendants.

All estimates of the target reference points for escapement of the Pacific salmon from various water bodies in the Northeast Kamchatka are used to predict their possible catch in the region. This provides full reproduction of salmon resources in the rivers of Karaginsky Bay. At the same time, we can note that over the past 5 years in the north-east of Kamchatka, if talking about main species of salmon (pink salmon and chum) passing for spawning has been carried out at a level higher than the maximum strata or corresponded to the targets.

Accounting on control/reference rivers allows, using the obtained dependencies, to extrapolate the number to the entire spawning stocks in the reproduction areas under consideration, but does not allow the data to be extrapolated to individual watercourses. In particular, therefore, estimates of the value of the stock are subsequently calculated for large units, rather than for individual watercourses. In addition, the strategy of fishing for salmon by fixed nets and other fishing gear in the sea coastal area implies that they intercept part of the transit aggregations that follow to their spawning bodies of water. This circumstance does not allow unambiguously attribute even the targeted volumes of salmon catch to these or other population complexes, and even those located in close proximity to them. That, in turn, introduces uncertainties in the assessment of both the general approach of producers in each particular year, and the size of the generations themselves. For example, the area of suitable spawning grounds is estimated based on the areas occupied by producers annually, without ranking them by the efficiency of reproduction. In addition, the lack of clear guidelines on the area suitable for spawning does not allow adequate assessment of the density factors regulating the number of populations. Therefore, the focus of study is always placed on the most commercially significant rivers. Thus, the existing fishing strategy, as well as the presence of a large number of relatively small units of stocks, suggests evaluating the needs of salmon reproduction as a combination of the spawning fund of the entire fishing area without a division into specific populations.

Limit reference points - A precautionary approach to the management of fish stocks implies the existence of not only target, but also boundary management guidelines (Babayan, 2000). The regulation rule is based on the boundary reference points: S_{lim} (minimum producers pass) and E_{lim} (maximum exploitation), which are obtained during the testing of the rule. The main goal of fish stock management will be to maximize the catch and replenishment (and, consequently, the stock) while minimizing the biological risk of stock degradation (Feldman et al., 2018a).

In-season regulations - For management purposes, the Kamchatka peninsula coastal zone is subdivided into several management units. Each management unit contains several fishing parcels. Pre-season run forecasts are made for each salmon species by the Fisheries Research Institute (KamchatNIRO). The fishery management agency (FAR) approves a recommended annual catch for each fishery subzone based of this forecast. The pre-season forecast is now used primarily for planning purposes and possibly to establish quotas for some non-commercial fisheries. The forecast was historically used to establish total allowable catches and quotas for

fishing companies. However, this system has now been replaced with an “Olympic” system where fishing companies operate in designated areas and periods and are allowed to harvest fish as available, as opposed to artificially limited by a specific allocation. Harvest quotas are still established for the fishery as a whole in each river but these quotas are adjusted in-season based on real time data.

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. Previously, passing days were only applied to in river fishing but in recent years passing days have also been used in marine fishing parcels (Shevlyakov et al., 2017). The number of passing days may be reduced to avoid exceeding established escapement goals.

However, during large pink salmon runs, the potential harvest exceeds the capacity of the fish processing plants and so fishing companies voluntarily reduce their fishing time even when the fishery is open. Therefore, harvest rates are effectively reduced by capacity limitations even when passing days are cancelled due to large escapements. Escapements of other salmon species likely benefit in large pink salmon years due to this effect.

The management decisions regulating salmon fishing in the Karaginsky subzone during the season of 2018 are summarized below.

According to the installation (main) Protocols of the Commission for the regulation of the catch of anadromous fish species in Kamchatka Krai No. 4 dated May 17, 2018 and No. 5 dated May 28, 2018 , as well as the subsequent ones in the Karaginsky fishing subzone, as well as in the groups of water bodies included in it, the following fishing control measures were established and introduced.

May 17, 2018 Protocol of Commission No. 4:

> 3.4. Impose a ban on the extraction (catch) of Chinook in the Vyvenka river for industrial, coastal fishing, as well as traditional fishing.
>
> 3.5. Determine the dates of commencement of industrial, coastal and traditional fisheries, as well as recreational and sport fishing in the marine area, in relation to the Pacific salmon and chars:
>
> East Coast: Karaginskaya subzone:
>
> - Olyutorsky District (with the exception of the Vyvenka River) from June 01; - Karaginsky district from June 15;
> - R. Ozernaya (eastern) and on marine FPE No. 278, 279 from June 15;

May 28, 2018 Protocol of Commission No. 5:

> 4.1. Determine passing days for industrial, coastal, traditional fishing: Rivers, lakes: in the rivers, lakes - Monday, Tuesday, Wednesday weekly; Sea area: in the period from June 4 to June 26 (inclusive) in Olyutorsky Bay water area - Monday, Tuesday weekly;
>
> 4.2. Identify days of amateur and sport fishing in the relation to the Pacific salmon with using of net gear:

- On river FPE - Monday, Tuesday weekly.

Fishing regime revisions:

May 31, 2018 Protocol of Commission No. 6

1.1. In amendment to clause 3.5 of the protocol of the commission dated May 17, 2017 No. 4, determine the dates for the commencement of industrial and traditional fishing in respect of the Pacific salmon and char in the r. Vyvenka as well as at sea fishing grounds No. 469-478 from June 25 (inclusive).

Cancel previously established passing days on June 25, 26, 27 in the basin of the r. Vyvenka.

August 29, 2018 Protocol of Commission No. 26

1. Introduce a ban on catching (fishing) of the Pacific salmon for industrial and coastal fisheries in the Karaginsky subzone from 00:00 on September 1.

September 21, 2018 Protocol of Commission No. 31

3.1. Introduce a ban on catching (fishing) from 00:00 on September 24 of the Pacific salmon for organization of traditional fisheries (communities and individuals) in the Karaginsky subzone.
3.2. Introduce a ban on fishing (catching) from 00:00 hours on October 15 of the Pacific salmon for organization of amateur and sport fishing in relation to the Pacific salmon in the Karaginsky subzone.

<u>Enhancement</u>

In total, five hatcheries exist in the Kamchatka region, three on the eastern coast and two in the western coast on the Bolshaya River (Malkinsky and Ozerki hatcheries). Hatchery objectives are to increase salmon returns for commercial fisheries. No hatcheries are present in Karaginsky Bay. The closest hatcheries are located in Avacha Bay nearly 700 km south of the UoA. Therefore, enhancement activities are not expected to impact natural stocks in the UoA.

Pink Salmon

Pink salmon are the most numerous salmon species. Pink salmon typically represent the majority of the commercial salmon catch in the Karaginsky subzone. Between 2014 and 2018, pink salmon averaged 89% of the catch in the target rivers during odd-years and 70% in even-years (Table 9).

Table 9. Average percent of total catch represented by pink and chum salmon in odd and even years, 2014-2018. Source: Bugaev et al. 2018b.

River	Generation	Pink	Chum
Uka River	odd-year	90.3	9.0
	even-year	66.3	30.0
Khaylyulya River	odd-year	87.8	10.7
	even-year	55.9	38.5
Rusakova River	odd-year	85.7	11.2
	even-year	65.4	27.9
Ivashka River	odd-year	86.2	10.2
	even-year	71.0	23.0
Dranka River	odd-year	88.4	8.8
	even-year	77.6	17.7

Distribution

Among Pacific salmon, pink salmon have the second largest distribution area after chum salmon. In the Russian Far East, this species is common from Primorye to Chukotka (Berg 1948), including streams of eastern Kamchatka. The North-East, including Karaginsky Bay, is the most important area of Pink Salmon spawning and fishing in Kamchatka.

Russian pink salmon generally range into ocean waters of the Okhotsk and Bering Seas. The deep-water part of the Okhotsk Sea is the major feeding ground of juvenile salmon within the Russian EEZ (Temnykh and Kurenkova 2006; Shuntov and Temnykh 2008). High seas tag-and-recapture experiments have revealed that Pink Salmon originating from specific coastal areas have characteristic distributions at sea which are overlapping, nonrandom, and similar from year to year.

Life History

Pink salmon return to Kamchatka primarily in July and August, and spawning occurs in August and September. Accordingly, the timing of the spawning run shifts from north to south: the earliest runs are observed in the Karaginsky Bay (from the late June up early July), then the runs occur in the northern part of the Karaginsky Bay (the first and the second decades of July), and further - in the southern part of the Karaginsky Bay (the second and the third weeks of July) (Birman 1984; Shuntov and Temnykh 2011). Spawning typically occurs in the lower and middle reaches of streams, rivers and sometimes the intertidal zone at the mouths of streams.

Like all salmon, eggs buried in redds excavated by the females in coarse gravel or cobble-size rock, often of shallow riffles and the downstream ends of pools. Fecundity typically averages about 1,500 eggs per female. Fry hatch after several months, then spend several weeks in the gravel before emerging in late winter or spring to migrate downstream into salt water. Pink Salmon fry spend only few days in river.

Pink salmon typically average 1.2 - 1.5 kg and 50 cm. All Pink salmon spawn at age of two years. As a result, this species forms two independent populations in the same river, entering the river in odd and even years. The odd-year or even-year cycle will typically predominate, although in

some streams both odd- and even-year pink salmon are about equally abundant. In Karaginsky Bay, odd-year pink salmon are dominant. Cycle dominance will occasionally shift with the previously weak cycle become most abundant.

Stock structure

Genetic analyses of pink salmon stock structure have generally identified broad geographical patterns (Bugaev et al., 2012) but little or no difference among local populations in any given region. Genetic differences appear to be less in Asian pink salmon than in North American pink salmon (Zhivotovsky, personal communication). Natural straying among local populations of pink salmon is generally assumed to be more significant than in other salmon species (Sharp et al., 1994; Zhivotovsky et al., 2008; Zhivotovsky, 2010; Shpigalskaya et al., 2011). However, the available information on pink salmon genetic stock structure and straying patterns is not conclusive. It remains unclear whether historical genetic methods found no stock structure because none existed or because the available methods lacked sufficient power to identify differences. More recent genetic analyses of pink salmon using microsatellites have been similarly inconclusive.

Shevlyakov and Koval (2012) compared parental abundance and returns to eastern Kamchatka rivers and concluded that there is reliable homing of pink salmon to their natal spawning grounds under normal conditions. Run patterns in larger river systems suggest that the aggregate return includes a number of substocks. For instance, KamchatNIRO (2013) 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. No significant stock structure might occur in smaller systems like those in the Karaginsky Bay.

Status

This species is currently at historical levels of high production throughout the western Pacific including the east Kamchatka rivers (Figure 34). High levels of production are demonstrated by high levels of commercial harvest during even years since the late 1990s (MRAG 2019). 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. More accurate harvest reporting may also have contributed to higher numbers since 2008, as a result of changes to the management system.

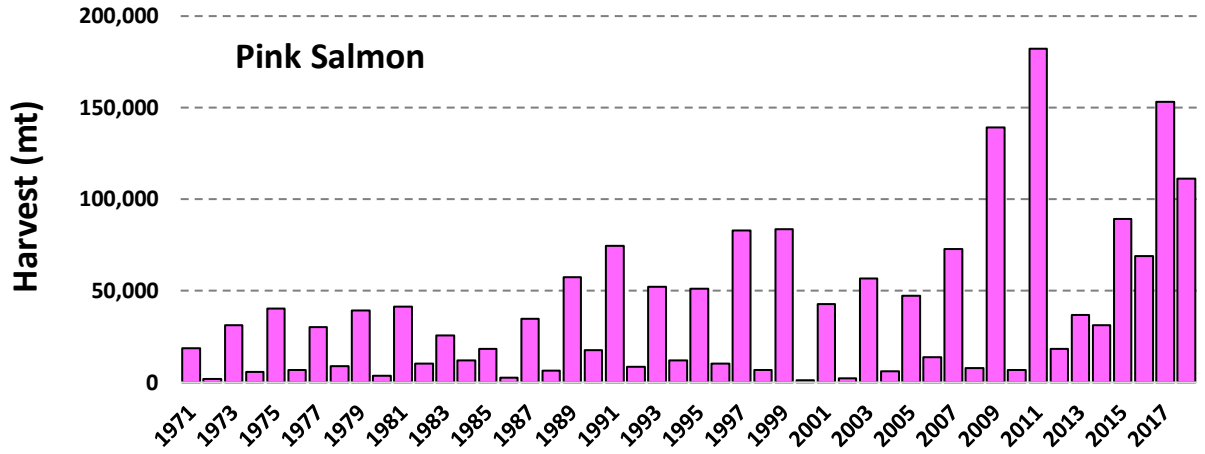


Figure 34. Total annual harvest of Pink Salmon in East Kamchatka (source: North Pacific Anadromous Fish Commission).

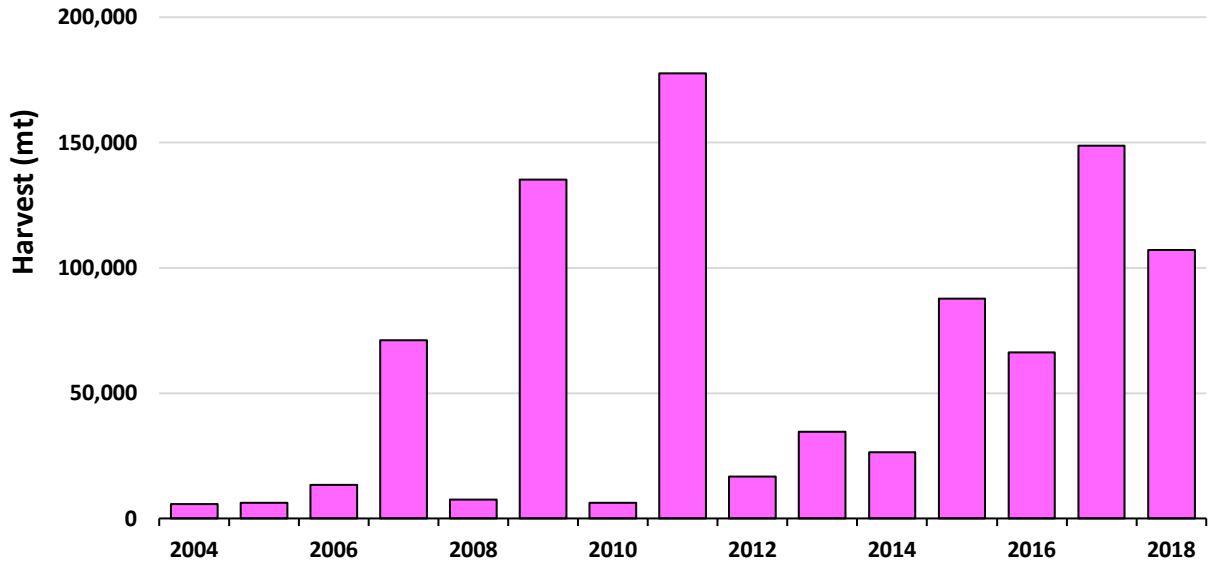


Figure 35. Total annual harvest of Pink Salmon in the Karaginsky subzone of East Kamchatka (source: KamchatNIRO).

Karaginsky Bay - Commercial catches of pink salmon in Karaginsky Bay averaged about 31 thousand mt in even years and 100 thousand mt in odd years from 2004-2018 (Figure 35). Pink salmon harvests have generally been increasing for both odd and even broods since 2012 (Shevlyakov et al. 2017). Interestingly, the 2016 even-year harvest was only slightly less than the odd-year harvest in 2015. Harvest of individual target stocks are more variable but generally follow the same trend as those of the Karaginsky subzone.

Pink salmon escapements to southern Karaginsky Bay target rivers have generally been stable over even and odd brood lines with minor fluctuations, which is shown for 2004-2018 timelines (Figure 36). During 2004-2013 period, average escapement of pink salmon to spawning areas in the main rivers of the southern Karaginsky Bay made 2199 thousand individuals in odd-numbered years (45 000 individuals in Nachiki river – 2009 year up to 15000 individuals approached spawning plots in Dranka river in 2011), in even-numbered years – from 7.25 thousand individuals up to 830 thousand individuals, in average – 119,000 individuals of pink salmon. In the last two even year cycles, pink salmon escapements have shifted toward the southern group of rivers of the Karaginsky administrative district (Bugaev et al. 2018b). During this period, the pink salmon escapements to the Dranka River reached 12.3 million fish and the Khaylyulya River reached 9.4 million fish. The escapement of pink salmon to the target rivers in odd-years averaged 25 million fish and increased from 22.3 million in 2015 to 27.8 million in 2017. Pink salmon escapement in even-years averaged 4.7 million fish and decreased from 8 million fish in 2014 to 1.4 million in 2016 then increased to 4.8 million in 2018. Although the low pink escapement in 2016 was well documented in the target rivers, 2018 aerial survey conditions were poor and likely resulted in undercounting of escapements to the Uka, Rusakova, and Ivashka Rivers (Bugaev et al. 2018a).

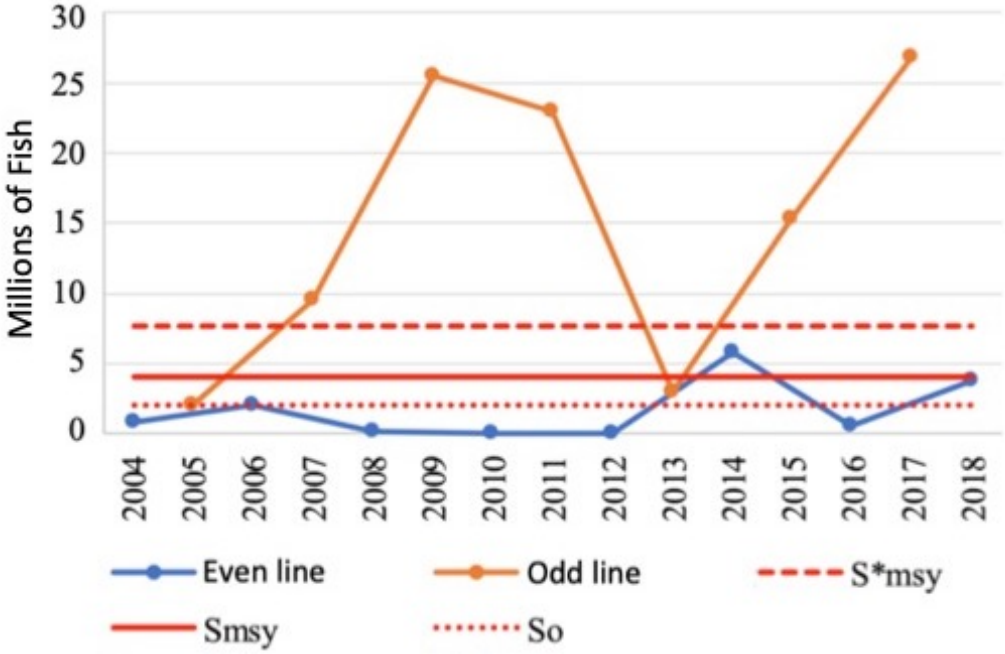


Figure 36. Combined pink salmon escapement survey counts to the Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka and Dranka rivers, 2004-2018. Source Bugaev et al. 2018a.

Feldman and Shevlyakov (2015) considered even- and odd-year pink salmon populations in Karaginsky Bay as one stock in their spawner-recruit analyses. The average escapement of pink salmon from 2014 to 2018 was greater than S*msy calculated for the target rivers (Figure 37). The Dranka and Khaylyulya Rivers are the largest producers of pink salmon representing an estimated 60% of the escapements to the target rivers (Figure 37).

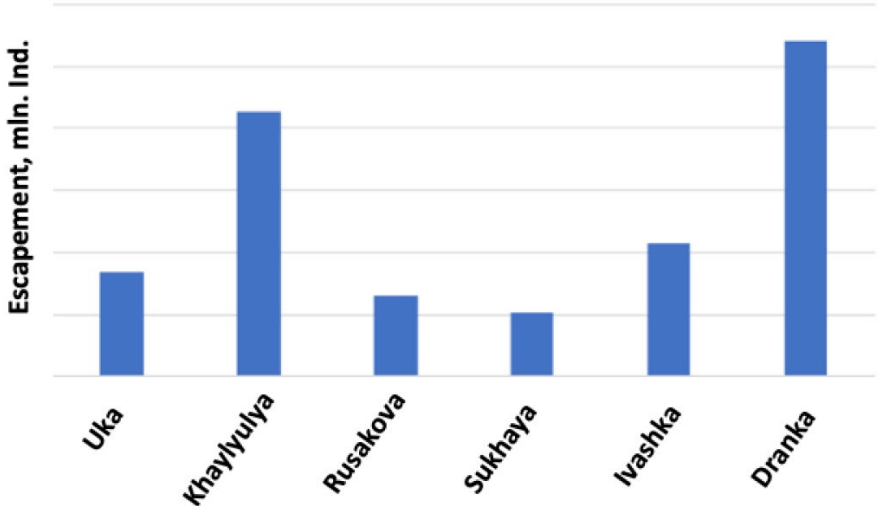


Figure 37. Average pink salmon escapement to the Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka and Dranka rivers, 2014-2018. Source Bugaev et al. 2018a.

For the Anapka and Khai-Anapka Rivers, the number of pink salmon counted over the past 15 years has averaged 2.2 million for the odd years and 0.9 million for the even years. Aerial surveys were the means by which these counts were made. Up until 2011 both rivers were surveyed, at which point the survey was reduced to only the Anapka River (Bugaev et al.2019a). Therefore, the actual escapement for this production area during the past eight years is higher than the numbers provided here.

The annual number of pink salmon during the odd years has ranged from 0.15 million to 32.8 million over the course of the survey period, with a general increase in abundance beginning about 2003 (Figure 38). The even-year pink salmon, the 'weaker' of the two lines, ranged from a low of 0.06 million to a high of 3.1 million fish and also experienced an increase in abundance starting in the early 2000s.

Bugaey et al (2019a) identified three escapement reference points of increasing certainty of sustainability for the Anapka/Khai-Anakpa complex: Slim = 1.05 million, Smsy = 1.74 million, and S*msy = 3.28 million (Figure 38). To evaluate the past performance of pink salmon for this area Bugaey et al. (2019a) suggested that an acceptable target range for the even years would be between the Slim and Smax (1.05 to 1.74 million spawners). Similarly, they suggest for the odd year classes the acceptable target should be between the Smsy and S*msy reference points (1.74 to 3.28 million spawners).

As evidenced in Figure 38, the recent observed escapement levels for the odd year returns beginning in 2003 have been within the desired range for all but two years. Similarly, for the same period, observed escapement levels for the even year returns have been within the desired range (or higher) in all but three years. In contrast, prior to 2003 the desired escapement levels were only achieved once for each of the two-year class cycles (odd and even years).

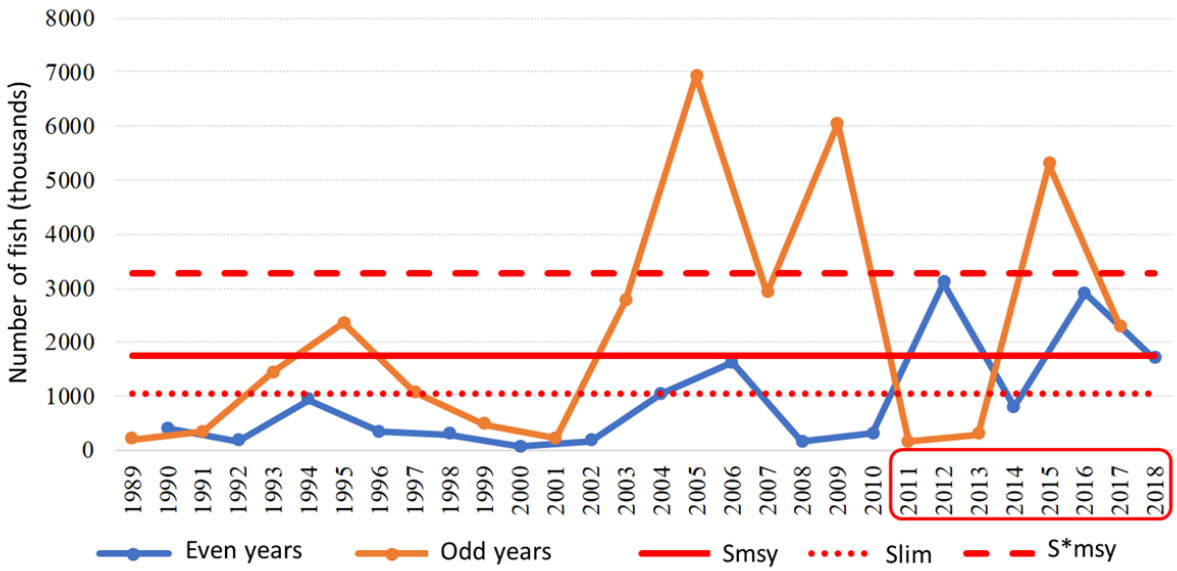
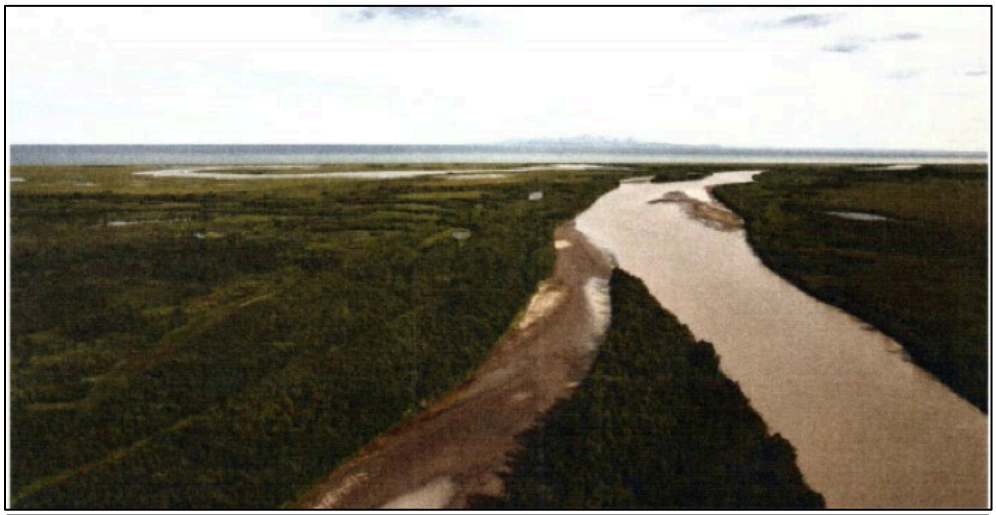


Figure 38. Combined pink salmon escapement survey counts to Anapka and Khai-Anapka rivers, 1989–2018 including the estimated escapement management levels: Slim, Smsy, and S*msy. For the years starting from 2011, the escapement has been surveyed only for the Anapka River.

In addition, it should be noted that in 2016 the hydrometeorological regime in the northern part of Kamchatka was characterized by high temperatures and an unprecedented drought. The winter with little snow and lack of precipitation in the summer period up to the middle of August led to a prolonged low-water period. Due to a prolonged dry weather, the rivers were depleted, which affected the total spawning area of salmon. Often, drainage of the wellhead in the confluence of the tributaries with the main channel was noted. The decrease in water inflow due to the surface runoff was not compensated by feeding with groundwater, weakening the river flow capacity, as a result of which the rate of water infiltration exceeded the channel flow (Figure 39). Probably, this could affect the filling level of the spawning grounds in the southern part of the bay, where

the water content of the rivers was characterized by the worst conditions. In addition, that year steady hot weather led to melting of the perennial glaciers in the mountains, causing an increase in water turbidity in the Khaylyulya and Uka rivers, which prevented carrying out of full-format aerial survey works in the basins of these rivers. Therefore, in 2016, we believe that the recorded number of Pink salmon spawners in these rivers could be underestimated.

Korfa Bay - For the Vyvenka River and smaller streams associated with the Legunmun Lagoon (Vyvenka/Legunmun complex), most of the pink salmon (70%) produced are produced in the Vyvenka River (Figure 40). The average annual escapement for this river from 1989 to 2018, for the odd-year return cycle was 4.6 million fish (Figure 41). Escapement levels for the even-year returns averaged 1.3 million fish over the same period. Annual variations in escapement for the even-year component have been relatively stable with the exception of a large return of 4.7 million fish that occurred in 2004. For the more abundant odd-year returns, annual escapement levels ranged from 0.8 to 13.7 million fish. For this component, the period from 2003 to 2009 represented a peak in spawner abundance for the time series during which the average number of spawners was 9.8 million fish.



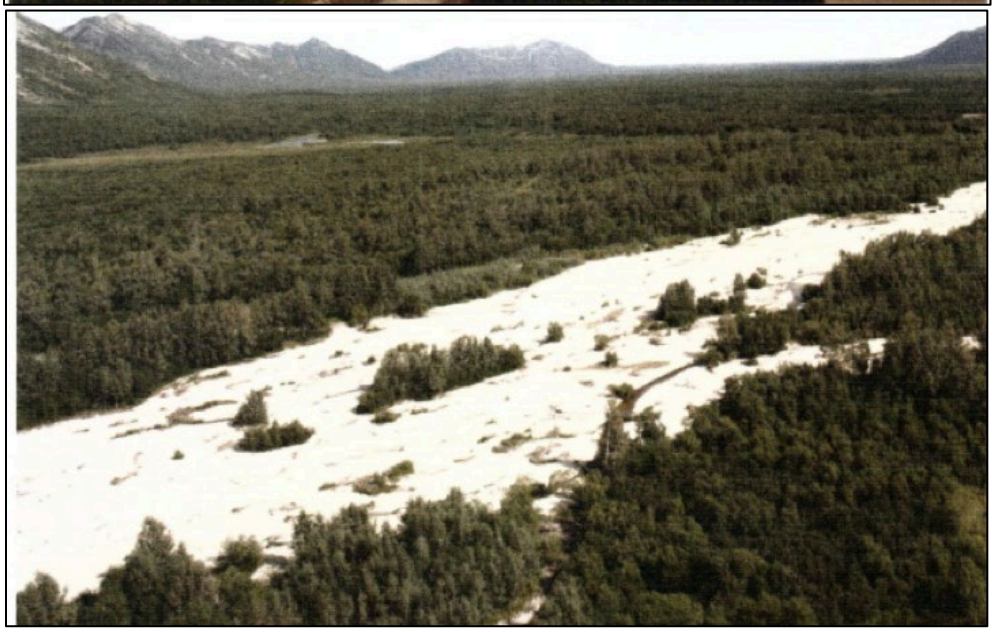


Figure 39. Pictures demonstrating changes in hydrometeorological regime (drought) in 2016 in the UoA. Top - mainstream and first-order shallowed inflow (left bank) of the river Khaylyulya, bottom - The shallowed bed of the Ivashka River (upstream).

In considering the results of this analysis it should be noted that up until 2010, escapement estimates represent the total of counts from the Vyvenka and Legunmun systems. However, from 2011 forward, only data from the Vyvenka River is represented because of a reduction in aerial survey effort (i.e. the Legunmun Lagoon was not surveyed) (Bugaev et al. 2019b). Therefore, from 2011 to 2018 the total escapement for this production was underestimated. According to the KamchatNIRO report (Bugaev et al., 2019), the very low escapements for 2011 to 2013 were due to lack of surveys and thus were excluded from the analyses.

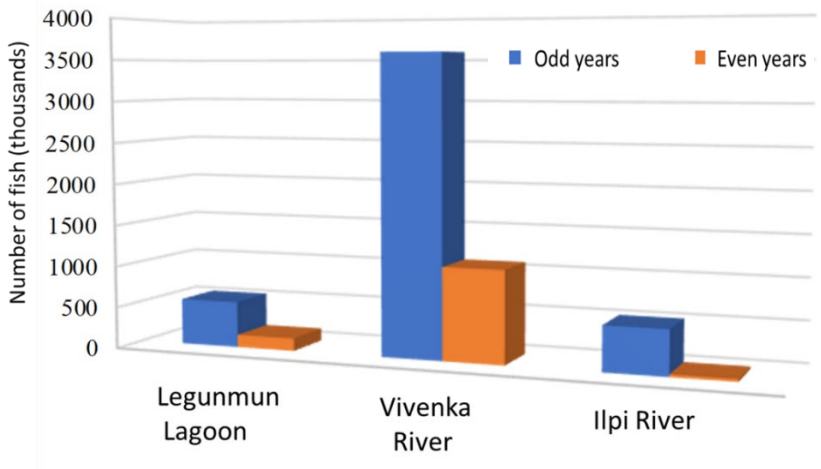


Figure 40. Average pink salmon escapement to Legunmun Lagoon, Vivenka River and Ilpi River,1989 - 2018.

Figure 41. Pink salmon escapement survey counts for the Vyvenka River, 1989-2018 including the estimated escapement management levels: Slim, Smsy, and S*msy. Data for 2011-2013 are excluded from the analysis due to luck of aerial surveys.

Using the spawner-recruit relationship developed for pink salmon from Karaginskaya sub-zone rivers (which included the Vyvenka River)(Figure 41), Bugaev et al (2019b) developed three management escapement benchmarks for the Vyvenka River as follows: Slim = 1.23 million, Smsy = 2.03 million, and S*msy = 3.84 million (Figure 41). It appears that escapements for even-year pink salmon have met the target range in most years, specified by (Bugaey et al 2019b) as

having a minimum level of 1.23 million and upper bound of 2.03 million (mean). For the odd-year cycle, a similar result occurred but with respect a higher reference escapement range of 2.03 to 3.84 million fish.

Management

Spawning escapement is assessed based on aerial surveys of index rivers and escapements to other areas are inferred from historical distribution patterns. KamchatNIRO estimates that it takes about 600 hours of aerial surveys to adequately cover all the salmon spawning rivers in Kamchatka (Bugaev et al. 2018a. However, aerial survey monitoring has been reduced from 545 hours in 2001 to an average of 131 hours over the past ten years due to budget constraints (Figure 32). This has increased the uncertainty related to escapement estimates for all salmon species. Analyses by KamchatNIRO (2017) have demonstrated a high degree of correlation in numbers among adjacent systems. Spawning escapements of pink salmon are monitored using aerial surveys of index rivers and extrapolated to estimate escapement for the Karaginsky subzone. However, survey numbers are not extrapolated for individual rivers or smaller areas within the Karaginsky subzone (Bugaev et al. 2018a). The Khaylyulya, Ivashka and Dranka rivers within the UoA are surveyed annually (Bugaev et al. 2018b). Escapement numbers presented in the figures in this report represent the number of fish actually counted during escapement surveys and are not extrapolated to larger areas.

Spawner-recruit analyses have been completed to identify escapement-based biological reference points (Figure 42). Pink salmon escapement goals based on maximum sustained yield (MSY) have been defined for the Karaginsky subzone and allocated to the target populations based on historical distributions (Table 10). Details on how these goals were estimated can be found in Feldman and Shevlyakov (2015) and Bugaev et al. (2018a).

Table 10. Precautionary estimates of pink salmon spawning escapement (S*MSY) that would achieve maximum sustained yield (MSY), as well as predicted spawners with maximum recruits (So), adult recruitment (R*MSY), harvest (MSY*) and exploitation rate (E*MSY) for the Karaginsky Subzone and target stocks (in millions of fish). Source: Bugaev et al. 2018a, 2019.

	So	Smsy	S*msy	R*msy	MSY*	E*msy
Kamchatka Subdistrict	9.066		34.66	86.1	47.6	55.3%
Uka	0.200		0.766	2.881	2.115	73.4%
Khaylyulya	0.561		2.149	6.239	4.09	65.6%
Rusakova, Sukhaya, Ivashka	0.652		2.498	13.215	10.717	81.1%
Dranka	0.587		2.248	5.432	3.184	58.6%
Anapka/Khai-Anakpa	1.05	1.74	3.28			
Vyvenka	1.23	2.03	3.84			

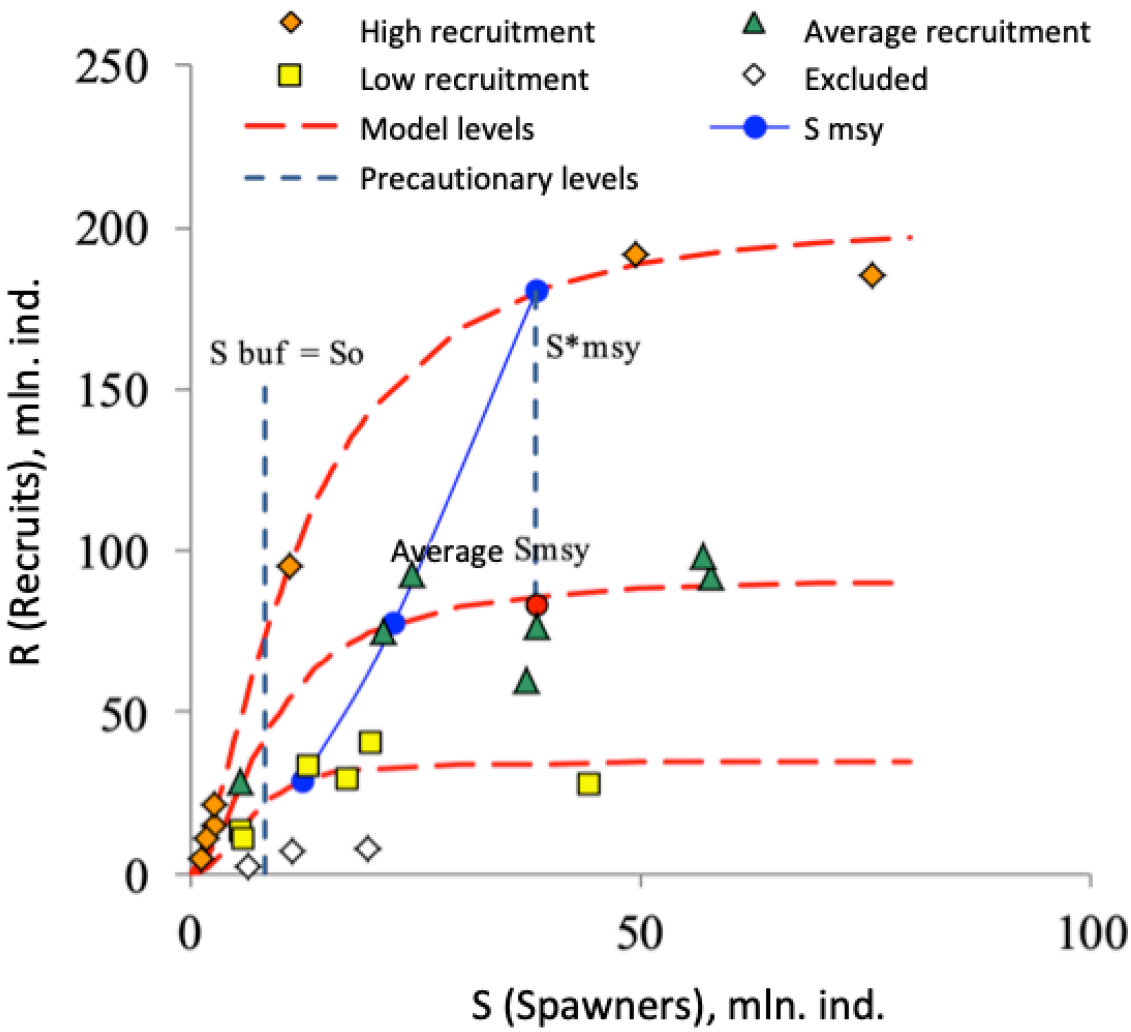


Figure 42. Spawner-Recruit analysis for Northeast Kamchatka pink salmon. Source: Bugaev et al. 2018a.

Definitions of references points from Shevlyakov et al. 2016 are as follows:

S_{lim} = boundary reference point set to the model parameter S_0 (spawner level S with maximum survival recruits per spawner. his serves as a proxy Limit Reference Point.

S_{buf} = Precautionary estimate of the boundary reference point – buffer reference point set to the upper boundary of the confidential interval of parameter S(0) estimation (Slim + tα*σSo) where tα is Student's coefficient as a given level of probability belief (α = 0.05), σSo is standard deviation of parameter S0 estimate.

S_{MSY} = spawning escapement at maximum sustainable yield;

S^*_{MSY} = precautionary estimate of spawning escapement at maximum sustainable yield determined for the lower boundary of the confidential interval of model regression (α = 0.05).

Chum Salmon

Distribution

Chum Salmon have the widest distribution of any of the Pacific salmon. Chum Salmon generally spawn in low gradient temperate and subarctic rivers and streams throughout the north Pacific. They range south to the Sacramento River in California and the island of Kyushu in the Sea of Japan. In the north they range east in the Arctic Ocean to the Mackenzie River in Canada and west to the Lena River in Siberia. Chum salmon are abundant in eastern Kamchatka streams including the rivers considered under this pre-assessment.

Life History

Karaginsky Bay chum salmon are classified as “summer run” that return from June through September and with the peak of migration in July and August (Salo 1991). Chum salmon typically reach their spawning grounds in August and September with most of the commercial catch in Northeast Kamchatka occurring July to early August (Shevlyakov et al. 2017). 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. After spawning all chum salmon die.

Northeastern Kamchatka chum salmon typically average about 3 to 4 kg in weight and 60 to 65 cm in length (Salo 1991). Age of maturity is 2 to 7 years with most returning at 4 and 5 years of age. Fecundity typically ranges between 2,100 and 3,100 eggs. Eggs incubate over the winter before hatching in early spring. Juvenile chum salmon spend one-two months in the fresh water after hatching and then migrate to the sea soon after emergence in the spring. In Northeast Kamchatka, chum salmon fry migrate to salt water from the end of May to the end of July (Zavarina 2003). Juvenile chum salmon remain in coastal waters during the summer/fall before migrating out into the Bering Sea sometimes mixing with North American chum salmon stocks (Salo 1991, Starovoitov 2003, Myers et al. 2009).

The average weight of eastern Kamchatka chum salmon has steadily declined from 3.8 kg during the 1970s to 3.2 kg in the 2000s. Temnykh et al. (2010) concluded that the average size of chum salmon was not correlated to abundance suggesting that size was more relate related to environmental factors such as ocean water temperature than density-dependent factors.

Stock Structure

Genetic analyses have generally identified system and run-specific differences among Chum populations in others regions. Stock structure is much more limited in the smaller systems of Karaginsky Bay where the stock is a summer run.

Status

Historical abundance of chum salmon has varied widely as evidenced by harvest numbers relative to escapements. Mortality of juvenile chum salmon in the Japanese drift net fishery in the open ocean explains much of the historical variation (KamchatNIRO 2013). High catches in Kamchatka during 1941-1950 coincide with the reduction and cessation of the drift fishery. Returns declined from 1960 - 1980 with the resumption of the drift fishery and climatic factors. Numbers rebounded beginning in the 1990s with regulation of the high seas drift net fishery and favorable ocean conditions for salmon throughout the north Pacific. Chum salmon returns and commercial harvest has steadily increased in Kamchatka from very low levels observed in the 1970s (Figure 43). Current harvests are consistently at high levels. Commercial catches of chum salmon in Karaginsky subzone averaged nearly 10 thousand mt from 2004-2018 (Figure 44). Catches increased to 21 thousand mt in 2014 and have since been stable at about 11 thousand mt.

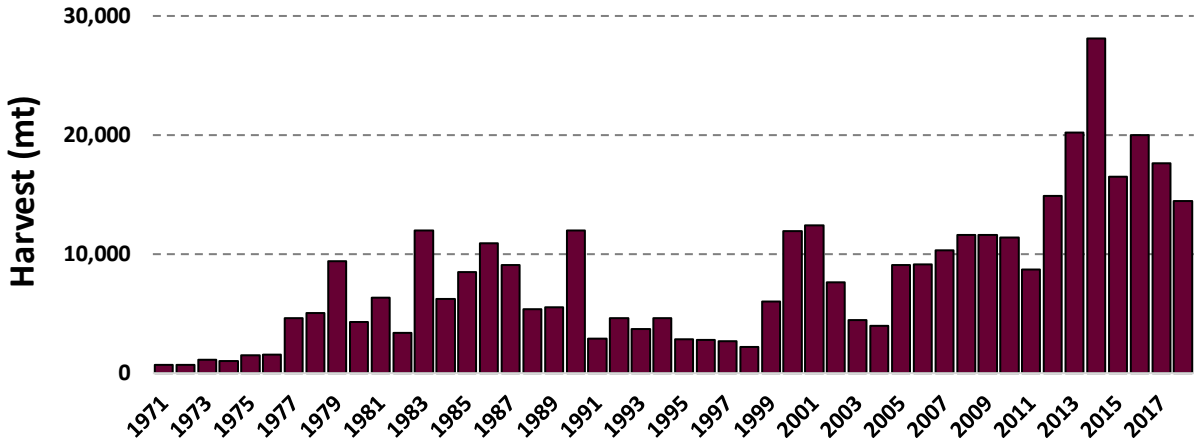


Figure 43. Total annual harvest of Chum Salmon in East Kamchatka (source: North Pacific Anadromous Fish Commission).

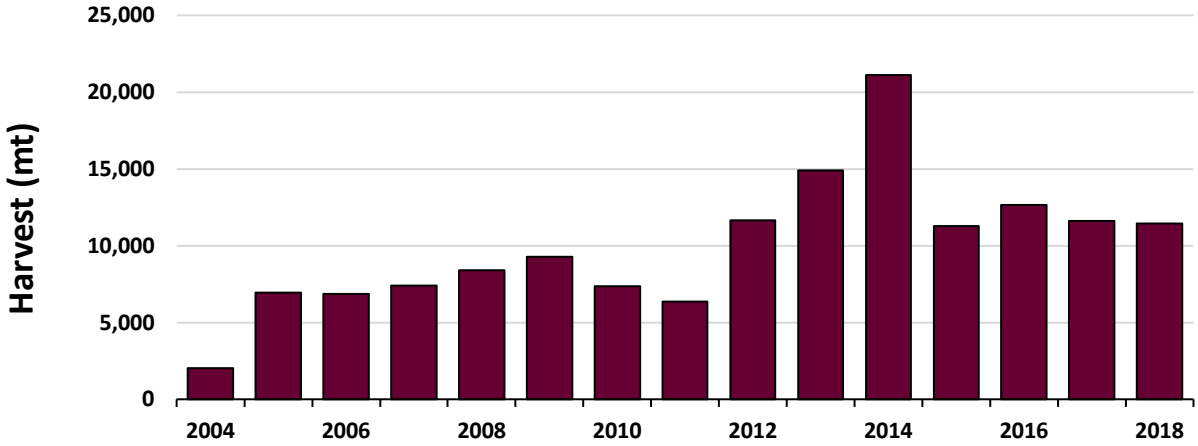


Figure 44. Total annual harvest of Chum Salmon in the Karaginsky subzone of East Kamchatka (source: KamchatNIRO).

Chum salmon are considered the second most important commercial salmon species (after pink salmon) in Northeast Kamchatka (Shevlyakov et al. 2017). Due to budget limitations, aerial escapement surveys are limited and focus on the timing of pink salmon migration. This has led some in the fishing community to speculate that chum escapements are underestimated due to displacement by pink salmon or possibly difficulties in identifying chum salmon among the large numbers of pink salmon. While KamchatNIRO staff recognize the potential role of pink salmon in influencing chum salmon escapement monitoring, their analyses have been unable to find a significant relationship between large numbers of pink salmon and chum salmon escapements (Bugaev et al. 2018a).

Karaginsky Bay - Chum salmon escapement counts to the target rivers have been variable over the past 15 years, ranging from 13-287 thousand spawners (Figure 45). These estimates are based on aerial surveys of the Uka, Khaylulya, Rusakova, Ivashka and Dranka Rivers. The Sukhaya River has not been consistently surveyed since 2009 (Bugaev et al. 2018b). The Khaylyulya is the largest chum salmon producer of the target rivers (Figure 46).

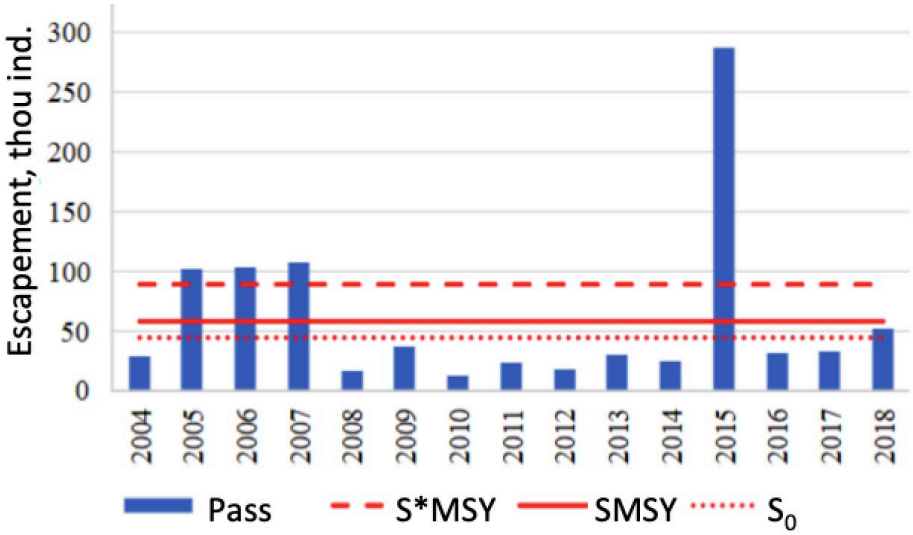


Figure 45. Combined chum salmon escapement survey counts to the Uka, Khaylyulya, Rusakova, Ivashka and Dranka rivers, 2004-2018. Source Bugaev et al. 2018a.

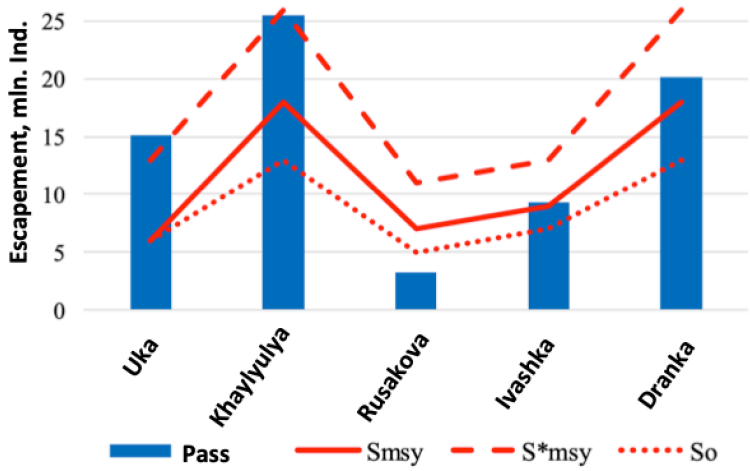


Figure 46. Average chum salmon escapement to the Uka, Khaylyulya, Rusakova, Ivashka and Dranka rivers, 2014-2018. Source Bugaev et al. 2018a.

On the average, about 80% chum of the Uala/Anapka area originate from the Anapka River; the remainder are produced from the Khai-Anapka River. Since counts of spawners in the Khai-Anapka River are only available through 2005, the escapement analysis for this production area relied primarily on observations from the Anapka River (Bugaev et al. 2019a). Over the 15-year survey period the annual counts of chum salmon have generally been less than 17,000 fish, the exception being 2014 and 2018 when large escapements on the order of 42,500 fish were observed (Figure 47). In addition, it appears that while there is some positive association between chum and pink salmon levels during the period of low overall production period prior to 1992, this association was not observed for the period after 2003 when system productivity was thought to have increased across the region.

The management escapement levels for the Uala/Anapka production area were based on the recruitment analysis of the Virovayam-Anapka river cluster. From this analysis, management escapement levels were derived for the Anapka River. The S_{MSY} preservation level escapement was 11,000 spawners as described by Bugaev et al. (2019a). The higher, more precautionary

level (S^*_{MSY}) was 16,000 spawners. The 15-year average escapement for the Anapka River of 13,200 is greater than the S_{MSY} preservation level of 11,000 fish.

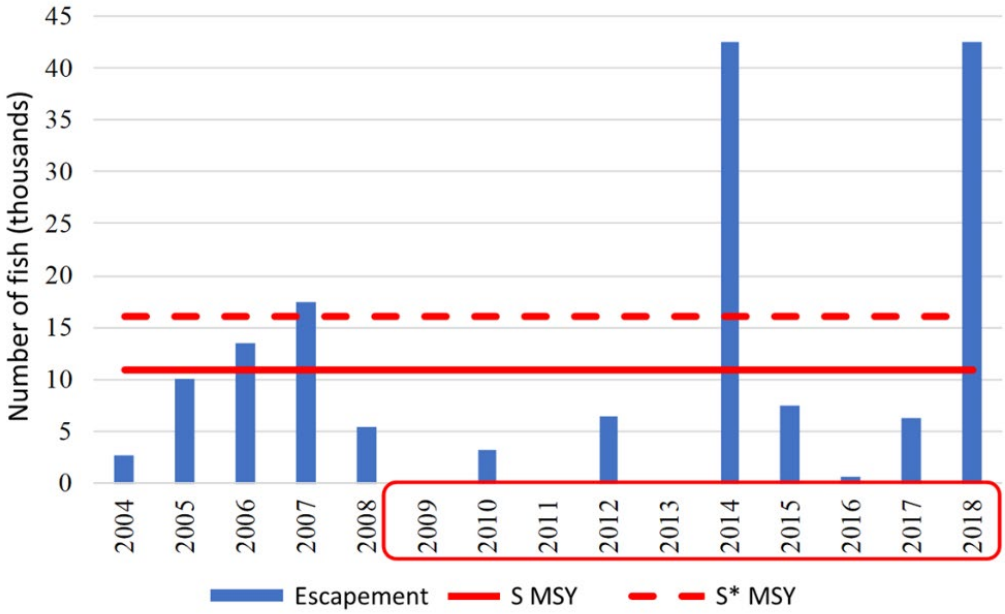


Figure 47. Chum salmon escapement survey counts for the Anapka River, 2004-2018 including the estimated escapement management levels: Smsy, and S*msy. Spawning escapement in years in a red frame was not complete.

Korfa Bay - Based upon available information, Bugeav et al. (2019b) estimated that 78% of the chum salmon for the Korfa Bay area come from the Vyvenka River (average = 41,200 fish). The remainder originate from either the Legunmun Lagoon (average = 3,900 fish) or the distant, Ilpi River (average = 8,000 fish). Because the majority of the chum are produced in the Vyvenka River and aerial surveys have been conducted each year (unlike the other two locations), Bugeav et al. (2019b) focused their analysis on this system. Since 2004, escapement levels have ranged from 2,300 to 130,000 fish (Figure 48). It is noted that data for 2011, 2012, and 2013 have been removed from the analysis because the surveys in these years were incomplete.

Based on the recruitment relationship for chum salmon cluster from Karaginsky subzone rivers (including the Vyvenka River). Bugaev et al. (2019b) determined an escapement level for S_{MSY} of 50,000 fish and a precautionary escapement level for S^*_{MSY} of 72,000 fish. Since these target levels are for a larger production area, comparison with annual escapement data for only Vyvenka River is problematic. However, Bugaev et al. (2019b) state that they believe the Vyvenka River escapements in most years are likely meeting the requirements for optimal escapement for the long-term species persistence.

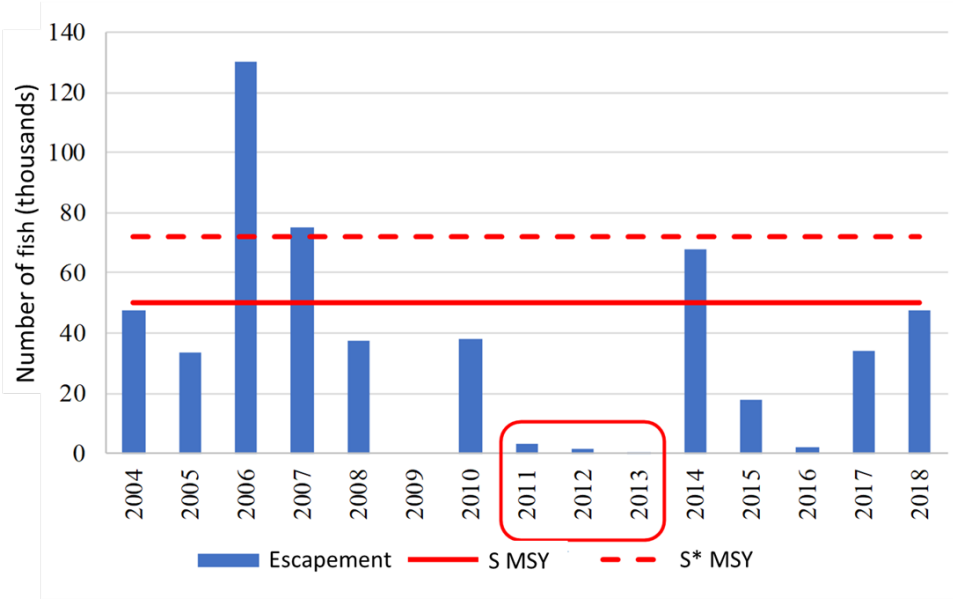


Figure 48. Chum salmon escapement survey counts for the Vyvenka River, 2004-2018 including the estimated escapement management levels: Smsy, and S*msy.

Management

Escapement objectives are identified for chum salmon based on historical production patterns (Figure 49). Chum salmon escapement goals based on MSY have been defined for the Karaginsky subzone and the target populations (Bugaev et al. 2018a, Table 11). According to KamchatNIRO report, the target spawning escapement is 250 thousand of spawners (upper estimate is 364 thousand) for North-East Kamchatka (Table 11). The limit reference point is 183 thousand. Corresponding reference points for Karaginsky subzone rivers are much lower as they comprise only a portion of the total return to the Karaginsky subzone and they have limited value because escapement estimates for individual rivers are extrapolated from regional indices (Bugaev et al. 2018a). Chum salmon escapement counts have generally been below the limit reference point (except 2005-2007, 2015 and 2018 (Figure 46). However, these counts are not extrapolated so comparison to the reference points is of limited value. Given that catches of this species were stable during this period (Figure 12 through Figure 16), it is likely that low spawning escapement is explained by insufficient aerial surveys rather than actual reduction of fish on the spawning grounds.

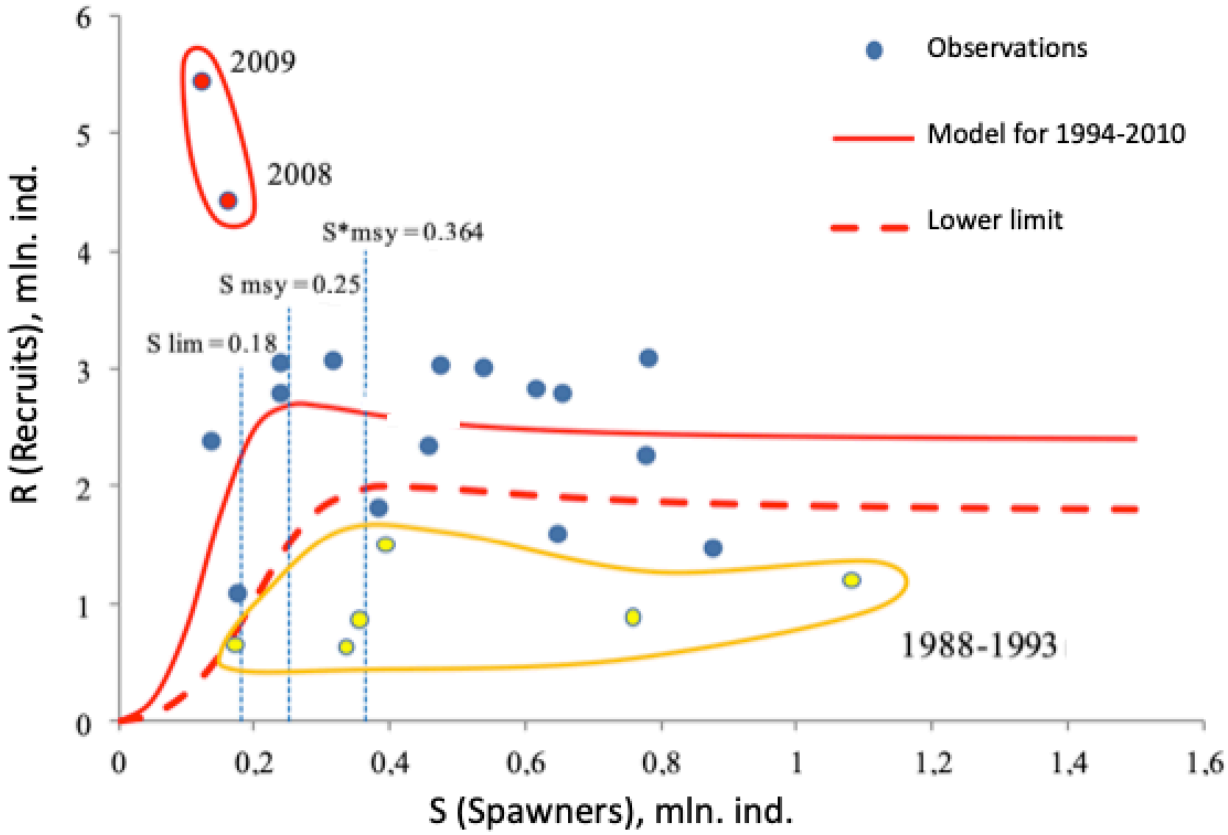


Figure 49. Spawner– Recruit analysis for Northeast Kamchatka chum salmon. Source: Bugaev et al. 2018a.

Table 11. Precautionary estimates of chum salmon spawning escapement (S*MSY) that would achieve maximum sustained yield (MSY), as well as predicted spawners with maximum recruits (So), adult recruitment (R*MSY), harvest (MSY*) and exploitation rate (E*MSY) for the Karaginsky subzone and target stocks (in millions of fish). Source: Bugaev et al. 2019a.

	So	Smsy	S*msy	R*msy	MSY*	E*msy
Karaginsky subzone	0.183		0.364	1.982	1.618	81.6%
Nachiki-Uka	0.006		0.013	0.096	0.083	86.5%
Khaylyulya	0.013		0.026	0.186	0.16	86.1%
Rusakova	0.005		0.011	0.239	0.228	95.6%
Ivashka	0.007		0.013	0.177	0.164	92.5%
Dranka	0.013		0.026	0.132	0.106	80.2%
Virovayam-Anapka		0.011	0.016			
Vyvenka		0.050	0.072			

Sockeye Salmon

Distribution - Sockeye occur throughout the north Pacific from Washington USA to Kamchatka. Two large populations comprise the majority of the Sockeye return in Kamchatka, the Ozernaya (with Kurilsky Lake) in western Kamchatka and the Kamchatka River in eastern Kamchatka. Within the UoA sockeye are found mainly in the Uka, Khaylyulya, Rusakova and Dranka Rivers.

Life History - Sockeye salmon prefer lake and lake-river systems because they rear primarily in lakes and can achieve large abundances in these systems (Bugaev 1995). Sockeye in the Karaginsky District rear almost exclusively in rivers and streams due to the lack of significant lake systems (Shevlyakov et al. 2017). Young sockeye salmon run to the sea mainly as yearlings, rarely as two-year-olds. The duration of the sea period of all above groups is mostly three years (Bugaev 2011).

Stock Structure - Sockeye runs are generally comprised of populations returning to specific spawning and rearing areas. These populations are typically demographically and genetically distinct. Sockeye salmon in large systems like the Kamchatka River have a complex hierarchical population structure. Stocks in smaller systems of Karaginsky Bay are less structured.

Status - Sockeye salmon abundance is currently at relatively high levels. Returns to Kamchatka streams have increased substantially since restrictions of the high seas drift net fishery and the shift to more productive ocean conditions for salmon in the North Pacific since the late 1970s. More accurate harvest reporting may also have contributed to higher numbers since 2008, as a result of changes to the management system.

Korfa Bay - For the Vyvenska/Legunmun basins complex, the Vyvenska River is the major producer of sockeye salmon. As reported by Bugaev et al (2019b), the number of sockeye returning to the Legunmun Lagoon river systems has averaged only 400 fish. The annual sockeye escapements to the Vyvenka River have averaged 27,500 fish, with the lowest individual year return of 12,800 fish occurring in 2005 and the highest return in 2017 of 45,800 fish (Figure 50). Escapement levels corresponding with the S_{MSY} and the more precautionary S^*_{MSY} management targets were derived from a spawner-recruit relationship developed for multiple sockeye populations that comprise the Karaginskaya sub-zone as described by Bugaev et al. (2019b). From this relation model parameters for the Vyvenka River were estimated by apportioning the spawners and recruits used in the full model to match the numbers for the Vyvenka River. In general, sockeye from the Korfa Bay, primarily the Vyvenka River, represent about 6% of the total sockeye used in the analysis of the Karaginskaya sub-zone rivers. For Vyvenka River sockeye, this translated into estimated escapement targets for S_{MSY} and S^*_{MSY} of 11,000 fish and18,000 fish, respectively.

As illustrated inFigure 51, the escapement of sockeye for the Vyvenka River has exceeded S_{MSY} (11,000 fish) in all the recent years, with the exception of 2011, 2012, and 2013 for which survey monitoring was incomplete. Further, in most of the years the escapement was great enough to exceed the more precautionary benchmark of S^*_{MSY} (18,000 fish).

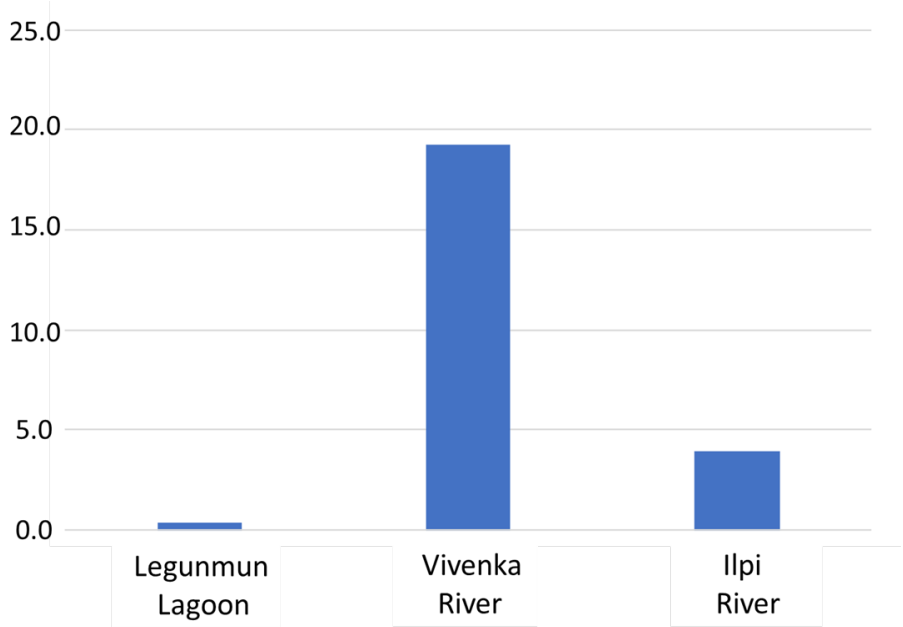


Figure 50. Average sockeye salmon escapement for Legunmun Lagoon, Vivenka River and Ilpi River, 2004-2018.

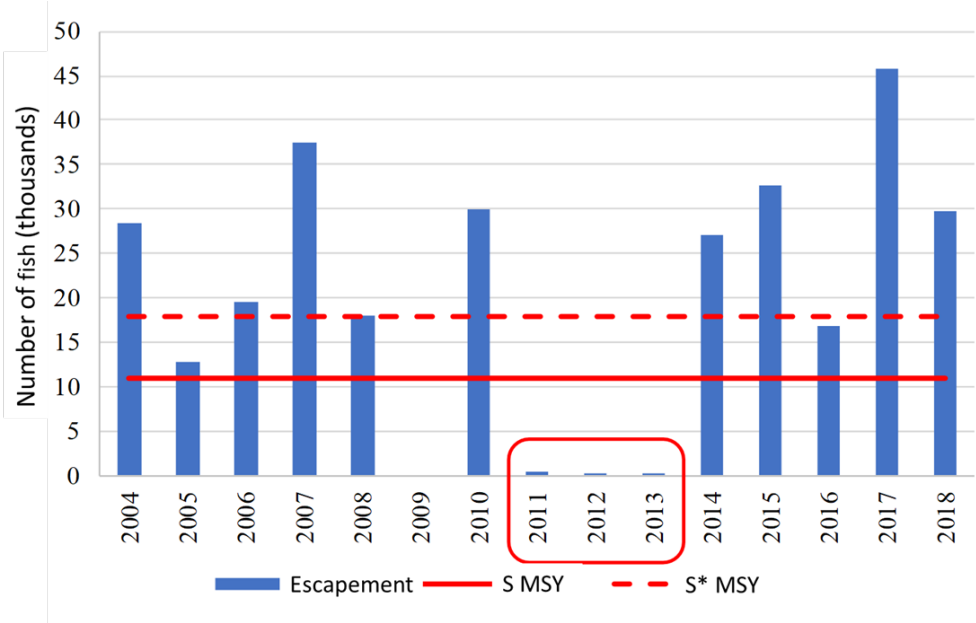


Figure 51. Sockeye salmon escapement survey counts for the Vyvenka River, 2004-2018 including the estimated escapement management levels: Smsy, and S*msy.

Management - Escapement objectives are identified for sockeye salmon based on historical production patterns (Figure 52). Sockeye salmon escapement goals based on MSY have been defined for the Karaginsky Bay subdistrict and the target populations (Bugaev et al. 2018a) (Table 12). According to KamchatNIRO report, the target spawning escapement is 165 thousand of spawners (upper estimate is 274 thousand) for North-East Kamchatka (Table 12). The limit reference point is 78 thousand. Corresponding reference points for Karaginsky subzone rivers are much lower as they comprise only a portion of the total return to the Karaginsky subzone.

Sockeye salmon escapements have generally been below Smsy (except 2017) and were below the limit reference point in 2016 (Figure 54).

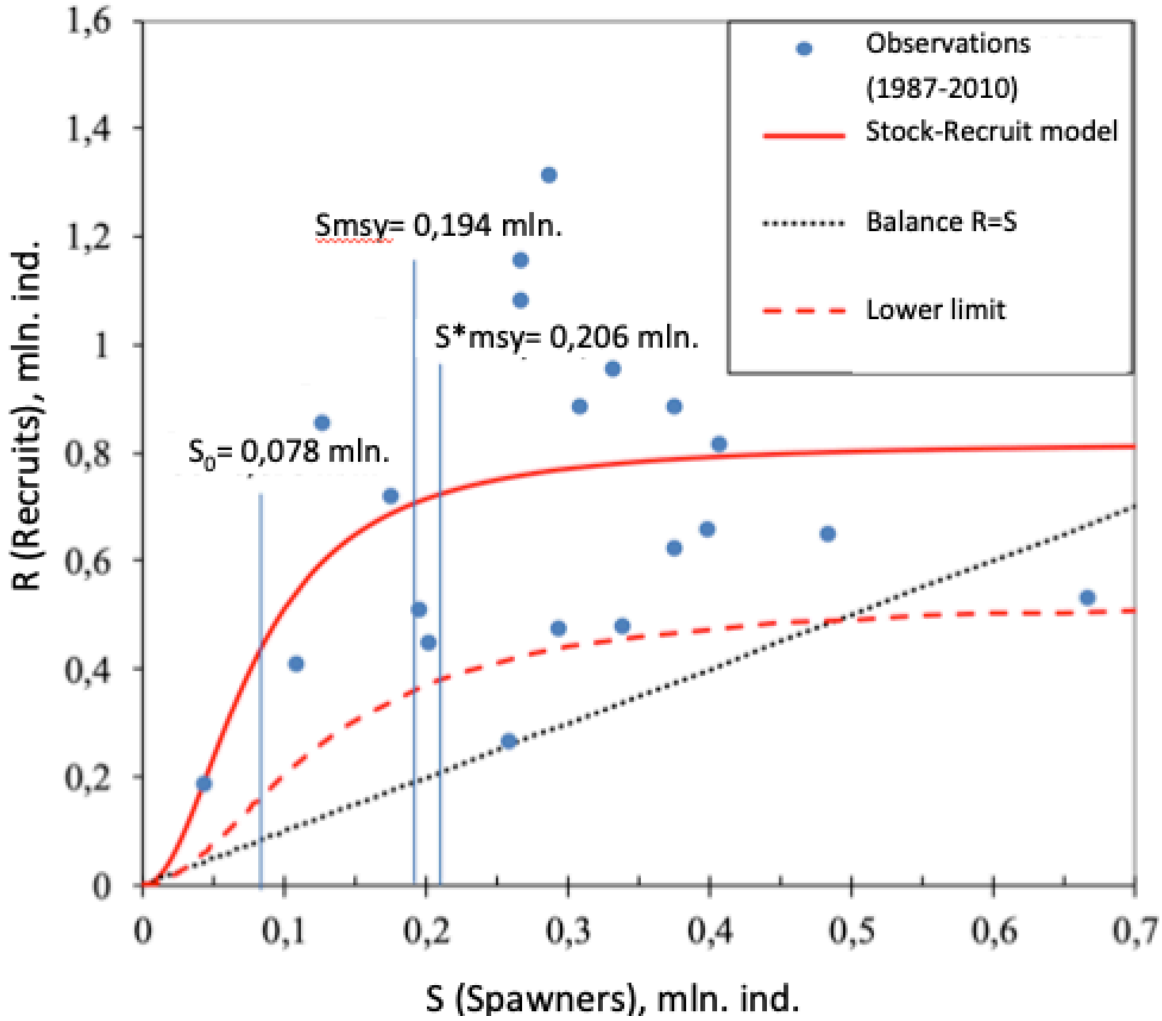


Figure 52. Spawner – Recruit analysis for Northeast Kamchatka sockeye salmon. Source: Bugaev et al. 2018a.

Table 12. Precautionary estimates of sockeye salmon spawning escapement (S*MSY) that would achieve maximum sustained yield (MSY), as well as predicted spawners with maximum recruits (So), adult recruitment (R*MSY), harvest (MSY*) and exploitation rate (E*MSY) for the Karaginsky subzone and target stocks (in millions of fish). Source: Bugaev et al. 2018a.

	So	S*msy	R*msy	MSY*	E*msy
Karaginsky subzone	0.078	0.206	0.377	0.171	45.3%
Ozernaya-Uka	0.008	0.021	0.025	0.004	16.1%
Khaylyulya	0.006	0.015	0.032	0.017	53.4%
Rusakova-Dranka	0.007	0.018	0.069	0.051	73.9%

5.2.2 Catch

Table 13. Total Allowable Catch (TAC) and catch data for Pink Salmon (Karaginsky & Korfa bays).

TAC	Year	NA[a]	Amount	--
UoA share of TAC	Year	NA[a]	Amount	--
UoA share of total TAC	Year	2018	Amount	--
Total green weight catch by UoC	Year (most recent)	2018	Amount	19,465 mt
	Year (2nd most recent)	2017	Amount	31,000 mt

Table 14. Total Allowable Catch (TAC) and catch data for Chum Salmon (Karaginsky & Korfa bays).

TAC	Year	NA[a]	Amount	--
UoA share of TAC	Year	NA[a]	Amount	--
UoA share of total TAC	Year	2018	Amount	--
Total green weight catch by UoC	Year (most recent)	2018	Amount	10,863 mt
	Year (2nd most recent)	2017	Amount	11,086 mt

Table 15. Total Allowable Catch (TAC) and catch data for Sockeye Salmon (Korfa Bay only).

TAC	Year	NA[a]	Amount	--
UoA share of TAC	Year	NA[a]	Amount	--
UoA share of total TAC	Year	2018	Amount	--
Total green weight catch by UoC	Year (most recent)	2018	Amount	80 mt
	Year (2nd most recent)	2017	Amount	130 mt

Annual 10-year average salmon harvest in the Karaginsky subzone of eastern Kamchatka commercial fisheries is about 91,000 mt according to the North Pacific Anadromous Fish Commission. Pink salmon accounted for about 88% of the salmon harvest over the past ten years, followed by chum at 13%, sockeye at 3% and coho at 0.2%. Commercial salmon harvests in the Karaginsky subzone averaged about 130 thousand mt in odd years, and 53 thousand mt in even years between 2009 and 2018.

Table 16. Total commercial catch (mt) of Pacific salmon and chars in Karaginsky subzone (Karaginsky and Olyutorsky administrative districts combined), 2004-2018. Source: Artyukhina 2014, Bugaev et al. 2018b.

Year	Pink	Chum	Sockeye	Coho	Chinook	Chars	Total
2004	5,818.6	2,012.9	299.2	4.0	6.5	NA	8,141.2
2005	6,279.9	6,941.2	750.8	8.9	22.4	NA	54,003.3
2006	13,277.1	6,871.9	896.5	156.8	34.9	NA	21,237.2
2007	71,188.7	7,417.0	,602.2	81.4	72.9	NA	80,462.2
2008	7,625.1	8,389.4	998.0	84.5	93.2	NA	17,190.2
2009	135,269.4	9,258.1	2,585.4	315.1	65.6	NA	147,493.6
2010	6,262.9	7,377.1	1,708.3	140.8	86.7	NA	15,575.8
2011	177,613.3	6,370.7	1,819.0	232.8	70.7	NA	186,106.5
2012	16,736.9	11,663.7	1,679.7	46.5	110.7	NA	30,237.5
2013	34,548.6	14,924.3	2,429.5	263.6	85.4	NA	52,251.4
2014	26,301.7	21,106.6	1,816.7	276.7	56.1	404.6	49,962.4
2015	87,646.8	11,275.6	2,851.2	261.0	51.7	850.6	102,936.9
2016	66,338.3	12,661.6	4,256.8	177.7	62.4	834.3	84,331.1
2017	148,797.8	11,591.9	1,775.0	236.3	44.5	317.5	162,763.0
2018	107,057.9	10,693.8	2,791.6	275.3	75.4	247.3	121,141.3

Table 17. Catch (mt) of salmon by Kolkhoz Bekereva, Ukinskij Liman, Vyvenskoe and Belorechensk fishing companies, 2013-2018.

Year	Pink	Chum	Sockeye	Coho	Chinook	Chars	Total
2012	2,735	933	53	2	0	0	3,723
2013	10,215	4,677	602	51	57	1	15,603
2014	6,174	6,249	384	16	59	1	12,882
2015	20,674	8,001	626	21	79	1	29,403
2016	13,131	5,459	1,048	9	118	3	19,767
2017	31,006	11,086	395	25	20	0	42,532
2018	19,465	10,863	422	50	29	0	30,830

Table 18. Catch (mt) of salmon by Kolkhoz Bekereva fishing company, 2013-2018. Source: Kolkhoz Bekereva

Year	Pink	Chum	Sockeye	Coho	Chinook	Char	Total
2013	7,415	3,354	518	41	1	57	11,386
2014	4,186	4,156	306	12	1	59	8,720
2015	11,258	1,804	518	21	1	79	13,680
2016	6,457	2,043	883	9	3	93	9,486
2017	18,792	1,818	204	9	0	20	20,843
2018	11,603	1,569	268	2	0	19	13,461

Table 19. Catch (mt) of salmon by Ukinskij Liman fishing company, 2016-2018. Source: Ukinskij Liman LLC

Year	Pink	Chum	Sockeye	Coho	Chinook	Chars	Total
2016	2,315.2	451.7	90.9	0.0	0.0	24.8	2,882.6
2017	3,492.6	368.8	10.2	0.0	0.0	0.8	3,872.3
2018	1,064.6	376.5	54.6	34.0	0.1	9.7	1,539.5

Table 20. Catch (mt) of salmon by Vyvenskoe fishing company, 2012-2018. Source: Vyvenskoe, LLC.

Year	Pink	Chum	Sockeye	Coho	Total
2012	1,080.4	220.8	44.0	1.9	1,347.1
2013	1,094.3	477.3	76.2	5.9	1,653.7
2014	987.9	753.0	71.7	3.2	1,815.8
2015	5,476.2	282.5	92.9	0.0	5,851.6
2016	2,528.8	235.8	66.3	0.0	2,830.8
2017	4,949.3	278.4	130.3	6.9	5,364.8
2018	1,416.4	360.0	80.5	4.3	1,861.3

Table 21. Catch (mt) of salmon by Belorechensk fishing company, 2012-2018. Source: RA Belorechensk, LLC.

Year	Pink	Chum	Sockeye	Coho	Total
2012	1,654.2	712.5	9.3	0.0	2,375.9
2013	1,705.5	845.6	8.1	3.6	2,562.8
2014	999.5	1,340.1	6.4	0.0	2,346.0
2015	3,939.8	5,915.4	16.0	0.0	9,871.2
2016	1,830.7	2,729.0	7.6	0.0	4,567.3
2017	3,771.3	8,621.3	50.4	9.0	12,452.0
2018	5,381.3	8,557.8	18.5	10.0	13,967.6

5.2.3 Principle 1 Performance Indicator scores and rationales

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			
	Guide post	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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				

SG 60 – See SG 80.

SG80 – It is highly likely that Pink and Chum Salmon in Karaginsky and Korfa bays, and Sockeye Salmon in Korfa Bay are above the LRP as evidenced by harvest which has increased or remained at high levels over the last decade and escapements have been sufficient to sustain continuing levels of harvest. Quantitative data on long-term production trends and escapement provide strong evidence that Pink and Chum salmon throughout this region and Sockeye returning to Korfa Bay are highly likely above the point where recruitment would be impaired by the current commercial fishery. Therefore, the SG80 is met.

Stock-recruitment analyses have identified optimum spawning levels relative to the point where recruitment would be impaired for Northeast Kamchatka Pink, Chum and Sockeye Salmon (Bugaev et al. 2018a, 2018b). These values can be characterized as limit reference points. Stock assessment information indicates that spawning escapements consistent with optimum production levels are consistently achieved. Escapements of these all five UoAs are generally above the values identified although lower escapement numbers are sometimes produced by incomplete escapement assessments.

- Pink Salmon are at historically high abundance and escapements have generally been well above the LRP (Slim) for the dominant odd-year lineage in both southern (Figure 36) and northern Karaginsky Bay (Figure 38). The even-year lineage may not always exceed Slim but returns do not appear to be strongly related to escapements for the subdominant return. Both odd and even-year runs exceed Slim on average.
- Pink Salmon are at historically high abundance and escapements have generally been well above the LRP (Slim) for the dominant odd-year lineage in Korfa Bay (Figure 41). The even year lineage may not always exceed Slim but returns do not appear to be strongly related to escapements for the subdominant return. Both odd and even-year runs exceed Slim on average.
- Chum Salmon escapements have periodically been below Slim (Figure 45, Figure 47) but average escapements into each river exceed Slim in four of 5 index rivers (Figure

46). Catches have remained stable at historically high levels of production and thus we consider that Chum Salmon also meet SG 80.

- Sockeye Salmon escapements in the Vyvenka River which accounts for the large majority of the Korfa Bay run consistently exceed MSY-based target levels which are well above points of recruitment impairment (Figure 51).

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 levels of fishery exploitation.

Management of Kamchatka salmon 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 helps avoid lower escapements to the extent that this is possible by regulating fisheries. 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 and Chum Salmon production over the last decade confirm that the management strategy based on target reference points has maintained the reproductive capacity of the aggregate stock of each species.

Highly variable annual run sizes are characteristic of salmon in response to normal environmental variability. Occasional poor run years and escapements into some systems are typical. Thus, it is not always possible to meet optimum targets in every population and year. 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.

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.

SG100 – A high degree of certainty is precluded for these SMU's because explicit limit reference points have not yet been fully integrated into management practice. Certainty is also limited by incomplete stock assessment data in recent years due to funding reductions for aerial surveys. Application is complicated by 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 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)

	Guide post		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?		Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

SG80 – Target reference points for Kamchatka Salmon are based on spawning escapements that historically produced high sustained yields, high rates of replacement and low probabilities of recruitment overfishing. Goals were generally based on stock-recruitment analyses for regional aggregates by species as measured in index rivers. 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).

Under the current management system which was adopted in 2008, consistent high levels of salmon production in eastern Kamchatka 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 in this assessment. 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 river-by-river scale in order to maximize harvest in any given year.

Over the last decade, the federal fishery scientific agency (KamchatNiro) has been refining the scientific basis for salmon management based on productivity functions for salmon stocks and populations throughout Kamchatka. Spawning escapement goals are being developed for specific river systems by apportioning aggregate values based on the relative sizes of the respective populations in each system. 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.

Population-specific escapement goals have only recently been formally quantified. Population-specific escapements are highly variable and strongly correlated from year to year. Many populations appear to consistently achieve objective levels but others appear to consistently fall below targets.

- Karaginsky Pink salmon stocks do not meet the standard because even-year pink escapements into Southern Karaginsky index rivers were below S msy in 7 of 8 years (Figure 36). However, odd-year pink escapements were well above S*msy. Pink Salmon escapements in the Anapka River complex generally exceeded S*msy levels in odd years but often failed to reach Smsy in even years (Figure 38).
- Korfa Bay Pink Salmon did not meet the standard because escapements in the Anapka River complex regularly failed to reach Smsy in even years (Figure 41).

- Karaginsky Bay Chum Salmon did not meet the standard because escapements into Southern Karaginsky index rivers were below Smsy in 11 of the past 15 years in each species (Figure 45 and Figure 54). Similar patterns were seen in the Anapka rivers.
- Korfa Bay Chum Salmon did not meet the standard because Vyvenka River escapments failed to achieve Smsy in 8 of the last ten years (Figure 48).
- Korfa Bay Sockeye Salmon meet the SG80 standard because Smsy has been consistently achieved in the Vyvenka River since 2004 except for three years from 2011-2013 (Figure 51).

Interpretation of spawning escapements relative to goals is confounded by limited data for some species and rivers in recent years due to recent reductions in aerial survey effort. Corresponding escapements are reported as low values by KamchatNIRO. Consistent high levels of production for Pink, Chum and Sockeye stocks in this assessment indicate that these stocks are fluctuating around target reference points. However, this conclusion cannot be confirmed based on spawning escapement information.

SG 100 - A high degree of certainty in escapement estimation is precluded in recent years by reductions in annual assessments of spawning escapement due to budget limitations. In the case of Korfa (Vyvenka) sockeye, periodic escapements below objective levels contribute to this uncertainty.

c	Status of component populations			
	Guide post			The **majority** of component populations in the SMU are within the range of expected variability.
	Met?			Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

The Karaginsky subzone supports multiple populations of each salmon species returning to specific areas. Management generally seeks to meet spawning escapement objectives throughout the available habitat. While the majority of the component populations of stocks included in this assessment are within the range of expected variability under the aggregate stock assessment approach, it cannot be concluded that target reference points provide a standard sufficient to meet the 100-scoring guidepost without explicit consideration of population-specific escapement goals derived independently for each species.

References

Tymlat Karaginsky Salmon Public Comment Draft Report (MRAG, 2019). https://fisheries.msc.org/en/fisheries/tymlat-karaginsky-bay-salmon-fishery/@@assessments

KamchatNIRO Report, 2018. REPORT ON THE AGREEMENT No. 36/18-NIR as of 19.09.2018. Topic: Population dynamics and management system of fishery of local stock of Pacific salmons (humpback salmon, chum salmon, red salmon, coho salmon) of some rivers (Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka, Makarovka, Vyvenka) of Karaginsky subzone of the

Eastern Kamchatka (scientific accompaniment of audit of Pacific salmons fishery according to MSC standards for “Vostochny Bereg” LLC)			
Stock status relative to reference points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring relative to LRP (SI a)	Escapement Pink S_{lim} S(0) ---------- Chum limit S(0)	 NE Kamchatka = 9.06 mln ---------- NE Kamchatka = 0.18 mln UoA ≈ 0.08 million	 odd years; = 22.3 million in 2015; and = 27.8 million in 2017. Average ~ 25 million even years: = 1.4 million in 2016; and = 8 million in 2014. Average ~ 4.7 million ---------- 2015 = 3.4 million; 2016 = 0.032 million; 2017 = 0.067 million 2018 = 1.0 million
Reference point used in scoring relative to TRP (SI b)	Escapement Pink S_{MSY} precautionary S^*_{MSY} ---------- Chum S_{MSY} precautionary S^*_{MSY}	 NE Kamchatka = 18.4 mln. UoA ≈ 7 mln. NE Kamchatka = 34.7 mln. UoA ≈ 12 mln. ---------- NE Kamchatka = 0.25 mln. UoA ≈ 0.11 mln. NE Kamchatka = 0.36 mln. UoA ≈ 0.16 mln.	UoA odd years; 22.3 million in 2015; and 27.8 million in 2017. even years: 1.4 million in 2016; and 8 million in 2014. ---------- UoA 2015 = 3.4 million; 2016 = 0.032 million; 2017 = 0.067 million 2018 = 1.0 million

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = 60-79 Chum = 55-79 Sockeye = <60 Coho = 60-79 Char = Requires RBF
Information gap indicator	More information sought: Annual escapement estimates for the Karaginsky subzone by year and species compared to applicable reference points needed to improve assessment

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 70 Karaginsky Chum – 70 Korfa Pink – 70 Korfa Chum – 70 Korfa Sockeye - 80
Condition number (if relevant)	1

PI 1.1.2 – Stock rebuilding

PI1.1.2		Where the stock management unit (SMU) is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
A	Rebuilding timeframes			
	Guide post	A rebuilding timeframe is specified for the SMU **that is the shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for SMU.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - na		Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - na
Rationale				
Scoring of PI 1.1.2 is required for scores less than 80 in PI 1.1.1 for pink, chum and sockeye salmon. SG60 – According to the data on long-term catch dynamics and the regularity of escapement assessments, rebuilding of Karaginsky and Korfa Bay pink and chum salmon is likely to be demonstrated within 2 generations (4-8 years) based on ongoing stock assessment, therefore the SG60 is met. Because salmon runs are harvested in terminal fisheries which target largely non-overlapping cohorts of adults, it is very unlikely that stocks are being overfished to the point of recruitment impairment even in the absence of detailed annual escapement estimates. SG100 – It is not clear that measures are in place to demonstrate rebuilding within one generation, therefore this standard is not met.				
B	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the fishery-based rebuilding	There is **evidence** that the fishery-based rebuilding strategies are being	There is **strong evidence** that the rebuilding strategies are being

		strategies are effective in rebuilding the SMU within the specified timeframe.	implemented effectively, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the **SMU** within the **specified timeframe.**	implemented effectively, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the SMU within the **specified timeframe.**
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - na	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - na	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - na

Rationale

SG60 – See SG80

SG80 – There is evidence that the fishery-based rebuilding strategies are being implemented effectively for Karaginsky and Korfa Bay pink and chum salmon based on sustained high levels of harvest and plans for continuing stock assessment, therefore the SG80 is met. The harvest of Chum salmon is relatively stable, and low escapements obtained are probably caused by reduction of aerial monitoring and relevant undercounting of fish, also, due to changes in turbidity of the water, rather than a failure to provide adequate spawning escapements.

SG100 – This standard is not met because stock assessment plans have not yet been implemented.

c	Use of enhancement in stock rebuilding			
	Guide post	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.	Enhancement activities are **very seldom used** as a stock rebuilding strategy.	Enhancement activities are **not used** as a stock rebuilding strategy.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - na	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - na	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - na

Rationale

Enhancement activities are not used as a stock rebuilding strategy for target species, therefore the SG100 is met.

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	Pink = >80 Chum = 60-79 Sockeye = 60-79 Coho = 60-79 Char – Not scored
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 85 Karaginsky Chum – 85 Korfa Pink – 85 Korfa Chum – 85 Korfa Sockeye - na
Condition number (if relevant)	--

PI 1.2.1 – Harvest strategy

PI1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is **expected** to achieve SMU management objectives reflected in PI 1.1.1 SG80 including measures that address component population status issues.	The harvest strategy is responsive to the state of the SMU and the elements of the harvest strategy **work together** towards achieving SMU management objectives reflected in PI 1.1.1 SG80 including measures that address component population status issues.	The harvest strategy is responsive to the state of the SMU and is **designed** to achieve SMU management objectives reflected in PI 1.1.1 SG80 including measures that address component population status issues.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG60 - See SG80 SG80 – The harvest strategy in place for all salmon stocks in the assessment is responsive to the state of the SMU based in in-season indicators of run strength and works effectively to				

achieve escapement-based management objectives defined for the SMU by regulating fishing times and areas, therefore the SG80 is met.

The strategy involves establishing fishing seasons; scheduled passing days of no fishing to limit exploitation rates and distribute escapement throughout the season; gear specifications; in-season monitoring of harvest, species composition, biological indicators, and spawning escapements; and in-season fishery management based on this information. Fishery times and areas are designed and regulated specifically to fill the available natural spawning areas and to achieve corresponding escapement objectives. Fishing areas, specific gears or dates may be closed based on abundance to ensure escapement. Meeting escapement targets is a priority of the management system.

SG100 – The SG100 standard is not met because the species-based strategy employed in the Karaginsky subzone may not by design meet population-specific objectives in every case owing to limitations in specific information.

b	Harvest strategy evaluation			
	Guide post	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain SMUs at target levels.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

SG60 - See SG80

SG80 –Direct evidence, including documentation of in-season restrictions based on abundance and assessments of spawning escapement, demonstrates that the harvest strategy is generally achieving its objectives of sustaining high levels of salmon production, therefore the SG80 is met. Consistent high levels of salmon production over the last decade confirm that the management strategy has effectively maintained the reproductive capacity of the aggregate stock of each species. Highly variable annual run sizes are characteristic of salmon. Occasional poor run years and escapements into portions of some systems occur. Thus, it is not always possible to meet optimum targets in every population and year. 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.

SG100 – The harvest strategy has been implemented since 2008, therefore, in light of relatively stable harvest volumes, it is not clear whether the system has ever been challenged by continuous low productivity. The SG100 is not met.

c	Harvest strategy monitoring

	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes		
Rationale				
SG60 – Monitoring is in place that is expected to determine whether the harvest strategy is working based on run strength, harvest and spawning escapement, therefore the SG60 is met. The harvest strategy involves extensive in-season monitoring of harvest, catch per unit effort, biological indicators (sex and age), and spawning escapement. These indicators are compared with historical values and patterns to determine run size and timing, and to guide adjustments in fishing times and areas. The harvest strategy is grounded in a well-developed system of scientific assessment and monitoring. Run forecasts are made based on brood year escapements and recent production patterns to identify recommended harvest levels as preseason planning tools. Once the fishing season begins, management to control exploitation rates is based on in-season data. Data are referenced to seasonal patterns in previous years to distinguish run timing and strength. Forecasts are typically uncertain and run timing may also vary from year to year. Overfishing might occur when run timing effects are mistaken for run size (for instance, mistaking a strong earlier-than-average return for a larger-than-forecast number). In-season management utilizes indicators based on biological harvest characteristics to avoid this potential problem. For instance, the early portion of each run typically includes a larger percentage of males which declines as the run progresses. Average fish size varies in tandem as male and female sizes are different.				
d	Harvest strategy review			
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG100 - The harvest strategy is periodically reviewed and improved. Extensive changes in the strategies adopted by the regional management system since 2008 provide for more local and responsive regulation are evidence to this effect. Recent work to develop population-specific limit and target reference points based on river-specific stock-recruitment data provide evidence to this effect. However, questions regarding the sufficiency of review in light of recent reductions in stock assessment information cause this indicator not to pass the SG100 level.				
e	Shark finning			

	Guide post	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
Rationale				
No sharks are caught in the fishery.				
f	Review of alternative measures			
	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Not applicable	Not applicable	Not applicable
Rationale				
There is no unwanted catch of the target stock.				
References				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = >80 Chum = >80 Sockeye = 60-79 Coho = 60-79 Char = <60
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 80 Karaginsky Chum – 80 Korfa Pink – 80 Korfa Chum – 80 Korfa Sockeye - 80
Condition number (if relevant)	--

PI 1.2.2 – Harvest control rules and tools

PI1.2.2		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			
	Guide post	**Generally understood** HCRs are in place **or available** which are **expected** to reduce the exploitation rate as the SMU **LRP** is approached.	**Well defined** HCRs are **in 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.	The HCRs are expected to 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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG60 –See SG80. SG80 – Well-defined control rules are in place that ensure that the exploitation rate is reduced to avoid low escapements which might impair future recruitment. HCRs generally appear to keep the stock fluctuating around a target level consistent with MSY, as evidenced by substantial yields in most years. Therefore, the SG80 is met. HCRs 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. 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 and consistently sustaining high levels of yield. Harvest control rules are generally sufficient to keep the SMU fluctuating around a target level that consistently produces high yields although MSY escapement may not be achieved in every river in every year. SG100 – The SG100 standard is not met because harvest control rules are not expected to keep the SMU at or above target levels consistent with maximum sustained yield in every case. Escapements of some species in some rivers periodically fall below target levels due to normal variation in run strength and limited in-season data for management in some areas.				
b	HCRs robustness to uncertainty			
	Guide post		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?		Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG80 – The HCRs are likely to be robust to the main uncertainties related to annual variation in run strength and timing, therefore the SG80 is met for these species. Forecasts of abundance are made prior to the season based on brood year patterns and estimates are adjusted over the course of the fishing season based on fishery catch rates and biological information. In-season management is generally effective in guiding fishery management measures for regulating harvest rates based on observed abundance to provide for spawning escapement. SG100 – The SG100 standard is not met because it is unclear whether harvest control rules are sufficiently robust to maintain appropriate levels of escapement under conditions 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 productivity of Pink, Chum and Sockeye in East Kamchatka corresponding to a period of favorable marine conditions. However, high harvests create an expectation for continuing high harvest and a fishery infrastructure scaled to corresponding expectations. A decline in marine productivity of salmon 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.				
c	HCRs evaluation			
	Guide post	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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG60 – see SG80 SG80 – Available evidence based on indicates that the tools in use are appropriate and effective in achieving the exploitation levels for Pink, Chum and Sockeye required under the HCRs. 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. Similarly, passing days were established in the fishery in order to limit harvest rates.

SG100 - It remains to be seen whether harvest control rules will be adequate to control exploitation extended periods of reduced salmon productivity.

d	Maintenance of wild population components			
	Guide post	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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

SG60 – See SG80

SG80 – Diversity in salmonids is represented among stocks and 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). The management practice of establishing weekly passing days maintains diversity by protecting 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

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = >80 Chum = >80 Sockeye = <60 Coho = 60-79 Char = < 60
Information gap indicator	More information sought for coho in particular

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 80 Karaginsky Chum – 80 Korfa Pink – 80 Korfa Chum – 80

	Korfa Sockeye - 80
Condition number (if relevant)	--

PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guide post	Some relevant information related to SMU structure, SMU production and fleet composition is available to support the harvest strategy. Indirect or direct information is available on some component populations.	Sufficient relevant information related to SMU structure, SMU production, fleet composition and other data is available to support the harvest strategy, including harvests and spawning escapements for a representative range of wild component populations.	A comprehensive range of information (on SMU structure, SMU production, fleet composition, SMU abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available, including estimates of the impacts of fishery harvests on the SMU and the majority of wild component populations.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				

SG60 - See SG80

SG80 – This standard is met for all salmon stocks in this assessment. A large amount of relevant information is collected to support the harvest strategy: data on stock structure and productivity, fleet composition and other data on biological characteristics of the run, run timing, spawning distribution, and spawning escapement. Assessments also include direct estimates of natural stock productivity by salmon species, which are used in spawner-recruit models to calculate the yield levels. The analysis and assessment of the overexploitation risk is conducted while testing the regulation rules.

Escapement is currently estimated in index areas with basin-wide inferences based on historical distribution patterns. Historical information on catches and escapements in relation to abundance and passing days supports the effectiveness of the current harvest strategy. Passing days have been effectively shown to provide opportunities for significant spawning escapement sufficient to sustain yields under current conditions of high marine productivity which prevail for these salmon species. Therefore, the available assessments based on index stocks and historical distribution patterns are generally adequate for current management of these species.

SG100 – This standard is not met because recent reductions in aerial surveys of escapement mean that a majority of wild component populations are no longer represented. Assessments based on index stocks and historical distribution patterns may not be adequate for long-term management under conditions of changing fishery dynamics, fish productivity or fish distribution patterns. This standard is not met for Korfa Sockeye due to limited information on the metapopulation structure of this species in the region and how representative this stock is of Sockeye in other rivers of the region.

B	Monitoring			
	Guide post	SMU wild abundance and UoA removals are monitored and at **least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	SMU wild abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,** and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

SG60 – Extensive information is collected on harvest in the commercial salmon fishery. Numbers are estimated at multiple stages of the harvest and processing chain. Detailed records are required and kept by the fishery and the government. Changes in the management system over the previous decade ensure accuracy of catch reporting by removing incentives for inaccurate accounting to avoid taxes or remain within a designated allocation. Catch data are reported on a real-time basis during the fishing season. Catch data are assessed in-season relative to historical levels which effectively provide for spawning escapement under the passing day system of management. Estimates of char abundance are not available, and char are not managed for specific stock levels or escapement objectives.

SG-80 - The continuing effectiveness of the harvest strategy will depend also on monitoring of spawning escapements. The SG80 standard for regular monitoring is not met for Pink and Chum Salmon because recent reductions in aerial survey intensity have substantially reduced the accuracy and precision of spawning escapement estimates used to guide management decisions. Surveys have been reduced due to budget limitations. The current survey intensity likely provides sufficient precision to distinguish large and small runs but lack the resolution to avoid estimation bias due to differences in run timing or fish distribution, and also prohibits the detection of effects on spawning escapement from degradation of habitat due to mining in the Vyvenka watershed (see P2 for more details). Historical assessments have generally been sufficient to support the current harvest strategy but current survey frequency may not be sufficient to identify any future changes in productivity or distribution patterns which might confound effective implementation of the harvest control rules. The SG80 standard for regular monitoring is met for Korfa Sockeye where stock assessment in the Vyvenka River system has

been afforded a high priority for continued monitoring by KamchatNIRO. The Vyvenka River is one of the largest and most productive for Sockeye in the region.

c	Comprehensiveness of information			
	Guide post		There is good information on all other fishery removals from the SMU.	
	Met?		Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	

Rationale

SG 80 – KamchatNIRO has conducted extensive studies on historical and current levels of salmonids removals by illegal fishing in Kamchatka Rivers (Shevlyakov 2013; Shevlyakov et al. 2016). Illegal harvest has long been a very significant problem in Kamchatka salmon fisheries but the incidence has been greatly reduced by changes in the management system. KamchatNIRO has estimated that illegal harvest substantially reduced historical spawning escapements in many rivers. However, industrial levels of poaching have been largely eliminated by changes in the management system. In 2008, with introduction of the Olympic system, individual quotas disappeared. With that change, incentives to exceed the quota disappeared too, thus eliminating industrial illegal fishing which a significant problem before 2008.

Harvest of Kamchatka salmon also historically occurred outside the UoC in commercial drift gillnet fisheries in marine waters of the Russian Exclusive Economic Zone. These catches were subject to a reporting and monitoring system which estimated catch levels for high value species such as Sockeye. This fishery has now been closed.

Illegal harvest has been substantially reduced from historical levels and current levels in the Karaginsky area are limited to low levels by the remoteness of the area (KamchatNIRO 2017). Therefore, this standard is met.

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = 60-79 Chum = 60-79 Sockeye = 60-79 Coho = 60-79 Char = <60
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 75 Karaginsky Chum – 75

	Korfa Pink – 75 Korfa Chum – 75 Korfa Sockeye - 75
Condition number (if relevant)	2

PI 1.2.4 – Assessment of stock status

PI1.2.4		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			
	Guide post		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?		Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG 80 – The SG 80 guidepost is met for all stocks in this assessment. The stock assessment includes in-season estimation of harvest, catch per effort, biological characteristics, timing and distribution of harvest and returns, and spawning escapement. Spawning escapements are estimated with aerial surveys. This information is used to implement harvest control rules intended to ensure escapement sufficient to sustain future production. Annual spawning escapement is estimated for representative samples of stock management units for each species. Adequacy of harvest control rules relative to escapement has been assessed over time and the assessment has been used to refine control rules. The identification of escapement-based reference points has been formalized in recent years based on analysis of historical production patterns using stock-recruitment analyses. SG100 – It is shown that the regular assessment provides some limited data on run strength and densities of species in particular parts of the UoA (Bugaev et al. 2018a, 2018b). Some consideration on component populations is given for sockeye salmon. Nevertheless, the assessments are generally based on species aggregates rather than component stocks, thus such major features of the species biology are not taken into account, SG100 is not met.				
b	Assessment approach			
	Guide post	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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No

		Korfa Chum – Yes Korfa Sockeye - Yes	Korfa Chum – No Korfa Sockeye - No	Korfa Chum – No Korfa Sockeye - No

Rationale

SG 60 – The SG60 standard is met. Stock status is estimated from aerial surveys of escapement by species and sometimes major substocks based on index surveys and distribution patterns. These estimates are evaluated relative to spawner objectives identified for each species based on historical values that were shown over time to sustain high returns and fishery harvests. In recent years, the management system has also explored development of more explicitly defined escapement goals for each species based on spawner-recruit analyses (Bugaev et al. 2019a, 2019b). Management for escapement-based reference points is a standard and effective practice in salmon fisheries throughout the Pacific.

SG80 – The SG80 standard is not met for this performance indicator due to the generic nature of historical application of reference points and questions regarding their application in specific areas of the region. This fishery historically estimated stock status relative to aggregate escapement goals based on annual index area surveys. Escapements were generally compared to historical values that were shown over time to sustain high returns and fishery harvests. However, goals were not always explicitly defined in historical practice and comparisons of specific escapement values with defined goals are not always available. In recent years, the management system has also explored development of goals based on population-specific analyses. However, population-specific goals have not yet been fully incorporated into management and effective application may be limited due to recent reductions in aerial survey coverage of a range of representative populations and time periods for each species. Reduced surveys provide low resolution on major stock subcomponents and will limit the effective development and application of population-specific reference points.

c	Uncertainty in the assessment			
	Guide post	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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

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 more-explicit quantification of goals based on stock-recruitment analyses. These analyses have been provided by KamchatNIRO (Bugaev et al. (2019a, 2019b). These goals include explicit precautionary safety factors based on statistical analysis of uncertainty.

SG100 - Uncertainty in escapement estimates has not been quantified. Stock status is not evaluated relative to reference points in a probabilistic way (although probabilistic analyses are beginning to be

incorporated into analyses of management effectiveness (Bugaev et al. (2019a, 2019b), hence the SG100 is not met.

d	Evaluation of assessment			
	Guide post			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

The real-time escapement assessment is conducted during aerial survey flights, which tend to be a standard procedure in salmon fisheries. Anyway, the robustness of assessment is not very high because of reduction of flight hours and territorial coverage. No information on exploration of alternative hypotheses and assessment approaches is shown, so the SG100 is not awarded.

e	Peer review of assessment			
	Guide post		The assessment of SMU status, including the choice of indicator populations and methods for evaluating wild salmon in enhanced fisheries is subject to peer review.	The assessment, including design for using indicator populations and methods for evaluating wild salmon in enhanced fisheries, has been **internally and externally** peer reviewed.
	Met?		Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No

Rationale

SG80 – The existing stock assessment is subjected to extensive internal review by regional institute KamchatNIRO. Additional and finalizing review of assessment rules and methodologies is conducted by head institute – VNIRO. The in-season assessment information is internally discussed as part of the annual management process overseen by the Anadromous Fish Commission.

SG100 - External peer review is limited hence the SG100 is not met.

f	Representativeness of indicator stocks			
	Guide post	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some scientific basis**	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some evidence of**	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**

		for the indicators selection.	**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.	**correlated** with other populations they represent within the management unit, including stocks with lower productivity (i.e., those with a higher conservation risk).
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No Korfa Chum – No Korfa Sockeye - No
Rationale				
SG60 – The stock assessment historically surveyed representative areas of most river systems for each salmon species. Index reaches were selected for their representative nature based on analysis of a fuller complement of historical survey areas. SG80 – The SG 80 guidepost is not met. It is unclear whether current assessments now fully represent the less-productive populations in the management unit in light of recent reductions in stock assessment effort. Stock assessment has become increasingly reliant on indicator streams with the reduction in sampling rate but changing distribution patterns over time at different scales of abundance and productivity can confound interpretation of index samples. Reliance on index areas may also 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. This problem is even worsening due to reduction of aerial surveys. Resulting reductions in the accuracy and precision of stock assessments can impair management effectiveness in the event of changing stock productivity and distribution or fishery patterns. Reduced surveys also provide low resolution on major stock subcomponents and will limit the effective development and application of population-specific reference points. 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)			
	Guide post	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?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No	Karaginsky Pink – No Karaginsky Chum – No Korfa Pink – No

		Korfa Chum – Yes Korfa Sockeye - Yes	Korfa Chum – No Korfa Sockeye - No	Korfa Chum – No Korfa Sockeye - No
Rationale				
SG60 –Each species is comprised of a hierarchy of subcomponents including stocks (e. g., early and late runs) and demographically-independent populations (e.g. species returning to home rivers or lakes). Major stocks of each species are defined based on run timing, and spawning distribution. This stock structure is considered in conservation, fishery management and stock assessment requirements. SG80 – This standard is not met because structure is not well defined at the substock or population level. The fishery in the sea and river mainstream operates on a complex of overlapping species, stocks and population. As a result, stock-specific information on harvest, exploitation and escapement is limited for some species.				
References				
Bugaev et al. 2019a, 2019b				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = 60-79 Chum = 60-79 Sockeye = 60-79 Coho = 60-79 Char = 80 (default score for 1.2.4 with RBF)
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 70 Karaginsky Chum – 70 Korfa Pink – 70 Korfa Chum – 70 Korfa Sockeye - 70
Condition number (if relevant)	3

PI 1.3.1 – Enhancement outcomes

PI1.3.1		**Enhancement activities do not negatively impact wild stock(s)**		
Scoring Issue		SG 60	SG 80	SG 100
a	Enhancement impacts			
	Guide post	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance or productivity and diversity of wild stocks.	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance or productivity and diversity of wild stocks.	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance or productivity and diversity of wild stocks.

	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes
Rationale				
No hatchery enhancement of any salmon species occurs in unit of certification systems. Chars would be assessed using the default assessment tree so this PI would not apply.				
References				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = >80 Chum = >80 Sockeye = >80 Coho = >80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 100 Karaginsky Chum – 100 Korfa Pink – 100 Korfa Chum – 100 Korfa Sockeye - 100
Condition number (if relevant)	--

PI 1.3.2 – Enhancement management

PI1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock(s)		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	**Practices and protocols** are in place to protect wild stocks from significant negative impacts of enhancement.	There is a **partial strategy** in place to protect wild stocks from significant negative impacts of enhancement.	There is a **comprehensive strategy** in place to protect wild stocks from significant negative impacts of enhancement.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes
Rationale				
No hatchery enhancement of any salmon species occurs in unit of certification systems.				
b	Management strategy evaluation			
	Guide post	The practices and protocols in place are **considered likely** to be effective based on plausible argument.	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts.	There is **clear evidence** that the comprehensive strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes
Rationale				
No hatchery enhancement of any salmon species occurs in unit of certification systems.				
References				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = >80 Chum = >80 Sockeye = >80 Coho = >80

Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 100 Karaginsky Chum – 100 Korfa Pink – 100 Korfa Chum – 100 Korfa Sockeye - 100
Condition number (if relevant)	--

PI 1.3.3 – Enhancement information

PI1.3.3		**Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock(s)**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy			
	Guide post	**Some** relevant information is available on the contribution of enhanced fish to the fishery harvest, total escapement (wild plus enhanced), and hatchery broodstock.	**Sufficient** relevant qualitative and quantitative information is available on the contribution of enhanced fish to the fishery harvest, total escapement (wild plus enhanced) and hatchery broodstock.	A **comprehensive range** of relevant quantitative information is available on the contribution of enhanced fish to the fishery harvest, total escapement (wild plus enhanced) and hatchery broodstock.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes
Rationale				
No hatchery enhancement of any salmon species occurs in unit of certification systems.				
b	Use of information in assessment			
	Guide post	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account qualitatively.	A **moderate-level analysis** of relevant information is conducted and used by decision makers to quantitatively estimate the impact of enhancement activities on wild-stock status, productivity, and diversity.	A **comprehensive analysis** of relevant information is conducted and routinely used by decision makers to determine, with a high degree of certainty, the quantitative impact of enhancement activities on wild-stock status, productivity, and diversity.
	Met?	Karaginsky Pink – Yes Karaginsky Chum – Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes	Karaginsky Pink – Yes Karaginsky Chum – Yes

		Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes	Korfa Pink – Yes Korfa Chum – Yes Korfa Sockeye - Yes
Rationale				
No hatchery enhancement of any salmon species occurs in unit of certification systems. Chars would be assessed using the default assessment tree so this PI would not apply.				
References				
KamchatNIRO Report, 2018.				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Pink = 100 Chum = 100 Sockeye = >80 Coho = >80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Karaginsky Pink – 100 Karaginsky Chum – 100 Korfa Pink – 100 Korfa Chum – 100 Korfa Sockeye - 100
Condition number (if relevant)	--

5.3 Principle 2

5.3.1 Principle 2 background

For the purposes of this assessment, primary species in the catch are defined as those not included under Principle 1 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 2 species based on level of harvest. “Main species” constitute 5% or more of the catch by weight. There are also provisions for identifying a “main” primary 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. No significant bird bycatch has been reported or observed in this fishery but based on experience with other salmon fisheries in the U.S. and Canada, a likelihood of some level of diving seabird bird mortality associated with tangling in the fishing gear cannot be discounted. GSA3.7.1 directs that out of scope species including birds, are always considered a main species regardless of their catch volume, Therefore, diving seabirds are identified as a main secondary species in this assessment. All other species are identified as “minor.” For the purposes of this assessment, all gears are combined for scoring purposes (Table 22).

Table 22 – Scoring elements for P2 species.

Component	Scoring elements	Designation	Data-deficient
Primary	Sockeye salmon (*Oncorhynchus nerka*) of Karaginsky Bay	Minor	No
Primary	Coho salmon (*Oncorhynchus kisutch*)	Minor	No
Primary	Chinook salmon (*Oncorhynchus tshawytscha*)	Minor	No
Primary	Char (*Salvelinus malma, S. leucomaensis*)	Minor	No
Primary	Saffron cod (*Eleginius gracilis*)	Minor	No
Primary	Rainbow smelt (Osmerus mordax)	Minor	No
Secondary	Diving birds (misc. species)	Main	No
Secondary	Starry flounder (*Platichthys stellatus*)	Minor	No
Secondary	Miscellaneous marine species	Minor	Not assessed

Primary Species

Primary species include include Sockeye Salmon, Coho Salmon, Chinook Salmon, Char, Saffron Cod (navaga) and Rainbow Smelt. Numbers of these species in Karaginsky rivers are quite small in relation to other areas of East Kamchatka. The species are intercepted during specialized salmon fishing activities. The total commercial salmon catch averaged 71.3 thousand mt between 2003 and 2017 of which pink and chum salmon represented 97.3% of this catch (Shevlyakov et al. 2017). Sockeye salmon represented the next highest percentage (2.3%) followed by Chinook (0.2%) and coho (0.1%) salmon. None of the primary species comprises more than 5% of the total salmon harvest in Karaginsky. Therefore, none are a main primary species.

<u>Sockeye Salmon</u>

Status (Karaginsky Bay) - Sockeye salmon reproduction mostly occurs in the southern group of rivers beginning from the Dranka River to the Khaylyulya River. Sockeye escapement counts to the target rivers over the past 15-year period has averaged about 17 thousand fish, ranging from

3-50 thousand fish (Figure 54). Sockeye escapement counts have generally been below the limit reference point S(0) (about 21,000 fish). Average sockeye escapements to the target rivers between 2014 and 2018 did not reach target reference points (Figure 55). Important uncertainties affect these estimates. First, since escapement counts of index areas are not extrapolated to smaller areas within the Karaginsky subzone comparing them to reference points for the UoA may not be accurate. Second, the model aggregates some rivers into clusters and estimates to individual rivers may not be precise. Third, high water turbidity from 2016 to 2018 complicated and limited aerial surveys. However, sockeye salmon catches in the UoA generally increased until 2016 and then declined.

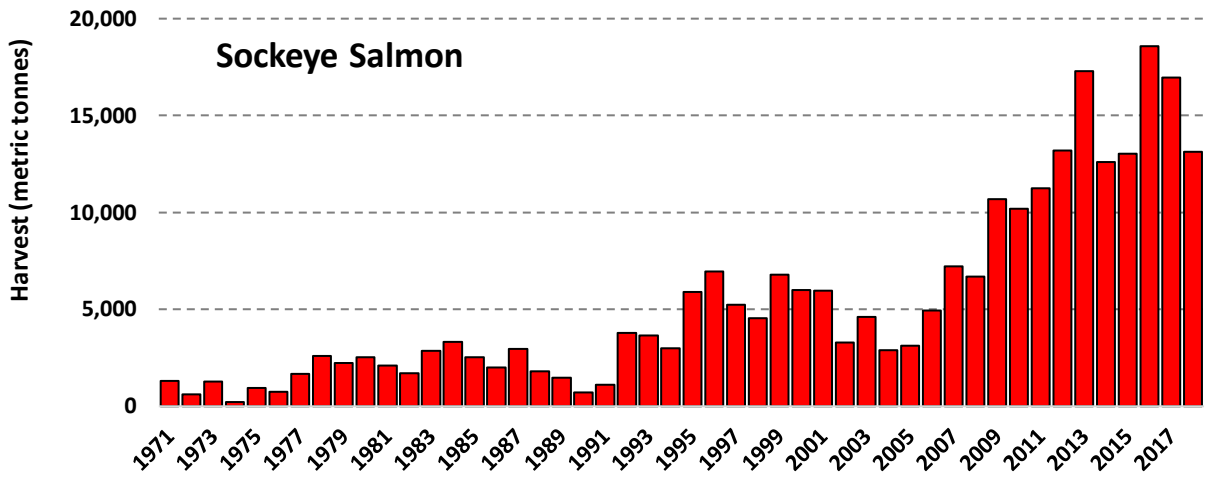


Figure 53. Total annual harvest of Sockeye Salmon in East Kamchatka (source: North Pacific Anadromous Fish Commission).

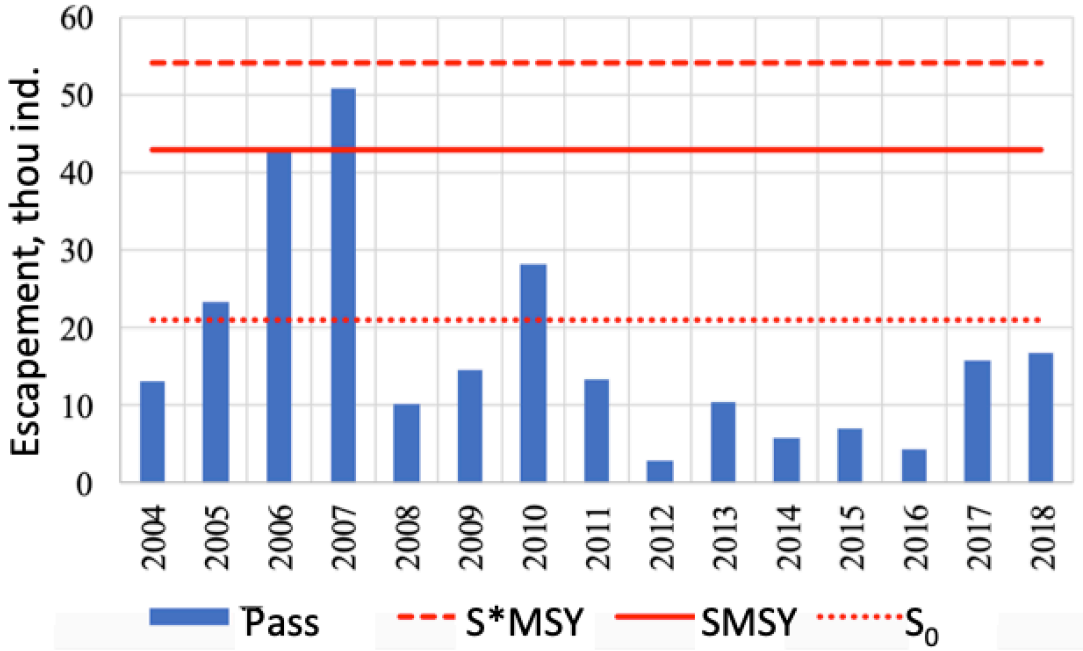


Figure 54. Combined sockeye salmon escapement survey counts to the Uka, Khaylyulya, Rusakova, Ivashka and Dranka rivers, 2004-2018. Source Bugaev et al. 2018a.

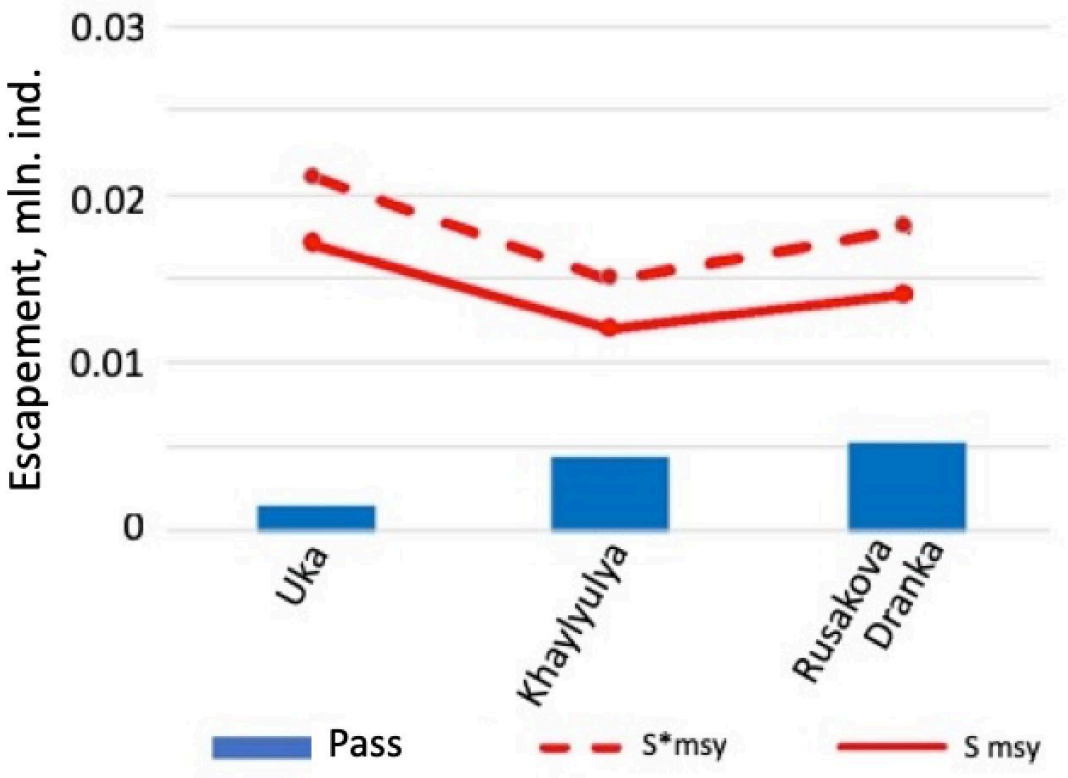


Figure 55. Average sockeye salmon escapement survey counts to the Uka, Khaylyulya, Rusakova and Dranka rivers, 2014-2018. Source Bugaev et al. 2018a.

Sockeye salmon represent less than 0.1% of the salmon species spawning in the Anapka/Khai-Anapka River complex (Bugaev et al. (2019a). As reported by Bugaev et al. (2019a), the estimated escapement target for maximum sustained yield (S_{MSY}) and the precautionary target (S^*_{MSY}) is 1,500 and 2,500 fish, respectively. The observed average escapement for over the past fifteen years was 1,000 fish for the Anapka River and 600 for the Khai-Anapka River. Combined (1,600 fish), this level meets the S_{MSY} target for the production area of 1,500 spawners.

Coho Salmon

Catch of Coho Salmon in the Karaginsky subzone fishery is low. Coho salmon migrate into Karaginsky Bay later than other salmon species and are not targeted by the commercial fishery. The species is caught in the end of the fishing season, and fishing is complete in many years prior to the majority of the Coho run.

Distribution - Coho Salmon are generally distributed in streams and rivers throughout the subarctic and temperate north Pacific from the Sea of Okhotsk to northern California (Sandercock 1991). 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. On the east coast of Kamchatka, the main area for the reproduction and fishing of Coho Salmon is the rivers of the southeast of Kamchatka (Petropavlovsk-Komandorskaya subzone, among which the Kamchatka River has the primary importance as the largest river on the peninsula with a length of 758 km (Zorbidi, 2010). The Kamchatka River accounts for 80-90% of the total catch of the species on the eastern coast of the peninsula, consistently occupying the first place in the catch in Asia (Bugaev et al. 2007; KamchatNIRO 2017). Coho numbers are quite small in the Karaginsky Bay rivers.

Life History - 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. Coho Salmon prefer to spawn in areas with intra-gravel water flow and/or areas with groundwater upwelling. Juvenile Coho may rear in streams for one to three years before undergoing a physiological transformation to smolts and migrating to the sea. The predominate age of return is 2.1 (70%), followed by 1.1 (26%) and 3.1 (4%). Adults typically return to spawn at 3 to 5 years of age after 1 year at sea. Karaginsky Coho typically average 63.3 cm in length and 3.55 kg in weight.

Stock Structure - Rivers with significant groundwater upwelling areas typically can 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.

Status – Coho catch in the northeast of Kamchatka is considered to be very low (Bugaev et al. 2019a). Coho catch in Kamchatka is variable from year to year (Figure 56) but typically much lower on the eastern coast than the western coast. Within the UoA, during the past ten years, coho salmon catch in the target region (Uala Bay, Anapka and Khai-Anapka rivers) has been insignificant and comprised, on average, less than 0.2% of the total Pacific salmon catch in the region (Bugaev et al. 2019a). Coho salmon catch has been recorded for some years between 2009 and 2018 in Korfa Bay and the Vyvenka River (Figure 57) and in Uala Bay and the Anapka and Khai-Anapka rivers (Figure 58).

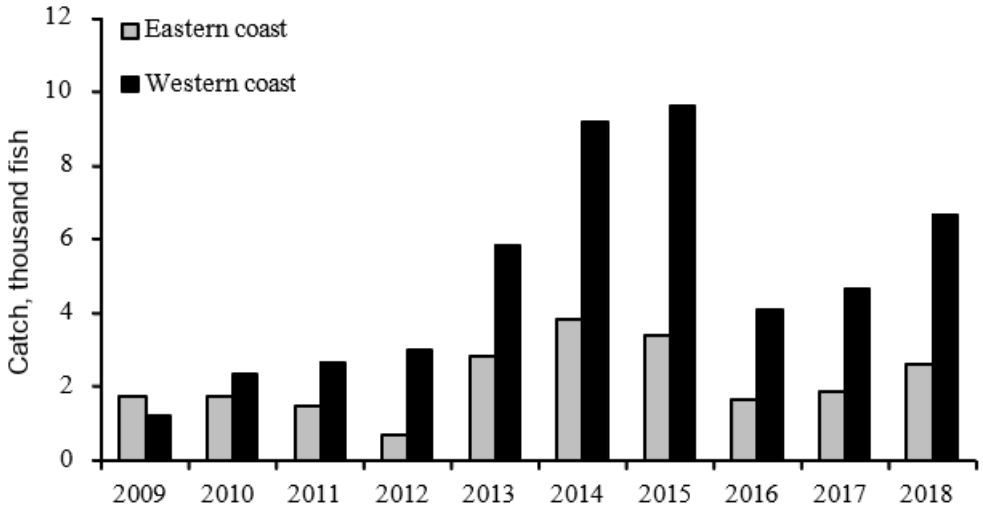


Figure 56. Coho catch dynamics in Kamchatka in 2009-2018. Source: Bugaev et al. 2019b.

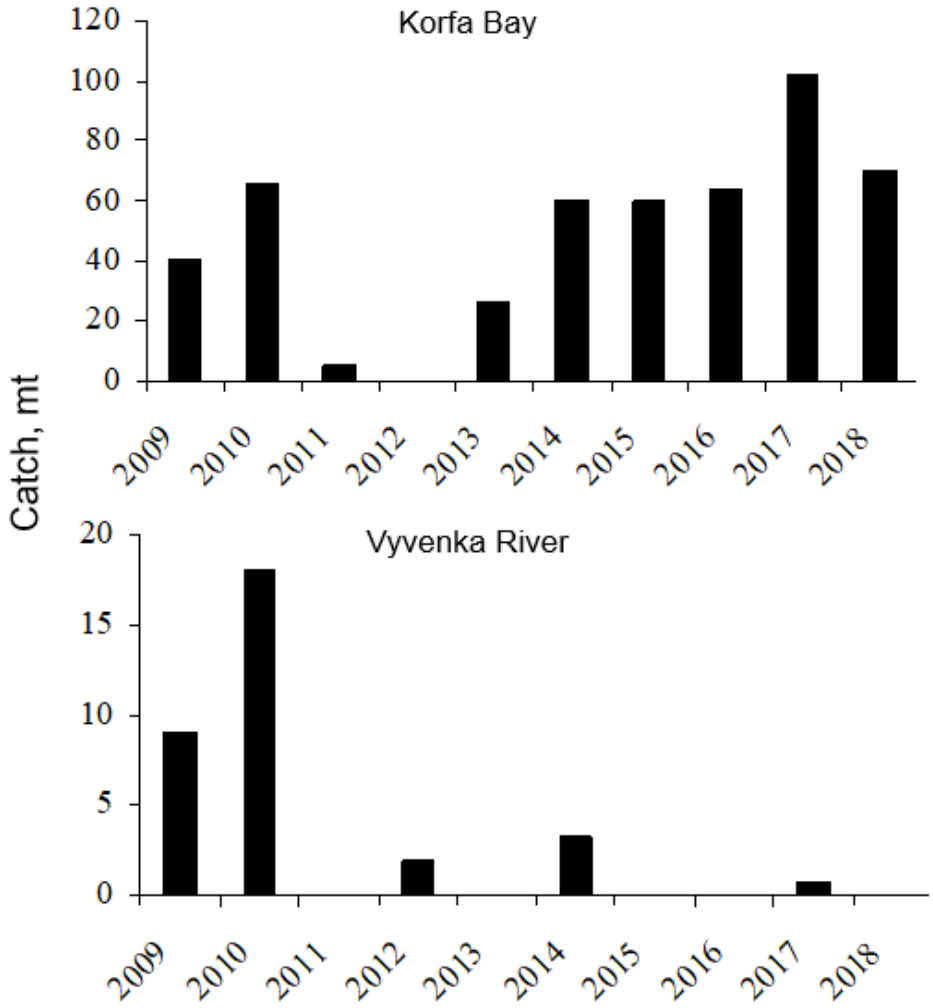


Figure 57. Coho salmon catch in Korfa Bay and the Vyvenka River, 2009-2018. Source: Bugaev et al. 2019b.

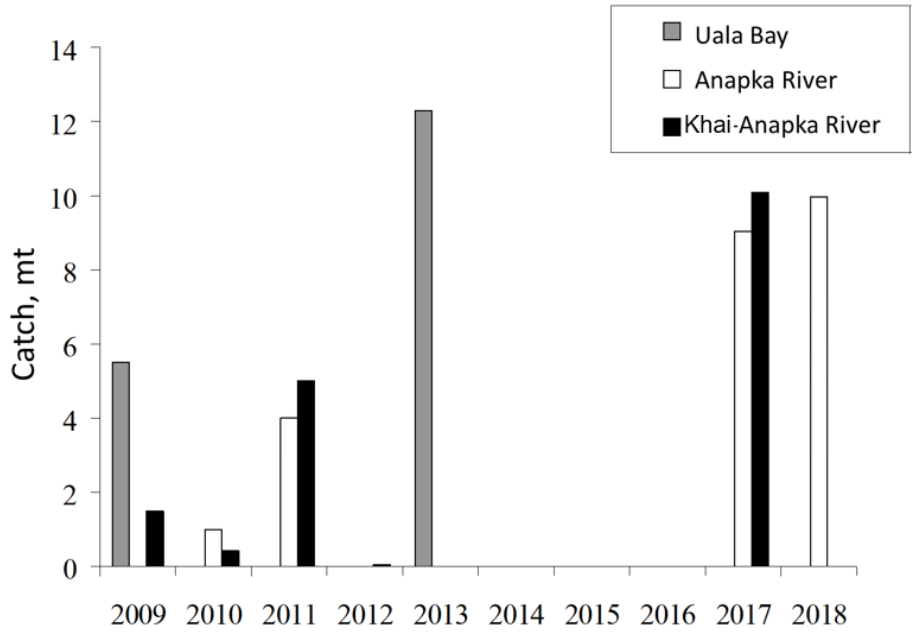


Figure 58. Coho salmon catch in Uala Bay, Anapka and Khai-Anapka rivers, 2009-2018. Source: Bugaev et al. 2019a.

There are significant uncertainties regarding coho escapement data for Karaginsky Bay. Numbers of coho salmon in east Kamchatka vary substantially from year to year with no clear trend since 1970 (Zorbidi 2010). Coho is not specifically targeted by the commercial fishery and there has been limited funding for aerial monitoring of coho escapements. Coho escapement data has typically been collected opportunistically during aerial monitoring for pink, chum, and sockeye salmon. Because coho salmon spawn later than other salmon species, these combined surveys have limited value.

In order to remedy this problem, the fishing industry provided financial support in 2014 and 2016 to conduct additional aerial surveys to assess coho escapements in the southern part of the Karaginsky district. In 2014, researchers estimated coho escapement at 1.5 thousand fish but the estimate is believed to be underestimated since surveys occurred after coho had distributed throughout the river system making surveys more difficult. Researchers believe that the 87.4 thousand coho spawners estimated in 2016 is a more representative count (Bugaev et al. 2018a). The number of spawners exceeded the precautionary values S*msy in all rivers that year (Figure 59, Figure 60). Taking into consideration insignificant fishing on coho populations, researchers conclude that the species has relatively high reproductive potential in the Karaginsky district.

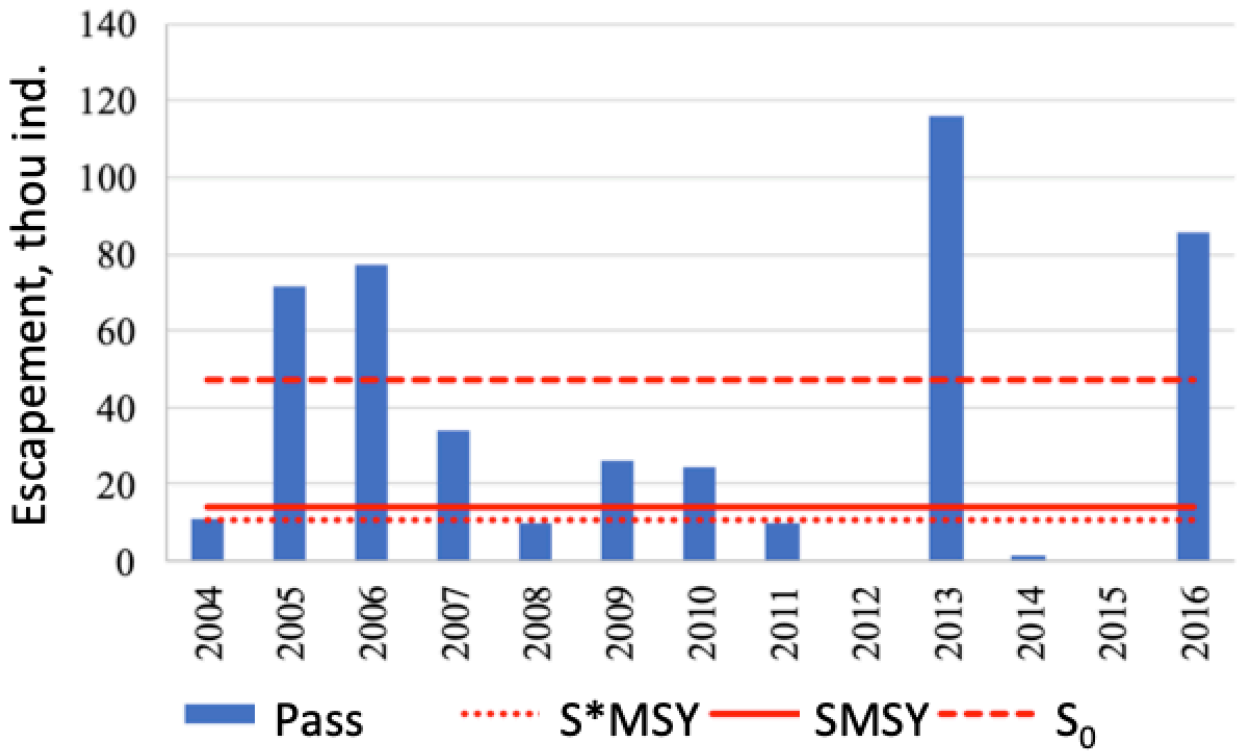


Figure 59. Combined coho salmon escapement survey counts to the Uka, Khaylyulya, Rusakova, Ivashka and Dranka rivers, 2004-2016. Source Bugaev et al. 2018a.

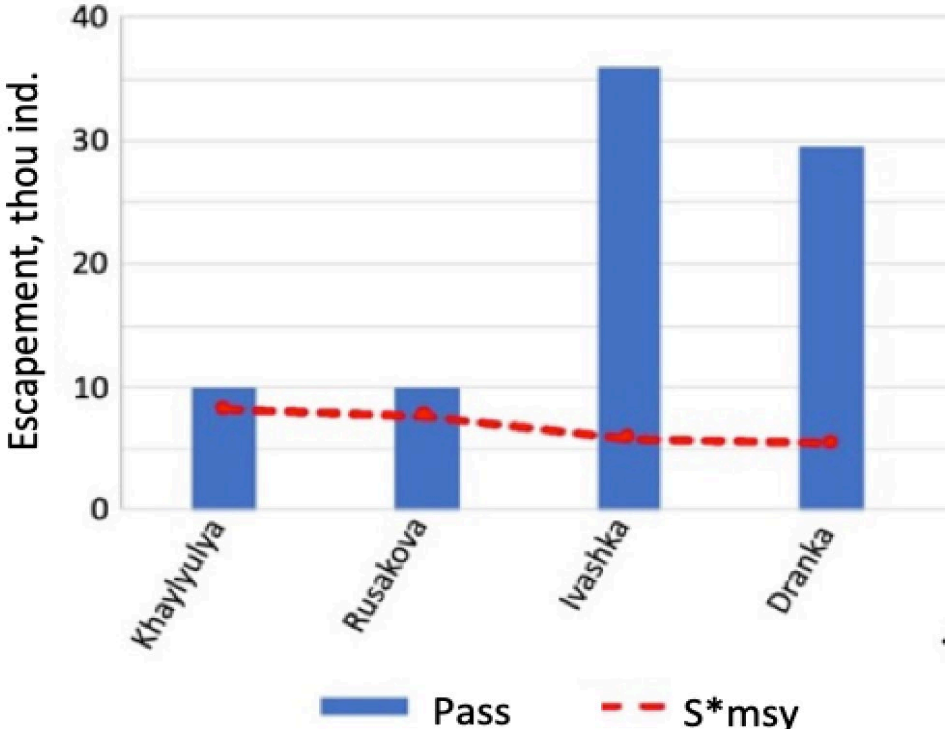


Figure 60. Coho salmon escapement survey counts to the Khaylyulya, Rusakova, Ivashka and Dranka Rivers in 2016, compared to S*msy. Source: Bugaev et al. 2018b.

Estimates of observed coho escapement in rivers are available for Vyvenka and Anapka rivers. However, because the surveys were conducted prior to the main spawning migration of the species, the data are considered only as supplemental information and not as reliable estimates of abundance. In the Vyvenka River, coho spawners were observed in the river in three years, providing the following estimates: 24.5 thousand fish in 2010, one thousand fish in 2011, and 0.4 thousand fish in 2018 (Bugaev et al. 2019b). In the Anapka River, estimates are available from 2005 (2.5 thousand fish) and 2010 (3.5 thousand fish).

Management - Coho salmon are not a subject of a specialized commercial fishery in the Karaginsky subzone, but coho are retained from fisheries for other Pacific salmon species. However, escapement objectives have been developed for coho salmon based on historical production patterns (Figure 61). KamchatNIRO uses a stratified model based on low, medium and high coho production which assumes that Smsy increases with stock productivity (Bugaev et al. 2018b, Table 23). Medium productivity parameters are found in Table 24. While Smsy and S*msy parameters vary with productivity, Bugaev et al. (2018b) point out that So (the equivalent of Slim) is roughly fixed at 31,928 spawners and MSY is achieved at about a 75% exploitation rate.

The target escapement (Smsy) for the Anapka River alone is determined to range from 2.5 to 8.0 thousand fish (Bugaev et al. 2019a). For the Anapka- Vyenka river cluster, Smsy ranges from 3.0 thousand fish to 12.1 thousand fish, with the middle stratum target at 3.6 thousand fish (Bugaev et al. 2019b). For the Uala Bay region, escapement targets are 2.0 thousand fish for the minimum stratum, 2.4 thousand fish for the medium stratum, and 8.2 thousand fish for the maximum stratum (Bugaev et al. 2019a). Although there are escapement targets defined, there are not reliable estimates of escapement in each river that can be compared to escapement goals. For greater certainty of the status of coho in the target region, aerial surveys covering the Ozernaya, Uka, Khaylyulya, Ivashka, Dranka, Karaga, Kichiga-Belaya, Anapka, Vyvenka, Kultuchnaya, and

Kamchimmovayam rivers are needed (Bugaev et al. 2019a). However, the low level of fishing for coho in the region suggests that the fishery is not having a large effect on the species.

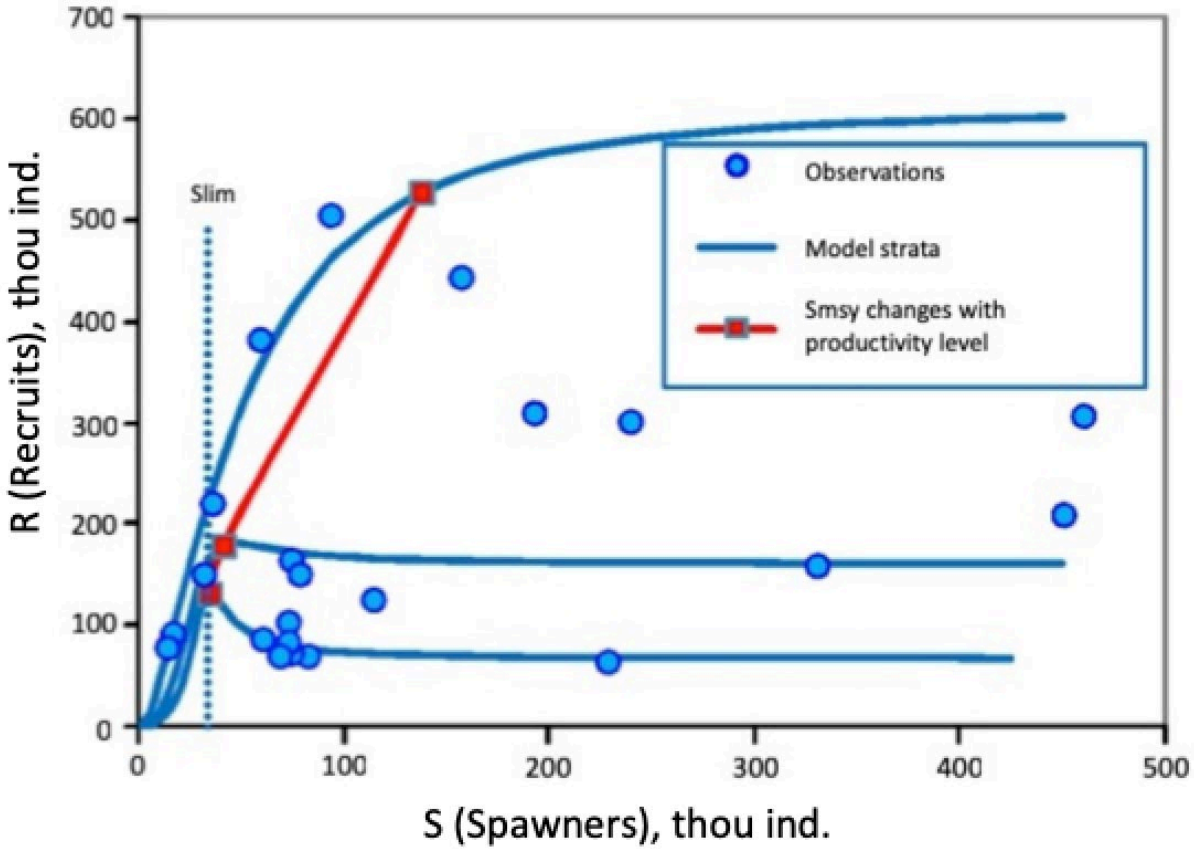


Figure 61. Limit and target reference points for three model strata of NE Kamchatka coho salmon. Source: Bugaev et al. 2018a.

Table 23. Limit and target reference points for Karaginsky subzone coho salmon under three productivity strata. Source: Bugaev et al. 2018a.

		Target	
Model strata	S_{lim}	S msy	S*msy
Low Productivity	31,928	33,712	40,773
Medium Productivity	33,712	40,773	137,214
High Productivity	40,773	137,210	171,518

Table 24. Medium productivity stratum parameters for Karaginsky subzone coho salmon rivers; including estimates of S(msy) and S(0).

	So	Smsy	Rmsy	MSY	Emsy
Karaginsky subzone	31,928	40,773	178,872	138,098	77%
Stolbovaya-Uka	4,604	5,88	24,388	18,508	76%
Khaylyulya	1,912	2,441	10,539	8,097	77%
Rusakova	1,785	2,279	13,622	11,343	83%
Ivashka	1,357	1,732	13,239	1 1,507	87%
Dranka	1,278	1,632	6,702	5,07	76%

Chinook salmon

Primary species include non-target Pacific salmon intercepted by the fishery during harvesting activities including Chinook salmon *Oncorhynchus tshawytscha*. In general, the abundance of this species in the waterbodies of the Karaginsky Bay is very small, not exceeding 5% of total catch. The intensity of fishing by the coastal fishing in Karaginsky Bay basin is so low that it was practically not reflected in the official fishing statistics until 2011. In the period from 2009 to 2018, an average catch of Chinook in Karaginsky Bay was 2.4 tons, the minimum catch was noted in 2010 - 0.05 tons, the maximum in 2016 - 10.2 tons. Total catch volume for the species is not exceeding 5% of the catch obtained in UoA, thus the Chinook is considered to be not “main” but “minor” primary species.

Distribution - Chinook Salmon production in Asia is primarily limited to the Kamchatka peninsula where significant populations may be found in large rivers of the western and eastern coasts. The bulk of the Chinook Salmon reproduces on the eastern coast of the peninsula in the basin of the Kamchatka River (KamchatNIRO, 2017). Small populations are also present in several of the larger rivers of Karaginsky Bay. Within the Karaginsky subzone, the rivers with the greatest abundance of Chinook salmon are the largest rivers of the Olyutorsky region, including the Apuka, Pakhacha, Vyvenka, and Avayvayam rivers.

Life History - Chinook typically return to rivers in the Karaginsky District from mid-May until early August (). The peak of the run in late June or early July. Chinook migrate to the sea mostly at the age of 1+ with smaller numbers at age 1+ or 2+. Migration to the sea occurs from June through August with a peak in late June - early July. In the lower reaches of the river and in the estuary zone, fry feed on crustaceans and other prey (Bugaev et al. 2007). Chinook spend 2-4 years in the sea before returning to their native rivers. Age structure is complex including up to 12 age groups. Ages 1.2, 1.3 and 1.4 predominate.

Stock Structure - In large systems, run patterns suggest that the aggregate return includes a number of substocks. These include an early run with a peak return in the middle of June and a late run with a peak return in early June. In smaller systems, one stock typically prevails.

Status - Chinook numbers in eastern Kamchatka River peaked during the 1970s, declined to low levels in the early 2000s, and have gradually improved until present (KamchatNIRO 2017). Similar patterns have been observed for Chinook Salmon stocks throughout the North Pacific and are related in part to patterns of ocean productivity. In Kamchatka, declines were also exacerbated by commercial and illegal harvest in some areas. More conservative fishery management and reductions in illegal harvest have contributed to improvements.

Chinook is a minor component of the Karaginsky fishery. The fishery is not actively managed for escapement or specific target reference points for Chinook in the Karaginsky subzone. Chinook salmon spawning abundance has not been assessed in the Karaginsky subzone in the past 10 years (Bugaev et al. 2019b). Escapement of Chinook Salmon is not monitored due to the lack of significant production areas and corresponding low abundance. Status is monitored based on catches, catch rates and biological characteristics of in catch.

Based on commercial catch statistics from 2009 to 2018, within the subzone, the highest Chinook salmon catch was recorded at 110.7 tons in 2012, and the lowest was 44.5 tons in 2017. Chinook salmon catch in the region has averaged 65-70 tons per year during this 10-year period. From 2009-2013, the catch was at or above this average, while in 2014-2018 the catch decreased, and averaged 58.0 tons per year (Bugaev et al. 2019b).

The data on bycatch volumes of Chinook in index rivers of the Karaginskaya subzone for the last decade is present in Figure 62. Chinook salmon catch data is also provided for the Vyvenka River

and Korfa Bay from 2009 to 2018. Chinook salmon catch in Korfa Bay varied from 0.3 tons in 2017 to 10.1 tons in 2013, averaging 3.2 tons per year during this period. In the Vyvenka River, catch was recorded in 2009 and 2011-2015, and ranged from 0.2 tons in 2012 to 3.6 tons in 2011 with an average of 1.4 tons (Figure 63).

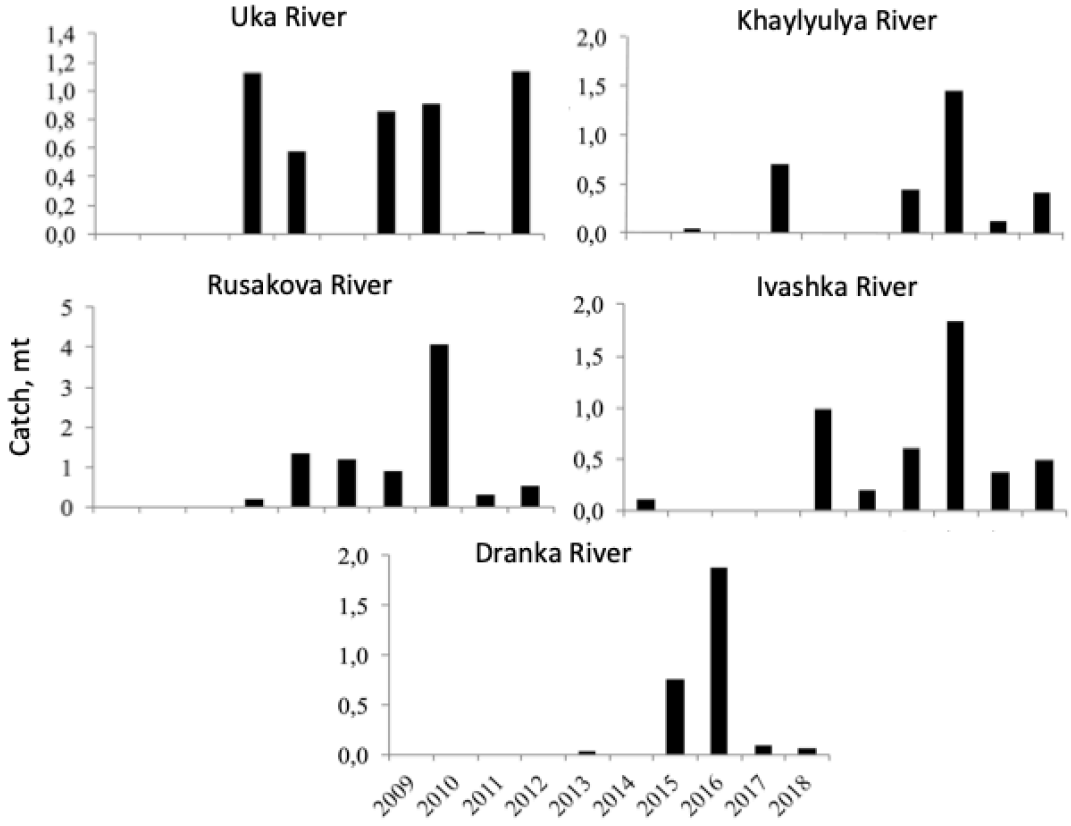


Figure 62. Commercial catch (mt) of Chinook salmon in the target rivers, 2009-2018. Source: Bugaev et al. 2018a.

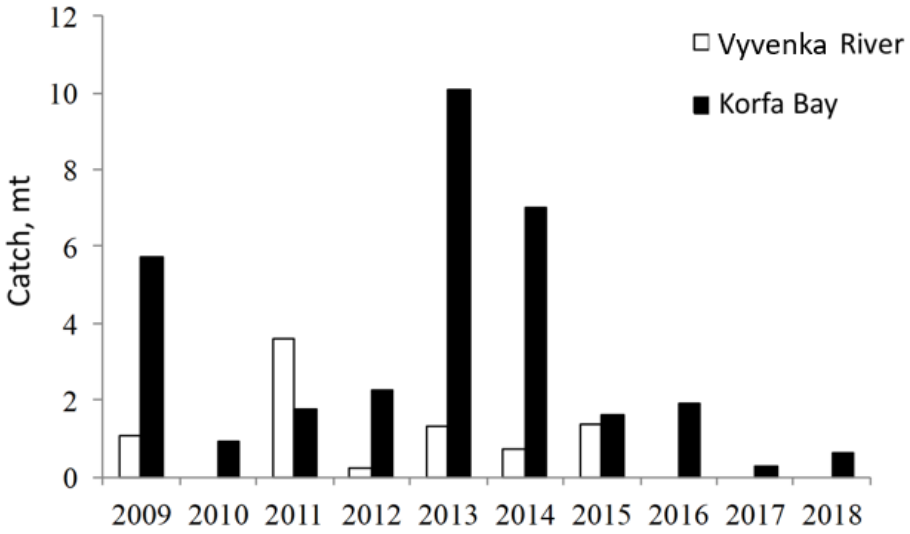


Figure 63. Chinook salmon catch in Vyvenka River and Korfa Bay, 2009-2018. Source: Bugaev et al. 2019b.

<u>Saffron cod</u>

The saffron cod *Eleginius gracilis* is caught as a bycatch in the set nets In the beginning and in the end of the salmon fishing season. The cod is abundant within the habitat boundaries and subjected to specialized commercial and indigenous fishing. The spawning of the species takes place in May-June, therefore it might be concluded that salmon fisheries are not seriously affecting the stocks.

The stock status in the Karaginsky subzone in 2013–2018 was estimated at 182 thousand tons (Status of commercial resources, 2018). At the same time, the minimum figures were recorded in 2013 - 163 thousand tons, and the maximum in 2015 - 217 thousand tons. In general, navaga fishery in the Karaginsky subzone cannot be called intensive, since the realization of its TAC varied within 49.2-92.7%, and, on average, was 76.5%. Its catch remained consistently lower than the amount of the stock recommended for withdrawal and varied from 5.4 to 11.1 thousand tons. It can be concluded that the reproduction of navaga in Karaginsky Bay in the recent years has been successful. Commercial stock is regularly replenished by significant generations. As a result, the age composition of the commercial part of the herd was characterized by a clear predominance of young and middle-aged fish. The basis of the commercial stock was a numerous generation of 2011 year of birth. Other generations of comparable numbers in the age composition is not observed. In this regard, it can be assumed that the stock of navaga of the Karaginsky subzone in the coming years will decrease, but this decrease is more likely the result of natural factors than fishing. The specialized commercial catch of Saffron cod is provided in Table 25.

Table 25. The commercial catches of saffron cod by the fishing companies under certification in the Karaginskaya subzone in 2015-2018.

	Kolkhoz im. Bekereva JSC	Ukinskij Liman LLC
2015	50.415	
2016	4.266	
2017	22.022	
2018	7.972	0.651

Rainbow smelt

The rainbow smelt *Osmerus mordax* is caught as a bycatch in the set nets in the beginning and in the end of the salmon fishing season. The smelt is abundant within the habitat boundaries and subjected to specialized commercial and indigenous fishing. The spawning of the species takes place in May-June, therefore it might be concluded that salmon fisheries are not seriously affecting the stocks.

According to the available information, the total volume of the regional stocks of this type is estimated at the level of 4-16 thousand tons (Status of commercial resources, 2018). The main biological indicators and the age structure of Asian toothy smelt in the Karaginsky subzone in the last 5 years have changed slightly. This allows us to characterize the state of the reserves of the species reproduced in the water bodies of the Karaginsky subzone as good (Bugaev et al., 2014). This conclusion is confirmed by the results of previous studies on the assessment of the long-term dynamics of the smelt stocks in the region at the turn of the first and second decades of the 2000th according to the bottom trawl surveys. RAC quota is not fully utilized due to the absence of significant stock aggregations and partial ice coverage of the area at the time of spawning. Probably, the impact of recreational fishing is not estimated correctly, but it is unlikely to affect the reserves due to the stability of the stock status. The volume of smelt harvested during specialized

commercial fishing of smelt in the Uka River by LLC Ukinskij Liman comprised 0.222 tons in 2017 and 12.569 tons in 2018 (Bugaev et al. 2018a).

Several companies commercially fish for Asian delta smelt in Uala Bay, Anapka and Khai-Anapka rivers, but the total catch of the species is quite low (Table 26).

Table 26. Commercial fishing for rainbow smelt in Vyvenka River, Korfa Bay, Uala Bay, Anapka and Khai-Anapka rivers in 2010–2018. Sources: Bugaev et al. 2019a, b.

Name of the company	Year	Water body	Catch (mt)
OOO FG «Belorechensk»	2010	Uala Bay	0.229
	2011	Anapka river	15.0
	2011	Uala Bay	2.532
	2017	Anapka river	9.994
	2017	Uala Bay	7.85
	2018	Anapka river	44.996
OOO «Kama»	2010	Uala Bay	0.854
	2011	Khai-Anapka river	15.0
OOO “Vyvenskoye” (Vyvenskoye Ltd.)	2010	Korfa Bay	2.150
	2011	Vyvenka river	10.0
	2012	Vyvenka river	0.578
	2013	Vyvenka river	5.7
	2014	Vyvenka river	21.89
FC of indigenous people	2010	Uala Bay	5.0
FC «Kedr (Ceder)»	2010	Uala Bay	5.0
FC of indigenous people «Juni»	2010	Anapka river	25.0
	2015	Anapka river	3.0
	2018	Anapka river	3.0
FC «Support of Itelmen»	2012	Uala Bay	12.10
OOO “Vyvenskoye” (Vyvenskoye Ltd.)	2010	Korfa Bay	2.150
	2011	Vyvenka river	10.0
	2012	Vyvenka river	0.578
	2013	Vyvenka river	5.7
	2014	Vyvenka river	21.89
ACF FG “Zaliv Korfa”	2010	Korfa Bay	15.0
	2011	Korfa Bay	55.0
Familial community of indigenous people “Tumgutum”	2013	Vyvenka river	7.5
	2015	Vyvenka river	0.5
	2018	Vyvenka river	1.777
FC «Kedr (Ceder)»	2015	Vyvenka river	0.5
FC «Kedr (Ceder)»	2018	Vyvenka river	1.777
Familial community “Yakhont’	2011	Vyvenka river	1.5
	2012	Vyvenka river	3.0
	2015	Vyvenka river	0.5
	2018	Vyvenka river	2.978
CKIP (indigenous people community) “Vayam”	2011	Korfa Bay	3.9
	2012	Korfa Bay	10.0
	2015	Korfa Bay	2.8

	2017	Korfa Bay	1.7
	2018	Korfa Bay	3.186
Familial community of indigenous people “Kilpalin”	2017	Korfa Bay	5.100
	2018	Korfa Bay	8.934
Familial community of indigenous people “Severnaya”	2012	Vyvenka river	10.0

Char

Char are widely distributed and abundant throughout the Kamchatka region. Char abundance throughout the region is believed to be increasing. Life history of these species is diverse and includes anadromous and resident individuals. Char generally move upstream following the Coho during late summer and return back downstream along with the juvenile salmon outmigration in spring.

Chars (*Salvelinus malma, S. leucomaensis*) are commonly caught as bycatch in the commercial fishery. Char are caught throughout the fishing season but numbers vary from month to month. Char is retained during commercial salmon seasons and sold. The annual catch of chars averaged 406 mt in Karaginsky Bay or 0.6% of the total between 2003 and 2017 (Shevlyakov et al. 2017). Char catch as a percentage of the total harvest during salmon seasons varies from year to year due to differences in Pink Salmon abundance of the even and odd year runs (MRAG 2019).

Harvest levels are established for char by the management system based on historical catch levels, i.e. some elements of management of this species is presented, but research supporting this management is not as comprehensive as for Pacific salmon. Fishery independent information stock status of char is not collected (Shevlyakov et al. 2017). The total commercial harvest of char is typically 70-80% of recommended catch during salmon season. Harvest rates are typically much less in alternate years when large abundance of Pink Salmon results in less fishing effort due to limitations in fish processing capacity (MRAG 2019).

Recent increases in the reported commercial harvest of char are likely a result of more accurate catch reporting since management system changes in 2008 rather than an expansion of fishing effort. Char are not managed for specific stock levels or escapement objectives. Rather, catch levels and age composition are monitored over time to identify any changes in numbers which might be indicative of overfishing (Shevlyakov et al. 2016). Trends in these indicators have been observed to generally fluctuate around long-term averages, which have led KamchatNIRO to conclude that current harvest levels and fishing rates are sustainable (Shevlyakov et al. 2016).

The catch of chars in the target rivers of southern Karaginsky Bay increased between 2012 and 2016, reaching a maximum catch of 152 tons in 2016, then declined in 2017 and increased again in 2018 (Figure 64).

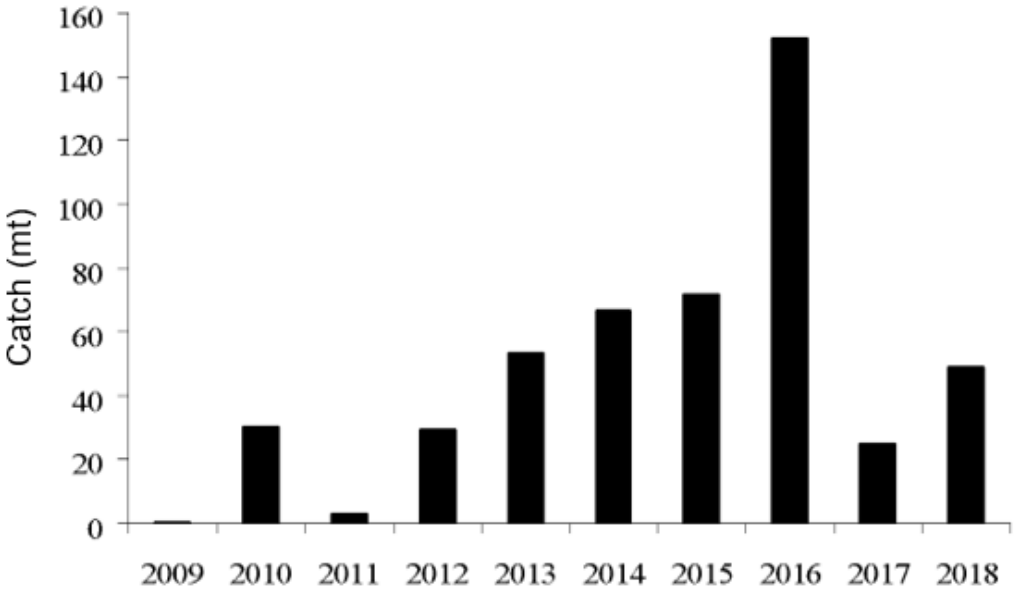


Figure 64. Commercial catch of chars adjacent to the target rivers in southern Karaginsky Bay, 2009-2018. Source: Bugaev et al. 2018a.

Char catch in Uala Bay, Anapka and Khai-Anapka rivers in 2009–2018 is presented in Figure 65 and Figure 66. The lowest catch was 0.1 tons in 2016 and the maximum was 4.7 tons in 2013. Char catch during this period averaged 1.62 tons (range: 0.09-4.31 tons) in Uala Bay, 0.33 tons in the Anapka River, and 0.16 tons (range: 0.04-0.29 tons) in the Khai-Anapka river (Bugaev et al. 2019a).

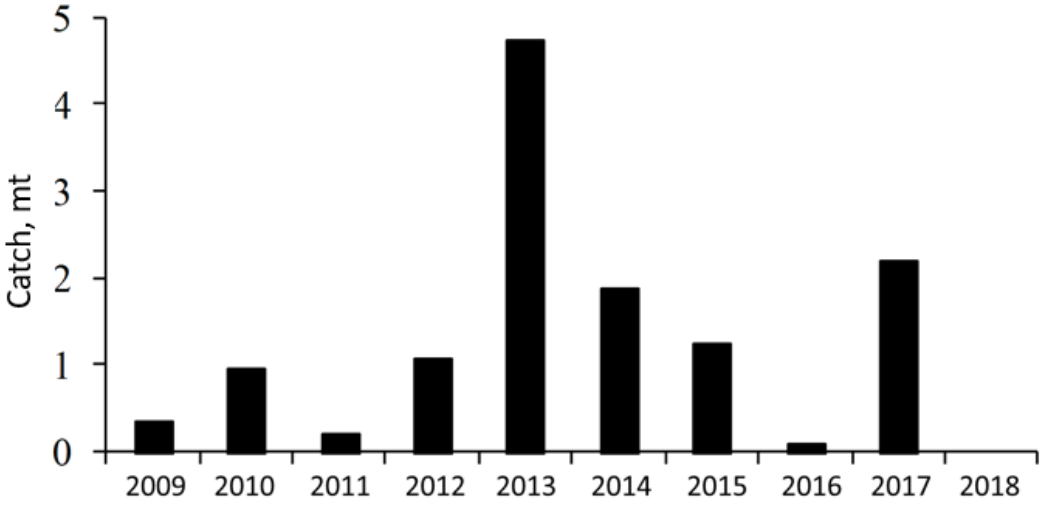


Figure 65. Total char catch in Uala Bay, Anapka and Khai-Anapka rivers in 2009-2018. Source: Bugaev et al. 2019a.

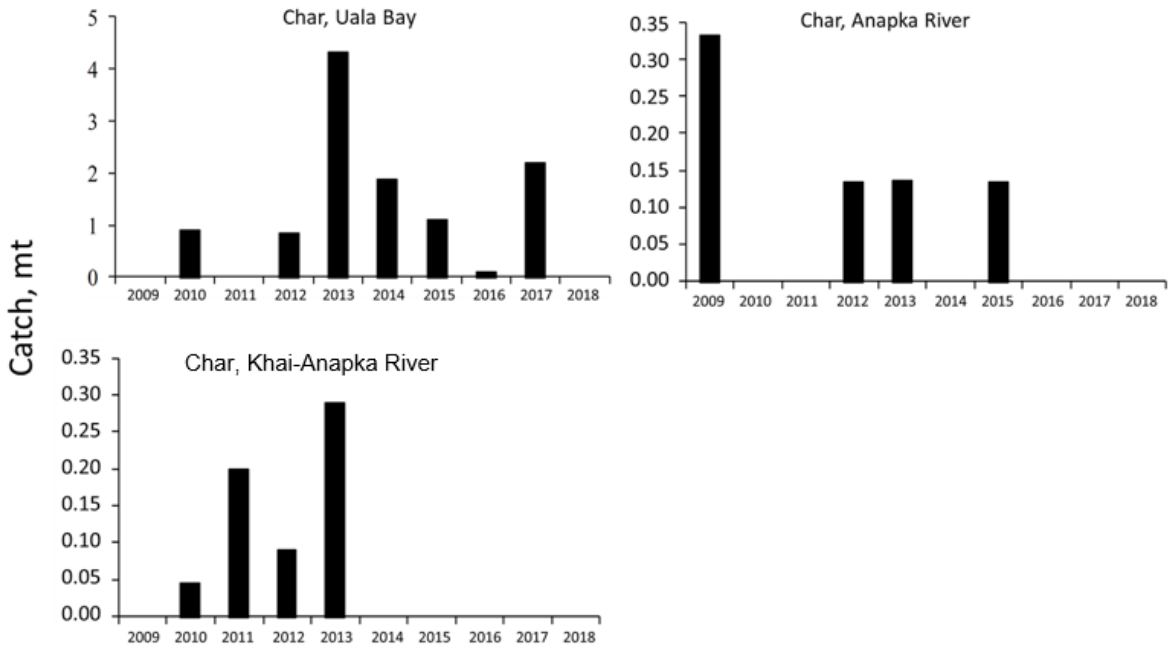


Figure 66. Char catch in Uala Bay, Anapka and Khai-Anapka rivers, 2009–2018. Source: Bugaev et al. 2019a.

In Korfa Bay and the Vyvenka river regions, about 96.4% of the char bycatch occurs in the marine locations in Korfa Bay with about 4% occurring in the Vyvenka River (Bugaev et al. 2019b). During the period 2009-2018, annual char catch averaged 17.4 tons in all marine and river locations of Korfa Bay and the Vyvenka Rivers, with the lowest catch of 8.2 tons recorded in 2012 and the maximum catch of 48.6 tons recorded in 2016 (Figure 67).

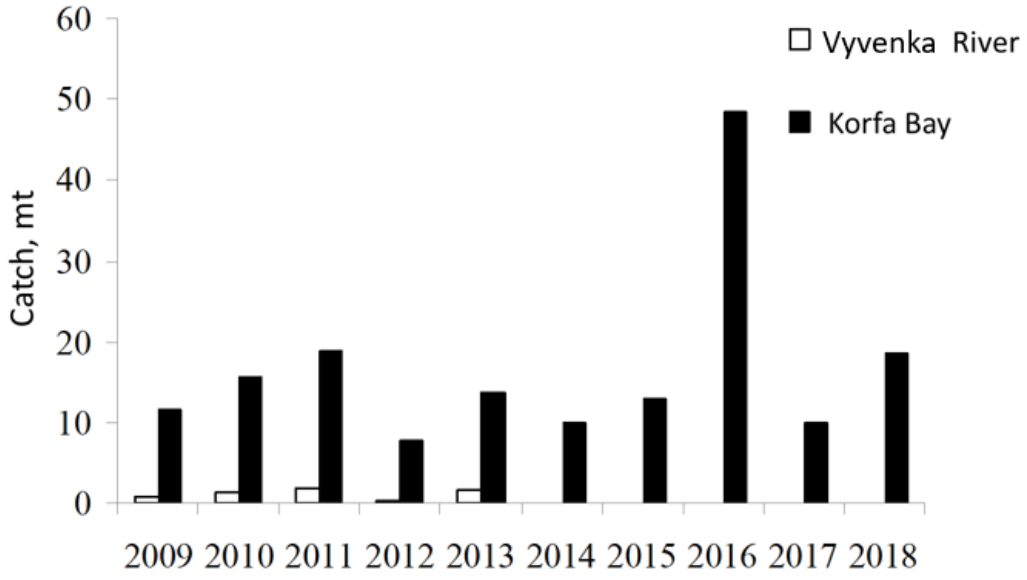


Figure 67. Char catch in Vyvenka River and Korfa Bay, 2009-2018. Source: Bugaev et al. 2019b.

Harvest levels are established for char by the management system based on historical catch levels, i.e. some elements of management of this species is presented, but research supporting this management is not as comprehensive as for Pacific salmon. Fishery independent information

stock status of char is not collected (Shevlyakov et al. 2017). The total commercial harvest of char is typically 70-80% of recommended catch during salmon season. Harvest rates are typically much less in alternate years when large abundance of Pink Salmon results in less fishing effort due to limitations in fish processing capacity. Recent increases in commercial harvest of char are likely a result of more accurate catch reporting since management system changes in 2008 rather than an expansion of fishing effort. Char are not managed for specific stock levels or escapement objectives. Rather, catch levels and age composition are monitored over time to identify any changes in numbers which might be indicative of overfishing (Shevlyakov et al. 2016). Trends in these indicators have been observed to generally fluctuate around long-term averages, which have led KamchatNIRO to conclude that current harvest levels and fishing rates are sustainable (Shevlyakov et al. 2016).

Char are highly likely to be above biologically based limits corresponding to a point of recruitment impairment based on historical trends in catch volume and age composition estimated by KamchatNIRO from commercial catch sampling. Catches appear to be fluctuating around long-term average values. KamchatNIRO has also concluded that current harvest levels are sustainable based on a broad and relatively stable size and age composition of this iteroparous species. (Overfishing would truncate the size structure because high mortality would reduce survival to older ages.) (MRAG 2019).

Secondary Species

For the purposes of this assessment, secondary species in the catch are defined as those not included under Principle 1 in the Unit of Assessment and not identified as primary. These include both retained and nonretained catch. Non-retained catch includes a variety of species, none of which comprise a significant volume of catch. There are no main secondary species.

Retained species include those which provide a commercial value significant enough to warrant processing and sale (and thus an economic incentive for capture). All retained fish delivered to the plants for processing and sale are weighed and numbers are reported to the management agencies. Information about retained species is collected by fisheries inspection and research institute.

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. Bycatch 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. Bycatch can include a variety of marine and freshwater species including flatfish (Platichthys stellatus sp.), sculpins (Myixocephalus sp.) and jellyfish (Blikshteyn 2011; Semenov et al. 2015; Lajus 2020).

Trap nets employed in this fishery generally keep the entire catch of all target and non-target species alive until it gets loaded into boats or trucks for delivery to the processor. Small numbers of small-sized bycatch species might become gilled in net. Some sorting of bycatch may occur at the fishing sites and some bycatch may be delivered to fish processing plants along with the target species. Fishers don’t typically handle fish directly as the catch is dipped or brailed from the trap or seine; however, an attempt is made to remove bycatch species as the catch is removed from the nets. Fishers might brail only commercially-important species, while leaving more bottom-oriented bycatch species (like flatfish) behind until they are ready to empty the net completely. If discarded, flatfish and cottids probably stay alive because they are very resistant to handling (MRAG 2019).

Bycatch species delivered to the processing plants are sorted from the retained catch at the start of the processing lines. Amounts typically do not exceed 15 or 20 kg per delivery. Any non-commercial species delivered to the plants are generally processed for fish meal along with heads and guts of the commercial catch. There is a large market for fish meal in Russia (MRAG 2019).

Because of its low volume, bycatch is not assessed by the fishery or the management system. There is no official reporting of bycatch such as cod, flounder, silver smelt and birds in these fisheries (Shevlyakov et al. 2014). Bycatch species are reported to be abundant throughout the region and fishery managers do not consider harvest levels to significantly affect these species. KamchatNIRO considers the catch of these species in the fishery to be very small or non-existent in the UoA (Shevlyakov et al. 2017). Bycatch species are abundant within the habitat boundaries and incidental levels of harvest in salmon fisheries pose no danger to bycatch species (Shevlyakov et al. 2016).

No specific information on other secondary species in this fishery was available, but KamchatNIRO indicates that small numbers of flatfish and jellyfish are likely caught (Bugaev et al. 2018b). These species are typically released at the capture site, often alive. A bycatch monitoring study conducted in the Ozernaya Sockeye fishery in 2011 supports the belief that bycatch in coastal trapnets and beach seines represented a negligible portion of the commercial catch (Table 8 in MRAG 2012). It is unlikely that the catch of any of the secondary species accounts for 5% or more of the total catch. Therefore, there are no “main” secondary species for the purposes of this assessment.

Starry Flounder *Platichthys stellatus* is likely the most abundant among secondary species. Small and large individuals of Starry Flounder are occasionally found in set nets of the salmon fisheries. The flatfish is abundant within the habitat boundaries and managed according to TAC levels for the commercial fishing. It is reported by KamchatNIRO that in salmon fisheries during the gear check the bycaught fish is usually released alive (Bugaev et al., 2018). The stock status of flounder appears to be satisfactory since it is not dominant flatfish species in the commercial fishing. The distinctive feature of the flatfish dynamics is absence of frequent numerical changes in age groups and populations in common, which provides stabilized long-term commercial yield in sight of scientific support (Antonov 2011).

ETP Species

Status

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 Red List 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 Red Book is based largely on the International Union for Protection of Nature and Natural Resources (IUCN), which formally designates protected species subject to enhanced regulatory protection. Related natural conservation legislation was adopted in 1980s-1990s including laws for protection of natural environment and fauna, natural (wildlife) areas under special protection, ecological expertise along with a number of various decrees by the Russian Federation Government. These regulations established conservation priorities for the Red Book’s rare fauna and flora species and liabilities for damage inflicted to the species and their habitats.

In the Red Book of Kamchatka, the only fish species which might be classified as a bycatch is a steelhead salmon *Oncorhynchus mykiss*. It is not endangered, but is in a state of risk associated with small numbers. In the Red Book of Kamchatka (2006) it is written that Steelhead salmon is also listed in the Red Book of the Russian Federation (since 1983) and the Red Book of the North of the Far East of Russia, they are inhabiting rivers of the Western Kamchatka from the River Bolshaya in the south to the River Penzhina in the north. There is information about occurrence of the species in some waters of the eastern coast of Kamchatka - r. Halaktyrka near Avacha Bay, a region north of the r. Kamchatka and r. Ozernaya (eastern). According to the Fishing Regulations, any type of fishing is prohibited. Meanwhile, no cases of catch of Steelhead salmon by salmon fisheries were ever reported.

Of the animals included in the Red Book of Kamchatka, near sea fixed nets during salmon fishing season only sea lions *Eumetopias jubatus* were noted. Sea lions were observed in groups or as single animals. Sometimes sea lions come into the trap area of the seine, where they ate the fish located there. In cases of sea lions entering the seine, they are driven off by shouts or knocks of oars, without causing physical harm. Northern sea lions reside on the coast of Kamchatka all year-round, but distribution and number of the population during different seasons varies considerably (Burkanov, 1988). In autumn, with a decrease in air and water temperatures, some animals probably migrate from the northern half of the eastern coast to the southern one. In winter, northern sea lions concentrate in the areas where the fishing fleet operates, where it is apparently easier for animals to get food. During the entire annual cycle of life, northern sea lion cannot live without a solid substrate. In summer for rest they go out to a rookery, and in winter they often go out on the ice. The abundance of sea lions reaches 500-700 individuals in summer at the Krasheninnikova Cape, 1000 individuals at the Uri Cape and in the Verkhoturova Island. The hunting of sea lions is prohibited.

Another ETP mammal species is larga seal, *Phoca largha*. The main breeding areas for seals off the coast of the Eastern Kamchatka are in Karaginsky and Ozernovsky bays. Larga rookery grounds are noted on drifting ice near Verkhoturova Island, along the eastern coast of Karaginsky Island, near Ozernoy peninsula, in Litke Strait and on a strip of harsh ices from the Ozernaya Cape to the Kamchatsky Cape. In Olyutorsky Bay detailed air surveys have not been carried out during the breeding season, but even there there may be herds of larga. On the east coast (as well as on the west) of Kamchatka, Larga is unevenly distributed. These seals concentrate near estuaries and capes to feed almost exclusively in salmon during salmon spawning runs. These seals constantly enter marine net traps, eat or damage fish, and then freely leave the nets. Beach seines do not normally affect marine mammals. Incidental take of these seals or sea lions by tangling in gear has not been observed due to the nature of the gear. Seals may be hunted with the proper license but the harvest allocation is considerably underused because of degradation of hunting infrastructure. Licenses can be obtained for commercial harvest but have not by the assessment companies. Seals are regarded as a nuisance by fishers. KamchatNIRO scientists report that fishermen drive off seals from nets the past prior to adoption of the company policy prohibiting firearms on boats. The available information indicates that this occurred at a low level, is not systematic, and fishermen generally complied with the law.

Other marine animals present in the area include killer whales and white whales. There was no mention by government officials or fishing industry representatives of other sea mammals captured or killed by the gears. The nature of the trapnet gear substantially reduces opportunities for encounters with marine mammals. Set gillnets do not normally encounter or affect marine mammals.

One red listed bird species, Steller sea eagle (*Haliaeetus pelagicus*) depends on Pacific salmon as an important food item. Steller sea eagle feeds on various animals such as aquatic birds, small

mammals, marine invertebrates, but mostly they prey on Pacific salmon. They feed both on live fish and dead fish. Some other birds and mammals feed on the remains from fish killed by Steller sea eagle. In a whole, the population of this species is stable, but it is considered that nesting gathering in the mouth of the Kamchatka River is under threat because of decline of salmon stock in this area (Red list of Kamchatka, 2006).

Another related species, *H. albicilla*, white-tail eagle, also depends on salmon as a food source. Similarly, with the previous Steller sea eagle, the population is quite stable in general. Some other birds of prey, such as bald eagle (*H. leucocephalus*) and golden eagle (*Aquila chrysaetos*) also depend of salmon in they feeding, but in less extent than abovementioned species. As they are distributed in entire Kamchatka, they also may be less dependent on decline of salmon.

Management

The Ministry of Natural Resources and Ecology is responsible for managing sensitive species. The Red list of Russian Federation is regularly updated. The last edition was published in 2001, and the next one is issued in 2015. Leading experts are involved in the updating of the Red List. Including of a species in the Red List not only certifies its official status, but also provides necessary basis for management decisions. Species included to the Red List are subdivided into the following categories: 0 – probably extinct, 1 – under threat of extinction, 2 – decrease of abundance, 3 – rare, 4 – status is unclear, 5 – recovering. Based on the Law of the Russian Federation “On animal world”, all the red listed species are protected regardless the categories they belong to. If they are accidently caught in fishing gear, they should be recorded in logbooks and released with minimal possible damage.

Organizationally, the Red List is under responsibility of the Commission on rare and endangered animals, plants and fungi, which is created and operates in accordance with the procedure approved by Order of State Committee on Ecology of the Russian Federation from 24.09.1998 № 542 "On the maintenance work on keeping the Red Book of the Russian Federation." The Commission includes representatives of leading Russian scientific organizations, including the Institute of Ecology and Evolution of the Russian Academy of Sciences named by A.N. Severtsov and the State Organization "All-Russian Research Institute for Nature Conservation" The functions of this Commission is to provide recommendations on including endangered species in the Red Book of the Russian Federation or the exclusion of species (subspecies, populations) of wild animals, wild plants and fungi from the Red Book of the Russian Federation. Each region in Russia (oblast, autonomous republic) has its own Red lists. Red list of Kamchatka was prepared by Pacific Institute of Geography and published in 2007. In total, it includes 123 species of animals – 13-invertebrates, 30 fish species, 60 birds and 23 terrestrial and marine mammals.

Habitats

Condition

The footprint and scale of human development in eastern Kamchatka is generally 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.

The only habitats commonly encountered is the coastal shoreline and the riverine streambed. Coastal marine fishing areas are on sandy substrates on gently sloping seafloor topographies in the sublittoral zone with a mixed epifauna biota. Riverine streambeds are on gravel and cobble

substrate in low gradient deposition zones above the estuarine zone in the lower reaches of the larger rivers in the region. For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible.

Fishing activities with traps and set gillnets do not have a significant long-term impact on habitat. Any effects of stationary trap construction or operation are localized and temporary. The traps are anchored to the sea bottom with large bags full of sand. Permits are required to dig. Net leads and wings are weighted to rest on the bottom but trap boxes constructed on steel frames are constructed on floats and do not contact the bottom where mechanical damage to benthic organisms might occur. KamchatNIRO scientists report no harmful effect on bottom flora or fauna. Assessments of this gear in other regions (i.e., Iturup and Sakhalin) have also shown minimal impacts. There is a special agency, State Sanitary-epidemiological inspection that monitors whether the fishery affects the fishing operation zone. In a case of violations, it is a usual practice to levy fines on the company.

Environmental protection

Protection of the salmon habitat is achieved through observance of the current laws of the Russian Federation. Any type of utilization either of natural resources directly or that impacts them indirectly, including fisheries, water and wood utilization, construction, etc., must be evaluated as to the extent of impact on the environment. The evaluation itself is performed by an expert commission having state ecological expertise, and the main federal agency responsible for conducting the state ecological expert review is the Rosprirodnadzor. In addition, activity related to natural utilization that has already been permitted is regulated to the extent to which it impacts the environment by a series of standards documents at the federal, departmental and local levels.

For the protection of fish habitat within the area of its competence, responsibility is borne by the Rosprirodnadzor under Ministry of Natural Resources and Ecology of Russian Federation, and the Federal Ecological, Technological and Atomic Oversight Service (Rostekhnadzor), the Agency of Fisheries of Russian Federation (FAR), and local governments of the territorial subjects of the Russian Federation. The Natural Protection Prosecutor's Office of the Russian Federation is responsible for enforcing laws relating to natural utilization.

Building/construction projects are regulated by a governmental agency (Rospotrebnadzor Sanitation Service) which requires completion of an environmental Impact Study (EIS) prior to approval of a project permit. Projects are monitored and can be delayed by the service if the builder does not fulfill the requirements. Assessments address discharges, disposal, drainage, soil pollution, the burial of wastes in the environment, accidents and catastrophes. The EIS includes a project description, descriptions of the environments subject to impact, and a characterization of the extent of the impact (based on a worst-case maximum), including a determination of the subsequent value of the losses, the form of compensation both in kind and in monetary terms, and development of the engineering for loss compensation. Also included are descriptions of the extent to which the conditions for land use and the requirements issued by the respective government agencies of supervision and control have been followed, a study of the risks associated with possible accidents, as well as the adequacy of the anticipated material resources and financial reserves to localize and eliminate the effects of accidents, and a study of the fullness and effectiveness of the anticipated measures for protecting the health of the population living in the surroundings of the environmental area. Decisions adopted must conform to the laws and standards of the Russian Federation and the Kamchatsky Kray.

The main indicator of success with respect to actions aimed at protecting fish (salmon) habitat is the record size of the harvests of Pacific salmon. It should be noted, however, that other factors such as sea conditions also impact to stock abundance and therefore catches.

At the same time, there is local effect of mining in the upstream of salmon spawning rivers, which may be significant in some cases. Since 1994 there is project on extraction of platinum, which includes four mine fields in the upstream parts of three salmon spawning rivers of the Vyvenka River basin – Lavtyrinyvayam, Vetvey (Ledianoy and luzhniy streams) and Yanytailyginvayam (Penistyi and Vetvistiy streams) (Vvedenskaya and Ulatov 2015). The most intensive works took place in 2005-2010. The steady deterioration of the feed base of salmon juvenile has been found here: in the zone of anthropogenic pollution productivity of zoobenthos has decreased in the Levtyrinovayam River - from 3-8 to 100-fold, in Yanytyliginvayam River – 3-fold, Vetvey Stream - 2-3 -fold (Leman et al., 2000; Chebanova, 2009). The zone of anthropogenic siltation and turbidity is visually and instrumentally registered throughout these streams from mining sites to their mouths and in the Vyivenka River itself. Aerovisual examinations of Vyvenka river in 2006 very high turbidity plumes were observed up to 120 km from the impact area. Turbidity of the river. Yanytyliginovyam River in high water and at emergency releases in the lowlands reach 2,000. 3000 mg/l, the Levtyrinivayam River constantly exceeds 100 mg/l in the low-water period (during precipitation up to 700 mg/l), in high water - more than 300 mg/l. The background turbidity is in low-water period 1-2 mg/l, in high water - up to 5-10 mg/l. Special study showed that all these sediments originated from platinum mines. There is a consensus among researchers that this pollution is due to inadequate efforts of mining business towards cleaning of their discharges. The threshold of safety level for long-term exposure of salmon is 25-35 mg (Leman and Chalov, 2014).

Figure 68. Platinum extraction in upstream of Levtyrinivayam River, 2000s (http://knowledge.su/k/kamchatskiy-kray)

Figure 69. Levtyrinnyam River "Discharge of waste waters, 2006. Photo from the archives of the State Monitoring Committee of KamchatNIRO. Левтыриннываям. «Сброс на рельеф» 2006 год. Фото из архивов Госмониторинга КамчатНИРО.

Significant part of salmon spawning grounds were affected by 2006: in Vyvenka river – 1,415,400 m2; in the Vetvey River - at least 1,209,000 m2, in Levtyrinivayam River spawning grounds reduced about 200,000 m2 (80-100%) compared to the period before development began. Therefore, the area of actual influence of mining activities is about 282.44 ha. According to aerial observations of KamchatNIRO since 1957 (Ostroumov 1995), spawning stock of chinook salmon in Vyivenka River counted 16,000-20,000 fish, 150,000-180,000 sockeye, 12,000,000 pink salmon, 360,000-400,000 of chum and 10,000-15,000 of coho. As of the mid-2000s, number of chinook salmon decreased by 5 times, sockeye and chum salmon - by 10 times, and only the number of the dominant generation of pink salmon of odd years did not experienced decline (Vvedenskaya and Ulatov 2015).

After starting the mining developments, redistribution of spawning grounds of salmon took place in the Vyvenka River basin, which result in reduction of spawning in upper parts of the rivers and some increase in the downstream parts (Kozlov 2008).

During period 1993-2006 species composition of fish in the affected stream changed drastically, for instance, round whitefish *Prosopium cylindraceum* and burbot *Lota lota* completely disappeared from the Vetvey river, and abundance of Arctic grayling *Thymalus arcticus* considerably reduced, whereas abundance of Siberian bulhead *Cottus poecipopus* increased (Kozlov 2008).

In summer 2016, inhabitants of the Vyvenka village sent a submission to the President of the Russian Federation, the Committee for Agrarian and Food Policy and Environmental

Management of the Federation Council, the Central Headquarter of the National People's Front where they expressed a disquietude with influence of mining on salmon populations.

Ecosystem Structure and Function

The salmon life cycle encompasses a vast ecosystem including natal rivers and lakes, the near-shore ocean, and the high seas of the North Pacific Ocean. Salmon migrate across large areas of the North Pacific Ocean which provides major feeding habitats for various salmon stocks originating from Asia and North America (Myers et al. 2009; Urawa et al. 2009). Juveniles gain over 90% of their biomass in the ocean before returning to freshwater to spawn (Groot and Margolis 1991). Ecosystem effects of salmon harvest and enhancement can be significant.

Marine-derived nutrients from salmon carcasses can have a significant impact on freshwater and riparian communities. The flux of salmon biomass entering fresh water from the ocean can be massive (Gende et al. 2002; Schindler et al., 2003). It is known that these nutrients form a base for the development of zooplankton in coastal areas, which serves as food for young salmon just after downstream migration. Russian scientists estimate that each Pink Salmon carcass is 0.5% organic phosphorus (Kizevetter 1971), and in dominant Pink Salmon years, carcasses provide a large amount of nutrients to the ecosystem. For example, KamchatNIRO has estimated that the Pink Salmon run in 1994 contributed about 110,000 mt of carcasses or 550 mt of organic phosphorus to the ecosystem (Shevlyakov 2014). Some dead fish drift to the sea, but the rest remain in the floodplains of the rivers, where carcasses are transformed into organic material that is incorporated into the food chain.

Removal of Pacific salmon by the fishery has consequences for river ecosystems. It should be noted the high trophic value of salmon for land animals. In Kamchatka krai, their direct consumers include at least 25 species of mammals and birds: bears, foxes, sables, otters, minks, even hares and ground squirrels, and from birds - white-shouldered eagle, white-tailed eagle, golden eagle, raven, big-billed raven etc. However, none of these animal species is able to regulate the number of salmon on the spawning grounds and, in turn, be as dependent on them as the brown bear. Brown bear depend on salmon for food. The number of Kamchatka bears is inseparably linked with the abundance of spawning salmon entering rivers. In periods of high salmon abundance, bear population growth due to increase in the birth rate and survival of offspring, and, on the contrary, in the years of depression, salmon stocks limit the number of consumers, both young and adults. With introduction of the large-scale salmon fishing, former relationships in the local ecosystem changed. It is assumed that in the wild ecosystem, without human influence, fluctuations of salmon abundance were higher than now. Indirectly, this can be judged from the periodically occurring famine of the indigenous peoples inhabiting Kamchatka (Krasheninnikov, 1949; Steller, 1999). According to modern ideas, the periods of low salmon returns could be a consequence of a change in the cycles of salmon population growth and its fall as a result of mechanisms of density-dependent regulation of the size of populations. In different years, depending on the periods of operation and the accounting methods used, the number of brown bear on the peninsula was estimated from 8-10 thousand to 15¬20 thousand individuals (Ostroumov, 1968; Gordienko, Gordienko, 2005). In the modern period as of April 2015, according to experts of the Agency of Forestry and Wildlife Conservation in Kamchatka, there are about 21.5 thousand individuals, of which 5,665 thousand - in the area of the Kamchatka River. It is clear, that these values possess some uncertainties; however, at present they are the only estimates obtained using standard methods in the field. Therefore, it is seen that there is no decrease of bear population in Kamchatka, and even there is some increase. According to the KamchatNIRO (2018), targets for fisheries management aimed at maintaining salmon biomass at the highest possible level suggest pass of humpback salmon, chum and sockeye producers to spawn a total of 9-10 to 26 million individuals, with a total weight of 15 to 35-40 thousand tons,

respectively. In fact, the actual pass of Pacific salmon producers, primarily humpback salmon, to the rivers of the northeast coast in recent years, depending on even or odd years, ranges from 10-15 to 60-90 million fish and significantly (many times) exceeds the needs of not only bears, but also of all the other (at all trophic levels) salmon consumers.

Salmon play also a significant role in marine ecosystems. It is clear that salmon influence the food webs in the North Pacific Ocean although the effect varies widely between systems and is dependent on many factors like timing, scale and alternative nutrient sources, etc. (Naydenko 2009). Resolving interaction strengths in the food web is made difficult by limited data and confounding effects of environmental forcing (Essington 2009). Ecosystem models that have been developed for the Eastern Bering Sea, Aleutian Islands and the Gulf of Alaska (Gaichas and Francis 2008, Aydin et al. 2008) do not suggest a critical or unique role of salmon in respect to the structure of the food web in the ocean. Gaichas and Francis (2008) used network theory to identify potentially key species in the Gulf of Alaska food web on the basis of high connectivity and four species were identified as (Pacific cod, Pacific halibut, walleye pollock and arrowtooth flounder) as highly connected species.

Extensive research has been conducted by the Russian Scientific Institutes on (1) Juvenile Anadromous Stocks in Ocean Ecosystems; (2) Anadromous Stocks in the Bering Sea Ecosystem (BASIS); and (3) Anadromous Stocks in the Western Subarctic Gyre and Gulf of Alaska Ecosystems (Temnykh et al. 2010) This work also involved substantial monitoring and research of related ecosystem components including food web composition, production and dynamics.

Enhancement of Pacific salmon across the Pacific Rim since the 1970s has resulted in very large abundance in the North Pacific Ocean (Mahnken et al. 1998; Irvine et al. 2009; Ruggerone et al. 2010). There is some evidence that high salmon abundances in the ocean might adversely affect wild salmon through competition (Peterman 1991). Ocean growth of Pink Salmon inversely correlated to their own abundance and survival of Chum, Chinook, and Sockeye appears to be reduced in years of high Pink Salmon abundance (Ruggerone et al. 2003, Ruggerone and Goetz 2004, Ruggerone and Nielsen 2004, Ruggerone et al. 2005; Ruggerone et al. 2010). There is growing concern that the ocean carrying capacity of Pink and Chum Salmon has been globally reached. However, salmon populations in the fishery under assessment have not been significantly enhanced.

The regional scientific agencies are conducting ongoing research and monitoring of the aquatic ecosystem of area rivers. Stationary or seasonal research stations are established in many areas.

5.3.2 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome

PI 2.1.1		**The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI**		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are **likely** to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI. OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	Yes	Yes	Yes
Rationale				
There are no main primary species for this fishery so SIa defaults to 100.				
b	Minor primary species stock status			
	Guide post			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.
	Met?			Yes
Rationale				
Minor primary species, including Sockeye, Coho and Chinook Salmon in Karaginsky Bay and Coho and Chinook Salmon in Korfa Bay are highly likely to be above the PRI because they return primarily outside the period of commercial fishing, therefore, the SG100 is met. Run timing data for Chinook and Coho and harvest data for sockeye provide strong evidence these salmon species are highly likely above the point where recruitment would be impaired by the current commercial fishery. Numbers have varied but				

historical escapements have continued to produce substantial returns and harvests over the last decade. Stocks are at consistent levels of production throughout eastern Kamchatka.

The spawning return of the Chinook salmon begins in May reaching the peak in the end of June, thus the species is not significantly affected by fisheries. Although the aerial assessment is not well-developed, and the monitoring data is not comprehensive, the registered harvest rate of Chinook is extremely low in the fisheries under assessment, it even was not reported in official statistics before 2011. This provides strong evidence that Chinook stocks are highly likely above the PRI. Widespread declines in Chinook productivity and numbers have been documented over the last decade in Alaska and western Kamchatka. However, KamchatNIRO (2017) reports that declines have been much less severe in eastern Kamchatka. Historical escapement data in other areas indicates that Coho were more productive in the 1970s than currently, likely due to environmental conditions. However, current returns and escapements remain significant under the apparently-lower current production cycle. Other salmon species are afforded significant protection from high fishing rates because of their return timing outside of fishing periods targeting Pink and Chum salmon.

These stocks have benefited by improvements in fishery management structures and enforcement which appear to have substantially reduced the illegal and unreported harvest which reduced spawning escapements. Freshwater habitat conditions in major production areas north of the Kamchatka River are also excellent for salmon production. Watersheds are virtually pristine and support tremendous diversity of aquatic systems including rivers, streams, lakes and wetlands which provide ideal conditions for salmon production. These conditions are conducive to high levels of salmon productivity and lead to inherent resilience to harvest which in turn can sustain robust levels of fishery exploitation.

Management to ensure significant spawning escapement provides a conservative standard for protecting populations from a point of recruitment impairment. Highly variable annual run sizes are characteristic of salmon, with occasional poor run years and escapements into portions of some systems. 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. While escapements may periodically fall below optimum levels, historical data indicates that escapements are sufficient to sustain significant production and harvest, particularly in years of favorable environmental conditions. Because Coho and Chinook Salmon are observed to sustain significant levels of production, it is likely that these species are within biologically based limits of exploitation consistent long-term sustainability.

Fishing methods, gear selectivity and harvest periods are designed especially for the commercial salmon fishing, thus not seriously affecting the stocks of other primary minor species. Species-specific biologically-based limits have not been established for non-salmonid species in this fishery because exploitation rates are deemed to be extremely low. Anyway, the long-term dynamics and age composition of the stock of primary species are well-studied for the UoA, and catches of Starry flounder, Rainbow smelt and Saffron cod appear to be fluctuating around long-term average values, consistent with commercial TAC and RAC levels. Although, these species return primarily outside the period of commercial fishing, thus, interaction is negligible.

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	--

PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	Yes	Yes	No
Rationale				
The SG 60 and SG 80 are met because there are no main primary species. SG100 – A partial strategy for management or Primary P2 species exists. These species are not a target of the fishery and are caught incidental to harvest of other species. Rainbow smelt and saffron cod are actively managed. However, Sockeye of Karaginsky Bay, Coho and Chinook Salmon are not actively managed based on local escapements, so no strategy exists for these minor species beyond concentration of fishing periods during times of Pink and Chum Salmon abundance. Therefore, the SG 100 standard is not met.				
b	Management strategy evaluation			
	Guide post	The measures are considered **likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Yes	Yes	No
Rationale				
The SG 60 and SG 80 are met because there are no main primary species. The minor primary species are targeted and actively managed in other fisheries. The salmon fishery occurs after the bulk of the harvest occurs for these species. Minor primary species are currently at sustainable levels of production throughout				

Eastern Kamchatka (KamchatNIRO, 2017). Harvests and/or escapements are generally variable with no consistent trend over the last 10-20 years.

The SG100 is not met. The current harvest strategy has been in place since only 2008 and may not have been fully tested under a wide range of conditions including the inherent variability in abundance and run timing of salmon. In particular, it is not clear whether the system has been challenged by an extended interval of low salmon productivity.

c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Yes	No
Rationale				
SG80 -Stock assessments are in place to monitor abundance of primary species and limit harvest in targeted fisheries when necessary. Documentation of harvest patterns, fishery regulations, and assessments of spawning escapement throughout Eastern Kamchatka, provide some evidence that management measures are being implemented successfully to maintain Sockeye, Coho and Chinook Salmon above a point of recruitment impairment. The SG 100 is not met because local Sockeye of Karaginsky Bay, Coho, and Chinook are not actively managed based on local escapements and escapement information is not available to demonstrate that the management strategy is achieving its overall objectives.				
d	Shark finning			
	Guide post	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	Met?	NA	NA	NA
Rationale				
Sharks are not caught in this fishery.				
e	Review of alternative measures			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.

	Met?	Yes	Yes	No
Rationale				
No main primary species occur in the Karaginsky Bay system, therefore there is no unwanted catch of such species, and SG60 and SG80 are met. SG100 – The management program includes special measures (fishing gear and practices), which are designed to minimize mortality of unwanted catch. The measures are subjected to extensive internal review, but it is not biennial, the SG100 cannot be awarded.				
References				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.1.3 – Primary species information

PI 2.1.3		**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**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	Met?	Yes	Yes	Yes

Rationale				
There are no main primary species.				
b	Information adequacy for assessment of impact on minor primary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Yes
Rationale				
The SG100 standard is met. A large amount of quantitative information is collected to support the harvest strategy for primary species. This includes composition and other data on biological characteristics of the run, run timing, spawning distribution, and some spawning escapement data. Detailed information is collected on harvest in the commercial salmon fishery. Numbers are estimated at multiple stages of the harvest and processing chain. Detailed records are required and kept by the fishery and the government. Changes in the management system over the previous decade ensure accuracy of catch reporting by removing incentives for inaccurate accounting to avoid taxes or remain within a designated allocation. Catch data are reported on a real-time basis during the fishing season. For other primary species (saffron cod and rainbow smelt) there are special stock assessment programs in the region. There are few catches of these species because of high specialization and timing of the salmon fishery				
c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	Met?	Yes	Yes	No
Rationale				
SG 60 and 80 are met because there are no main primary species. SG100 is not met because Sockeye, Coho and Chinook Salmon assessments are not conducted with a high degree of certainty. The bycatch of saffron cod and rainbow smelt is not reported by fisheries due to the rarity of such catches.				
References				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80

Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	95
Condition number (if relevant)	--

PI 2.2.1 – Secondary species outcome

PI 2.2.1		**The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit**		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide post	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.
	Met?	Yes	Yes	No
Rationale				
There are no main secondary fish species. No secondary fish species comprises anywhere near 5% of the total catch which would categorize it as a main secondary species. No secondary species is less resilient or otherwise vulnerable. Non-retained catch includes a variety of species, none of which comprise a significant volume of catch.				

No significant bird bycatch has been reported or observed in this fishery but based on experience with other salmon fisheries in the U.S. and Canada, a likelihood of some level of diving bird species mortality associated with tangling in the fishing gear cannot be discounted. GSA3.7.1 directs that out of scope species including birds, are always considered a main species regardless of their catch volume, Therefore, diving seabirds are identified as a main secondary species in this assessment. Any incidental levels of mortality of diving seabirds in the fishery is highly likely to be so low as to be effectively insignificant with respect to species status. However, the lack of associated observational data precludes a high degree of uncertainty. Therefore, the SG 100 standard is not met.

	Minor secondary species stock status			
B	Guide post			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			Yes

Rationale

SG100 – Secondary species comprise a very small proportion of the catch. Fishing methods, locations, and periods are very highly selective for migrating salmon.

Char are highly likely to be above biologically based limits corresponding to a point of recruitment impairment based on historical trends in catch volume and age composition estimated by KamchatNIRO from commercial catch sampling. Catches appear to be fluctuating around long-term average values. KamchatNIRO has also concluded that current harvest levels are sustainable based on a broad and relatively stable size and age composition of this iteroparous species. (Overfishing would truncate the size structure because high mortality would reduce survival to older ages.)

No other secondary species is harvested in numbers sufficient to significantly affect status. The fishery is remarkably clean from the standpoint of bycatch due to the focus on times and areas of salmon abundance. The low incidence of other secondary species documented in this fishery provides a high degree of certainty that the fishery does not significantly affect production of these species. Species-specific biologically-based limits have not been established for non-salmonid species in this fishery because exploitation rates in the salmon fishery are deemed to be so low as to constitute no discernable impact on the status of these lightly or unexploited species. Other secondary finfish species have no commercial value, are widespread throughout the region, and the fishery footprint from ocean traps is very small relative to the distribution of the species. This information provides qualitative justification that other finfish bycatch in the fishery satisfies high degree of certainty outcome guideposts at the 100-scoring level.

References

MRAG 2019. Tymlat Karaginsky Salmon Public Comment Draft Report. https://fisheries.msc.org/en/fisheries/tymlat-karaginsky-bay-salmon-fishery/@@assessments

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	90
Condition number (if relevant)	--

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	Yes	Yes	No
Rationale				
SG 60 and 80 are met because there are no main secondary species. The SG100 is not met because a comprehensive strategy for managing secondary species has not been defined. The management system regards bycatch reduction strategies beyond current levels as unnecessary because current exploitation rates are considered to be minor. There is a partial strategy for managing and minimizing catch of secondary species in the commercial salmon fishery by use of fixed trap nets and beach seines, which have a low capture rate of secondary species, and monitoring catch of some secondary species. These gears are very effective in concentrating harvest on salmon during spawning migrations while also avoiding significant catches of other non-migratory local fish species. There are no main secondary species. Catch monitoring demonstrates use of gears with low capture rate and ensures that incidental harvest levels of minor secondary species such as char in the salmon fishery do not substantially reduce sustainability. Other minor secondary species are generally not retained and many are released alive in order to limit fishery impacts. SG100 – The SG100 is not met because a comprehensive strategy for managing secondary species has not been defined. The management system regards bycatch reduction strategies beyond current levels as unnecessary because current exploitation rates are considered to be minor.			
b	Management strategy evaluation			

	Guide post	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	Met?	Yes	Yes	No
Rationale				
SG 60 and 80 are met because there are no main secondary species. The very low incidence of secondary species in the catch, based on information directly about the fishery and the species involved, provides a strong objective basis that this strategy is effective. Information from independent observer efforts of other similar fisheries in the region (Ozernaya, Iturup and Sakhalin salmon) supports high confidence that the fishery strategy is effective for managing bycatch. There is also an objective basis for confidence that the strategy is effective for flatfish and other finfish, for which there is management strategy for these species. The nearshore salmon fishery comprises a negligible portion of the total harvest of flatfish. Catch monitoring and biological sampling of secondary species retained and sold by the fishery provides sound testing to support some objective basis for confidence that the management strategy is effective for this species. The SG 100 is not met because a regular quantitative bycatch sampling program is not conducted for other species, many of which are not retained or only partially retained.				
c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	No
Rationale				
SG80 – Periodic observer observations of salmon fisheries throughout the region provide evidence that the fishing strategy is being implemented successfully to harvest salmon with minimal catch of other secondary species, as the trap nets inherently have low bycatch rates and allow for live releases of some bycatch species. Documentation of harvest patterns, fishery regulations, and assessments of spawning escapement throughout Eastern Kamchatka, provide some evidence that management measures are being implemented successfully to maintain Sockeye, Coho and Chinook Salmon above a point of recruitment impairment. The SG 100 is not met because a regular quantitative bycatch sampling program is not conducted for other species, many of which are not retained or only partially retained. This standard is not met for Sockeye, Coho and Chinook Salmon which are not actively managed based on local escapements.				
d	Shark finning			

	Guide post	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	Met?	NA	NA	NA
Rationale				
Scoring issue need not be scored if no Secondary species are sharks.				
e	Review of alternative measures to minimise mortality of unwanted catch			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
Rationale				
SG60, 80 -There are no main secondary species in the particular fisheries, therefore SG60 and SG80 are awarded. SG100 - Very small numbers of unwanted catch of minor secondary species occur. Some evidence for efficiency of the measures for minimizing mortality of bycatch is provided by periodic observer surveys in the UoA. The reviewing by internal management system is present, but it is not biennial, because the level of exploitation is negligible.				
References				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	Yes	Yes	No
Rationale				
SG 60, 80 and 100 are met for secondary fish species for which none are main. No significant bird bycatch has been reported or observed in this fishery but based on experience with other salmon fisheries in the U.S. and Canada, a likelihood of some level of diving bird species mortality associated with tangling in the fishing gear cannot be discounted. GSA3.7.1 directs that out of scope species including birds, are always considered a main species regardless of their catch volume, Therefore, diving seabirds are identified as a main secondary species in this assessment. Any incidental levels of mortality of diving seabirds in the fishery is highly likely to be so low as to be effectively insignificant with respect to species status. However, the lack of associated observational data precludes a high degree of uncertainty. Therefore, the SG 100 standard is not met.				
b	Information adequacy for assessment of impacts on minor secondary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			No
Rationale				
Qualitative information on the amount of minor secondary species affected by the fishery is available from limited observer sampling. This information is sufficient to confirm that their catch of minor secondary				

species in relatively insignificant. However, catch and the status of bycatch species is not quantified in regular management practice.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	Yes	Yes	No

Rationale

SG 60 and 80 are met because there are no main secondary species.

SQ 100 - Qualitative information on the amount of other minor secondary species affected by the fishery is available from limited observer sampling in similar fisheries throughout the region. This information is sufficient to confirm that the catch of other secondary species in relatively insignificant. However, catch and the status of bycatch species is not quantified in regular management practice, so does not meet SG100.

References

MRAG 2019. Tymlat Karaginsky Salmon Public Comment Draft Report. https://fisheries.msc.org/en/fisheries/tymlat-karaginsky-bay-salmon-fishery/@@assessments

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.3.1 – ETP species outcome

PI 2.3.1	The UoA meets national and international requirements for the protection of ETP species The UoA and associated enhancement activities do not hinder recovery of ETP species		
Scoring Issue	SG 60	SG 80	SG 100
a	Effects of the UoA on population/stocks within national or international limits, where applicable		

	Guide post	Where national and international requirements set limits for ETP species, the **effects of the UoA** and associated enhancement activities on the population/stock are known and **likely** to be within these limits.	Where national and/ or international requirements set limits for ETP species, the **combined effects of the MSC UoAs and associated enhancement activities** on the population/stock are known and **highly likely** to be within these limits.	Where national and/ or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** and associated enhancement activities are within these limits.
	Met?	NA	NA	NA

Rationale

National legislation provides for protection of ETP species identified in the Russian Federation Red Data Book. Steelhead Oncorhynchus mykiss are red-listed in Kamchatka, but are generally not found along the eastern coast of Kamchatka. There is one red-listed species of marine mammals in this area - Steller sea lion (*Eumetopias jubatus*). Another seal species is quite common - harbor seal (Phoca vitulina). One red listed bird species, Steller sea eagle (*Haliaeetus pelagicus*) is present. 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 is 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.

No numerical limits on impacts, such as through setting Potential Biological Removal Level (the maximum number of animals, not including natural mortalities, that may be removed from a stock while allowing that stock to reach or maintain its optimum sustainable population), has been set for any ETP species. However, national legislation requires that fishing operations avoid adverse impacts on Red Book listed species present in this area (steelhead salmon, Steller sea lions, larga seal, Steller sea eagles, white-tail eagle, bald eagle, golden eagle). Additionally, rookeries for Steller sea lions have been protected in Russia. The low occurrence of ETP species in the area of this fishery provide a high likelihood that the effects of the fishery are within limits of national and international requirements for protection of ETP species. None of these species interact with the fishery or any other salmon fishery in the region to any significant degree. Therefore, it is highly likely that the combined effects of the MSC UoAs are within national requirements. Other marine animals present in the area, including seals, killer whales, white whales, and cormorants, are managed or protected by federal regulation. For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible.

b	Direct effects			
	Guide post	Known direct effects of the UoA including enhancement activities are **likely to not hinder recovery** of ETP species.	Direct effects of the UoA including enhancement activities are **highly likely to not hinder recovery** of ETP species.	There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA including enhancement activities on ETP species.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - It is reported by KamchatNIRO (2018) that the Steller sea lion and Larga seal constantly interact with fishing gear, eat and damage the entangled fish. Nevertheless, the gear design provides high degree

of certainty that entanglement of foraging ETP mammals does not occur, which is proved by the absence of such fishery reports. Company policy prohibits the use of firearms during the fishery operation, thus the animals are normally driven away by movement and noise of working fishermen. The licensing system for seal hunting exists, but the local hunting infrastructure has declined. No cases of steelhead salmon catch were ever reported by companies or scientists. The fisheries are not enhanced, thus not bringing any changes in trophic relationships. The SG80 can be granted.

SG100 – there is no systematic observation program for such ETP species as Steller sea lion and Larga seal in the portion of fishery. The aerial monitoring is designed especially for mass salmon species, and currently is in reduced state, thus it is unlikely to provide any information on steelhead salmon. Direct impact assessments and status monitoring information for Steller sea lion and Larga seal is limited. SG100 is not met.

c	Indirect effects			
	Guide post		Indirect effects have been considered for the UoA including enhancement activities and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no **significant detrimental indirect effects** of the UoA including enhancement activities on ETP species.
	Met?		Yes	No

Rationale

SG80 - No significant indirect effects of fisheries have been identified which might pose unacceptable risk to these species. The likelihood of significant indirect effects of the fishery on protected species is considered to be very low due to the low degree of interaction. If any indirect effects exist they would likely result from ecosystem effects of the fisheries. Meanwhile, the management vector to maintain high levels of salmon production might be regarded as beneficial from a food chain perspective for species such as sea lions and seals. KamchatNIRO has conducted feeding studies of seal which have demonstrated that salmon are a primary seasonal food item.

SG100 - The SG100 guidepost is not met due to the lack of indirect impact assessments and status monitoring information for Steller sea lions, larga seal and steelhead salmon.

References

Tymlat Karaginsky Salmon Public Comment Draft Report.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.3.2 – ETP species management strategy

P I 2.3.2		The UoA and associated enhancement activities have in place precautionary management strategies designed to: - meet national and international requirements - ensure the UoA does not hinder recovery of ETP species Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guide post	There are **measures** in place that minimise the UoA-related mortality of ETP species due to the UoA including enhancement activities, and are **expected to be highly likely** to achieve national and international requirements for the protection of ETP species.	There is a **strategy** in place for managing the UoA and enhancement activities' impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **comprehensive strategy** in place for managing the UoA **and enhancement activities'** impact on ETP species, including measures to minimise mortality, which is designed to **achieve above** national and international requirements for the protection of ETP species.
	Met?	Yes	Yes	No
Rationale				
SG60, 80 - National legislation provides for protection of ETP species identified in the Russian Federation Red Data Book. In addition to general protection of ETP species, in particularly, imposing fines for their retaining, the timing and operation of the fishery assure minimal adverse interactions with ETP species. The strategy involves fishery times and areas where ETP species are uncommon and a ban on retention of these species. Catch of any Red listed species in Russia is prohibited and in case of catch, they must be immediately released. The absence of enhancement precludes impacts on ETP species. Therefore, SG80 is met. SG100 -This SG is not met because it is not clear that the fishing strategy was specifically designed to manage ETP impacts				
b	Management strategy in place (alternative)			
	Guide post	There are **measures** in place that are expected to ensure the UoA including enhancement activities do not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA including enhancement activities do not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA including enhancement activities do not hinder the recovery of ETP species.
	Met?	Not applicable	Not applicable	Not applicable

Rationale				
See scoring issue A. This issue applies only where species are recognized as ETP but requirements are not defined in legislation or agreements. There is no salmon enhancement in the UoA.				
c	Management strategy evaluation			
	Guide post	The measures are **considered likely** to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar UoA/species).	There is an **objective basis for confidence** that the measures/strategy will work, based on **information** directly about the UoA and/or the species involved.	The strategy/ comprehensive strategy is mainly based on information directly about the UoA and/or species involved, and a **quantitative analysis** supports **high confidence** that the strategy will work.
	Met?	Yes	Yes	No
Rationale				
SG60 - See SG80 SG80 - Observations of a low incidence of ETP catch in the fishery consistent spatial and temporal in occurrence of ETP species in the fishery, provide an objective basis for confidence that the fishery strategy will work based on qualitative information directly about the fishery and/or the species involved, hence the SG80 is met. SG100 - Information is not specifically collected on ETP species in this fishery due to the low incidence of these species in the fishery and the corresponding low level of concern hence the SG100 is not met.				
d	Management strategy implementation			
	Guide post		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and is **achieving its objective as set out in scoring issue (a) or (b).**
	Met?		Yes	No
Rationale				
SG80 – The available information from KamchatNIRO and independent observer reports for other salmon fisheries in the region provides clear evidence that the strategy is being implemented successfully. The incidence of interactions with endangered or threatened species is reportedly very low hence the SG80 is met. SG100 – Information is not specifically collected on ETP species in this fishery due to the low incidence of these species in the fishery and the corresponding low level of concern, hence the SG100 is not met.				
e	Review of alternative measures to minimize mortality of ETP species			

	Guide post	There is a **review** of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a **regular review** of the potential effectiveness and practicality of alternative measures to minimise UoA and enhancement related mortality of ETP species and they are implemented as appropriate.	There is a **biennial review** of the potential effectiveness and practicality of alternative measures to minimise UoA and enhancement related mortality ETP species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
Rationale				
SG60 – see SG80 SG80 – Effective protection of ETP species is regularly reviewed in the normal course of activity by regional fishery management and environmental protection agencies of the Government, hence the SG80 is met SG100 – the review is not scheduled biennially, and it is not met.				
References				
Tymlat Karaginsky Salmon Public Comment Draft Report.				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.3.3 – ETP species information

PI2.3.3		**Relevant information is collected to support the management of UoA and enhancement activities impacts on ETP species, including:** - **Information for the development of the management strategy;** - **Information to assess the effectiveness of the management strategy; and** - **Information to determine the outcome status of ETP species**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA and associated enhancement on ETP species.	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA and associated	Quantitative information is available to assess with a high degree of certainty the magnitude of UoA- and associated enhancement related

		OR if RBF is used to score PI 2.3.1 for the UoA: Qualitative information is **adequate to estimate productivity and susceptibility** attributes for ETP species.	enhancement may be a threat to protection and recovery of the ETP species. OR if RBF is used to score PI 2.3.1 for the UoA: Some quantitative information is **adequate to assess productivity and susceptibility** attributes for ETP species.	impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - Information on the negligible incidence of interaction of the fishery with ETP species is sufficient to determine that any related mortality or impact is sufficiently low as to not threaten protection or imped recovery. 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, hence the SG80 is met.

SG100 – Impacts, mortalities and injuries are not explicitly quantified hence the SG100 is not met.

b	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	Information is adequate to support a **comprehensive strategy** to manage impacts, minimize mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - Information from observations by scientists, managers, and inspectors, though not from a formal observer program, on the lack of impacts is adequate to support the management strategy for ETP species; the SG80 is met.

SG100 - Impacts, mortalities and injuries are not explicitly quantified; the SG100 is not met.

References

List any references here, including hyperlinks to publicly-available documents.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.4.1 – Habitats outcome

PI2.4.1		The UoA and its associated enhancement activities do not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	Yes	Yes	Yes

Rationale

The only habitats commonly encountered is the coastal shoreline. Coastal marine fishing areas are on sandy substrates on gently sloping seafloor topographies in the sublittoral zone with a mixed epifauna biota.

SG60 - See SG100

SG80 - See SG100

SG100 – The allocation of parcels to fishing companies requires that fishing activities occur at the same locations year after year. This limits the footprint of the gear to a small portion of the available habitat. The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. No significant marine habitat impacts are associated with marine trap net use. The only conceivable effects would involve highly localized and temporary disturbances of the substrate due to net anchors or possibly occasional movement of weighed lead lines. Any related damage to the bottom communities is minor and local relative to redistribution of sediments during storms.

Limited habitat effects result from beach seine or gill net site preparation activities in river fishing parcels prior to the fishing season. These might include removal of snags such as boulders or trees which might snag nets. Beach seines operation can impact the bottom, but this damage is considered minor compared

to spring flooding in the rivers. Site preparation activities regulated and monitored by the government. Enhancement programs for salmon do not occur in the Karaginsky Bay.

b	VME habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	Not relevant	Not relevant	Not relevant
Rationale				
No Vulnerable Marine Ecosystems or potential VME are identified in the area of the unit of assessment.				
c	Minor habitat status			
	Guide post			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			No
Rationale				
Limited habitat effects might result from beach seine or gill net site preparation activities in river fishing parcels prior to the fishing season. Areas where these activities occur can be considered minor habitats. Serious or irreversible harm is not observed from these fishery-related activities, however there is no direct evidence of this, hence the SG100 is not met.				
d	Impacts due to enhancement activities within the UoA			
	Guide post	The enhancement activities are unlikely to have adverse impacts on the habitat	The enhancement activities are highly unlikely to have adverse impacts on the habitat	There is a high degree of certainty that the enhancement activities do not have adverse impacts on the habitat
	Met?	Yes	Yes	Yes
Rationale				
No hatchery enhancement occurs in the area of the fishery.				
References				
Tymlat Karaginsky Salmon Public Comment Draft Report.				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	95
Condition number (if relevant)	--

PI 2.4.2 – Habitats management

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA and associated enhancement activities do not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a **partial strategy** in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries UoA **and associated enhancement activities** on habitats.
	Met?	Yes	Yes	No
Rationale				
SG60 - See SG80 SG80 - The fishing strategy involves use of trap nets, gill nets and beach seines, none of which has significant physical habitat effects; fishing gear has minimal impact relative to natural disturbances such as storms and floods. Cumulative impacts from non-MSC fisheries are similarly negligible. The enhancement strategy involves no operation of hatcheries in the UoA hence the SG80 is met. SG100 - The degree to which the fishing strategy is specifically intended to manage the impact of fishing activities on habitats is unclear. Therefore, the SG100 is not considered to be met.				
b	Management strategy evaluation			
	Guide post	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/ enhancement activities/habitats).	There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA, enhancement activities and/or habitats involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA, enhancement activities and/or habitats involved.
	Met?	Yes	Yes	No

Rationale
SG60 - See SG80 SG80 - In th UoA, the salmon fisheries are not enhanced, thus no habitat modification occurs and no underlying environmental regulations and requirements are needed. The substrate coverage of the specialized gear is relatively low, and it also provides objective basis for confidence that the measures will work. SG80 is awarded. SG100 - No formal testing of the gear effects on the habitat present, SG100 is not met.

c	Management strategy implementation			
	Guide post		There is **some quantitative evidence** that the measures/partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		Yes	No

Rationale
SG80 - Information from observations by scientists, managers, and inspectors, though not from a formal observer program, demonstrates that the fishing operations occur within parcels and with the gear authorized. Observations of habitat conditions in the fishery zone provide clear evidence that habitat impacts are very low or negligible at a regional scale. Quantitative evidence on the successful implementation of habitat protection measures has been provided for the Ozernaya in the form of a physical habitat assessment completed as a condition of another assessment; the Ozernaya results apply to the Karaginsky Bay as the fishing activities and habitat are so similar hence the SG80 is met. SG100 - Clear quantitative evidence on effects of fishing and related activities on the habitat is not available. Therefore, the SG100 is not considered to be met.

d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guide post	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is some **quantitative evidence** that the UoA and associated enhancement activities comply with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA and **associated enhancement activities** comply with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	Not relevant	Not relevant	Not relevant

Rationale
No vulnerable marine habitats were identified for the fisheries under assessment

References

Tymlat Karaginsky Salmon Public Comment Draft Report.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 2.4.3 – Habitats information

PI 2.4.3		**Information is adequate to determine the risk posed to the habitat by the UoA and associated enhancement activities and the effectiveness of the strategy to manage impacts on the habitat**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	The types and distribution of the main habitats are **broadly understood**. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Yes	Yes	No
Rationale				

SG60 - See SG80

SG80 - The nature and distribution of habitat types, including vulnerable areas, in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. The operation of the fishing gear requires the proper kind of substrate, and exploration early in the development of the fishery determined suitable sites. The distribution and quality of available spawning habitat is well known from ongoing spawning ground surveys. Streams have been mapped at a regional scale and there is good information on impacts to water quality in spawning streams from platinum mining in the past. Therefore SG80 is met. However, this monitoring has not continued to the level necessary to ensure the 80 will be met in future, hence a recommendation has been raised.

SG100 – Habitat quantity and quality have not been formally detailed for all known habitats in the region, hence the guidepost is not met.

	Information adequacy for assessment of impacts			
b	Guide post	Information is adequate to broadly understand the nature of the main impacts of gear use and enhancement activities on the main habitats, including spatial overlap of habitat with fishing gear. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	Information is adequate to allow for identification of the main impacts of the UoA and enhancement activities on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	The physical impacts of the gear and enhancement activities on all habitats have been quantified fully.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG100

SG80 - Habitat types are identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear. Fishing gear impacts on the sand bottom in coastal and riverine fishing areas is known to be minimal and to have all signs of fishing obliterated during natural events such as storms and floods. Sufficient information is available to determine that fishery activities do not have a quantifiable impact on habitat. All such activities are licensed and monitored by the government. Enhancement does not occur in the Karaginsky Bay.

SG100 – Some quantitative evidence of required main UoA habitat assessment from KamchatNIRO exists, but comprehensive information on habitat spatial allocation, state of biota and physical impacts is very limited. As a result, the 100-scoring guidepost for this indicator is not met.

	Monitoring			
c	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		Yes	No

Rationale
SG60 - See SG80 SG80 - Risks of fishery impacts to habitat may be assessed based on the number and location of fishing parcels which are licensed and regulated by the government. Similarly, all fishery construction and operation are regulated by the government. There is a special agency, State Sanitary-epidemiological inspection which controls whether the fishery affects the fishing operation zone. In a case of violations, it is a usual practice to impose fines to the company. This information is sufficient to detect any risk to habitat due to changes in the fishery. Relative to the issue of mining upstream of spawning habitat (where no fishing occurs, thus not a commonly encountered habitat for these UoAs), monitoring to detect increased risk to spawning habitat could be improved to ensure the SG80 can continue to be met in future. A recommendation has been raised. SG100 – Physical habitat assessments have not been conducted (due to the lack of significant impacts) hence the SG100 is not met.
References
List any references here, including hyperlinks to publicly-available documents.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--
RECOMMENDATION	1

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		**The UoA and associated enhancement activities do not cause serious or irreversible harm to the key elements of ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guide post	The UoA is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Yes	Yes	No
Rationale				

SG60 - See SG80

SG80 – Information on the distribution, scale and effect of the fishery provides justification for a conclusion that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible.

North Pacific Ecosystem - Potential ecosystem concerns related to fishing might involve effects of changes in salmon abundance on ecosystem structure, trophic relationships, and biodiversity. For instance, decreases in salmon abundance due to fishing might favor prey species of salmon and harm predator species of salmon. However, the salmon fishery has complex short and long-term effects on salmon abundance. Salmon fishery management to provide escapements consistent with maximum sustained yield generally increases average abundance in the ocean and return relative to what can be expected in an unmanaged system. Conversely, high exploitation rates and management for optimum rather than equilibrium escapements will substantially reduce the average number of fish escaping to freshwater.

Effects of salmon abundance on ecosystem productivity in the ocean have been the subject of extensive research over the last 20 years and the scientific literature generally suggests that high abundance of salmon on the high seas due to the net effects of fishery management and hatchery enhancement throughout the north Pacific Rim has may have contributed to ecosystem changes. However, the contribution from any specific area to total salmon abundance in the ocean is relatively small. Therefore, the UoAs are highly unlikely to serious or irreversible harm to the structure and function of the North Pacific ecosystem.

Riverine Ecosystem - Effects of salmon abundance on ecosystem productivity in freshwater have also been well documented in other systems. Larger escapements provide more food for salmon predators such as bears and eagles and also more marine derived nutrients to support primary and secondary productivity. However, while fishery management may affect abundance, it also reduces the variability in abundance relative to what can be expected in an unmanaged system. On balance these effects are not expected to result in serious or irreversible harm to any other component of the ecosystem. Therefore, the UoAs are highly unlikely to serious or irreversible harm to the structure and function of the riverine ecosystem.

SG100 - The governmental scientific agency is conducting a series of ecosystem assessments in Kamchatka. These include evaluations of the effects of salmon abundance by species on individual characteristics and population dynamics of other salmon species, assessments of food marine derived nutrient contributions and effects of salmon to freshwater ecosystems, and food web productivity. These assessments provide a basis for evaluating fishery effects on ecosystem structure and function. However, a specific analysis of the likelihood of the fishery to disrupt key elements underlying North Pacific or riverine ecosystem structure and function to a point where there would be a serious or irreversible harm has not been reported hence the SG100 is not met.

	Impacts due to enhancement			
b	Guide post	Enhancement activities are **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	Enhancement activities are **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the enhancement activities are **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Yes	Yes	Yes

Rationale
No enhancement occurs in this UoA.
References
Tymlat Karaginsky Salmon Public Comment Draft Report.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	90
Condition number (if relevant)	--

PI 2.5.2 – Ecosystem management

PI 2.5.2		**There are measures in place to ensure the UoA and enhancement activities do not pose a risk of serious or irreversible harm to ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary which take into account the **potential impacts** of the UoA on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.
	Met?	Yes	Yes	No

Rationale
SG60 - See SG80 SG80 - Measures include fishery management goals for spawning escapements adequate to meet ecosystem needs in freshwater systems; including food for bears and provision of marine derived nutrients. This strategy also involves significant monitoring and research of ecosystem components at a regional scale. The partial strategy takes into account available information, monitors new information from the extensive research, and is expected to restrain impacts of the fishery activities on the ecosystem should the research identify any need.

SG100 - It is not apparent that the strategy involves a specific plan containing measures to address all main impacts of the fishery on the North Pacific and riverine ecosystems, nor that all functional relationships between the fishery and the components and elements of the ecosystem are well understood, hence the SG100 is not met.

b	Management strategy evaluation			
	Guide post	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoA/ ecosystems).	There is **some objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	**Testing** supports **high confidence** that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - General experience and information from other systems indicate that the fishery measures are likely to minimize risks of serious or irreversible harm to ecosystem structure and function. Salmon populations are inherently dynamic with large interannual variation on run sizes due to normal environmental variation in abundance. Related ecosystems are affected by these same dynamic conditions. Management of fisheries to provide significant natural spawning escapements and minimal disruption from enhancement ensure future production of salmon to fuel future fisheries while also providing fish and marine derived nutrients critical to sustaining freshwater and nearshore marine ecosystems. The SG80 is met.

SG100 – Systematic testing of the ecosystem effects of fishery is limited and the SG100 is not met.

c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	Yes

Rationale

SG80 - See SG100

SG100 – Monitoring of new information from the extensive research regularly occurs. Qualitative information and observations readily indicate that stream and nearshore ecosystems are intact, diverse, and productive. The area of the fishery is remote undeveloped except for a few local areas; the SG100 is met.

d	Management of enhancement activities

	Guide post	There is an **established** artificial production strategy in place that is expected to achieve the Ecosystem Outcome 60 level of performance.	There is a **tested and evaluated** artificial production strategy with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that the strategy is effective in achieving the Ecosystem Outcome 80 level of performance.	There is a **comprehensive and fully evaluated** artificial production strategy to verify with certainty that the Ecosystem Outcome 100 level of performance.
	Met?	Yes	Yes	Yes
Rationale				
No enhancement occurs in the area of the Unit of Assessment, providing basis for complete compliance with SG100				
References				
Tymlat Karaginsky Salmon Public Comment Draft Report.				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	90
Condition number (if relevant)	--

PI 2.5.3 – Ecosystem information

PI2.5.3		**There is adequate knowledge of the impacts of the UoA and associated enhancement activities on the ecosystem**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	
	Met?	Yes	Yes	
Rationale				
SG60 - See SG80 SG80 - The salmon life cycle encompasses a vast ecosystem including natal rivers and lakes, the nearshore ocean, and the high seas of the North Pacific Ocean. Key ecosystem elements include trophic				

structure and function (in particular key prey, predators, and competitors), community composition, productivity pattern (e.g. upwelling or spring bloom, abyssal, etc.), and characteristics of biodiversity. Key elements of the salmon ecosystem are broadly understood based on extensive work by scientists associated with the management system. Extensive research has been conducted on freshwater and marine aquatic ecosystems. This information consists of Kamchatka-specific research and research conducted in other salmon-producing regions; the SG80 is met.

b	Investigation of UoA impacts			
	Guide post	Main impacts of the UoA and associated enhancement activities on these key ecosystem elements can be inferred from existing information, and **have not been investigated in detail**.	Main impacts of the UoA and associated enhancement activities on these key ecosystem elements can be inferred from existing information and **some have been investigated in detail**.	Main interactions between the UoA and associated enhancement activities and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - Marine-derived nutrients from salmon carcasses can have a significant impact on freshwater communities as well as those communities in the freshwater to terrestrial interface. The relationships between salmon and the population dynamics of their terrestrial predators has been well documented in other systems. It has been reported that these nutrients also form a base for rich development of zooplankton in coastal area, which serves a food for young salmon just after downstream migration. Many aspects of ecosystem dynamics have been investigated in detail. For instance, estimates of the contribution of marine derived nutrients from salmon carcasses have been made for the Bolshaya system and research is underway on food web productivity.

SG100 - Of particular concern to salmon fishery management throughout the North Pacific Region is the effect of ocean environmental conditions on stock productivity. Short term and long-term variability in stock productivity is now understood to be strongly related to patterns of ocean productivity. Ocean productivity regimes have been observed shift periodically to more or less favorable conditions. The region is currently in a very productive ocean regime for many northern salmon stocks including Kamchatka Pink and Chum Salmon. These patterns and their effects are generally understood but future patterns are cannot be forecast. Thus, salmon productivity and sustainability would be negatively affected by a shift to a less favorable regime. It remains unclear whether knowledge of fishery-ecosystem interactions is sufficient to recognize changes and to revise management objectives and practices in a timely fashion. Thus, while information on fishery-ecosystem functions and elements is sufficient to meet 80 scoring guideposts, it does not rise to the standard of the 100 scoring guideposts.

c	Understanding of component functions			
	Guide post		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA and associated enhancement activities on P1 target, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the

				ecosystem are **understood**.
	Met?		Yes	No
Rationale				
SG80 - It is clear that salmon influence the food webs in the North Pacific although the effect varies widely between systems and is dependent on many factors like timing, scale and alternative nutrient sources, etc. SG100 – the knowledge on joint functioning of all components is probably limited, supposedly, especially in case of ETP species, since the complete studies on their functioning might be interdicted by extreme rarity of particular species (such as Steelhead salmon) and following laboriousness of purposed work. National legislation might also appear as a source of interdiction. The guidepost is not met.				
d	Information relevance			
	Guide post		Adequate information is available on the impacts of the UoA and associated enhancement activities on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the fishery and associated enhancement activities on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		Yes	No
Rationale				
SG80 - Sufficient information is available on the impacts of the fishery on these components to allow some of the main consequences for the ecosystem to be inferred. Main consequences include changes in competition levels between salmon species and nutrient contributions to freshwater food webs from marine derived nutrients delivered by salmon carcasses. Scientists of the government research institutes have collected substantial information on Pink Salmon and their role in the ecosystem. Information on salmon ecosystems throughout the Pacific rim has also provided a good understanding of the salmon's function in freshwater ecosystem, particularly for supporting aquatic and terrestrial food webs either directly by feeding predators and scavengers or indirectly by the delivery of marine derived nutrients. Active fishery management might also help stabilize returns by avoiding excessively large escapements which can depress future returns under some conditions. Enhancement with hatcheries can substantially increase salmon numbers in certain times and areas although hatchery contributions to Chum Salmon runs remain uncertain. Enhancement of Pacific salmon across the Pacific Rim since the 1970s has resulted in very large abundance in the North Pacific Ocean. There is some evidence that high salmon abundances in the ocean might adversely affect wild salmon through competition. As hatchery production does not occur in the UoA, no adverse impacts are expected. The SG80 is met. SG100 – Information is not sufficient to evaluate fishery impacts on all ecosystem elements. The SG100 is not met.				
e	Monitoring			
	Guide post		Adequate data continue to be collected to detect	Information is adequate to support the development

			any increase in risk level.	of strategies to manage ecosystem impacts.
	Met?		Yes	No

Rationale
SG80 - Extensive research has been conducted on salmon ecosystems in western Kamchatka, particularly for Sockeye but also for other salmon species. In marine waters, extensive research has been conducted by the Russian Scientific Institutes on (1) Juvenile Anadromous Stocks in Ocean Ecosystems; (2) Anadromous Stocks in the Bering Sea Ecosystem (BASIS); and (3) Anadromous Stocks in the Western Subarctic Gyre and Gulf of Alaska Ecosystems (Temnykh et al. 2010). SG100 – Detailed strategies for managing ecosystem impacts have not been identified.
References
Tymlat Karaginsky Salmon Public Comment Draft Report.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

5.4 Principle 3

5.4.1 Principle 3 background

Legal & Customary Framework

The current Russian Federation became independent of the former Soviet Union in 1991. As a federation, it consists of numerous jurisdictions with various levels of autonomy. The legal system is based on civil law system with judicial review of legislative acts. The federal government has centralized authority in Moscow, where final decisions are made. The fisheries management consists of complex levels of authority for management and research, with ultimate authority centralized in Moscow. At the same time, recent years more decisions are delegated to the regional level. In-season management is entirely delegated to local agencies. The Federal Agency for Fisheries (FAR) is governed directly by the government of Russia, is the ultimate authority, reviewing recommendation passed up from the local level and passing directives back, as described in the next section.

The fundamental legal act determining the basics of fisheries management, including Salmon fisheries is the federal law “On Fishery and Conservation of Aquatic Biological Resources” which was amended in 2008 to reflect changes regarding fishery of anadromous fish in inland waters of Russian Federation and territorial seas of Russian Federation (Article 291 of the Federal Law of December 20 2004 № 166-FZ). This law gave the government the authority to assign fishery sections to individual lease holders for up to 20 years, and salmon fisheries management was entrusted 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 now based on achieving spawning escapement rather than by quota limitations of a TAC.

More than 30 regulatory legal acts of the Government of the Russian Federation have been passed in development of provisions of the law. A number of regulations address environmental impact of business, but they are rather general. For instance, in the Law “On Protection of the Environment” (2001) (extracted from article 5) states that “Business activities of all subjects must follow such principles as:

- the right of a person on favourable environment;
- scientifically justified combination of interests of person, society and state with a goal of sustainable development and favorable environment;
- conservation, reproduction and rational use of natural resources as necessary preconditions of providing of favorable environment and ecological safety;
- presumption of ecological danger of planned business activities;
- compulsion of environmental assessment of planned business projects;
- priority of preservation of natural ecosystems, natural landscapes and natural complexes;
- protection of biodiversity;
- prohibition of any activity with unpredictable environmental consequences, and prohibition of the realization of projects, which may result in degradation of natural ecosystems and change or destruction of genetic diversity of plants, animals and other organisms, exhausting of natural resources and other negative changes of environment.

Article 26 reads in part: The amount of admissible extraction of components of natural environment must be established in accordance with limitation of the amount of extraction with

the aim to conservation of natural and nature-anthropogenic objects, providing of sustainable functioning of natural ecosystems and preventing their degradation.

The Law “On Animal World” (extracted from article 22): Any activity resulting in changes of animal environment and deterioration of condition of their reproduction, feeding, rest and migration routes must be performed in accordance with rules of nature conservation.

Extract from Article 35: Use of objects of animal world should be performed together with system of measures of conservation and reproduction of the animal world and protection of their environment.

The government fishing permits contain a requirement that the permit holder is responsible for the ecological sustainability of the area where fishing occurs. Discovery of destructive fishing practices could lead to loss of the fishing permit, which provides an incentive for sustainable practices.

Some references concerning conservation of environment are contained also in federal laws directly related to fisheries: “On Fisheries and conservation of aquatic biological resources" and “The rules of fishing for the Far Eastern Fishery basin”.

Recently adopted State program “Development of fishery industry” (18 December 2014) (http://government.ru/media/files/ulCPlqzA6Nw.pdf) has a goal to enable the transition from export-commodity type to innovative development based on conservation, reproduction, rational use of aquatic biological resources, introduction of new technologies, the development of import-substitution sub-sectors; providing the sufficient amount of domestic fishery production and competitiveness of Russian fishery products on domestic and foreign markets. Although the main task of the program to increase fisheries production, quite high attention is also paid to conservation of aquatic biological resources and expanding of scientific research, including ecosystem research.

Management Structure - Consultation, Roles & Responsibilities

Management of Kamchatka salmon fisheries is administered by Federal and Regional governmental agencies (Figure 68). Kamchatka Krai, which includes Kamchatka Oblast and Koryak Autonomous Okrug is the subject of the Russian Federation and is a part of Far Eastern Federal Region. It is under the direction and control of the Government of the Russian Federation. Fisheries of Russia are managed and controlled by Federal Fishery Agency (FAR) of the Russian Federation, which located in Moscow and also represented by a local office in Kamchatka. Operational management of all activities is performed by the Governor of the Kamchatka Krai. In total, 69 different governmental agencies control the fisheries (data of Vityaz-Avto company), and the most important of them are addressed below.

The Russian Fishery Management System provides a set of opportunities for public participation in fishery management. The Federal Law “On fisheries…” sets that all citizens, public organizations, and associations have the right to participate in decision making process. For these purposes the FAR maintains a multi-level system of public (community) and scientific fishery councils providing opportunities to participate and influence on decision process and regulations. There are several fishermen associations and unions in Russia based on fish species or regional principle.

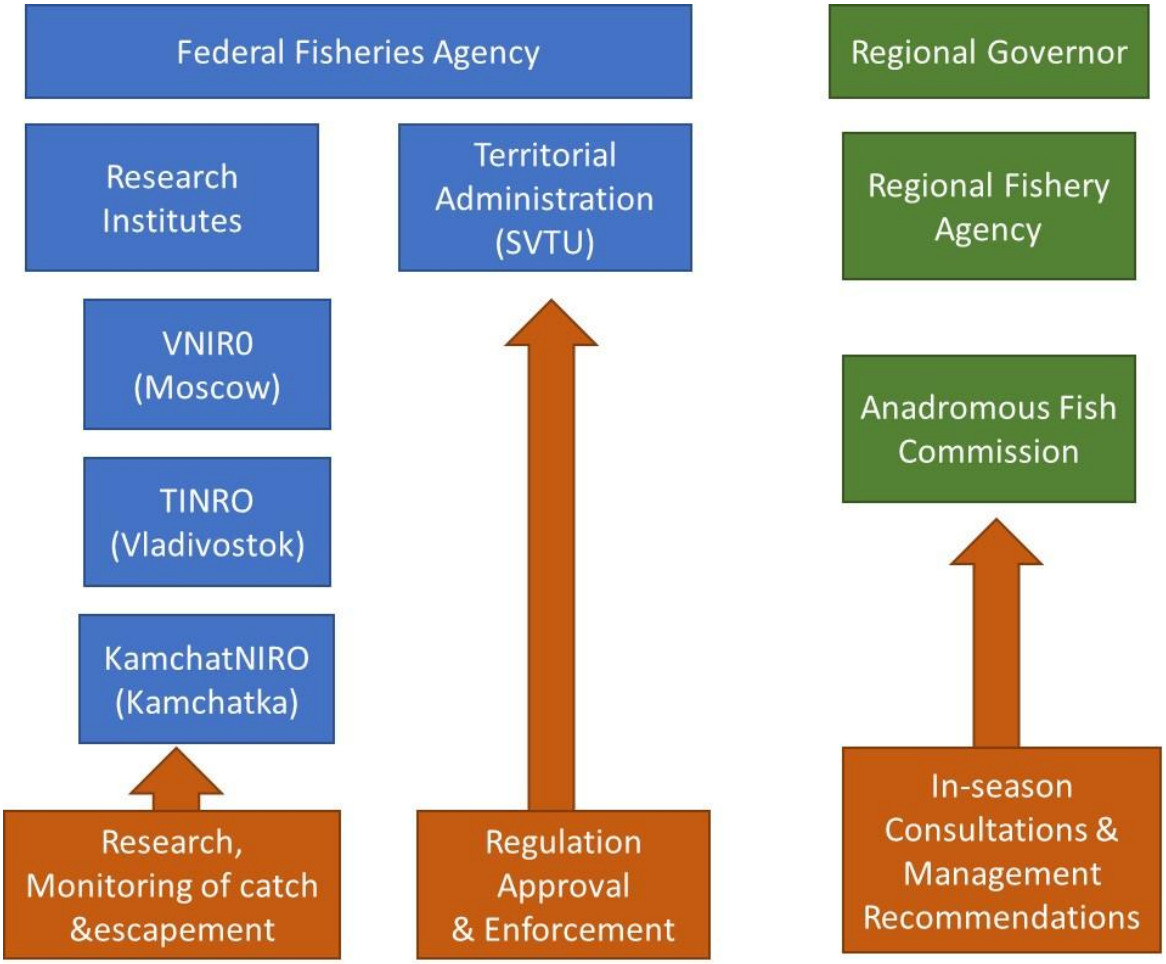


Figure 70. Organization of Federal and Regional salmon fishery management structure

Federal Fishery Agency (FAR)

Federal Fishery Agency (FAR) (*Федеральное агентство по рыболовству or Federal'noe Agentstvo po Rybolovstvu*, http://fish.gov.ru) is an executive authority of the Russian Federation, established by the Presidential Decree No. 724 issued 05.12.2008, by converting the pre-existing Russian Federation State Committee for Fisheries (RosRybolovstvo). The President issued the Decree No. 863 on 12.30.2008, which established that FAR reports directly to the Government of Russian Federation. RF Government Decree of 06.11.2008 No. 444 approved the current Regulations governing the FARs operations. Due to changes in the Russian Government structure adopted in 2012 (President Decree No. 636 of 21.05.2012), the FAR has returned to operate under the Ministry of Agriculture. Meanwhile, the Ministry of Agriculture is responsible for fisheries regulation and legislation background, FAR performs general management of the Russian fisheries.

FAR interacts with various agencies at the federal level while controlling its territorial departments. It is responsible for oversight of departments under its jurisdiction, which define the rules and the annual Total Available Catches or Recommended catches (for those species which are not under TAC regulation, like Pacific salmon), as well as define the areas of fisheries. FAR also conducts communication and coordination with foreign government agencies, international committees and international organizations on issues of fisheries, policy and technical programs related to the application of innovative technologies in the fisheries complex and prepares federal-level and agency-level reports on the fishing industry.

The head of FAR supervises deputies and departments, which are responsible for the management of the fishing fleet, protection and rational use of resources, reproduction of aquatic biological resources and their habitats. FAR is also responsible for monitoring water resources and stocks of commercial species and control over the distribution of TAC/RAC among the users. FAR also provides related to fisheries social services, conducts research and engineering, directs federal fishing vessel and fishing ports, and controls the activity of artificial breeding.

Northeastern Territorial Administration of FAR (SVTU)

FAR has territorial departments in all regions of the Russian Federation, which have been created in order to accelerate the implementation of many of the functions of the FAR on the level of Russian Federation subjects. *Northeastern Territorial Administration of FAR (SVTU) (Северо-восточное территориальное управление ФАР, СВТУ or Severo-vostochnoe upravlenie FAR)* is the local management and enforcement arm of FAR for Kamchatka Krai and Chukcha Autonomous Okrug, which is located in city of Petropavlovsk-Kamchatsky. 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. SVTU posts all approved management decision of Anadromous Fish Commission on its website (www.terkamfish.ru).

Federal Fishery Research Institutes

FAR includes a network of scientific research organizations conducting the research and development of both applied and fundamental nature in accordance with the program entitled "Scientific and engineering support of the Russia's fisheries industry." Federal Agency of Fisheries has 15 scientific-research organizations under its direct supervision – of which nine are marine scientific research institutes; they are assigned to appropriate regions on the legal basis and are responsible for the state level monitoring of stocks and additional resources and inclusion of the said resources in harvesting process and also responsible for rational and efficient usage of the bio-resources. The above-mentioned scientific research institutes have legal status as federal state unitary enterprises. Their activities are regulated by the charters approved by FAR. All-Russia Institute for Fisheries Research and Oceanography, VNIRO (Всероссийский научно-исследовательский институт Рыболовства и Океанографии, ВНИРО or Vserossiiskii nauchno-issledovatelskii institute rybolovstva i okeanografii) of Moscow is a head institute in the field of fishery related research.

Research for the Pacific aquatic biological resources is conducted by the following scientific regional research institutes: TINRO-Centre (Vladivostok) (Тихоокеанский научно-исследовательский институт Рыболовства и Океанографии, ТИНРО-Центр or Tikhookeanslii nauchno-issledovatelskii institute rybolovstva i okeanografii) with branches in Khabarovsk and Anadyr; MagadanNIRO (Magadan) (Магаданский научно-исследовательский институт рыбного хозяйства и океанографии, МагаданНИРО or Magadanskii nauchno-issledovatelskii institute rybolovstva i okeanografii), KamchatNIRO (Petropavlovsk-Kamchatsky) (Камчатский научно-исследовательский институт рыбного хозяйства и океанографии, KamchatNIRO or Kamchatskii nauchno-issledovatelskii institute rybolovstva i okeanografii) and SakhNIRO (Yuzhno-Sakhalinsk) (Сахалинский научно-исследовательский институт рыбного хозяйства и океанографии, СахНИРО or Sakhalinskii nauchno-issledovatelskii institute rybolovstva i okeanografii). Studying of aquatic biological resources of the Arctic, northern Atlantic Ocean, Baltic Sea and Atlantic Ocean and that of Black, Azov and Caspian seas and, biological resources of internal freshwater bodies is performed by other territorial institutions. KamchatNIRO conducts research of marine and freshwater resources in the Kamchatka region to monitor the status of commercial species, including salmon, and preparing annual forecasts of commercial species

and the proposal on the volume of their potential catch. Each October KamchatNIRO issues forecast for recommended catch of salmon for the next season. The forecast is developed based on the amount of salmon required for optimal filling the spawning grounds (i.e., optimal spawning escapement), the number of juveniles from natural spawning grounds (based on sampling of juveniles in the sea and their survivorship there), and the release of juveniles from hatcheries (taking into account their survivorship in the sea).

Annual forecasts by KamchatNIRO of potential catch are sent to TINRO-Centre where they are approved in the special Far East Salmon Council (FESC) and then sent to VNIRO, which examines and approves the forecast on the Scientific Council. Following the adoption of the forecast VNIRO sends it to the FAR for approval. Approval of the forecast is the basis for the organization of fishing in the region.

Northeastern Rybvod (SevvostRybvod)

SevvostRybvod (Севвострыбвод) is directly managed by the FAR agency. SevvostRybvod does not occupy as important a role in management of salmon fisheries in Kamchatka as, for instance, the analogous structure, SakhRybvod, in Sakhalin. This is because artificial reproduction in Kamchatka is not of such significant as in Sakhalin-Kuril region. SVTU of FAR controls hatchery permitting and management in the Kamchatka Kray. Sevvostrybvod operates five hatcheries in Kamchatka including two in the Western coast of the Peninsular (Bolshaya river basin).

Federal Ministry of Natural Resources and Ecology of the Russian Federation encompassing the Federal Service for Supervision in the Sphere of Ecology & Natural Resources Use (Rosprirodnadzor)

Rosprirodnadzor (Росприроднадзор) 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.

Federal Agency for Veterinary and Phytosanitary Supervision (Rosselkhoznadzor)

Rosselkhoznadzor (Россельхознадзор) is the Federal enforcement and control agency for biological resources under the Russian Ministry of Agriculture. Responsibilities include 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.

In total, activities of any enterprise operating on rivers are controlled by 14 different State commissions, but their role is not as significant as those described above.

Public Council for FAR (PC)

FAR Policies and Regulation of fisheries are created by a consultative process. In 2008, FAR created the Public Council (PC) in Moscow (Общественный совет по рыболовству, Obschestvennyi sovet po rybolovstvu), which facilitates public discussions of accepted and proposed regulations. The PC is composed of wide range of fishermen associations, environmental institutions, environmental services, the World Wildlife Fund and other interested community organizations. In the consultative process the PC is joined by government agencies and territorial Association of Fishermen, fisheries departments and offices of subjects of Russian Federation. The government policies are finally adopted and implemented following the process of consideration of the proposed policies and discussions between the PC and the interested parties.

Far East Scientific Commercial Fisheries Council (FESFC)

Far East Scientific Commercial Fisheries Council, FESFC (Дальневосточный рыбопромысловый совет, Dalnevostochny rybopromyslovy sovet) is an independent council made up of representative of the Federal Fisheries Agency, scientific research institutes, non-profit commercial associations of commercial fisheries, minority peoples of the North and Russian Far East, and the union of the pool of professional fishers. The personnel composition of the FESFC is approved by order of FAR based on the recommendations of the Russian Federation territorial subject. However, half of its members must be either from scientific or similar fish conservation or natural resources agencies. The council has the authority to engage other competent authorities, interested parties (or stakeholders) as needed, upon approval of a vote of its members. Meetings are held at least twice a year generally in Vladivostok. The FESFC meetings can be attended by any interested party, where they may express their opinions and participate in the discussions. Central to the responsibilities of the FESFC is the compilation of scientific information concerning the management of marine bio-resources in the Russian Far East for submission to the Federal Fisheries Agency for final approval. In addition, it reviews and submits its recommendations on fisheries regulations, construction of fish hatcheries and the recommendations for the distribution of quota among its subjects.

Ministry of Fisheries of Kamchatka Kray

Under the new management system, the regional government has the responsibility for in-season management of fisheries (although SVTU has final approval). The Kamchatka Ministry of Fisheries is responsible for establishing and operating of the Commission on the Regulation of Harvesting (catch) of Anadromous Fishes, AFC and providing information on the fishery (such as catch and escapement data collected by KamchatNIRO.

Commission on the Regulation of Harvesting Anadromous Fishes (AFC)

The AFC (Комиссия по регулированию вылова (добычи) анадромных видов рыб, Komissia po regulirovaniu vylova (dobychi) anadromnykh vidov ryb) has the responsibility for the distribution of recommended yearly catch of salmon among users and identifying areas of commercial fishery, recreational fishing, and traditional fishery of the indigenous population. The AFC was established by regional authorities in 2008 to implement management changes identified in new federal regulation. The AFC is chaired by the regional governor and consists of government, industry and interested stakeholders. These include 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 list of members of AFCs is suggested by the Governor and approved by the Territorial Administration of FAR (SVTU).

Upon the request of companies, the AFC sets up the recommended catch for a management unit area and accepts applications from the users, each of which cannot exceed the total recommended catch for management unit. In case of approaching recommended catch for some management unit, AFC can close fishing or increase the recommended catch following recommendations of KamchatNIRO. The recommended catch is authorized by FAR and accounts for the number of salmon required for filling in the spawning areas and broodstock hatcheries, as well as quotas for sport fishing and harvest by the indigenous population. The AFC meets weekly for the purpose of considering in-season fishery management decisions. Based on the reports about filling of the spawning grounds, the AFC 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 AFCs 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).

Functioning of the Commission is regulated by the order of RF Ministry of Agriculture No. 170, dated April 8, 2013, “Concerning Approval of the Rules of Activity of the Commission on Regulation of Harvesting Anadromous Fish”. The key items are the following:

Item 6. The Commission composed of the Chairman, Deputy Chairman, Executive Secretary and members of the Commission is formed.

Item 7. The Commission is headed by the highest official of a corresponding Russian Federation constituent (head of the supreme executive authority of the state government body of Russian Federation constituent) (hereinafter referred to as Commission Chairman). The Commission Chairman conducts meetings of the Commission, makes decisions on procedural issues and signs minutes of the meetings. In the absence of the Commission Chairman its activity is managed by the Deputy Commission Chairman. The Executive Secretary of the Commission assists the Commission Chairman and Deputy Commission Chairman in organization of work of the Commission and work group formed within the Commission, as well as keeps minutes of the meetings and organizes work on their filing to a territorial authority of the Russian Federal Fisheries Agency.

Item 8. The Commission consists of representatives of federal executive authorities, including a representative of the federal executive authority in the sphere of defense, a representative of the federal executive authority in the sphere of organization of safety of the Russian Federation, a representative of the federal executive authority in the sphere of environmental protection, representatives of bodies of state power of Russian Federation constituents, public associations, alliances of legal entities (associations and unions), as well as scientific organizations under the jurisdiction of the FAR.

Item 9. Public associations, alliances of legal entities (associations and unions), as well as scientific organizations under the jurisdiction of the FAR file proposals related to composition of the Commission to the executive government body of a corresponding Russian Federation constituent. Federal executive authorities (their territorial bodies) and the executive government body of a corresponding Russian Federation constituent file proposals on composition of the Commission to the Ministry of Agriculture of the Russian Federation, who issues an order on approval of personal composition of the Commission for every Russian Federation constituent on the territory of which procurement (yield) of anadromous species of fish will be carried out.

Item 10. Commission’s activity is carried out in a form of meetings organized as and when necessary.

Item 11. All members of the Commission have equal rights during discussion of issues being considered at a meeting.

Item 12. The Commission is authorized to make decisions in case more than half of its members are present at the meeting. A decision of the Commission is deemed made in case more than half of its members that are present at the meeting voted for. If votes of Commission’s members divide equally, vote of a person chairing the Commission will be decisive.

Item 13. Commission’s resolution is documented in a protocol no later than in 2 days after conduct of a regular meeting to be signed by the Commission Chairman or, in its absence, by Deputy Commission Chairman chairing the meeting, and initialed by the Executive Secretary, as well as by all members of the Commission present at the meeting.

Item 14. In case a member of the Commission does not agree with a decision made, it is entitled to express its special opinion in writing, which shall be added to the minutes of the meeting.

Item 15. Minutes of the meeting shall be sent to a territorial administration of the Russian Federal Fisheries Agency within 2 days after its signing to be approved within 2 business days.

In case the territorial body of the FAR does not approve the minutes of the Commission, it shall notify the Commission thereof in writing within 2 days after receipt of the minutes, indicating reasons preventing approval of minutes of the meeting.

Item 16. After the minutes of the meeting is approved by the territorial body of the FAR, it is published on its official website and sent to executive government bodies of Russian Federation constituent within 2 business days and is binding.

Fishery Objectives & Measures

Management Objectives

The main objective of the salmon management system is to provide spawning escapements sufficient to sustain continuing high salmon productivity in future returns. Adequacy of escapement is assessed by observing whether all areas potentially suitable for spawning are actually used by salmon to spawn. The fishery generally managed for species-specific regional escapement ranges observed to produce significant returns in the past. At higher than optimal spawning density on the spawning grounds, overspawning results in decrease of recruits per spawner due to resorption of gonads and destruction of redds by later spawners.[1]

Escapement goals are generally based on models of abundance of parental and progeny generations using mathematical equations. The base for estimates are data obtained by observers on commercial fisheries, surveys of number of spawners entering the river (visual foot counting, aerial visual and photo registration, hydro acoustic techniques, and marking) data on downstream migration of juveniles, and data on trawling of juveniles before feeding migration to high seas mouth during spawning migrations. Given that dynamics of populations in the same area is usually synchronous, several reference populations are studied in more details, at so-called fish monitoring stations, and then estimates are extrapolated to the entire area. The proportion of each population in the area is considered to be constant and is determined based on long-term fisheries and research data. In recent years, the regional scientific agency (KamchatNIRO) has begun to explore more explicit species and system-specific numerical escapement goals.

Fishery Measures

Fishery methods, areas and seasons are designed based on historical information to regulate harvest and exploitation rates consistent with escapement goals. Fish numbers, biological characteristics and fishery statistics are then monitored in-season and fisheries are adjusted based on abundance. Fishing may continue through the run if spawning escapement is on

[1] An obvious overspawning event occurred in the northwestern Kamchatka in 1983, when huge amount of spawners entered rivers because fishing facilities of the companies were not sufficient to prevent them. As a result, mortality of progeny was very high, and the next generation was weak. Due to this, since this period odd generation of Pink depressed and even generation dominants until present.

schedule to meet its goals. Fishing is reduced in years of low runs in order to protect escapements. Fishing is expanded in year of large runs in order to access harvestable surpluses in excess of escapement needs.

Participation in the commercial salmon fishery is controlled by a limited entry system where fishing companies obtain 20-year leases for fishing parcels established along the coast line and in rivers throughout the region. For management purposes, the Kamchatka peninsula coastal zone is subdivided into several management units, each of which contains a limited number of fishing parcels.

Prior to 2009, catch was regulated according to a system of Total Available Catch (TAC) which was established based on a preseason run forecast prepared by KamchatNIRO scientists. Catch shares were then apportioned among fishing companies by the Federal and Regional regulatory agencies. This system was not effective in responding to normal annual variability in salmon run sizes and led to incentivized inaccurate catch reporting in years where salmon were more abundant than forecast. While in theory, it was possible to revised TACs based on in-season data, the need for centralized government approval made it impossible to make effective in-season changes in a timely manner.

Beginning in 2010, introduction of an “Olympic system” of catch allocation has made fisheries management much less complicated and more effective. In this system, in-season fishery management authority is delegated from the central authority to local agencies – this makes management decisions much more responsive to in-season information. Fishing companies are allowed to fish their lease sites during at times when the fishery is opened by fishery managers. Catches are not artificially limited by assigned TAC shares. Fishing companies may purchase additional catch shares during the fishing season as long as fish remain available. The main principles of this management model are the following:

- determining a management unit as group of fishing parcels situated in close geographical area (usually combination of sea and river parcels) inhabited by salmon populations with similar biology;
- self-dependence of users in terms of use their gear, in particularly, they are not obliged to use all their gear but only some, depending on situation;
- user defines himself size of his quota which, however, cannot exceed total quota for management unit determined by AFC. The companies report their catches to SVTU on daily basis. After sum of catches of all companies fishing in the management unit achieved the total quota, the fishing terminated if AFC decided not to increase quota based on new data.
- the main advantage of this system of management is opportunity for users to plan their fishing operations and free competition between them. Moreover, it provides more operative reporting of catches.
- disadvantages are possible exceeding of quota allocated for management unit if two or more companies simultaneously (in the same day) report catches which altogether increase total quota. Thus, the companies do not have individual responsibility not to exceed the quota. Also, companies can report false catches (exceeding the actual) in order to have opportunity to buy illegally obtained caviar.

Fishing effort during established fishing seasons is regulated using a system of passing days when fishery is prohibited. Weekly passing days (typically 2 or 3 per week) are established prior to the fishing season in each fishery area. The system of pass-days creates kind of moving window for fish to safely approach the spawning grounds (Shevlyakov et al. 2011). If spawning

escapement is not sufficient based on in-season monitoring data, additional off days are set up in the river, and, if needed, in the sea.

Preseason Forecasts

Run size forecasts continue to be made for preseason planning purposes although fishery regulation has changed from TAC management to recommended catch management. The local research fisheries institution, KamchatNIRO, plays a key role in producing fishery forecasts. Expected catch is calculated as a difference between total number of returning fish estimated for a season and the target amount of spawners, taking in account a total area of spawning grounds in the district and optimal density of spawners, which depends on river and species. Forecasts are subject to an extensive review process by the TINRO-Center, the Far East Salmon Council, which was created within the TINRO-center with the goal of coordinating the research and forecasting of salmon in the Far Eastern basin, and VNIRO which reviews forecast of recommended catch by the FESC. During the period of approval, discussion with stakeholders takes place with active participation of representatives of fisheries companies, local administrations and federal ministries. On the basis of this forecast FAR approves the recommended annual catch for each fishery subzone. The detailed scheme of issuing RAC is presented in the Figure 69.

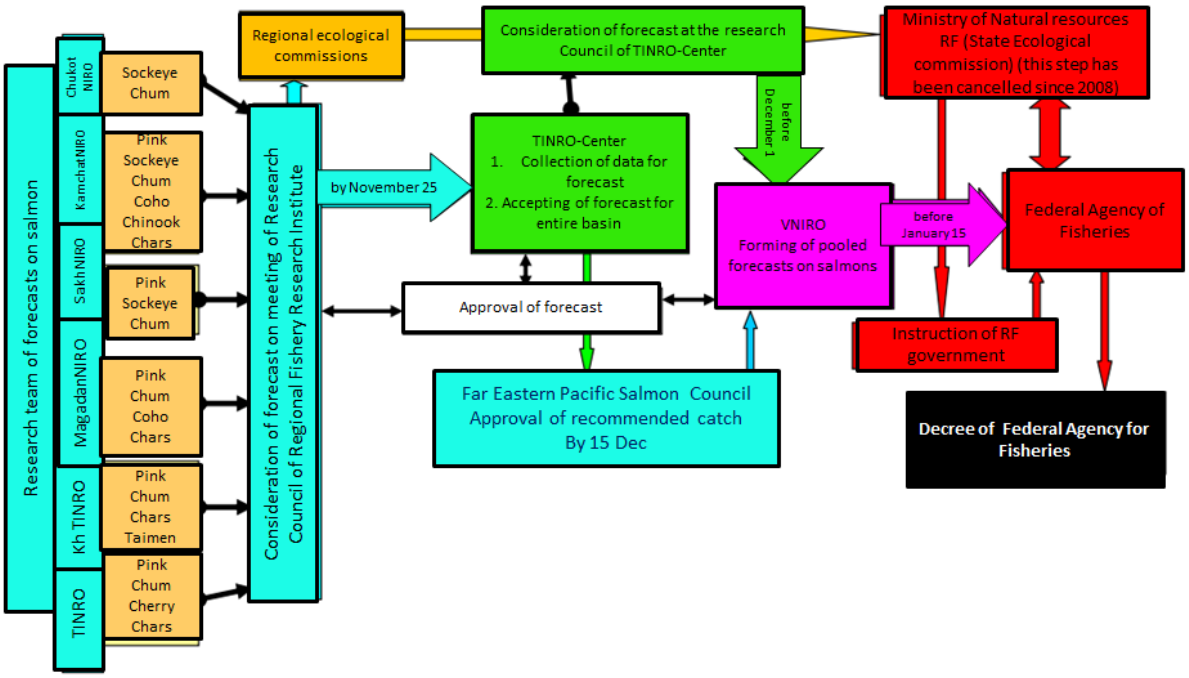


Figure 71. A procedure of issuing of the Pacific salmon recommended catch (Rassadnikov, 2006).

In-season Process

The Anadromous Fish Commission (AFC) opens and closes fishery times and areas based on harvest and escapement relative to expectations and objectives (Figure 70). Usually, all these operations are done by decisions of AFC based on recommendations of KamchatNIRO.

Approved value of annual recommended catch may be adjusted by AFC based on real-time data on the number of the salmon approaching the fishing areas and spawning grounds. In order to assist in this adjustment, KamchatNIRO monitors the dynamics of catches and biological indicators of salmon runs in the main areas of operation, in the migration routes and the reproduction of the species. Each coastal set net or river beach seine is served by a crew of

fishermen. The crew leaders report directly to the company's Directors. Each crew keeps fishing log according to the template specified by the FAR. This log records: coordinates of seine; daily catch (in metric tons); and species composition and bycatch. Each company submits information on the catch volumes and species composition to SVTU daily which is then summarized for reporting to the AFC. The monitoring results are used for developing operational guidelines on salmon fishing.

The procedure of termination of fishing is not complex and can be done by AFC based on recommendations of KamchatNIRO. Following this decision, SVTU terminates all fishing activity if necessary, and may implement special closed days to obtain spawning escapement goals. Increase of quota now, when approval by State Ecological Expertise is not necessary anymore, is also not difficult and can be done by AFC based on recommendations of KamchatNIRO. Such a management system existed during 1990s, before introduction of the State Ecological Expertise and was considered quite convenient.

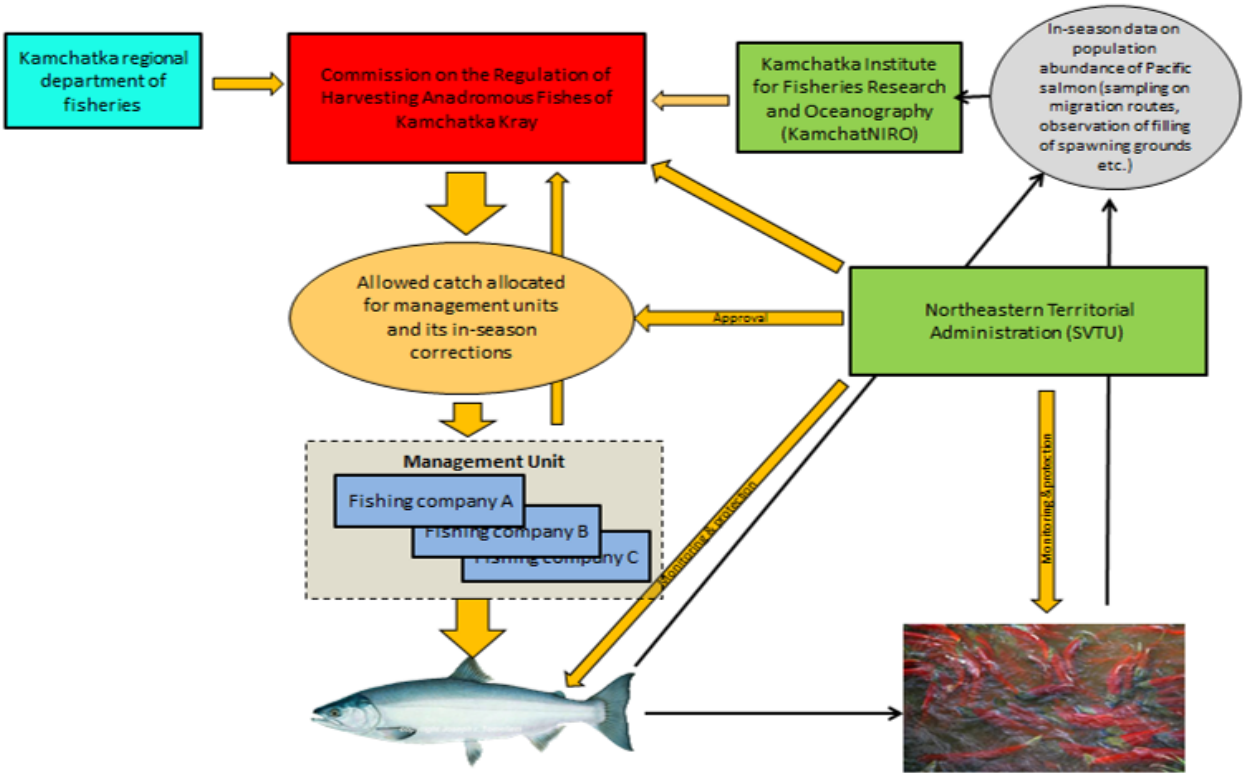


Figure 72. **In-season management of the Kamchatka salmon fishery.**

Enforcement

SVTU controls the compliance with the law and rules of fishing. SVTU contains in total 12 departments and among them the department of state control, supervision and protection of aquatic resources and habitats with enforcement functions. SVTU includes 12 local departments situated in every administrative district of Kamchatka Oblast. Fishing area assessed in this report is in the territory of Karaginsky district department. The supervision is conducted by the number of state inspectors and also voluntary inspectors, which are funded by the fishing companies in the area. SVTU has responded to concerns of bribery and corruption of enforcement officers by monitoring agents through undercover surveillance of officers and monitoring changes in officer

life styles; encouraging reporting by competitors and acquaintances; and by increasing penalties including fines and job loss for convictions. SVTU reports that corruption cases have declined to about one per year, with none in 2013-14.

SVTU reports that illegal fishing by fishing companies has diminished to low levels since the beginning of the Olympic System and the removal of individual quotas for the companies. Partly, it is explained just by change of organization of fisheries - now companies do not have incentives to hide their catch, and their reports are more objective. At the same time, sanctions on companies are severe, including fines and loss of fishing privileges (cancellation of leases), which reduce incentives to fish illegally or launder illegal roe. SVTU stated that inflated catches reported by fishing companies to cover purchases of illegal roe have not been detected, and that exchange of information with tax inspectors is used to compare roe production with reported fish quantities.

As the amount of illegal fishing and misreporting by fishing companies has decreased, the dominant component of illegal fishing comes through poachers from outside the region and from residents, including indigenous people. Shevlyakov (2013) estimated that criminal poaching represents 5-10% of legal harvest in Kamchatka and traditional poaching represents 3-5%, for a likely range of 8-15%. Criminal poaching is focused on road-accessible areas with significant local populace (e.g., Bolshaya and Kamchatka rivers).

The companies clearly understand the importance of work on protection of aquatic biological resources. In 2018 by the joint effort of fishing companies and SVTU two observation posts were established on the rivers Uka and Makarievaskaya (Supplement 1). In case of particular companies under assessment, the “Kolkhoz im. Bekereva” and “Ukinskij Liman” provide fuel, motorboats and other material resources on behalf of provision of SVTU activities (Supplement 2).

According to SVTU, which performs patrols each year, number of the law infringements in Karaginsky Bay basin during period 2013-2017 was about at the same level: 2013-66, 2014-72, 2015-97, 2016-95, 2107-90 (Supplement 2). On 19 September 2018 (salmon spawning migration was not finished at this time), 35 infringements was registered, most of them on violation of fishing rules (mostly poaching). The violations are reported for Ivashka river (13), Dranka River (2), Ossora River (1), Karaga River (4), Tymlat River (6), Sigaektap River (6), Letnik Stream (2), Kichiga River (1) (Supplement 1, 3).

Information about one violation, which took place in Ossora lagoon 15 June 2016, when the poachers illegally caught almost 1.5 mt of pink salmon, and were convicted, was published: http://www.kamprok.ru/brakoneram-iz-karaginskogo-rajona-ne-udalos-ujti-ot-otvetstvennosti/. Another article reporting about poaching in Karaginsky district in 2014, describes illegal warehouses and workshops found in settlements Karaga, Tymlat and Ossora. The owners of these facilities, where tonnes of caviar were kept, did not present documents about its origin, meaning that it is most probably, illegal product (http://ikornaya.ru/articles/284/).

Legal challenges are not currently reported.

Research Plan

Until mid-1990’s the studies of salmon in the Far East Russian Federation were performed according to the complex target program “Salmon,” which was controlled by the former Committee on Fisheries of Russian Federation (Federal Agency for Fishery). This program was designed for every 5 years starting with mid-1980s. Studies in second half of 1990s were performed according to 5-year programs, which took into account the basin and partly the ecosystem approaches. In 2005, the TINRO-center with the participation of regional NIROs, have developed “The concept

of the Far East basin program for the complex study of Pacific Salmon for period 2006-2010", which was approved by Rosrybolovstvo (which is now FAR). In accordance with this concept TINRO-center has developed the "Far East basin program for complex study of Pacific Salmon for period 2007-2012".

According to the political course of FAR on the centralization of fisheries research in 2009, VNIRO has developed the departmental comprehensive target research program for fisheries of Russian Federation for 2010-2014 named "Scientific support and monitoring of conservation of reproduction and rational using of resources of fisheries base". Within that program the "Far East basin program of complex study of Pacific Salmon for period 2010-2014" was adopted in which the succession of approach and research directions was preserved. In accordance with this program, the TINRO-center develops its annual program of complex research of Pacific Salmon; and regional institutes, including KamchatNIRO, develop their own annual research salmon programs. All annual programs are approved by FAR.

Regional fishery research institutions carry out studies of salmon in the river and early marine life periods, which includes the study of biology, population structure, escapement monitoring, survival of eggs, downstream migration of fry, feeding of juveniles in estuarine period and the collection of statistics of salmon catch. TINRO-center directs and carries out research of marine life period of salmon, including the study of the state of ocean and marine biota in the feeding areas and migration routes of salmon, and total trawl counts of juvenile of salmon during catadromous migration and abundance of salmon in the period of anadromous migration.

At the end of the year, the results of these programs are discussed in the Far East Salmon Council at TINRO-center and published in the annual edition of The Bulletin of the Implementation of the "Concept of the Far East basin program for the complex study of Pacific Salmon". A total of 9 bulletins for the period 2006-2014 have been published (in 2011-2014 the books were entitled "Bulletin of study of Pacific salmon). Funding for all the programs is provided by FAR from the federal budget.

Research program "Habitat forming role of anadromous fish in formation of ecosystems of riverine and lacustrine ecosystems of the Far East" was started in 2014, and data are partly collected in the Opala River in the area of certification. The ultimate goal of this program is analysis of quantitative relationships between biomass of anadromous fish entering the freshwater and production of rivers, estuaries and lakes of the Far East.

Fishing companies participating in this certification regularly help to workers of KamchatNIRO in terms of providing them infrastructure facilities (transportation, laboratory space etc.).

International Management

Russia is party to the Convention for the Conservation of Anadromous Fish Stocks in the North Pacific Ocean, and a member of the North Pacific Anadromous Fish Commission (NPAFC). The Commission promotes the conservation of anadromous fish in the Convention area, which includes the waters of the North Pacific Ocean and its adjacent seas north of 33° Latitude and beyond the 200-mile zones of the coastal states. The Commission requires member states to:

- Prohibit directed fishing for anadromous fish in the Convention Area.
- Minimize to the maximum extent of the incidental taking of anadromous fish
- Prohibit the retention on board a fishing vessel of anadromous fish taken as an incidental catch during fishing for non-anadromous fish.

The Convention authorizes research fishing for anadromous fish on the high seas if consistent with the NPAFC science program. The parties conduct joint research programs including exchange of information. The parties have an obligation to enforce the provisions of the Convention.

5.4.2 Principle 3 Performance Indicator scores and rationales

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** - **Is capable of delivering sustainability in the UoA(s);** - **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** - **Incorporates an appropriate dispute resolution framework**		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guide post	There is an effective national legal system **and a framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Yes	Yes	No
Rationale				
SG60 - see SG80 SG80 - the Russian Federation has an effective salmon fishery management system. Section 7.6.1 (P3 Background) provides details of the Russian management system, including federal and state scientific and management agencies and the laws under which they operate. Management of Kamchatka salmon fisheries is administered by Federal and Regional governmental agencies. Kamchatka Krai, 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. Fisheries of Russia are managed and controlled by Federal Fishery Agency (FAR) of the Russian Federation, which located in Moscow and also represented by a local office in Kamchatka. Operational management of all activities is performed by the Governor of the Kamchatsky Kray. The Federal Law "On fisheries…" sets that all citizens, public organizations, and associations have the right to participate in decision making process. For these purposes the FAR maintains a multi-level system of public (community) and scientific fishery councils providing opportunities to participate and influence on decision process and regulations. SG100 – given the continuing significance of illegal fishing by some residents of the region, it is not clear that the legal system and cooperation by all parties are 100% effective. Therefore, the SG100 standard is not achieved.				
b	Resolution of disputes			
	Guide post	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be**	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context

			effective in dealing with most issues and that is appropriate to the context of the UoA.	of the fishery and has been **tested and proven to be effective**.
	Met?	Yes	Yes	Yes

Rationale

SG60,80 - see SG100

SG100 - the management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. The legal system is based on civil law system with judicial review of legislative acts. An evidence of effectiveness of system of resolution of legal disputes comes from the open-access judicial protocols (http://sudact.ru/regular/participant/nX2uCqjkPrYc/) Although there were no cases of successful accusation of the company "Kolkhoz im. Bekereva" delivered in the regional courts, in all shown cases the company demonstrated obedience with the law and was not observed in multiple repeated violations of the same type. All the disputes were resolved and protocols published transparently. The SG100 is therefore awarded.

c	Respect for rights			
	Guide post	The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Yes	Yes	Yes

Rationale

SG60,80 - see SG100

SG100 - the management system has a mechanism to formally commit to the legal rights created explicitly and practicing by people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2 (SG 100). The federal law on indigenous peoples of the Far North applies to the management system to ensure their traditional fisheries and livelihoods. In accordance with the law, every district establishes fishing sites for indigenous peoples near their homes. While distributing quotas for salmon fishing, the Anadromous Fish Commission first sets a quota for indigenous peoples (the rate of 100 kg per person per year of aquatic biological resources for local population has been established by the government of Kamchatka Krai). The remainder of the quota is distributed among the other users of water resources. Representatives of the Association of Indigenous Peoples of Kamchatka are involved in the distribution of the quota. In the case the interests of the indigenous peoples are violated, the legal system intervenes.

References

Database with court decisions http://sudact.ru/regular/participant/nX2uCqjkPrYc/

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	>80
Information gap indicator	Information sufficient to score PI
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	95
Condition number (if relevant)	--

PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.
	Met?	Yes	Yes	No
Rationale				
SG60 - see SG80 SG80 - organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction, thus should be scored at least SG80. All stakeholders, including fishing companies and public organizations, are able to participate in the decision-making process. All interested parties are part of main management body – The Anadromous Fish Commission on local Kamchatka level. On higher levels, also there are structures which allow to participate interested parties such as Public Council for FAR. Each representative has the right to vote and can influence the decision. This collective body bears the responsibilities for the decisions made. SG100 – the guidepost is not met since not all functions, roles and responsibilities are clearly understood. Some overlaps in responisbilities might occur.				
b	Consultation processes			
	Guide	The management system includes consultation	The management system includes consultation	The management system includes consultation

	post	processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
	Met?	Yes	Yes	Yes

Rationale

SG60,80 - see SG100

SG100 - the management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used through public discussions in the Anadromous Fish Commission (AFC) with decisions publicized on the internet. Consultations with stakeholders are conducted on the regional level via the AFC. As part of the consultation process AFC sends information used for pre-season management to all stakeholders. During its meeting, the AFC examines data on the intensity of salmon runs, hydrological regime in the spawning grounds and fill rate of spawning ground by spawners, as well as recommendation of KamchatNIRO on the timing and regulation of fishing. AFC decisions are recorded. The protocols of the AFC meetings are sent to all interested parties and published on web site of Federal Fishery Agency. SG100 is met.

c	Participation			
	Guide post		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.
	Met?		Yes	No

Rationale

SG80 - the consultation process provides opportunity for all interested and affected parties to be involved and facilitates their effective engagement, thus the SG80 is met. However, the process does not appear to always encourage and facilitate effective engagement by nongovernmental or industry interests. Mechanisms for involvement of environment and different interest groups as well as the broader community are not well developed, but there are number of non-governmental organizations that are interested in salmon fisheries in Kamchatka area. Stakeholders may have an opportunity for involvement but may have reluctance to participate as a carryover from Soviet days.

SG100 - while internal information from the management agencies is technically available to the public, the process for obtaining it can be involved making access difficult. This does not allow to score this PI 100.

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	>80
Information gap indicator	Information sufficient to score PI
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	85
Condition number (if relevant)	--

PI 3.1.3 – Long term objectives

PI3.1.3		**The management policy for the SMU and associated enhancement activities has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are **explicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. The over-arching fisheries and resource regulations cited earlier in this report lay out long-term objectives and long-term goals for the salmon fisheries of the Russian Far East. The regional fisheries management demonstrates its strategy towards sustainable use of fish resources by contribution to fisheries research, increasing control over poaching, development of modern fish-processing factory, contribution to social sphere, and organization of protected areas.

SG100 - However, objectives consistent with MSC Principles and Criteria and the precautionary approach are not always required by management policy.

References

Tymlat Karaginsky Salmon Public Comment Draft Report.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	85
Condition number (if relevant)	--

PI 3.2.1 – Fishery-specific objectives

PI3.2.1		**The fishery-specific and associated enhancement management system(s) activities have clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	**Objectives,** which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery and associated enhancement management system(s).	**Short and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery and associated enhancement management system(s).	**Well defined and measurable short and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery and associated enhancement management system(s).
	Met?	Yes	Yes	No
Rationale				

SG60 - See SG80

SG80 - Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and enhancement activities. These include short term objectives for spawning escapements intended to provide for maximum sustained yield and long-term objectives for fishery sustainability reflected in management regulation.

Objectives consistent with Principles 1 and 2 are also reflected in the absence of enhancement of species in areas which are under scope of this certification. Most rivers are completely free of hatcheries. According to overall strategy of development salmon fisheries in Russia, hatcheries are among the priorities to increase fishery productivity. At the moment, however, there are no specific plans to further develop hatchery system in the Kamchatka.

SG100 - Short and long-term objectives do not always provide clear measurable standards with respect to effects of fisheries on the ecosystem. Objectives are explicit with respect to protecting spawning escapement but are less clear on the environmental/ecosystem end. If ecosystem changes were

observed, a response would be expected; but no substantive changes have occurred at the level of current monitoring. Therefore, this performance indicator might partially meet the SG100 for hatchery objectives but does not meet the SG100 for specific objectives related to fishery effects on the ecosystem.

References
Tymlat Karaginsky Salmon Public Comment Draft Report.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

PI 3.2.2 – Decision-making processes

PI3.2.2		**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**		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific and enhancement objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific and enhancement objectives.	
	Met?	Yes	Yes	

Rationale
SG60 - See SG80 SG80 - Well-established and formal decision-making processes result in measures and strategies to achieve the fishery-specific objectives. The Anadromous Fish Commission (AFC) is a central feature of the decision-making process. The AFC is responsible for the distribution of recommended 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 government, industry and interested stakeholders. These include 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. Upon the request of fishing companies, the AFC sets up the recommended catch for a management unit area and accepts applications from the users, each of which cannot exceed the total recommended catch for management unit. In case of approaching recommended

catch for some management unit, AFC can close fishing or increase the recommended catch following recommendations of KamchatNIRO. The AFC meets regularly before and over the course of the fishing season. The AFC's decisions are made through discussions and consultations with stakeholders. All meetings are open to the public.

b	Responsiveness of decision-making processes			
	Guide post	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Yes	Yes	No

Rationale

SG60 - See SG80

SG80 - Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. KamchatNIRO uses relevant information to provide pre-season forecasts so that fishermen, buyers, processors, and the Anadromous Fish Commission can plan for the upcoming season. The Anadromous Fish Commission considers a wide range of issues regularly reported by federal and regional agencies and those brought up by stakeholders to make in-season decisions. All stakeholders have an opportunity to attend the Anadromous Fish Commission meetings.

SG100 - It cannot be concluded that decision-making processes respond to all issues due to the lack of transparency regarding many internal decisions by Russian governmental agencies. For instance, information on run size, harvest by time and area, fishery management actions, and escapement is not typically reported outside the management system except in summary form in the case of serious and other important issues addressed during public processes.

c	Use of precautionary approach			
	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Yes	

Rationale

SG80 - The decision-making processes are compliant with the national legislation (Law "On protection of the environment" (2001)) requiring the priority conservation of resources and favorable environment, and are based on best available information provided by research institute KamchatNIRO and territorial branch of FAR - SVTU. The use of diversified Spawner-Recruit models and testing of LRP defined demonstrate the precautionary approach. Information received in-season assures that the management

system uses current information. The target reference point occurs approximately at the midpoint of the optimal escapement range. Higher levels of precaution would occur as the target moved toward the upper end of the range.

d	Accountability and transparency of management system and decision-making process			
	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's 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.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Yes	No	No

Rationale

SG60. Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. This is achieved by transparent decision-making in the Anadromous Fish Commission, which gathers for meetings once per several days during a fishing season. For instance, in 2018 the Commission carried out 34 meetings from 9 April to 25 October devoted to management of Pacific salmon and char fisheries. Decisions are available for all interested parties and immediate (usually within few hours after the meeting) publication of its decisions at the SVTU website (http://xn--b1a3aee.xn--p1ai/organizatsiya-rybolovstva/rybolovstvo-v-tsifrakh/komissiya-po-regulirovaniyu-dobychi-vylova-anadromnykh-vidov-ryb/protokoly-zasedaniya-komissii-po-kamchatskomu-krayu.html). The protocols contain information about participants of the meeting, questions discussed, results of voting and decisions have been made accompanying by relevant information. Moreover, significant amount of information about current situation is available from the SVTU website.

SG80 - At the same time, 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. Inconsistent availability of annual fish run and fishery information outside the local governmental management system limits the availability of information for actions or lack of action associated with findings and relevant recommendations; therefore, the fishery does not score 80.

e	Approach to disputes			
	Guide post	Although the management authority or fishery may be subject to continuing	The management system or fishery is attempting to comply in a timely fashion with judicial decisions	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial

		court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	arising from any legal challenges.	decisions arising from legal challenges.
	Met?	Yes	Yes	Yes
Rationale				
SG60, 80 – see SG100 SG100 – all stakeholders interested in salvation of disputes are able to appeal to the court. According to the judicial protocols for the legal challenges of the last years, which are available in the open access (http://sudact.ru/regular/participant/nX2uCqjkPrYc/), the fishery “Kolkhoz im. Bekereva” acted proactively to avoid legal disputes. There were no cases of successful accusation of the company “Kolkhoz im. Bekereva” delivered in the regional courts. Nevertheless, the company's position was always represented at the court meetings, there was no disrespect, and the disputes were resolved according to the national legislation, which provides the high probability for the readiness to implement necessary decisions. Based on open-access protocols, it is also unlikely that the company regularly repeats the violations of the same laws, which could have compromised the sustainability required in P1 and P2. Thus, the SG100 can be awarded.				
References				
Database with court decisions http://sudact.ru/regular/participant/nX2uCqjkPrYc/				

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	75
Condition number (if relevant)	4

PI 3.2.3 – Compliance and enforcement

PI3.2.3		**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			

	Guide post	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	No
Rationale				
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 those in the assessment, 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. Client companies intensively cooperate with state enforcement agencies (SVTU, State police) to enforce salmon spawning rivers within UoC (Supplement 1, 2). SG80 – the available information shows that illegal fishing is still active in the area. Recently, in several settlements located in the UoC there were found significant (few metric tonnes) storages of illegal caviar which demonstrates presence of well-organized distributional networks despite on increasing level of enforcement. Moreover, very high level of anti-poaching activities performed by companies and state agencies, when multiple infringements are reported, reflects high significance of the problem of IUU fishing. 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 in some areas of Kamchatka 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 in some areas. The SG80 is not met.				
b	Sanctions			
	Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.
	Met?	Yes	Yes	No
Rationale				
SG60 - Sanctions to deal with noncompliance exist, are consistently applied and thought to provide effective deterrence for well-run fishing companies including those in this assessment. 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 – Sanctions appear to be applied effectively applied and provide effective deterrence in areas like Karaginsky Bay which are remote and controlled by fishing companies.

SG100 - Questions remain regarding the consistency of application and the effectiveness of deterrence for illegal harvest activities in freshwater by non-commercial fishers in other more-accessible areas of Kamchatka. Sanctions do not appear to provide effective deterrence to components of illegal fishing which remains significant in accessible systems. While apparently much reduced from historical levels, illegal harvest remains a chronic concern in other areas.

c	Compliance			
	Guide post	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

Rationale

SG60, 80 – 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. There is no evidence of systematic noncompliance by commercial fishing companies in the judicial protocols, the authorities and stakeholders also confirm the compliance of the companies participating in this certification. The fishing companies closely cooperate with SVTU to protect salmon populations from illegal activities and fund 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 2008.

d	Systematic non-compliance			
	Guide post		There is no evidence of systematic non-compliance.	
	Met?		Yes	

Rationale

There is no evidence of systematic noncompliance by commercial fishing companies in the judicial protocols, the authorities and stakeholders also confirm the compliance of the companies participating in this certification. Thus, the guidepost is met.

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	Information sufficient to score PI
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	75
Condition number (if relevant)	5

PI 3.2.4 – Monitoring and management performance evaluations

PI 3.2.4		**There is a system of monitoring and evaluating the performance of the fishery-specific and enhancement management system(s) against its objectives** **There is effective and timely review of the fishery-specific and associated enhancement program(s) management system**		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	The fishery and associated enhancement program(s) has in place mechanisms to evaluate **some** parts of the management system.	The fishery and associated enhancement program(s) has in place mechanisms to evaluate **key** parts of the management system.	The fishery and associated enhancement program(s) has in place mechanisms to evaluate **all** parts of the management system.
	Met?	Yes	Yes	No
Rationale				
SG60 – See SG80. SG80 - The fishery and its enhancement programs have in place mechanisms to evaluate key parts of the management system. Key elements include catch monitoring process and the stock assessment that determine the level of removals occur during the annual fishing season and at the end to ensure the possibility of allowed catch over-run are minimized. There are mechanisms in place to adjust allowed catch or the allocation of allowed catch between management units these are evaluated annually. At the same time, available information does not prove that all parts of the management system are evaluated, which does not allow to score this element 100.				
b	Internal and/or external review			
	Guide post	The fishery-specific and associated enhancement program(s) management system is subject to **occasional internal** review.	The fishery-specific and associated enhancement program(s) management system is subject to **regular internal and occasional external** review.	The fishery-specific and associated enhancement program(s) management system is subject to **regular internal and external** review.
	Met?	Yes	Yes	No
Rationale				

SG60 – See SG80

SG80 – Guidance for this indicator considers whether there are opportunities and/or forums for decision-makers to receive feedback on the management system. The fishery has in place mechanisms to evaluate key parts of the management system and are subject to regular internal review. 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 (Shevlyakov et al. 2016). Methodical approaches to stock evaluation and the recommended volumes are discussed by a specialized Salmon Council of the Far East industry institutes within the research and engineering association of the Pacific Institute of Fishery and Oceanography (NTO TINRO), then assessed by the Scientific Council of KamchatNIRO, then by the Scientific Council of TINRO-Center and VNIRO (Russian Federation Research Institute of Fishery and Oceanography). After that the recommended regional volumes of Pacific salmon are reviewed and approved by the Industry Council of Rosrybolovstvo (Russian federal Fisheries Agency).

The fishery also has in place mechanisms for occasional external review. External review means external to the fishery management system. This could occur by another department within an agency, another agency or organization, an external government audit, a peer organization or expert peer reviewers. The FAR interacts with various agencies at the federal level while controlling its territorial departments and provides oversight of departments under its jurisdiction. The FAR evaluates the management system through its responsibility for defining the rules and the areas of fisheries and for preparation of federal-level and agency-level reports on the fishing industry. Federal review provides periodic external review of fishery programs implemented by the FAR. The operation of this system was demonstrated by changes in the system of fishery allocation from an assigned quota by fishing company to the Olympic system where the harvestable surplus is not allocated by fishing company prior to the fishing season. This change occurred in response to regional and Federal review processes working on concert.

SG100 – The fishery is not subject to regular external review as part of an established process.

References
Tymlat Karaginsky Salmon Public Comment Draft Report

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	--

6 References

Antonov N.P. 2011. Biology, population dynamics and rational exploitation of fish of the Kamchatka and adjacent marine territories. Doctoral thesis. VNIRO, Moscow.

Artyukhina N.B. 2014. Report by the agreement “The scientific monitoring of preliminary phase of fishery certification (Enterprises of South Karaginsky and Olyutorsky River Basins: “Vostochnyi Bereg LLC”, “Koryakmoreprodukt LLC”, Open-End Corporation “Bekerev Kolkhoz” and “Vyvenskoye LLC”.

Aydin K., Gaichas S., Ortiz I., Kinzey D., Friday N. 2008. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. NOAA NMFS Tech Memo. 233 p.

Blikshteyn, M. 2011. Vityaz-Avto Ozernaya River sockeye salmon fisheries improvement project. Wild Salmon Center. Portland OR.

Bugaev, A.V., Yu.N. Amelchenko and S.V. Lipnyagov. 2014. Rainbow smelt *Osmerus mordax dentex* in the shelf zone and inland waters of Kamchatka: state of stocks, fishing and biological structure//News of the Pacific Research and Development Commercial Fishing Center. - 2014. - V. 178. - P. 3-24. (Russian).

Bugaev A.V., O.V. Zikunova, N.B. Arryukhina, M.G. Feldman and S.V. Shubkin. 2018a. Report on contract No38/18-НИР. Analysis of the fishery and the stock status of Pacific salmons and chars in Karaginsky Bay basin (Eastern Kamchatka) (Dranka, Ivashka (Pankara), Sukhaya (Tengayvayam), Rusakova, Khaylyulya and Uka rivers) for the purpose of certification of the fishing industry of SC “Kolkhoz im. Bekereva" according to the standards of the Marine Stewardship Council (MSC). KamchatNIRO, 13.11.2018. Petropavlovsk-Kamchatsky.

Bugaev V. F. 1995. Asian Sockeye Salmon (freshwater period of life, the structure of local populations, population dynamics) // M: Kolos. 464 p.

Bugaev V. F., N.B. Artyukhina, M.G. Feldman and S.V. Shubkin. 2018b. REPORT ON CONTRACT No. 36/18-NIR dated 19.09.2018 Topic: Population dynamics and management system of fishery of local stock of Pacific salmons (humpback salmon, chum salmon, red salmon, coho salmon) of some rivers (Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka, Makarovka, Vyvenka) of Karaginsky subzone of the Eastern Kamchatka (scientific accompaniment of audit of Pacific salmons fishery according to MSC standards for “Vostochny Bereg” LLC). KamchatNiro, Petropavlovsk.

Bugaev V. F., Vronskiy B. B., Zavarina L. O., Zorbidi Z.K., Ostroumov A. G., Tiller I. V. 2007. Fishes of the Kamchatka River. Edited by Dr. Sc. Bugaev V.F. Petropavlovsk-Kamchatskiy: Izdatel'stvo KamchatNIRO, 459 p.

Bugaev, V. F. 2011. Asian Sockeye Salmon (freshwater period of life, biological structure, population dynamics). Petropavlovsk-Kamchatskiy: Izdatelstvo “Kamchatpress.”

Burkanov V. N. 1988. Modern state of the resources of marine mammals in Kamchatka // Rational use of biological resources Kamchatka shelf. Petropavlovsk-Kamchatskiy: Dal’nevostochnor kn. izd-vo, Kamchatskoe otd-nie, Pp. 138-176.

Chebanova, V.V. Bentos lososevykh rek Kamchatki [Bentos of salmon rivers in Kamchatka]. Moscow: VNIRO Publishing House. 172 c. Чебанова В.В. 2009. Бентос лососевых рек Камчатки. М.: Изд-во ВНИРО. 172 с

Essington T. E. 2009. Trophic cascades in open ocean ecosystems. In: Terborgh J.W., Estes J.A. (Eds.). The science of trophic cascades. Island Press.

Feldman, M.G and E.A. Shevlyakov. 2015. Survival capacity of Kamchatka pink salmon as a result of the cumulative effect of density regulation and external environmental factors// News of the Pacific Research and Development Commercial Fishing Center. V.182. pp. 88-114 (Russian).

Gaichas S. K, Francis R. C. 2008. Network models for ecosystem-based fishery analysis: a review of concepts and application to the Gulf of Alaska marine food web. Can. J. Fish. Aquat. Sci., V. 65: pp. 1965-1982.

Gende S. M., Edwards R. T., Willson M. F., Wipfli M. S. 2002. Pacific Salmon in Aquatic and Terrestrial Ecosystems. BioScience V. 52: pp. 917-928.

Groot C., Margolis L. Pacific Salmon Life Histories. 1991. Vancouver, British Columbia (Canada). UBC Press. 564 p.

Irvine J. R., and 9 coauthors. 2009. Pacific salmon status and abundance trends. North Pacific Anadromous Fish Commission Document 1199, rev. 1.

KamchatNIRO. 2017. Review of stock status of Pink Salmon, Chum Salmon, Sockeye Salmon in rivers Laguna Kavacha, Pakhacha, and in the costal line from river Emet to Impuka Severnaya (Imka) of Karaginsky Bay of Bering Sea. Prepared for pre-assessment against the standards on sustainable fisheries of Marine Stewardship Council. Petropavlovsk-Kamchatsky, March 2017.

Kizevetter I. V. 1971. Technological and chemical characteristics of commercial fish of the Pacific rim. Vladivostok: Palizdar, 298 p.

Kosygin G. M., Trukhin A. M., Burkanov V. N., Makhnyr A.I. 1986. Rookeries of seals on the shores of the Okhotsk sea // Scientific research works on marine mammals of the Northern Pacific Ocean in 1984-1985. M: VNIRO, Pp. 60-70.

Kozlov, A.P. 2008. Impact of the alluvial deposits development on the ichthyofauna reproduction in the adjacent water basins (Kamchatka). Gorny informatsionno-analitichesky bulletin MGGU. №5: 376-383.

Krashennikov S.P. 1949. Description of the Kamchatka. With supplementary reports and other unpublished materials. M: Glavsevmorput'.

Lajus, D. 2020. Marine Stewardship Council certifications of fisheries as a source of information on status of non-target species: cases of the Russian Barents Sea codfish and Far East salmon trapnet fisheries. Draft manuscript.

Leman V.N., Upryamov V.E., Chebanova V.V. 2000. Ecological problems of alluvial and ore gold mining in salmon spawning rivers basins of Kamchatka. Problemy okhrany I ratsionalnogo ispolzovania bioresursov Kamchatki. Doklady Vtoroy Kamchatskoy Oblastnoy // Problems of protection and rational use of bioresources of Kamchatka. Dokl. Second Kamnauchno-prakticheskoi conferentsii. Petropavlovsk-Kamchatsky. C. 49–60.

Mahnken C., Ruggerone G., Waknitz W., Flagg T. 1998. A historical perspective on salmonid production from Pacific Rim hatcheries. North Pacific Anadromous Fish Commission Bulletin 1: Pp. 38-53.

MRAG. 2019. Tymlat-Karaginsky Bay salmon fisheries. Public Comment Draft Report. January 2019. MSC.org.

Myers K. W., Walker R. V., Davis N. D., Armstrong J. L., Kaeriyama M. 2009. High seas distribution, biology, and ecology of Arctic–Yukon–Kuskokwim salmon: direct information from high seas tagging experiments, 1954–2006. Pp. 201–239 in C.C. Krueger and C.E. Zimmerman, editors. Pacific Salmon: ecology and management of western Alaska's populations. American Fisheries Society, Symposium 70, Bethesda, Maryland.

Naydenko S. V. 2009. The role of Pacific salmon in the trophic structure of the upper epipelagic layer of the western Bering Sea during summer–autumn 2002–2006. N. Pac. Anadr. Fish Comm. Bull. 5: pp. 231–241.

Ostroumov A.G. 1968. Aerovisual counting of brown bear in Kamchatka and some results of observations on the behaviour of animals. Biuleten moskovskogo obschestva ispytatelei prirody. Otdelenie biologia, vypusk 73: 35-50.

Ostroumov A.G. 1995. Spawning stock of salmon in Kamchatka region. Archive of the KamchatkaNIRO. 92 p.

Peterman R. M. 1991. Density-dependent marine processes in North Pacific salmonids: Lessons for experimental design of large-scale manipulations of fish stocks. ICES Marine Science Symposium 192: pp. 69-77.

Rassadnikov O. A. 2006. Forecasted and actual catch of salmon in the Far eastern basin in 1993-2006. Bulleten N 1 Realizatsii Kontseptsii Dal'nevostochnoy Basseynovoy programmy izuchenia tikhookeanskikh lososey". Izdatelstvo TINRO-Tsentr. Vladivostok.

Red data book of Kamchatka. 2006. Petropavlovsk-Kamchatskiy: Kamchatskiy pechatnyy dvor. Knizhnoe izdatelstvo. V. 1. 272 p.

Ruggerone G. T., Goetz F. A. 2004. Survival of Puget Sound Chinook Salmon (Oncorhynchus tshawytscha) in response to climate-induced competition with Pink Salmon (Oncorhynchus gorbuscha). Canadian Journal of Fisheries and Aquatic Sciences, V. 61: pp. 1756-1770.

Ruggerone G. T., Nielsen J. L. 2004. Evidence for competitive dominance of Pink Salmon (Oncorhynchus gorbuscha) over other salmonids in the North Pacific Ocean. Reviews in Fish Biology and Fisheries, V. 14: pp. 371-390.

Ruggerone G. T., Zimmermann M., Myers K. W., Nielsen J. L., Rogers D. E. 2003. Competition between Asian Pink Salmon (Oncorhynchus gorbuscha) and Alaskan Sockeye Salmon (O. nerka) in the North Pacific Ocean. Fisheries Oceanography. V. 12 (3): pp. 209–219.

Ruggerone G. T., Farley E., Nielsen J., Hagen P. 2005. Seasonal marine growth of Bristol Bay Sockeye Salmon (Oncorhynchus nerka) in relation to competition with Asian Pink Salmon (O. gorbuscha) and the 1977 ocean regime shift. Fish. Bull. V. 103: pp. 355¬370.

Ruggerone G.T., Peterman R.M., Dorner B., Myers K.W. 2010. Magnitude and trends in abundance of hatchery and wild Pink, Chum, and Sockeye Salmon in the North Pacific Ocean. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science, V. 2: pp. 306-328.

Sandercock F.K. 1991. Life history of Coho Salmon (Oncorhynchus kistuch). Pages 395 to 446 in C. Groot and L. Margolis, editors. Pacific salmon life histories. University of British Columbia Press. Vancouver, British Columbia, Canada.

Schindler D.E., Scheurell M.D., Moore J.W., Gende S.M., Francis T.B., Palen W.J. 2003. Pacific salmon and the ecology of coastal ecosystems. Front Ecol Environ 1:31–37.

Semenov D., Yanislavsky V., Markov P. 2015. Independent Observers Vitiaz-Avto and Delta Fishery Report. Kamchatka Fish Fund. Petropavlovsk-Kamchatsky

Sharp, D., S. Sharr, and C. Peckham. 1994. Homing and straying patterns of coded wire tagged Pink salmon in Prince William Sound. Proceedings of the 16th northeast Pacific Pink and Chum salmon workshop. University of Alaska, Sea Grant Program, Report 94-02:77–82. (Fairbanks.)

Shevlyakov E. A. 2013. Structure and dynamics of illegal coastal fishing of Pacific salmon in Kamchatka region in modern period // Rybnoe khozyaystvo, №2. C. 58-65.

Shevlyakov, E. A., Dubynin, V. A., and A. Bugaev. 2011. Improving environmental responsibility of the resource: practical recommendations for implementing principles of sustainable fishery based on voluntary environmental standards for MSC certification. Federal Agency for Fisheries, Kamchatka Research Institute of Fisheries and Oceanography. Report to the World Wildlife Federation (Project WWF19/RU007020/GLM). Petropavlovsk-Kamchatsky.

Shevlyakov E. A., Dubynin V. A., Zaporozhets O. M., Golobokova V. N. 2014. Report on the Contract N28/13-BO on topic: scientific support of certification MSC of Bolsheretsk LTD". KamchatNIRO.

Shevlyakov, E. A., V. A. Dubynin, M. G. Feldman, L. O. Zavarina, I. V. Tiller, S.V. Shubkin, O. A. Zakharova, O. V. Zikunova N. B. Artyukhina, and V. N. Baeva. 2016. Report under Contract No. 04/15-НИР dated 23.06.2015 Subject: Pacific salmon (Humpback, Chum, red, Coho, Chinook) population characteristics, target indexes and harvest management system in certain rivers (Vorovskaya, Kol, Opala, Golygina, Koshegochek, Ozernaya) in West Kamchatka (scientific justification of Pacific salmon harvest certification to MSC standards for Vityaz-Avto LLC and Delta LLC). KamchatNiro, Petropavlovsk.

Shevlyakov, E. A., V. A. Dubynin, M. G. Feldman, L. O. Zavarina, S.V. Shubkin, and O. A. Zakharova. 2017. REPORT ON CONTRACT No 24/17-НИР dated 05.10.2017 Object: "Population dynamics, biological structure and management system of Pacific salmon local stocks fishing (Pink salmon, Chum salmon) in some rivers (Tymlat, Kichiga, Ossora, Virovayam, Belaya, Paklavayam, Karaga, Dranka, Vytvirovayam) of Eastern Kamchatka (scientific follow-up for Pacific salmon fishery certification according to the MSC standards for LLC Tymlatskiy Rybokombinat)." KamchatNiro, Petropavlovsk.

Shuntov V. P., Temnykh O. S. 2008. Pacific salmon in marine and ocean ecosystems: monograph. V. 1 // Vladivostok: TINRO-Tsentr, 481 p.

Shuntov V. P., Temnykh O. S. 2011. Pacific salmon in marine and ocean ecosystems: monograph. Pacific Scientific-Research Fisheries Center. Vladivostok: TINRO-Tsentr, V. 2. 473 p.

Steller G.V. 1999. Opisanie zemli Kamchatki [Description of the Kamchatka land]. Petropavlovsk-Kamchatskiy. Kamchatskiy Knizhnyi Dvor.

Temnykh O.S., Kurenkova E.V. 2006. Distinctive features of preanadromous and postctadromous migrations of pink salmon in the western Bering Sea in 2002-2006. TINRO. V.151. P. 96-114.

Temnykh O. S., Zavolokin A. V., Koval M. V. 2010. Russian Research under the NPAFC Research Plan 2006-2010: A Review and Future Issues. Pacific Research Fisheries Center (TINRO-Center), Vladivostok, Russia. NPAFC Doc. 1238. 23 pp. (Available at www.npafc.org).

Urawa S., Sato S., Crane P. A., Agler B., Josephson R., Azumaya T. 2009. Stock-specific ocean distribution and migration of Chum Salmon in the Bering Sea and North Pacific Ocean. N. Pac. Anadr. Fish Comm. Bull. V. 5: pp. 131-146.

Vronskiy B. B. 1972. Materials on the reproduction of the Oncorhynchus tschawytscha (Walbaum) of the River Kamchatka // Vopr. Ikhtiologii. V. 12. № 2. P. 293-308.

Vronskiy B. B. 1994. Dependence of reproduction efficiency of Chinook salmon in the basin of the river Kamchatka from the hydrological regime // Systematics, biology and biotechnology of salmonids breeding. St. Petersburg. Materials of the Fifth All-Russian Conference. P. 34-35.

Vvedenskaya T.L., Ulatov A.V. 2015. Review of the results of studies of salmon water bodies with different degree of anthropogenic load in the Kamchatka region. Trudy VNIRO. 157: 173-188.

Zavarina L. O. 2003. Biological structure of the Chum salmon Oncorhynchus keta of the northeastern coast of Kamchatka // Readings of the memory of V. Ya. Levanidov. Issue 2. Vladivostok, March 19-21, 2003. Vladivostok. Dal'nauka. Pp. 531-540.

Zikunova O. V. 2014. Biological characteristics of the Oncorhynchus tschawytscha (Walbaum) breeding stock of the River Kamchatka basin // Issled. Vodn. Biol. Resursov Kamchatki i sev.-zap. chasti Tikhogo okeana. Sb. Nauch. Tr. Kamchat. NII ryb. khoz-va i okeanografii. Issue 32. Pp. 48-58.

Zorbidi Z.K. 2010. Asian stocks of Coho Salmon. Petropavlovsk-Kamchatskiy: KamchatNIRO, 306 p.

7 Appendices

7.1 Evaluation processes and techniques

7.1.1 Site visits

A site visit was held in Petropavlovsk-Kamchatsky, Russian Federation on June 24 – July 5, 2019. Meetings were conducted in the Company Offices. A meeting with government scientific agency KamchatNIRO was conducted at the agency office. participants were in attendance are identified in Table 27. This site visit was part of a 2-week on-site visit to several Kamchatka salmon fisheries in either their first full assessment or surveillance cycles.

Table 27. Surveillance meetings in Petropavlovsk-Kamchatka, 2019.

Name	Organization	Title	Time & location
Dmitry Lavrentyev	Kolkhoz im. Bekereva, JSC	Financial Director	Kolkhoz im Bekereva Office, June 27
Artem Maslov	Ukinskij Liman, LLC	Deputy General Director, Economics Department	Kolkhoz im Bekereva Office, June 27
Ksenia Davydova	Vyvenskoe, LLC	Manager	Kolkhoz im Bekereva Office, June 27
Rostislav Filshin	Vyvenskoe, LLC	Head of Production	Kolkhoz im Bekereva Office, June 27
Natalia Novikova	ForSea Solutions	Founder and Director, Client Group Consultant	All
Randy Ericksen	ForSea Solutions & RP Ericksen Consulting	Fisheries Advisor, Client Group Consultant	All
Amanda Stern-Pirlot	MRAG Americas	MSC Assessment Team Leader	All
Dmitry Lajus	MRAG Americas & St. Petersburg State University	Independent Consultant & MSC Assessment Team	All
Ray Beamesderfer	MRAG Americas & Fish Science Solutions	Sr. Fish Scientist &MSC Assessment Team	All
Sergey Vakhrin	Let's Save Salmon Together Museum	Director	Museum, village Yelizovo, June 25
Sergey Rafanov	WWF Russia	Director of Kamchatka\Bering Sea	Hotel Arsenyev, June 30
Alexander Bugaev	KamchatNIRO (Kamchatka Research Institute of Fisheries and Oceanography)	Deputy Director of Research	KamchatNIRO, June 26
Olga Zikunova	KamchatNIRO (Kamchatka Research Institute of Fisheries and Oceanography)	Head, Laboratory of Population Dynamics	KamchatNIRO, June 26
Nina Artukhina	KamchatNIRO (Kamchatka Research Institute of Fisheries and Oceanography)	Statistician	KamchatNIRO, June 26
Andrey Zdetovetsky	Kamchatka Fisheries	Minister	VA office, June 25

Vladimir Galitsyn	Kamchatka Association of Salmon Fishermen	Head	VA office, June 25
Aleksandr Khristenko	SVTU/FAR	Head of SVTU/FAR	FAR, June 26
Aleksandr Savin	SVTU/FAR	Deputy Director, SVTU/FAR	FAR, June 26
Veronika Simonova	European University of St. Petersburg	Research Fellow, Department of Anthropology	VA office, June 28

7.1.2 Stakeholder participation

A list of site visit participants and a description of stakeholder outreach is given in the section above. As noted, one eNGO stakeholder submitted written comments and requested a meeting with the assessment team in Petropavlovsk-Kamchatsky. The stakeholder comments received and response from the assessment team is given in the section indicated below.

MRAG sent a direct email regarding this assessment to all stakeholders on our stakeholder list, indicating where the ACDR could be accessed and instructions for how to submit comments or request a meeting with the team. MSC posted the announcement on their track-a-fishery webpage, as well as sent it by email in their Fishery Announcements newsletter to all registered recipients. This was done according to the process requirements as laid out in MSC's Fisheries Certification Process v2.1. Together, these media presented the announcement to a wide audience representing industry, agencies, and other stakeholders.

7.1.3 Evaluation techniques

MRAG published an announcement of the reassessment on our website and sent a direct email to all stakeholders on our stakeholder list. MSC posted the announcement on their track-a-fishery webpage, as well as sent it by email in their Fishery Announcements newsletter to all registered recipients. At this time, MRAG Americas also announced the assessment site visit dates and location, as well as the assessment team. This was done according to the process requirements as laid out in MSC's Fisheries Certification Requirements v2.1. Together, these media presented the announcement to a wide audience representing industry, agencies, and other stakeholders.

The assessment team and the clients set up meetings with Kamchatka salmon fishery management and science personnel, and industry, and harvest-sector representatives relevant to the fishery assessment.

The FCR v2.1 default assessment tree for salmon fisheries was used for this assessment, comprising 31 'performance indicators', nine in Principle 1, 15 in Principle 2, and seven in Principle 3. The performance indicators are grouped in each principle by 'component.' Principle 1 has two components, Principle 2 has five, and Principle 3 has two. Each performance indicator consists of one or more 'scoring issues;' a scoring issue is a specific topic for evaluation. 'Scoring Guideposts' define the requirements for meeting each scoring issue at the 60 (conditional pass), 80 (full pass), and 100 (state of the art) levels. Note that some scoring issue may not have a scoring guidepost at each of the 60, 80, and 100 levels. The scoring issues and scoring guideposts are cumulative; this means that a performance indicator is scored first at the SG60 levels. If not all of the SG scoring issues meet the 60 requirements, the fishery fails and no further scoring occurs. If all of the SG60 scoring issues are met, the fishery meets the 60 level, and the scoring moves to SG80 scoring issues. If no scoring issues meet the requirements at the SG80 level, the fishery receives a score of 60. As the fishery meets increasing numbers of SG80 scoring issues, the score increases above 60 in proportion to the number of scoring issues met; performance indicator scoring occurs at 5-point intervals. If the fishery meets half the scoring issues at the 80 level, the performance

indicator would score 70; if it meets a quarter, then it would score 65; and it would score 75 by meeting three-quarters of the scoring issues. If the fishery meets all of the SG80 scoring issues, the scoring moves to the SG100 level. Scoring at the SG100 level follows the same pattern as for SG80.

Principle scores result from averaging the scores within each component, and then from averaging the component scores within each Principle. If a Principle averages less than 80, the fishery fails.

Scoring for this fishery followed a consensus process in which the assessment team discussed the information available for evaluating performance indicators to develop a broad opinion of performance of the fishery against each performance indicator. Review of sections 3.2-3.5 by all team members assured that the assessment team was aware of the issues for each performance indicator. Subsequently, the assessment team member responsible for each principle, filled in the scoring table and provided a provisional score. The assessment team members reviewed the rationales and scores, and recommended modifications as necessary, including possible changes in scores.

Performance Indicator scores were entered into MSC's Fishery Assessment Scoring Worksheet to arrive at Principle-level scores (Table 28).

Table 28. Scoring elements

Component	Scoring elements	Main/not main	Retained?	Data-deficient?
Principle 1	Chum Salmon	--	Yes	No
Principle 1	Pink Salmon	--	Yes	No
Principle 1	Sockeye Salmon of Korfa Bay	--	Yes	No
Primary	Sockeye Salmon of Karaginsky Bay	Not main	Yes	No
Primary	Coho salmon	Not Main	Yes	No
Primary	Chinook Salmon	Not Main	No	No
Primary	Char	Not Main	Yes	No
Primary	Saffron cod (navaga)	Not Main	Yes	No
Primary	Rainbow smelt	Not Main	Yes	No
Secondary	Diving birds (misc. spp.)	Main	Yes	No
Secondary	Starry flounder	Not Main	Yes	No
Secondary	Miscellaneous marine species	Not Main	No	Not assessed
ETP	Steller sea lion	--	No	No
ETP	Steller sea eagle	--	No	No
Habitat	Sand, silt, gravel bottom	Main	--	No
Ecosystem		--		No

7.2 Peer Review reports

The following tables contain the peer reviewer comments and assessment team responses from peer reviewers A and B.

Peer Reviewer A, general comments

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	No	The report is generally well-written but is lacking detail in key parts, and I would like to see addiitonal conditions raised where informaiton is very limited, including on secondary and ETP species. There are also concerns on how the evidence used to justfy passing scores in P1, where it is accepted that the escapement survey coverage is limited and in-season managment is only described in general terms. More points are made against specific PIs.	See PI comments
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	No	Conditions 1 and 2 should be separated in to four separate conditions (two each for pink and chum in both cases), and Condition 3 has to be separated into five separate conditions (two each for pink and chum, and one for sockeye). This is consistent with (admittedly opaque) requirements at 7.18.1 ("The CAB shall set ... if **the** UoA achieves a score of less than 80..."), but is in any case essential because it means that if one species (UoA) doesn't meet the condition, it doesn't put the ongoing certification of the other species (UoA/UoAs) at risk.	It is not required to have separate conditions per scoring issue of UoA so long as as the action plan effectively addresses each scoring issue. Our experience with communicating conditions in these Russian salmon fisheries has found it easier to address related issues for a PI with one condition rather than having a long list of similar conditions for different species, stocks or scoring elements under one PI.

Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	No	Condition 1. Noting the concern about all four pink salmon and chum salmon UoAs being covered in the same condition, I note the condition here is to "Demonstrate that Pink Salmon and Chum Salmon in the Karginsky and Korfa stock management units (SMU) are at a level which maintains high production consistent with escapements at or fluctuating around its TRP." But only three years has been allowed - that seem far too short! In essence, how can a survey plan be designed and executed, with data available and anaysed over a sufficient period to demonstrate that "The SMU is at or fluctuating around its TRP." The client would be lucky to present a single year of data - will that be enough?	See PI comments
Enhanced fisheries only: Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	Yes	No enhancement occurs.	No response required
Traceability	N/A	A note on Section 4.3. The report states: "T*he current list of companies and their fishing parcels eligible for the current fishery certification will be published at the MSC website and may be changed. Salmon species specified in the UoC of the assessment, harvested by the companies of the Client Group with gears allowed in the Fishing Rules, and landed from authorized parcels in the rivers of the Karaginsky Bay are eligible to enter further chains of custody*." Of course, it is only the fish from the gear types assessed as part of the UoA and deemed to be meeting the MSC requirements that would be eligible to enter, not necessarily all those that are allowed by the fishing rules (e.g., sport fishing gears). A little edit to this sentence is required.	The fishing rules for the commercial companies are specific to the licensed gears and do not include sport fishing gear. The language was revised for clarification.

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	The report would really benefit from a glossary, and for initialisms and acronyms to be spelled out in full the first time they are used (e.g., SKTU - P.13). It would also be really helpful if the the roles of relevant bodies were clarified in the glossary and the first time they were referenced (e.g., RosPrirodNadzor - P.13 - I think this is the Governmental environmental regulator, but it would be useful to have that made clear.)	Descriptions of relevant bodies are found in Section 5.4.1 - Management Structure. The abbreviation "SKTU" has appeared in the text erroneously and has been corrected to "SVTU".
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P. 42 states: "*SMSY levels for populations of specific water bodies studied (Uka, Khaylyulya, Rusakova, Sukhaya, Ivashka, Dranka) were determined using private models, the parameters of which were obtained...*" Please define what is meant by a 'private model'?	Russian term was translated inadequately. Has been changed to "particular".
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P. 42 states: "*A number of population characteristics, traditionally used to describe the effectiveness of spawning, do not carry the semantic load laid in them.* " The examples provided in subsequent text make me think I understand what is meant here, but the sentence on its own ('do not carry the semantic load?) is not clear. Could this be reviewed please?	Russian term apparently lost in translation. Welcome to our world. Revised.
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.42. The terms 'Ntr' and 'N1' are not defined. What are they?	Deleted

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P. 43. The report states: "*Fishery openings and closures may be made on short notice based on fish availability and progress in meeting spawning escapement objectives*." How is this achieved with confidence given the limited escapement survey effort undertaken - it would seem difficult/unlikely given the very limited escapement monitoring?	Inseason assessments are based on a combination of catch and catch sampling information which is extensive, and escapement assessment which are more limited. Moreover, seasonal patterns of runs from the previous years are taken into consideration.
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.49: The report states: "*Bugaey et al (2019a) identified three escapement reference points of increasing certainty of sustainability for the Anapka/Khai-Anakpa complex: Slim = 1.05 million, Smsy = 1.74 million, and S*msy = 3.28 million (Figure 38). To evaluate the past performance of pink salmon for this area Bugaey et al. (2019a) suggested that an acceptable target range for the even years would be between the Slim and Smax (1.05 to 1.74 million spawners). Similarly, they suggest for the odd year classes the acceptable target should be between the Smax and S*max reference points (1.74 to 3.28 million spawners)*." I note that Smax and S*max are not defined - is this supposed to be Smsy and S*msy?	Corrected

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	On P.50 the text states: "For the Anapka and Khai-Anapka Rivers, the number of pink salmon counted over the past 15 years has averaged 2.2 million for the odd years and 0.9 million for the even years. Aerial surveys were the means by which these counts were made. Up until 2011 both rivers were surveyed, at which point the survey was reduced to only the Anapka River (Bugaev et al.2019a). Therefore, the actual escapement for this production area during the past eight years is higher than the numbers provided here." However, this is confusing where Figure 38 on P. 49 is labelled as the combined pink salmon escapement to the Anapka and Khai-Anapka rivers, 1989-2018. What does the figure actually show from 2011?	Corrected
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.51. The report states: "*However, from 2011 forward, only data from the Vyvenka River is represented because of a reduction in aerial survey effort (i.e. the Legunmun Lagoon was not surveyed) (Bugaev et al. 2019b). Therefore, from 2011 to 2018 the total escapement for this production was underestimated. In addition, the data points for 2011 to 2013 were excluded from the analysis because they produced extremely low returns and were considered outliers*." It's not clear what the 'analysis' is that is referred to in this last sentence - is it Buaev's or is it the assessment team's? But it is interesting that the catches of pink salmon in 2013 seemed to be very low. also - it seems to be a real result for that year, not just a sampling error. Is it right to exclude these data in this case?	Revised for clarification. Data for period 2011-2013 were excluded from the analysis by the KamchatNIRO researchers.

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	The report states (P.52) that "Spawning escapement is assessed based on aerial surveys of index rivers and escapements to other areas are inferred from historical distribution patterns. KamchatNIRO estimates that it takes about 600 hours of aerial surveys to adequately cover all the salmon spawning rivers in Kamchatka (Bugaev et al. 2018a. However, aerial survey monitoring has been reduced from 545 hours in 2001 to an average of 131 hours over the past ten years due to budget constraints (Figure 32). This has increased the uncertainty related to escapement estimates for all salmon species". I agree with this final comment, but then none of the escapement estimates include the associated error, and I suspect it will be considerable in this case. How is the team determining that the SMU is above the LRP in ≥80% of the 15 most recent years?	See detailed explanations under PIs. The assessment team heavily weighted consistently high levels of harvest over the last decade which clearly indicate that the escapements are consistently above a point of recruitment impairment. The fishery is exploring application of subareas-specific BRPs but inconsistent patterns of achievement reflect limitations of the existing stock assessment information rather than an indication of recruitment overfishing. This concern has been recognized with intermediate levels scores and conditions for PI 1.1.1(b), 1.2.3, and 1.2.4.L5
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.57-58. The figure legends for Fig 47, 48 and 51 state that Slim is shown. I cannot see it, although it might be helpful to show it if it is known. However, I can't see the value for Slim mentioned in the text, either.	Figure captions revised to match figures
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.60-61. There were a number of hyperlink errors showing in the vesion I looked at that should be checked and/or fixed as necessary.	Corrected

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.61. For sockeye, the report states: "Corresponding reference points for Karaginsky subzone rivers are much lower as they comprise only a portion of the total return to the Karaginsky subzone." This doesn't seem to make sense - could you check please?	Clarified. Escapement estimates for specific rivers not surveyed are extrapolated from regional estimates based on historical estimates of river-specific production potential. Regional estimates are based on aerial surveys from index rivers and historical data on total escapement from years when surveys were more comprehensive.
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	PI 1.1.2. I note that the scoring text refers to coho salmon. This is presumably left over from the ACDR. A thorough check of the reort to remove these confusing references to species that are no longer being assessed as target species would benefit the report.	Corrected
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P.93. The report states: "*Sockeye salmon represent less than 0.1% of the salmon species spawning* ***in the Anapka/Khai-Anapka River complex (Bugaev et al. (2019a). Over the recent 15-year time period the annual returns have averaged 400 fish*** *with a maximum return in 2005 of 1,200 fish. As reported by Bugaev et al. (2019a), the estimated escapement target for maximum sustained yield (SMSY) and the precautionary target (S*MSY) is 1,500 and 2,500 fish, respectively.* ***The observed average escapement for over the past fifteen years was 1,000 fish for the Anapka River and 600 for the Khai-Anapka River. Combined (1,600 fish)****, this level meets the SMSY target for the production area of 1,500 spawners.*" This seems to be a straight contradiction?	Corrected
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	P. 94. There is a header and then a large space "Karaginsky subzoneKaraginsky subzoneKaraginsky subzone". Some sort of typo?	Corrected

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	It seems unlikely that the correct answer to the 'Data-deficient?' question in Table 22 for 'miscellaneous marine species' would be 'No', given that "*No specific information on other secondary species in this fishery was available, but KamchatNIRO indicates that small numbers of flatfish and jellyfish are likely caught (Bugaev et al. 2018b)*." Still, if these species don't controbute to scoring at SG80 then I can understand that no RBF would have been carried out.	This is listed as "no" precisely to avoid begging the question of why the RBF was not carried out. We have adjusted it to be more accurate by changing "no" to "not assessed."

Peer reviewer A, specific Performance Indicator Comments

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
1.1.1	Yes	No (material score reduction expected to <80)	No	SIa. The scoring text states: "*Quantitative data on long-term production trends and escapement provide strong evidence that Pink .... salmon throughout this region .... are highly likely above the point where recruitment would be impaired by the current commercial fishery.*" It also states "*Pink Salmon are at historically high abundance and escapements have generally been well above the LRP (Slim) for the dominant odd-year lineage in both southern (Figure 36) and northern Karaginsky Bay (Figure 38). The even-year lineage may not always exceed Slim but returns do not appear to be strongly*	Annual harvest data for Pink Salmon clearly demonstrate that Pink Salmon are above the point of recruitment-related limitation represented by a LRP. Current harvest levels throughout Karaginsky Bay and Eastern Kamchatka are at historical record levels. Harvest levels provide a relatively robust indicator of run strength in Kamchatka due to the nature of the fishery where fishing effort from year to year is relatively stable due to a fixed number of fishing sites and the use of passive gear. Thus harvest value may be used as CPUE, and therefore a proxy of stoclk status (SGA2.2.3.1). Harvests vary from year to year due to the typical even-odd year cycle pattern for Pink salmon and environmental variability but freshwater and ocean conductions are obviously conducive to high levels of productivity. If escapements	Not accepted (no score change)

				related to escapements for the subdominant return. Both odd and even-year runs exceed Slim on average." Noting that there is no estimate of the error around the escapement values, when I combine the northern and southern Karaginsky Bay monitoring for 2004-2018, for odd years the escapement was above Slim in 12 out of 14 years (southern = 7/7 above, northern = 5/7 above), but for odd years it was above only in 8 out of 16 years (southern = 3/8 above, northern = 5/8 above). The result is that quantitative data on escapement do not provide strong evidence that SG80 is met here (where SC2.2.3.1 specifies that "Highly likely" shall be interpreted to mean ≥80% of the 15 most recent years, i.e., 12 of the 15 years.). Please see the 'General comments' section for a note on the condition'.	consistently fell below a point of recruitment limitation, we would expect to see a pattern of reduced levels of harvest rather than consistently high levels. Salmon fishery management and stock assessment continues to evolve in Kamchatka with an increasing attention on the potential of subarea-specific management and stock assessment. The historical practice has been to manage for loosely-defined escapement objectives for indicator areas shown in historical assessment to be generally representative of regional stocks. This approach was demonstrated to be effective in part due to the precautionary management approach of gear limitations and in some cases, established passing days. Fishing effort was scaled by practice over a period of time to sustain high levels of production on average. Over the last 5-10 years KamchatNIRO has begun to develop stock and river-specific assessment information for stock-recruitment based biological reference points (BRPs) including those referenced in the assessment. This is a substantive step toward a more optimum and intensive salmon management system and this work has also been bolstered by fishery participation in the MSC program. However, this remains a work in progress and the fishery has not fully incorporated this information into management. Theoretical reference points have been identified for recruitment impairment and maximum yield and the fishery is considering their application and effectiveness in management. At the same time, the fishery is moving to support funding of additional spawning ground surveys necessary to implement a more subarea-specific management assessment. Over time, government funding levels for stock assessment have declined and fishing companies are recognizing their interest in funding additional assessment, in part due to the long term leasing structure of fishing sites in Kamchatka. At this time, the river-specific a+L2ssessment information on BRPs and escapements does not fully	

					align with other information stock status and harvest. For a number of rivers, apparent escapement might appear to fall below preliminary estimates for BRPs but consistently high harvest levels across relatively stable fishing efforts indicate that escapements must have been sufficient to sustain high levels of harvest. The issue is the preliminary nature of the BRP estimates and uncertainty in subarea-specific stock assessments. It is clearly not a case of overfishing relative to spawning habitat capacity or a point of reproductive impairment at existing levels of fishing effort. Rather, it is an issue of the quality of the available stock assessment information relative to target reference points for maximum sustained yield. This concern has been recognized with intermediate levels scores and conditions for PI 1.1.1(b), 1.2.3, and 1.2.4.	
1.1.1	Yes	No (material score reduction expected to <80)	No	SIa. The text states: "*Chum Salmon escapements have periodically been below Slim (Figure 45, Figure 47) but average escapements into each river exceed Slim in four of 5 index rivers (Figure 46). Catches have remained stable at historically high levels of production and thus we consider that Chum Salmon also meet SG 80.*" I note that average escapement to the southern Karaginsky rivers (Fig 46) is of limited indicative value given that it is skewed dramatically by the apparently huge 2015 year (Fig 45). Neverthelsss, Fig 45 shows that escapement to the southern Karaginsky rivers exceeded S0 in 5 of 15 years only. Fig 47 does not show an Slim, but escapement is demonstarbly above SMSY in only 4 of 15 years. This does not appear to meet the SC2.2.3.1 requirement that “Highly likely” shall be interpreted to mean	The situation with chum salmon is similar to that detailed above for Pink Salmon. Consistently high levels of harvest over the last decade clearly indicate that the escapements are consistently above a point of recruitment impairment. The fishery is exploring application of subareas-specific BRPs but inconsistent patterns of achievement reflect limitations of the existing stock assessment information rather than an indication of recruitment overfishing. This concern has been recognized with intermediate levels scores and conditions for PI 1.1.1(b), 1.2.3, and 1.2.4.L5	Not accepted (no score change)

				≥80% of the 15 most recent years, i.e., 12 of the 15 years. Please see the 'General comments' section for a note on the condition'.		
1.1.1	Yes	No (material score reduction expected to <80)	No	SIa. The scoring text states: "*Pink Salmon are at historically high abundance and escapements have generally been well above the LRP (Slim) for the dominant odd-year lineage in Korfa Bay (Figure 41). The even year lineage may not always exceed Slim but returns do not appear to be strongly related to escapements for the subdominant return. Both odd and even-year runs exceed Slim on average.*" However, Fig 41 appears to show that for the 2004-2018 period, Slim is exceeded in only 4 out of 7 odd years and 4 out of 8 even years. This does not show that 'escapements have generally been well above the LRP', nor that the SG80 requirement for SC2.2.3.1 is met. Please see the 'General comments' section for a note on the condition'.	See explanations above	Not accepted (no score change)
1.1.1	No (scoring implications unknown)	No (material score reduction expected to <80)	No	SIa. I note the scoring text does not refer to the Korfa Bay chum salmon. Looking back at Figure 48 for the Vyenka River, though, while there is no Slim information, it is demonstrated that escapement exceeded Smsy in only 3 out of 15 years. It is not clear that the SG80 requirement for SC2.2.3.1 is met. Please see the 'General comments' section for a note on the condition'.	See explanations above	Not accepted (no score change)

1.1.1	Yes	Yes	NA	Nothing further.	None required	Accepted (no score change)
1.1.2	No (scoring implications unknown)	No (scoring implications unknown)	NA	SIa: I note the scoring text in PI 1.1.1 SIa states: "*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.*" However, I also note the guidance in GSC2.3: "*The requirements for rebuilding salmon SMUs differ from those for other species in the following ways; The complex structure of salmon stocks requires rebuilding strategies to account for specific populations that may have lower productivities than the SMU average*." Given the region-wide assessment approach, how is GSC2.3 addressed in the rebuidling approach?	Extensive scientific information is available on the attributes of viable salmon populations related to formal listings of threatened and endangered stocks in the U.S. and Canada. See for instance, McElhany et al. 2000 https://www.nwfsc.noaa.gov/assets/25/6190_06162004_143739_tm42.pdf. Viability has been related to abundance, productivity, spatial structure and diversity. Our assessment of Karaginsky Bay salmon stocks is that they are inherently robust as a feature of all these elements present in these stocks. Sub-80 scores for PI 1.1.1 for demonstrating success in meeting target reference points are related to the quality of the stock assessment information. The status of component populations is specifically addressed om PI 1.2.1 (a), 1.2.2(d), 1.2.3(a), and 1.2.4(f). The limitations of related information are addressed with intermediate levels scores and conditions for 1.1.1, 1.2.3, and 1.2.4. Concern over the representativeness of indicator stocks is specifically identified in condition 3 for PI 1.2.4.	Not accepted (no score change)
1.1.2	No (scoring implications unknown)	No (material score reduction expected to <80)	NA	SIb: The scoring text here states: "SG80 – There is evidence that the fishery-based rebuilding strategies are being implemented effectively for Karaginsky and Korfa Bay pink and chum salmon **based on sustained high levels of harvest and plans for continuing stock assessment**, **therefore the SG80 is me**t. The harvest of Chum salmon is relatively stable, **and low escapements obtained are probably caused by reduction of aerial monitoring and relevant undercounting**	Sustained high levels of harvest at approximately constant fishing effort provide clear evidence that low escapement estimates in recent years are an artifact of the reduction in aerial survey efforts. This issue is compounded by the difficulty in obtaining accurate information in some years where higher than normal flows and corresponding turbidity reduce fish visibility. Related concerns have been recognized with intermediate levels scores and conditions for PI 1.1.1(b), 1.2.3, and 1.2.4.	Not accepted (no score change)

				of fish, also, due to changes in turbidity of the water, rather than a failure to provide adequate spawning escapements." This basically says the evidence that the strategy is being implemented comprises high catches and low escapement monitoring, together with doing the status quo on the stock assessment. This doesn't meet the requirement.		
1.1.2	Yes	Yes	NA	Not scored.	None required	Accepted (no score change)
1.2.1	No (scoring implications unknown)	No (scoring implications unknown)		SIa: All five UoAs are scored the same, based on "*SG80 – The harvest strategy in place for all salmon stocks in the assessment is responsive to the state of the SMU based in in-season indicators of run strength and works effectively to achieve escapement-based management objectives defined for the SMU by regulating fishing times and areas, therefore the SG80 is met.*" But I see very little evidence of responsiveness - the only mention of in-season management change appears to be appears to be cancelling the passing days on June 25, 26, and 27 in the River Vyvenka. The other protocols seem simply to establish the opening and closing dates, but with no associated rationale. Certainly it is difficult to imagine the dates are based on escapement monitoring when that has been undertaken at a very low level in recent years?	This fishery is managed with a series of time and effort regulations designed to scale annual fishing effort to levels which have consistently been demonstrated to produce high levels of harvest from year to year. The fishing strategy may be generally described a fixed harvest rate strategy where average fishing levels are scaled to ensure substantial levels of spawning escapement in most years. Fishing levels are thus scaled to the state of the SMU where the state is defined in terms of the inherent productivity and sustainable fishing levels of the stock. This approach is effective because: 1) fixed passive gear harvests fish in proportion to their abundance and 2) passing days provide inherent protection by limiting harvest rates and ensuring that significant levels of spawning escapement are produced over a wide range of run sizes and across the breadth of the run. Inseason management is employed to regulate fisheries based on gross levels of abundance. In Kamchatka management actions are taken inseason by the Anadromous Fish Commission to address very large and very small run sizes. In particular, inseason actions may be adopted in response to low run sizes in order to	Not accepted (no score change)

					protect escapements. Liberalizations may also occur although these actions are generally less impactful because harvest during large runs is often limited by processor capacity. Similarly, fishing rates during subdominant-pink years are often lower than dominant pink years because relative low harvest volumes do not provide incentives for fishing companies to operate at full capacity. This fishing strategy is different than what we would typically see in a high value Alaska style fishery where intensive daily or even hourly management is used to maximize harvest in every year relative to established spawning escapement goals. The Kamchatka style fishing strategy is more extensive - it limits fishing power to optimize harvest under most conditions effectivelly foregoing higher harvest rates in big run years and accepting lower escapement levels in low run years. The fishing strategy is effectively scaled to the vast area involved and the existing limitations on fishery management resources. it works because these stocks are extremely productive and resilient, and the passing days at terminal fishing sites provide precautionary limits on exploitation. Note that this coservative management succeeds to sustain salmon stocks without enhancement.	
1.2.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	SIb: The scoring text states: "*SG80 –Direct evidence, including documentation of in-season restrictions based on abundance and assessments of spawning escapement, demonstrates that the harvest strategy is generally achieving its objectives of sustaining high levels of salmon production, therefore the SG80 is met.*" But the evidence from escapement monitoring does not show generally high levels of prodution for any species other than sockeye. For pink and chum the fishery doesn't meet SG80 for PI 1.1.1 SIb.	See previous explanations. Annual run sizes of Pink Salmon, Chum Salmon and Sockeye salmon are are historically high levels of production. This provides clear evidence that the harvest strategy is effective. Consistently large run sizes and levels of harvest are occuring despite escapement data suggesting that low levels of escapement are occuring in some systems. However, aerial survey effort to monitor escapement has been substantially reduced over the years and the consistent large returns indicate that low estimates of escapement are an artifact of low assessment rates. Conditions identified by this MSC assessment identify the need for substantial increases escapement monitoring	Not accepted (no score change)

				Given the data presented in Figures 36, 38, 41 and 45, I would suggest that it is not entirely accurate to suggest that the escapement montioring shows that only "*Occasional poor run years and escapements into portions of some systems occur.*"	and assessment relative to established goals. The need for this information to achieve certification as well as the inherent value of sustainable management for long term fishing site lease holders is providing very large incentives for the fishing companies to fund these efforts and collaborate with the regional management and scientific agencies to provide the necessary information.	
1.2.1	No (scoring implications unknown)	Yes	NA	SIc: I highlght that there is little if any information in the introduction to corroborate that "*The harvest strategy involves extensive in-season monitoring of harvest, catch per unit effort, biological indicators (sex and age), and spawning escapement. These indicators are compared with historical values and patterns to determine run size and timing, and to guide adjustments in fishing times and areas.*" This approach seems comprehensive but how, where and how extensively is this work done - it would certainly help to boost confidence in the management approach if this was detailed.	The assessment team has examined extensive information on biological assessments for this fishery documented in reports provided by the regional fishery scientific agency on behalf of the fishing companies addressed by this assessment. Key pieces of this information are summarized in this report. Further detail may be found in corresponding KamchatNIRO reports and related scientific literature. The assessment team has reviewed English translations of key materials and Russian originals and is confident in its assessment of the management approach with the concerns identified in conditions identified for this assessment. The proof is evident in the management outcome measured in terms of sustained high levels of harvest demonstrated in the fishery.	Not accepted (no score change)
1.2.2	No (material score reduction expected to <80)	No (material score reduction expected to <80)	NA	SIa: The report states: "*Well-defined control rules are in place that ensure that the exploitation rate is reduced to avoid low escapements which might impair future recruitment. HCRs generally appear to keep the stock fluctuating around a target level consistent with MSY, as evidenced by substantial yields in most years. Therefore, the SG80 is met. HCRs 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*	According to FS 2.01 GSA2.5, *HCRs are the arrangements by which a fishery expects to achieve the stock status outcomes expressed in PI 1.1.1. They are defined as the pre-agreed rules and management actions that will be taken in response to changes in indicators of stock status with respect to explicit or implicit reference points, and MSC expects these elements to be part of HCRs.*Hence, a majority of means adressed in this report can be considered harvest control rules. In this fishery, HCRs primarily take the form of fishing site leases, gear specifications, fishing seasons, and passing days specifically established to produce exploitation rates consistent with high levels of sustained harvest and	Not accepted (no score change)

				timing based on harvest and biological composition of the harvest. Operation of the fishing gear is modified in response to whether escapement goals are being met." However, there is no information on how escapement is monitored in sufficient detail to allow managers to respond by modifying the operation of the fishing gears. Also, season dates, passing days and time/area closures are 'tools', not 'rules'. So, what are the actual HCRs, and how are they 'well-defined'?? Without this information being presented, it is not possible to say 'Well-defined HCRs are in place", as required for the SG80 score.	escapement levels sufficient to produce those harvests across a broad range of run sizes distributed around normal levels. In years of substantially lower or higher run sizes, inseason actions may be taken to liberalize or reduce exploitation rates. The primary management tool for inseason management is changes in the number of passing days. Inseason decisions are generally based on fishery data which is generally sufficent to distinguish run sizes substantially lower or greater than average. This includes both catches and also stage in the run which is identified from changes in sex and size ratios derived from extensive catch sampling in this fishery. Spawning escapement estimates were also historical used as inseason indicators but this has become less prevalent as aerial survey effort was reduced over the last decade. As previously, discussed, this fishery is managed extensively over broad areas based on HCRs calibrated over the years to sustain high levels of harvest. Inseason management is employed primarily in years when run sizes depart substantially from normal ranges. The efffectiveness of this strategy under current conditions has been proven by sustained high levels of harvest of wild stocks.	
1.2.2	No (material score reduction expected to <80)	No (material score reduction expected to <80)	NA	SIc: The report states: "*Available evidence based on indicates that the tools in use are appropriate and effective in achieving the exploitation levels for pink, and chum required under the HCRs. 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.*" I'll note that the escapements for both species are not demonstrably at or fluctuating around the	See previous explanations. Sustained high levels of harvest clearly indicate the tools in use are appropriate.	Not accepted (no score change)

				TRP (hence for PI 1.1.1 SIb the fishery was scored as not meeting SG80 (i.e., significant escapements of target stocks are not consistently achieved), whilst I note my disagreement with the score of 80 for PI 1.1.1 SIa, also), hence it is not demonstrated that the tools in use are effective in "achieving the exploitation levels required under the HCRs".		
1.2.2	Yes	Yes	NA	SIc: Nothing further.	None required	Accepted (no score change)
1.2.3	Yes	Yes	No	PI. The scoring text here seems fine. As for the condition, though, I note that states: "*Regularly monitor spawning escapement of Karaginsky and Korfa Pink and Chum Salmon in area rivers at a level of accuracy and coverage sufficient to ensure effective harvest controls. In Korfa Bay, monitoring and research must also be sufficient to detect negative impacts due to degradation of spawning habitat due to mining.*" It seems unlikely at best that 'regular' monitoring could be demonstrated in three years - surely the client needs longer??	Timeline for compliance was extended to four years recognizing that while this period may not be sufficient for a definitive assessment, it is adequate to demonstrate that a robust stock assessment program has been implemented.	Accepted (no score change)
1.2.4	No (scoring implications unknown)	No (scoring implications unknown)	No	SIa: Just a note that I don't know what the HCRs are, hence, it is difficult to understand if the assessment is adequate to meet SG80 here. I also see that the report states "*This information is used to design and make in-season adjustments of harvest control rules intended to ensure escapement sufficient...*" I presume it isn't actually the HCRs that are being adjusted,	See previous explanation of harvest control rules. Text is assessment was revised as suggested.	Accepted (no score change)

				here, and that instead the report is intended to read something like 'This information is used to implement the HCRs to ensure escapement sufficient...'?. If not, and it is in fact the HCRs that are adjusted, scoring of 1.2.2 needs to be reviewed as a priority.		
1.2.4	No (no score change expected)	No (no score change expected)	No	Noting that the Condition here should be split in to 5 to cover each UoA, in any case it currently requires that "*Estimate stock status of Karaginsky and Korfa Pink and Chum Salmon and Korfa Sockeye in area rivers relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit*" Again, only three years is allowed for the condition, which seems far too short a perod. I simply cannot imagine a body or work like this being completed in three years!?	There needs to be one condition per PI, never a condition combining PIs. However, it is not required to have separate conditions per scoring issue of UoA so long as as the action plan effectively addresses each scoring issue. Our experience with communicating conditions in these Russian salmon fisheries has found it easier to address related issues for a PI with one condition rather than having a long list of similar conditions for different species, stocks or scoring elements under one PI. As far as I understand the only difference between one and five conditions in this particular case is that in the latter case the results of implementation of one condition does not affect others. In such case I think I woud prefer to have five independent conditions instead of one large condition with interdependent components. Just a thought. Related work is currently in progress by KamchatNIRO and it is expected that this condition can be effectively addressed by expanding annual aerial survey efforts and documenting stock assessment information which is held by KamchatNIRO. (Unlike North American fisheries, detailed fishery data in Russia is typically considered the property of the government authority and is generally not widely published as a matter of coarse. As a result, the fishing companies can formally request general information and contract with the government to obtain detailed information. That is the basis for condition 4.)	Not accepted (no score change)

1.3.1	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
1.3.2	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
1.3.3	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
2.1.1	No (non-material score reduction expected)	No (non-material score reduction expected)	NA	Note that where there are minor primary species but no main primary species, SIa is scored 'n/a' not at '100'. https://mscportal.force.com/interpret/s/article/P2-species-outcome-PIs-scoring-when-no-main-or-no-minor-or-both-PI-2-1-1-1527262009344. Also, I do not agree that sockeye salmon is demonstrably meeting SG100 here. The escapement data for the Uka, Khaylyulya, Rusakova, Ivashka and Dranka rivers indicate the stock is performing very poorly (Fig 53), and there is no evidence that the fishery is not causing the stock to be below PRI. There is also no evidence that run timing protects sockeye salmon or Chinook salmon - a revision of the ratioanle and score is necessary.	Scoring for SI(a) was revised to NA. Sockeye are not abundant in Karaginsky Bay rivers, are not a focus of the fishery and are caught incidental to fishing for the more abundant pink and chum salmon, and are not a priority for aerial surveys of spawning escapement. Sockeye catches in southern Karaginsky rivers vary from year to year over the last 10 years with no clear trend. A figure was also added to the assessment showing that sockeye catches throughout Eastern Kamchatka are consistently at record high levels since 2010. Escapements in the Vyvenka River, which is the primary sockeye producer in the region, also demonstrate consistently high escapements. Corresponding high levels are productivity coincide with a period of extremely favorable marine conditions and elimination of the offshore drift gillnet fishery in the Russian EEZ. This information provides strong evidence that the Karaginsky salmon stock is above a point of reproductive impairment. Low numbers for sockeye escapement in Karaginsky rivers are due to limited assessment effort for this species. The fishery sought to include Southern Karaginsky sockeye in the certification. However, the assessment found that stock assessment information was insufficient to meet the P1 standard and so sockeye are addressed as a P2 species in the certification. In the case, of Pink	Not accepted (no score change)

					and Chum Salmon, the stock assessment is generally conducted on index populations in the UoA, However, stock assessment of Sockeye in the UoA are much less complete and may not provide a firm foundation for management going forward at current levels, do. The scoring rationale was revised to clarify that the scoring for sockeye was based on harvest data as described above for sockeye. Run timing clearly provides significant protection for Chinook many of which return prior to significant fishing and coho many of which return after significant fishing. As with sockeye, the fishery sought to include coho in the certification but stock assessment information was inadequate for this purpose.	
2.1.1	No (no score change expected)	No (no score change expected)	NA	Note comment above about scoring where there are minor species but no main species.	No response required	Accepted (no score change)
2.1.2	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
2.1.3	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
2.2.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	I note the introduction states: "*Because of its low volume, bycatch is not assessed by the fishery or the management system. There is no official reporting of bycatch such as cod, flounder, silver smelt and birds in these fisheries (Shevlyakov et al. 2014).*" I also note that both the Karaginsky and Korfa Bay fisheries include gillnet fisheries - given that the diversity of species present in the region it seems very	Members of this assessment team have reviewed information on bycatch in similar salmon fisheries throughout Russia including Kamchatka, Sakhalin and the Kuril Islands. This information has included a series of dedicated bycatch assessments in other fisheries (Blikshteyn 2011, Lajus 2020), observations of fishing and processing observations during site visits and discussions with fishery representatives, management authorities, and stakeholders. All available evidence confirms that effective fishing rates on nontarget fish	Accepted (non-material score reduction)

				unlikely that there will be no bird bycatch at all. Nevertheless, any out-of-scope secondary species has to be treated as main - GSA3.7.1. That being said - there are no data, so it is difficult to know.	species is extremely low. Those nontarget species most commonly observed in the bycatch are also common in the region. With respect to birds, no significant bird bycatch has been reported or observed in this fishery but based on experience with other salmon fisheries in the U.S. and Canada, we cannot discount the likelihood of level of diving bird bird mortality associated with tangling in the fishing gear. Gillnet use in this fishery is very low and is limited to freshwater. The very large majority of the fishing effort and catch occurs in marine trapnets. Therefore, diving birds were added as a main species to the list of secondary species to address this comment. Any incidental levels of mortality of birds in the fishery highly likely to be so low as to be effectively insignificant with respect to species status. However, the lack of associated observational data precludes a high degree of uncertainty. Therefore, PI (a) was rescored downward from SG 100 to SG 80 in response to this comment.	
2.2.2	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
2.2.3	No (material score reduction expected to <80)	No (material score reduction expected to <60)	NA	SIa and SIc: There are no main species known, but back to my point on out-of-scope secondary species - if there is no monitring or collection of data then how is this known relative to GSA3.7.1? A score of 100 is inappropriate here - in fact I cannot see past SG60 - there are no quantitative data! I note that secondary species include out of scope bird species, some of which may regionally red-listed but not nationally red-listed (e.g., contrast http://www.travelkamchatka.com/birdsmore.htm with http://aroundnature.info/en/red-	Scoring was revised to acknowlege the potential for a small amount of incidental bird mortality for diving bird species which occur in the vicinity of the fishery by entanglement. Diving birds were added to the list of main secondary species for the purposes of this assessment. Given the limited usage of gillnet in the fishery (after the ban of the marine driftnetting in 2016), the freshwater locations of use and the active tending of those gears, the assessment team has concluded that the information is adequate to meet the SG80 guidepost. Further, given the very low likelihood of significant encounters of birds with fishing gear, it is difficult to conceive of a monitoring program with sufficient statistical power to quantify the	Accepted (non-material score reduction)

				list-of-birds-threatened-species-of-the-russia/ - there are several species straight off which appear on the first list but not the second - e.g., pelagic cormorant, red-faced cormorant, red-throated diver/loon, grebes and some ducks), which means they are not classified as ETP, unless they are covered by other accepted designations - e.g. through the CMS), and these clearly have the potential to occur in the vicinty of the fishery, which does employ (and lose) gillnets, including in the rivers. Experience from other fisheries suggests it would be extremely unusual for there to be no bycatch of bird species, and given the MSC requires teams to look at mortality wherever it occurs (i.e., observed and unobserved - SA3.1.8), the team needs to address the fact that while there might be qualitative information suggesting low bycatch rates, there is nothing that that could qualify reasonably as quantiative information adequate to assess the impact of the UoA on such main secondary species with respect to status in active gillnets and nets that are ghost fishing, including in rivers (e.g., see GSA3.6.3, including Table GSA5). A condition is required here.	corresponding low rates. Personally, I think that use of gillnets is negligible because most of fish in freshwaters is caught by beach seines. But as we do not have data on proportion of fish obtained by gillnets, we have to accept this.	
2.3.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	The report states: "One red listed bird species, Steller sea eagle (*Haliaeetus pelagicus*) is present.". However, I note that there is no mention in the report of ETP bird species (including black-thraoted diver/loon and any other species which are considered ETP - it would be extremely	Gillnets, which may interact with these ETP birds, are very rarely used in this fishery. In freshwaters, most of salmon catch is taken by beach seines which are not dangerous for birds. During more than a decade of certification process of salmon fisheries in Kamchatka we never observed or heard about entanglement of diving birds in the gillnets in freshwater. At the same time, a new edition	

				surprising if these species did not occur as bycatch in active gillnets and/or in lost, ghost fishing gear, including in rivers. If these species are not assessed here, though, they would need to be considered as secondary species - see comments against PI 2.2.3.	of the Kamchatka Red Data Book (2018) lists two species of birds for which salmon fishing gear are indicated as a source of risk: one case of mortality in a coastal trapnets is reported for Yellow-billed loon Gavia adamsii (белоклювая гагара) and few cases for the long-billed murrelet Brachyramphus perdix (длинноклювый пыжик). The first species also spend some time in freshwaters and thus may be affected by gillnets. The black-throated diver Gavia arctica is not included in the Kamachatka Red Data Book (2018).	
2.3.1	Yes	No (no score change expected)	NA	SIa - The report says there are no numerical limits set. Therefore this SI should not be scored.		Accepted (no score change)
2.3.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	In SIb, the report states: "*SG80 - It is reported by KamchatNIRO (2018) that the Steller sea lion and Larga seal constantly interact with fishing gear, eat and damage the entangled fish. Nevertheless, the gear design provides high degree of certainty that entanglement of foraging ETP mammals does not occur, which is proved by the absence of such fishery reports.*" It seems here that scoring has considered the coastal traps, only, and not gillnets, including in rivers. It is certainly not the case that seals are able to move freely around gillnets, including lost gear, without risk - in fact there are numerous examples catalogued of seals and birds being caught and killed in salmon gillnets, including in ghost fishing gear in rivers and the sea. However, such cases will invariably not be reported routinely and can go largely	Giilnets are prohibited in marine waters of East Kamchatka and use is freshwater is limited to specific times and locations where nets are closely tended. The very large majority of the harvest in the fishery occurs in trapnets which do not function effectively when damaged. Distribution of seals and sea lions in the fishery region is largely limited to marine waters. Larga seal is not included in the Kamchatka Red List Book, but a subspecies of harbor seal, Phoca vitulina stejnegeri is included. Extensive reporting by the regional scientific agency has determined that no significant interaction of the fishery with ETP species exists and there is little basis to expect one. It is difficult to envision any kind of reasonably implementable condition or monitoring design with suffcient power to demonstrate a low incidence of interaction of a rare species which is seldom encountered. In addition, high availability of fish in the trapnets may cause increase of marine mammals and seabirds hunting in such gear.	Not accepted (no score change)

				unnoticed. This PI needs to be reconsidered.		
2.3.2	No (material score reduction expected to <80)	No (material score reduction expected to <80)	NA	SIa is scored at SG100 ('comprehensive strategy'), which is not appropriate given the lack of reliable and/or independent information on bycatch of ETP species. Even SG80 ('strategy') is not likely wihtout considerably more evidence being provided. The definitions in Table SA8 are clear (with my emphasis on relevant elements "*A "strategy" represents* ***a cohesive and strategic arrangement*** *which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which* ***should be designed to manage impact on that component specifically****. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification fishing practices* ***in the light of the identification of unacceptable impacts***." In this case there is not a strategic and cohesive arrnagement, I see no evidence that management has been designed ot manage impacts on ETP species specifically, and in the absence of a somewhat systematic and/or verifiable monitoring programme there is no way that unacceptable impacts can be identified. A comprehensive strategy in comparison requires "*A complete and* ***tested*** *strategy made up of* ***linked monitoring, analyses, and management measures and responses***". It is clear this is not the case	Score was downgraded from SG100 to SG80 to address this comment. The assessment found that legislative protections and fishing strategies which avoid significant ETP impacts comrpise an effective strategy. Given a clear lack of significant ETP impacts, a condition would be inappropriate.	Accepted (non-material score reduction)

				here - the absence of any actual monitoring data is telling. I believe a Condition is required.		
2.3.2	No (material score reduction expected to <80)	No (material score reduction expected to <80)	NA	SIc. I suggest that the text here demonstrates that SG80 is not met in SIa, where it is stated: "*Information is not specifically collected on ETP species in this fishery*". It is argued that information collection is innecessary becasue of the "l*ow incidence of these species in the fishery and the corresponding low level of concern*". However, if there are no data, including from ghost fishing, then it is very hard to see how there can be either a strategy in place (SIa SG80), or an objective basis for confidence that the measures/strategy will work (SIb SG80).	Giilnets are prohibited in marine waters of East Kamchatka and use is freshwater is limited to specific times and locations where nets are closely tended. The very large majority of the harvest in the fishery occurs in trapnets which do not function effectively when damaged. We are not aware about lost of trapnets, which likehood is very low taikng into account the gear construction, thus ghost fishing in this fishery is negligible.	Not accepted (no score change)
2.3.2	No (material score reduction expected to <80)	No (material score reduction expected to <80)	NA	SIe. The scoring states: "*SG80 – Effective protection of ETP species is regularly reviewed in the normal course of activity by regional fishery management and environmental protection agencies of the Government, hence the SG80 is met.*" This may show SG60 is met, but it is not clear what the basis of the reviews is (i.e., what data), and more fundamentally there is no justification here of measures being implemented as apporpriate. This latter element needs to be considered if the fishery is to meet SG80.	Extensive research and monitoring of the natural system occurs in Kamchatka in the normal course of responsibilities of the government authorities as well as academic institutions.	Not accepted (no score change)
2.3.3	No (material score reduction	No (material score reduction	NA	SIa and SIb. SG80 does not appear to be met here. There are no quantitative data presented (the scoring accepts there are none), and while the assessment states in	Gillnets are prohibited in marine waters of East Kamchatka and use is freshwater is limited to specific times and locations where nets are closely tended. The	Not accepted (no score change)

	expected to <80)	expected to <80)		scoring PI 2.3.1 that such data are not needed ("*The fishing authorities have determined that the fishery has such low impacts that it needs no specific data collections on interactions with ETP species*."), the MSC SG80 requirement is clear on that point. I highlight again that there are risks to marine mammals and birds associated with gillnets as part of the UoA, including through ghost fishing and in river, that may go largely unnoticed, will not be reported routinely, and can be difficult to estimate.	very large majority of the harvest in the fishery occurs in trapnets which do not function effectively when damaged.	
2.4.1	Yes	Yes	NA	Nothing further.	None required	Accepted (no score change)
2.4.2	No (non-material score reduction expected)	No (non-material score reduction expected)	NA	SIa at SG100 requires a strategy to be in place, which is defined as "A cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically." I don't see that the use of trapnets and beach seines in and of itself is 'designed' to manage impacts on habitats specifically (they're designed to catch salmon in an efficient manner!), while more informaiton on other fisheries and their management would be needed to justify the comment that "Cumulative impacts from non-MSC fisheries are similarly negligible.". SG80 should be OK here.	Scoring was revised consistent with this comment	Accepted (non-material score reduction)

2.4.3	Yes	Yes	NA	Just a question as to whether there has been any consideration of habitat imapcts through lost gear? And whether that should be in some way quantified?	Trapnet gear is costly and concerted efforts are made to avoid loss or damage. Storm damage can be a significant issue particularly later in the year but lost or damaged gear typically appears to end washed up on the beach. The gear is very large and heavily anchored, thus its loss is improbable. Gillnet use is quite limited in this fishery and while some potential for loss may exist, this gear is actively tended which reduces the potential for loss. Gear impacts on habitat do not appear to be a significant issue in relation to the large scale and pristine condition of the area in which the fishery is located.	Accepted (no score change)
2.5.1	No (scoring implications unknown)	Yes	NA	SIa - the text is generally OK, but I note that there are various statements here that are not referenced and have questionable scientific basis; specifically "*Salmon fishery management to provide escapements consistent with maximum sustained yield generally increases average abundance in the ocean and return relative to what can be expected in an unmanaged system*.", and "*However, while fishery management may affect abundance, it also reduces the variability in abundance relative to what can be expected in an unmanaged system, thus providing a more stable resource and avoiding catastrophic extremes.*" In essence, this appears to be saying that fishing is positively good for the environment - it is an understatement to say that this will come as a surprise to many readers! In any case, I suspect SG80 will be met, but the rationale for the riverine system needs to be reviewed and a well-referenced, fact-based rationale presented. In particular, detailed explanation should be provided on how the	Rationale was revised as per comment. This fishery is managed to sustain high levels of salmon production. Large escapements in excess of habitat capacity can substantially reduce future returns. There is some evidence for this dynamic in Kamchatka pink salmon for instance where a very large escapement during the 1980s was associated with a reversal of the even-odd year dominance cycle. So the point we were making is that a fishing strategy designed to maximize salmon production can be expected to benefit a salmon-dependent ecosystem. It would not be an understatement to say that these Kamchatka ecosystems are currently some of the most functional and productive salmon-driven systems on the planet.	Accepted (no score change)

				escapement goals are defined (hopefully they are based on both stock needs **and** ecosystem needs) - this information is necessary to justify an 80 score, but is missing from the report.		
2.5.2	Yes	Yes	NA	SIa: I note there is some reference here to escapement goals accounting for ecosystem needs, and this is adequate for scoring 80 here, so long as the detail on how the escpement needs are determined is provided in the text of PI 2.5.1. However, I note, also that the introductory text for P3 states: "*Each October KamchatNIRO issues forecast for recommended catch of salmon for the next season. The forecast is developed based on the amount of salmon required for optimal filling the spawning grounds (i.e., optimal spawning escapement), the number of juveniles from natural spawning grounds (based on sampling of juveniles in the sea and their survivorship there), and the release of juveniles from hatcheries (taking into account their survivorship in the sea)*." This text does not indicate that ecosystem needs are considered?	Escapement goals do not explictly identify "shares" of salmon escapement to stream but are intended to seed available spawning grounds to optimum production capacity with concommittent benefits to salmon-dependent ecosystem components. For instance, as the optimal spawning escapement is estimated from relationship between parents and progeny, and parents are used by predators (bears, eagles etc.) during their way to the spawning grounds, and the status of the predators population is good, this approach implicitly includes ecosystem requirements. By all appearances, Kamchatka salmon ecosystems are among the most robust on the planet.	Accepted (no score change)
2.5.3	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
3.1.1	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)

3.1.2	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
3.1.3	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)
3.2.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	It is not clear from the text that there are any objectives consistent with achieving P2 outcomes. For example, where it is stated "*These include short term objectives for spawning escapements intended to provide for maximum sustained yield and long-term objectives for fishery sustainability reflected in management regulation.*" - that is all P1. I don't agree that SG80 scoring is bolstered because "*Objectives consistent with Principles 1 and 2 are also reflected in the absence of enhancement of species in areas which are under scope of this certification*". The requirement at SG80 is for objectives to be 'explicit'. Please add to the rationale as appropriate.	The regulatory framework provides clear direction for fishery management and environmental protection consistent with P2 outcomes. See section 5.4.1 - Legal and Customary Framework. With respect to salmon enhancement, the regional fishery scientific and management agencies have made a determination, as a result of open discussion among stakeholders, that large scale hatchery enhancement is inconsistent with wild fish management goals in Kamchatka.	Not accepted (no score change)
3.2.2	Yes	Yes	Yes	Nothing further.	No response required	Accepted (no score change)
3.2.3	Yes	Yes	No	A thought here is that the Condition might have been more appropriate on SIc rather than SIa, or also on SIc - if there is still considerable illegal fishing activity then how can it be deemed that 'sanctions are thought to provide effective deterrence"? - apparently, they don't provide effective detterence! As for the condition, and in	Illegal fishing is a chronic, social issue in Kamchatka and as such defines simple or immediate solutions. Regulatory changes in the fishery allocation and management structures over the last two decades have largely resolved industrial scale abuses by fishery parcel leaseholders. All available information indicates that the level of illegal harvest has been substantially reduced but poaching is still an issue, especially in readily-accesible areas of	Not accepted (no score change)

				common with the conditions set on P1, I feel that the three year timeline is unreasonable - almost any fishery would need more time to demonstrate the necessary improvement.As for the condition, and in common with the conditions 1 and 2, I feel that the three year timeline is unreasonable - almost any fishery would need more time to demonstrate the necessary improvement.	Kamchatka. It is much less significant in remote areas like Karaginsky Bay from which it is difficult to export significant volumes of unlicensed catch. Thus, at some level the provided deterence is effective. Because of the the condition is set up for the SIa. The large and lucrative fishing companies enrolling these certifications are highly incentivized and contribute significant resources to control illegal fishing in their fishery areas. Due to this the condition would be not so appropriate for the SIc. The condition is intended to continue to develop in a systematic fashion, monitoring, control and surveillance information to better understand the drivers and dynamics of the chronic poaching problem in some areas and contribute to the development of long term solutions. The duration of the condition is obviously not sufficient to solve the problem but is consistent with the MSC instrument empowering long term remedies.	
3.2.4	Yes	Yes	NA	Nothing further.	No response required	Accepted (no score change)

Peer Reviewer B general comments and assessment team responses

Question	**Yes/No**	**Peer Reviewer Justification (as given at initial Peer Review stage).** Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	**CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)**
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	Yes	This is consistent for all PIs	None required
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes	As noted in my comments for PI 1.1.1, the stock-recruit models used do not reflect the scientific consensus on appropriate sr model choices for Pacific salmon (i.e. a Ricker model). This could be addressed in Condition 1 or at least in a non-binding recommendation.	A wide variety of functional forms are being applied to describe stock-recruitment relationships in salmon fishery management around the Pacific Rim. Conventions vary in western and eastern Pacific fisheries but many applications appear to perform reasonably for spawning escapements throughout the normal range, especially considering the typical scatter of points around any given functional relationship.
Enhanced fisheries only: Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	Yes	There are no enhancement activities.	None required

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	The draft report is comprehensive and includes all relevant information sources. A few typos remain in the text.	Report was proofed to address typos

Peer Reviewer B Performance Indicator comments and team responses

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
1.1.1	Yes	Yes	Yes	Scoring agreed but the stock-recruit models cited in the draft report do not reflect the well established scientific consensus on appropriate sr model choices (i.e. Ricker model). This is a weakness in the stock assessment. I suggest moving to state-space Bayesian sr models (i.e. Fleischman, S.J., Catalon, M.J., Clark, R.A., and D.R. Bernard. 2013. An age-structured state-space stock-recruit model for Pacific salmon (Oncorhynchus spp.). Canadian Journal of Fisheries and Aquatic Science 70:401-414). I suggest encorporated this concern into the text for Condition 1 or at the very least in a separate, abeit non-binding, recommendation.	A wide variety of functional forms are being applied to describe stock-recruitment relationships in salmon fishery management around the Pacific Rim. Conventions vary in western and eastern Pacific fisheries but many applications appear to perform reasonably for spawning escapements throughout the normal range, especially considering the typical scatter of points around any given functional relationship. Ricker functions are widely applied for salmon but in other cases Beverton-Holt may also be considered. The Kamchatka convention is comparable to to a Beverton-Holt formulation. State-space Bayesian statistical methods have been relatively recently been adapted for stock-recruitment analysis and have been applied to several Alaska salmon stocks. However, conventional statistical methods continue to be employed for most salmon stocks including those in Russia.	Accepted (no score change)

1.1.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
1.2.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
1.2.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
1.2.3	Yes	Yes	Yes	Scoring agreed. The supporting text in the PCDR should be modified to reveal whether age composition data to estimate recruitment is collected annually for chum and sockeye.	Extensive data is routinely collected by the regional fishery scientific agency (KamchatNIRO) during catch sampling.	Accepted (no score change)
1.2.4	Yes	Yes	Yes	Scoring agreed	None required	Accepted (no score change)
1.3.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
1.3.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
1.3.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.1.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)

2.1.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.1.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.2.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.2.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.2.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.3.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.3.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.3.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.4.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.4.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)

2.4.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.5.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.5.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
2.5.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
3.1.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
3.1.2	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
3.1.3	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
3.2.1	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)
3.2.2	Yes	Yes	Yes	Scoring agreed	None required	Accepted (no score change)
3.2.3	Yes	Yes	Yes	Scoring agreed	None required	Accepted (no score change)

3.2.4	Yes	Yes	NA	Scoring agreed	None required	Accepted (no score change)

7.3 Stakeholder input

Stakeholder comments were received from WWF Kamchatka pertaining to this Karaginsky Bay assessment. The table below contains the comments and the assessment team response. Note the stakeholder provided the identical comment in both the 'general comments' section, and under the habtiats PI "specific comments" section. To avoid unnecessary duplication, the table below contains the comment and the team response only once.

General comments	Evidence or references	CAB response to stakeholder input	CAB Response Code
General comments on the assessment. Stakeholders should note that input is most useful for assessment teams when attributed to an MSC Performance Indicator or Principle, and provided with objective evidence and references in support of any claims or claimed errors of fact.	Objective evidence or references should be provided in support of any claims or claimed errors of fact.	CABs should respond in this column. CAB responses should include details of where different changes have been made in the report (which section #, table etc).	The CAB shall assign a response code to each row completed by the stakeholder.
UoA as stated in Draft report includes salmon fisheries harvesting salmon stocks of Vyvenka river. Stock assessment within certification process provides assessment of harvesting strategy, operations, impact of fishing operations etc. But gives no information on cumulative impact on Vyvenka salmon habitats and stocks from not only fishing operation by UoA fisheries, but non-fishing businesses taking place in the watershed. Here we mean platinum-mining by KoryakGeolDobycha company which takes place in the upstream of Vyvenka watershed. The problem of negative impact from platinum mining on Vyvenka watershed is well-known in Kamchatka, but not officially and openly discussed due to the support of the factory by Kamchatka government. At the moment, there is no objective and official information that salmon stocks of Vyvenka watershed are not being impacted by mining, moreover independent scientists and local activists insist that such an impact exist. Official monitoring data reg. mining operations in Kamchatka in general (chemicals going into water, area of spoiled spawning grounds) is either not publicly available, or manipulated to hide negative info. With regard to this particular area regular monitoring of Vyvenka upstream (tributaries) doesn't exist. Kamchatka Branch of Russian Fishery Agency (SVTU) and KamchatNIRO are responsible for performing the State Monitoring of Salmon Watersheds, but over the last decade this monitoring has not been performing due to several reasons: lack of finance, barriers built by government and mining business. At the moment scientific data on habitat status and impacts caused by habitat degradation is not complete and is not taken into account when harvest strategy is being developed. AT the same time it's known that salmon habitats of 2 upstream tributaries of Vyvenka	As objective evidence and for reference please consider official publications on the problem by Kamchatka scientific fisheries research Institute (KamchatNIRO), All-Russia Institute for Fisheries Research and Oceanography (VNIRO), and independent scientists and NGOs. 1. By KamchatNIRO: http://www.kamniro.ru/presscenter/news/krupnomasshtabnaya_dobycha_zolota_opasna_dlya_kamchatki 2. By VNIRO: http://www.vniro.ru/files/trydi_vniro/archive/tv_2015_t_157_article_11.pdf 3. By VNIRO\KamchatNIRO: http://www.vniro.ru/files/rybokhosyajstvennaya_shkola/2015/Vvrdrnskaya_2015.pdf 4. Russian Academy of sciences: http://www.giab-online.ru/files/Data/2008/5/37_Kozlov_IPKON.pdf 5. By Fishkamchatka.ru:	The assessment team has reviewed information related to the effects of mining in the Vyvenka River basin on salmon habitats and has incorporated corresponding descriptions into the assessment under P2 sections related to environmental protection, as follows: There is local effect of mining in the upstream of salmon spawning rivers, which may be significant in some cases. Since 1994 there is project on extraction of platinum, which includes four mine fields in the upstream parts of three salmon spawning rivers of the Vyvenka River basin – Lavtyrinyvayam, Vetvey (Ledianoy and Iuzhniy streams) and Yanytailyginvayam (Penistyi and Vetvistiy streams) (Vvedenskaya and Ulatov 2015). Mining impacts include significant increases in turbidity and siltation and reduced productivity of zoobenthos. Significant parts of salmon spawning grounds were affected by 2006: in Vyvenka river – 1,415,400 m2; in the Vetvey River - at least 1,209,000 m2, in Levtyrinivayam River spawning grounds reduced about 200,000 m2 (80-100%) compared to the period before development began. Therefore, the area of actual influence of mining activities is about 282.44 ha. According to aerial observations of KamchatNIRO since 1957 (Ostroumov 1995), spawning stock of chinook salmon in Vyivenka River counted 16,000-20,000 fish, 150,000-180,000 sockeye, 12,000,000 pink salmon, 360,000-400,000 of chum and 10,000-15,000 of coho. As of the mid-2000s, number of chinook salmon decreased by 5 times, sockeye and chum salmon - by 10 times, and only the number of the dominant generation of pink salmon of odd years did not experienced decline (Vvedenskaya and Ulatov 2015). After starting the mining developments, redistribution of spawning grounds of salmon took place in the Vyvenka River basin, which result in reduction of spawning in upper parts of the rivers and some increase in the downstream parts (Kozlov 2008).	Accepted (no score change)

watershed has completely degraded over the last 7 years and lost their salmon stocks and spawning capacities. In this regard there is no evidence that management of stocks for fishing operations takes into account impact on stocks from mining. With this in mind, we insist on including into UoA Conditions framework the following actions: 1) to obtain objective information on impact of platinum mining operations on Vyvenka watershed salmon habitat and make it publicly available and discussable; 2) to assess cumulative impact - of both fishing and mining - on salmon stocks in the long-term, comparing the baseline (before beginning of mining operations) with modern state; 3) to adjust fishing management strategy according to results of these assessments; 4) UoA fishing companies to establish dialogue with respective mining company to require conducting re-cultivation of mining tails to restore habitats quality and health. This work to be done by fishing companies of UoA via contracting KamchatNIRO and independent experts (biologists and hydrologists of Moscow State University who used to work in the watershed several times over the last 10 years, with last time in 2018). The results of the assessment to be officially publicized and taken into account within MSC certification process with respective conditions. Without this work and without taking into account impacts of platinum mining on salmon habitats of Vyvenka river, MSC certification cannot be considered reliable and salmon stocks sustainable. The results of this additional assessment to be used in scoring the following performance indicators (right now scores presented in Draft report are not objective and reliable): P1 - Stock status, Stock rebuilding, Information and monitoring; P2 – Habitats outcome, Habitats information, Ecosystem information.	http://fishkamchatka.ru/articles/kamchatka/16980/	The MSC standard assesses the fishery relative to outcomes of the management process and management strategies implemented that aim to achieve those outcomes. Habitat-related concerns for the fishery are addressed primarily under Principle 2 of the standard. Here the assessment considers whether: 1) the fishery causes serious or irreversible harm to habitat structure and function (performance indicator 2.4.1); 2) there is a strategy in place to ensure that the fishery does not pose a risk to habitat (PI 2.4.2); and 3) information is adequate to determine the risk posed to the habitat by the fishery and the effectiveness of the strategy to management impacts on the habitat (PI 2.4.3). The MSC standard does not directly assess the impacts of other human activities on the structure and function of the habitat. Doing so in effect would assign the responsibility for habitat protection to the fishery which typically has no responsibility or authority in this regard. Effects of habitat changes due to nonfishery factors are indirectly considered in the standard under Principles 1 and 2 relative to stock status for target and primary species. Here the assessment considers whether: 1) the stock is at a level which maintains high production and has a low probability of falling below its limit reference point (PI 1.1.1); 2) there is evidence of stock rebuilding within a specified timeline where the stock is reduced (PI 1.1.2); 3) whether there is a robust and precautionary strategy in place (PI 1.2.1); 4) there are well defined and effective harvest control rules (PI 1.2.2) and 5) relevant information is collect to support the harvest strategy. Principle 1, like Principle 2 is assessed relative to the activities of the fishery, but also assesses stock status/productivity directly. Yields and sustainability of the fishery are a function of habitat conditions which in turn, may be impacted by other human activities. The fishery is evaluated based on its effective regulation consistent with the productivity of the extant habitat. Where habitat has been degraded by other non-fishery activities, the fishery would be required to reduce harvest and exploitation rates consistent with the capacity of the degraded habitat to produce fish. However, due to changes in aerial survey activities by KamchatNIRO over this time period across Kamchatka, it is not possible with the information available to directly link decreases in survey counts on the spawning grounds to habitat degradation in these areas. These uncertainties in escapement counts are already the subject of conditions on this fishery in P1 and P2. Therefore, to address this comment within the structure of the fishery certification standard, the assessment team has added to P1 information and P2 primary species information conditions to explicitly refer to information needs to understand the contribution of mining pollution to changes in escapement for target and primary species in this watershed. In addition, we have added a recommendation to report on management response to any effects registered.	

7.4 Conditions

Condition 1 – PI 1.1.1 Stock Status

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	Karaginsky Pink Salmon – 70 Karaginsky Chum Salmon – 70 Korfa Pink Salmon – 70 Korfa Chum Salmon – 70
Rationale	Karaginsky Pink salmon stocks do not meet the standard because even-year pink escapements into Southern Karaginsky Bay index rivers were below S msy in 7 of 8 years. However, odd-year pink escapements were well above S*msy. Pink Salmon escapements in the Anapka River complex generally exceeded S*msy levels in odd years but often failed to reach Smsy in even years. Korfa Bay Pink Salmon did not meet the standard because escapements in the Anapka River complex regularly failed to reach Smsy in even years. Karaginsky Bay Chum Salmon did not meet the standard because escapements into Southern Karaginsky Bay index rivers were below Smsy in 11 of the past 15 years in each species. Similar patterns were seen in the Anapka rivers. Korfa Bay Chum Salmon did not meet the standard because Vyvenka River escapments failed to achieve Smsy in 8 of the last ten years. Interpretation of spawning escapements relative to goals is confounded by limited data for some species and rivers in recent years due to recent reductions in aerial survey effort. Corresponding escapements are reported as low values by KamchatNIRO. Consistent high levels of production for Pink, Chumstocks in this assessment indicate that these stocks are fluctuating around target reference points. However, this conclusion cannot be confirmed based on spawning escapement information.
Condition	Demonstrate that Pink Salmon and Chum Salmon in the Karginsky and Korfa stock management units (SMU) are at a level which maintains high production consistent with escapements at or fluctuating around its TRP.
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.
Consultation on condition	The Client will work with KamchatNIRO, AFC and other stakeholders.

Condition 2 – PI 1.2.3 Information & Monitoring

Performance Indicator	**1.2.3. Information and monitoring - Relevant information is collected to support the harvest strategy**
Score	Karaginsky Pink Salmon – 70 Karaginsky Chum Salmon – 70 Korfa Pink Salmon – 70 Korfa Chum Salmon – 70
Rationale	The continuing effectiveness of the harvest strategy will depend also on monitoring of spawning escapements. The SG80 standard for regular monitoring is not met for Pink and Chum Salmon because recent reductions in aerial survey intensity have substantially reduced the accuracy and precision of spawning escapement estimates used to guide management decisions. Surveys have been reduced due to budget limitations. The current survey intensity likely provides sufficient precision to distinguish large and small runs but lack the resolution to avoid estimation bias due to differences in run timing or fish distribution. Historical assessments have generally been sufficient to support the current harvest strategy but current survey frequency may not be sufficient to identify any future changes in productivity or distribution patterns which might confound effective implementation of the harvest control rules. In addition, in Korfa Bay UoAs, platinum mining has led to decreased quality of spawning habitat in freshwater streams. It is essential that sufficient information is available on run returns in these areas in order to ensure precautionary salmon management in light of possibly reduced reproductive success for these SMUs.
Condition	Regularly monitor spawning escapement of Karaginsky and Korfa Pink and Chum Salmon in area rivers at a level of accuracy and coverage sufficient to ensure effective harvest controls. In Korfa Bay, monitoring and research must also be sufficient to detect negative impacts due to degradation of spawning habitat due to mining.
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 fourth annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Consultation on condition	The Client will work with KamchatNIRO, AFC and other stakeholders.

Condition 3 - 1.2.4. Assessment of stock status

Performance Indicator	**1.2.4. Assessment of stock status - There is an adequate assessment of the stock status of the SMU**
Score	Karaginsky Pink Salmon – 70 Karaginsky Chum Salmon – 70 Korfa Pink Salmon – 70 Korfa Chum Salmon – 70 Korfa Sockeye Salmon – 70
Rationale	The SG80 standard is not met for this performance indicator due to the generic nature of historical application of reference points and questions regarding their application in specific areas of the region. This fishery historically estimated stock status relative to aggregate escapement goals based on annual index area surveys. Escapements were generally compared to historical values that were shown over time to sustain high returns and fishery harvests. However, goals were not always explicitly defined in historical practice and comparisons of specific escapement values with defined goals are not always available. In recent years, the management system has also explored development of goals based on population-specific analyses. However, population-specific goals have not yet been fully incorporated into management and effective application may be limited due to recent reductions in aerial survey coverage of a range of representative populations and time periods for each species. Reduced surveys provide low resolution on major stock subcomponents and will limit the effective development and application of population-specific reference points.
Condition	Estimate stock status of Karaginsky and Korfa Pink and Chum Salmon and Korfa Sockeye in area rivers relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.
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: Include a clear definition of stocks and populations for all species.
Consultation on condition	The Client will work with KamchatNIRO.

Condition 4 - 3.2.2. Decision-making processes

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. Shevlyakov 2013b) provide a historical perspective but are not sufficient to allow tracking action associated with findings and relevant recommendations. Inconsistent availability of annual fish run and fishery information outside the local governmental management system limits the availability of information for actions or lack of action associated with findings and relevant recommendations; therefore, the fishery does not score 80.
Condition	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.
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.
Consultation on condition	The Client will work with SVTU, Kamchatka Ministry on Fisheries, and KamchatNIRO.

Condition 5 - 3.2.3. Compliance and Enforcement

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	75
Rationale	This standard is not met because the available information shows that illegal fishing is still active in the area. Recently, in several settlements located in the UoC there were found significant (few metric tonnes) storages of illegal caviar which demonstrates presence of well-organised distributional networks despite on increasing level of enforcement. Moreover, very high level of anti-poaching activities performed by companies and state agencies, when multiple infringements are reported, reflects high significance of the problem of IUU fishing. 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 in some areas of Kamchatka 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 in some areas.
Condition	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.
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 fourth 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 effectiveness of the monitoring, control and surveillance system in the unit of certification by the first surveillance audit. In addition, to documenting enforcement activities undertaken by SVTU and the fishing companies, and media reports, the plan will include some methodology to evaluate the relative effectiveness of enforcement activities. 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 is implementing 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	The Client will work with SVTU, KamchatNIRO, and academic consultants to develop and implement the plan.

7.5 Client Action Plan

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	Karaginsky Pink Salmon – 70 Karaginsky Chum Salmon – 70 Korfa Pink Salmon – 70 Korfa Chum Salmon – 70
Rationale	Karaginsky Pink salmon stocks do not meet the standard because even-year pink escapements into Southern Karaginsky Bay index rivers were below S msy in 7 of 8 years. However, odd-year pink escapements were well above S*msy. Pink Salmon escapements in the Anapka River complex generally exceeded S*msy levels in odd years but often failed to reach Smsy in even years. Korfa Bay Pink Salmon did not meet the standard because escapements in the Anapka River complex regularly failed to reach Smsy in even years. Karaginsky Bay Chum Salmon did not meet the standard because escapements into Southern Karaginsky Bay index rivers were below Smsy in 11 of the past 15 years in each species. Similar patterns were seen in the Anapka rivers. Korfa Bay Chum Salmon did not meet the standard because Vyvenka River escapments failed to achieve Smsy in 8 of the last ten years. Interpretation of spawning escapements relative to goals is confounded by limited data for some species and rivers in recent years due to recent reductions in aerial survey effort. Corresponding escapements are reported as low values by KamchatNIRO. Consistent high levels of production for Pink, Chumstocks in this assessment indicate that these stocks are fluctuating around target reference points. However, this conclusion cannot be confirmed based on spawning escapement information.
Condition	Demonstrate that Pink Salmon and Chum Salmon in the Karginsky and Korfa stock management units (SMU) are at a level which maintains high production consistent with escapements at or fluctuating around its TRP.
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 work with KamchatNIRO to develop a plan to improve Pink salmon and Chum salmon escapement monitoring within Karaginsky Bay and Korfa Bay that will facilitate better inseason management of the fishery. The Client will participate in AFC meetings during the fishing season and advocate for management measures that allow Pink salmon andChum salmon to meet escapement targets in the UoA. By the first annual surveillance, the Client will provide a written plan for improving Pink salmon and Chum salmon escapement monitoring. Further annual reports will contain Pink and Chum salmon escapement information collected during the previous season.
Consultation on condition	The Client will work with KamchatNIRO, AFC and other stakeholders.

Condition 2a

Performance Indicator	1.2.3. Information and monitoring - Relevant information is collected to support the harvest strategy
Score	Karaginsky Pink Salmon – 70 Karaginsky Chum Salmon – 70 Korfa Pink Salmon – 70 Korfa Chum Salmon – 70
Rationale	The continuing effectiveness of the harvest strategy will depend also on monitoring of spawning escapements. The SG80 standard for regular monitoring is not met for Pink and Chum Salmon because recent reductions in aerial survey intensity have substantially reduced the accuracy and precision of spawning escapement estimates used to guide management decisions. Surveys have been reduced due to budget limitations. The current survey intensity likely provides sufficient precision to distinguish large and small runs but lack the resolution to avoid estimation bias due to differences in run timing or fish distribution. Historical assessments have generally been sufficient to support the current harvest strategy but current survey frequency may not be sufficient to identify any future changes in productivity or distribution patterns which might confound effective implementation of the harvest control rules.
Condition	Regularly monitor spawning escapement of Karaginsky and Korfa Pink and Chum Salmon in area rivers at a level of accuracy and coverage sufficient to ensure effective harvest controls.
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 written plan to improve escapement monitoring sufficient to identify the status of Karaginsky Bay and Korfa Bay pink and chum salmon in relation to harvest in the UoC during the first annual surveillance. 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. bi-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. The plan will be implemented prior to the second surveillance audit. Information on survey effort and distribution and escapement results from the previous season will be provided during each audit.
Consultation on condition	The Client will work with KamchatNIRO and other stakeholders.

Condition 2b

Performance Indicator	1.2.3. Information and monitoring - Relevant information is collected to support the harvest strategy
Score	Korfa Pink Salmon – 70 Korfa Chum Salmon – 70
Rationale	The continuing effectiveness of the harvest strategy will also depend on monitoring of potential changes to salmon productivity. The SG80 standard for monitoring is not met for Pink and Chum Salmon in Korfa Bay UoAs, due to concerns that platinum mining has led to decreased quality of spawning habitat in freshwater streams. It is essential that sufficient information is available on run returns in these areas in order to ensure precautionary salmon management in light of possibly reduced reproductive success for these SMUs.
Condition	In Korfa Bay, monitoring and research must also be sufficient to detect negative impacts due to degradation of spawning habitat due to mining.
Milestones	By the first annual surveillance the client must present a plan 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 work with KamchatNIRO to develop a plan to assess the likely impacts of mining on salmon productivity in rivers draining into Korfa Bay and determine the appropriate management response. The plan will be presented during the first annual surveillance and include a synthesis of literature provided by WWF Kamchatka and may include additional information to assess mining impacts. Evidence will be provided during the second surveillance audit that the plan has been implemented. A report will be provided during the third surveillance audit summarizing the results of the analysis including recommendations for any necessary fishery management actions if salmon productivity has declined due to mining activities.
Consultation on condition	The Client will work with KamchatNIRO and other stakeholders.

Condition 3

Performance Indicator	**1.2.4. Assessment of stock status - There is an adequate assessment of the stock status of the SMU**
Score	Karaginsky Pink Salmon – 70 Karaginsky Chum Salmon – 70 Korfa Pink Salmon – 70 Korfa Chum Salmon – 70 Korfa Sockeye Salmon – 70
Rationale	The SG80 standard is not met for this performance indicator due to the generic nature of historical application of reference points and questions regarding their application in specific areas of the region. This fishery historically estimated stock status relative to aggregate escapement goals based on annual index area surveys. Escapements were generally compared to historical values that were shown over time to sustain high returns and fishery harvests. However, goals were not always explicitly defined in historical practice and comparisons of specific escapement values with defined goals are not always available. In recent years, the management system has also explored development of goals based on population-specific analyses. However, population-specific goals have not yet been fully incorporated into management and effective application may be limited due to recent reductions in aerial survey coverage of a range of representative populations and time periods for each species. Reduced surveys provide low resolution on major stock subcomponents and will limit the effective development and application of population-specific reference points.
Condition	Estimate stock status of Karaginsky and Korfa Pink and Chum Salmon and Korfa Sockeye in area rivers relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.
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	By the first surveillance, the Client will provide a written report detailing escapement goals that are actually used to manage pink and chum salmon in Karaginsky Bay and Korfa Bay and sockeye in Korfa Bay. The report will detail which rivers (or river sections) are annually surveyed and how this information is used to evaluate escapements relative to the goals. It will also include an analysis of how the surveyed rivers are representative of unsurveyed rivers in the UoA. By the second surveillance, that Client will provide a written report to demonstrate that survey indicator rivers continue to be representative of populations throughout the unit of certification, including documentation of methodology by which survey counts are expanded so that spawning escapement can be directly compared with the spawning escapement goals.
Consultation on condition	The Client will work with KamchatNIRO.

Condition 4

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. Inconsistent availability of annual fish run and fishery information outside the local governmental management system limits the availability of information for actions or lack of action associated with findings and relevant recommendations; therefore, the fishery does not score 80.
Condition	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.
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	Annually the Client will provide a written report explaining management actions taken during the previous fishing season that were relevant to the fishery. The report will identify initial passing days, modifications to passing days, and season closures as well as clearly specify Anadromous Fish Commission protocols for the fishery area. The report may also include relevant information on the fishery management adopted from other management agencies and institutes.
Consultation on condition	The Client will work with SVTU, Kamchatka Ministry on Fisheries, and KamchatNIRO.

Condition 5

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	75
Rationale	This standard is not met because the available information shows that illegal fishing is still active in the area. Recently, in several settlements located in the UoC there were found significant (few metric tonnes) storages of illegal caviar which demonstrates presence of well-organised distributional networks despite on increasing level of enforcement. Morever, very high level of anti-poaching activities performed by companies and state agencies, when multiple infringements are reported, reflects high significance of the problem of IUU fishing. 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 in some areas of Kamchatka 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 in some areas.
Condition	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.
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 effectiveness of the monitoring, control and surveillance system in the unit of certification by the first surveillance audit. In addition, to documenting enforcement activities undertaken by SVTU and the fishing companies, and media reports, the plan will include some methodology to evaluate the relative effectiveness of enforcement activities. 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	The Client will work with SVTU, KamchatNIRO, and academic consultants to develop and implement the plan, as well as consult with ForSea Solutions LLC.

Условие 1

Показатель Эффективности	**1.1.1. Состояние запасов. - Единица управления запасами (SMU) находится на уровне, который поддерживает высокое воспроизводство и имеет низкую вероятность падения ниже предельного контрольного значения (LRP) состояния запасов**
Балл	Горбуша в Карагинском заливе – 70 Кета в Карагинском заливе – 70 Горбуша в заливе Корфа – 70 Кета в заливе Корфа – 70
Обоснование	Запасы лососей в Карагинском заливе не соответствуют стандарту, поскольку пропуски горбуши четных лет в индикаторные реки южной части залива находятся ниже уровня S*msy в последние 7-8 лет. Однако пропуски горбуши

	нечетных лет были намного выше S*msy. Пропуски горбуши нечетных лет в систему реки Анапка обычно превышали уровни S*msy, но в четные годы часто не достигали его. Горбуша в заливе Корфа не соответствует стандарту, поскольку пропуски в систему реки Анапка регулярно не достигают S*msy в четные годы. Кета в Карагинском заливе не соответствовал стандарту, поскольку пропуски в индексные реки южной части Карагинского залива были ниже уровня S*msy в течение 11-ти из последних 15-ти лет по каждому виду. Подобная ситуация сложилась в отношении системы рек Анапки. Кета залива Корфа не соответствует стандарту, поскольку пропуски в реку Вывенка не достигали S*msy в течении 8-ми из последних десяти лет. Интерпретация нерестовых пропусков относительно целей ограничивается лимитированными данными по некоторым видам и рекам в последние годы из-за недавнего сокращения количества авиаучетов. Соответствующие данные по пропускам сообщаются КамчатНИРО как низкие значения. Стабильно высокие уровни воспроизводства горбуши и кеты в данной оценке показывают, что эти запасы колеблются вокруг целевых ориентиров. Однако этот вывод не может быть подтвержден на основании информации о нерестовом пропуске.
Условие	Продемонстрировать, что горбуша и кета в рамках единиц управления запасами (SMU) Карагинского залива и залива Корфа находится на таком уровне, при котором поддерживается высокое воспроизводство в соответствии с пропусками на уровне или колеблющимися около целевых контрольных значений (TRP).
Этапы	К началу первого ежегодного надзорного аудита клиент должен предоставить доказательства того, что существует план по удовлетворению этого условия. К началу второго ежегодного надзорного аудита клиент должен представить доказательства того, что план был выполнен. К началу третьего ежегодного надзорного аудита клиент должен продемонстрировать, что условие было выполнено, и в таком случае промысел получит не менее 80.
План действий Клиента	Клиент будет работать совместно с КамчатНИРО в целях разработки плана по улучшению мониторинга пропусков горбуши и кеты в пределах заливов Карагинский и Корфа, способствующего более эффективному сезонному управлению. Клиент будет участвовать в заседаниях Комиссии по анадромным в течение промыслового сезона и будет выступать за меры управления, которые позволят производителям горбуши и кеты достичь целевых пропусков в рамках Единицы Оценки (UoA). К первому надзорному аудиту Клиент предоставит письменный план по улучшению мониторинга пропусков горбуши и кеты. Дальнейшие ежегодные отчеты будут включать информацию по пропускам горбуши и кеты, собранную в предыдущем сезоне.
Консультация по выполнению условия	Клиент будет работать с КамчатНИРО, Комиссией по анадромным и другими заинтересованными сторонами.

Условие 2а

Показатель Эффективности	**<u>1.2.3. Информация и мониторинг</u> – Собирается соответствующая информация для поддержания стратегии добычи**
Балл	Горбуша в Карагинском заливе – 70 Кета в Карагинском заливе – 70 Горбуша в заливе Корфа – 70 Кета в заливе Корфа – 70
Обоснование	Обеспечение эффективности стратегии в дальнейшем зависит в том числе и от мониторинга заполнения нерестилищ. Стандарт SG80, предусматривающий

	регулярный мониторинг, не выполнен поскольку недавнее сокращение количества авиаучетов значительным образом повлияло на снижение точности и аккуратности оценки заполняемости нерестилищ, которая используется как руководство для принятия решений. Количество учетов было сокращено вследствие ограничений бюджета. Интенсивность учетов в настоящее время является достаточной для получения информации о сильных и слабых подходах, однако недостаточна чтобы избежать неточностей в оценках из-за разницы в сроках путины или распределения рыбы. Исторические оценки были в целом достаточны для поддержки настоящей стратегии промысла, однако частота исследований в настоящее время может оказаться недостаточной для идентификации любых изменений в продуктивности или распределении паттернов в будущем, что может стать неожиданным препятствием для эффективного выполнения мероприятий по контролю за исполнением правил добычи.
Условие	Регулярный мониторинг пропусков на нерест горбуши и кеты в реках Карагинского залива и залива Корфа на уровне точности и охвата, достаточных для обеспечения эффективного контроля за выловом.
Этапы	К началу первого ежегодного надзорного аудита клиент должен предоставить доказательства того, что существует план по удовлетворению этого условия. К началу второго ежегодного надзорного аудита клиент должен представить доказательства того, что план был выполнен. К началу третьего ежегодного надзорного аудита клиент должен продемонстрировать, что условие было выполнено, и в таком случае промысел получит не менее 80.
План Действий Клиента	Клиент предоставит письменный многолетний план по улучшению мониторинга заполнения, достаточный для определения состояния запасов горбуши и кеты в заливах Карагинский и Корфа по отношению к Единице Оценки (UoA) во время первого ежегодного надзорного аудита. План будет включать в себя методологию (например, авиаучеты, подсчет на РУЗах и т. Д.), приблизительный период времени (например, с середины августа до начала сентября), частоту (например, каждые две недели), реки / участки рек для каждого вида и определение шаги по предоставлению достаточной информации о заполнении нерестилищ диким лососем для поддержки стратегии добычи и демонстрации того, что ведется мониторинг численности. План будет реализован до начала проведения второго надзорного аудита. Информация о работах по обследованию, распределению и результатах заполнения за предыдущий сезон будет предоставляться во время каждого аудита.
Consultation on condition	Клиент будет работать с КамчатНИРО, и другими заинтересованными сторонами.

Условие 2b

Показатель Эффективности	**1.2.3. Информация и мониторинг – Собирается соответствующая информация для поддержания стратегии добычи**
Балл	Горбуша в заливе Корфа – 70 Кета в заливе Корфа – 70
Обоснование	Обеспечение эффективности стратегии в дальнейшем зависит в том числе и от мониторинга потенциальных изменений продуктивности. Стандарт SG80 не выполнен из-за озабоченности о том, что добыча платины привела к снижению качества нерестовых местообитаний в пресных водотоках. Очень важно, чтобы информация о возвратах рыбы на данной территории была достаточной, что позволит обеспечить предупредительное управление лососевым промыслом в свете возможного снижения репродуктивного успеха на данных единицах управления лососевыми.
Условие	В заливе Корфа мониторинг и исследования должны быть достаточными для того, чтобы зафиксировать негативные воздействия, связанные с деградацией нерестилищ из-за добычи платины.
Этапы	К началу первого ежегодного надзорного аудита клиент должен предоставить доказательства того, что существует план по удовлетворению этого условия. К началу второго ежегодного надзорного аудита клиент должен представить доказательства того, что план был выполнен. К началу третьего ежегодного надзорного аудита клиент должен продемонстрировать, что условие было выполнено, и в таком случае промысел получит не менее 80.
План Действий Клиента	Клиент будет работать с КамчатНИРО для разработки плана по оценке воздействия горнодобывающей промышленности на продуктивность лососевых в реках, впадающих в залив Корфа, чтобы принять необходимые меры по управлению в ответ на негативное воздействие. План будет представлен в ходе первого надзорного аудита и включит синтез литературных данных, предоставленных WWF Камчатка, и также может включать дополнительную информацию для оценки воздействии горнодобывающей промышленности. Доказательства того, что план был выполнен будут предоставлены в ходе второго надзорного аудита. Отчет, суммирующий результаты анализы, включая рекомендации о любым необходимых действиях по управлению промыслом в случае снижения продуктивности лососей, связанной с деятельностью горнодобывающей промышленности, будет предоставлен в ходе третьего надзорного аудита.
Консультация по выполнению условия	Клиент будет работать с КамчатНИРО, и другими заинтересованными сторонами.

Условие 3

Показатель Эффективности	**<u>1.2.4. Оценка статуса запасов</u> - Существует адекватная оценка состояния запаса Единицы управления запасами (SMU)**
Балл	Горбуша в Карагинском заливе – 70 Кета в Карагинском заливе – 70 Горбуша в заливе Корфа – 70 Кета в заливе Корфа – 70
Обоснование	Стандарт SG80 не выполнен в связи с общим характером исторического применения контрольных значений и вопросов, относящиеся к нему в определенных районах региона. Данный промысел исторически оценивал статус запасов в соответствии с агрегированными целевыми значениями пропусков на основе ежегодных исследований индикаторных рек. Пропуска в основном сравнивались с историческими значениями, которые в течении продолжительного времени поддерживали высокие возвраты и добычу. Однако, при этом цели не всегда были четко определены и сравнение специфических значений пропусков с определенными целевыми показателями не всегда возможно. В последние годы, система управления попробовала разрабатывать цели основываясь на анализе определенных популяций. Однако целевые показатели для определенных популяций все еще не до конца в управление и их эффективное применение может быть лимитировано всвязи с недавним сокращением охвата авиаучетами рядя репрезентативных популяций и сроков по каждому из видов. Снижение количества авиаучетов способствует генерадизации подкомпонентов стока и лимитирует эффективную разработку и применение контрольных значений специфических для каждой популяции.
Условие	Оценить состояние запасов горбуши и кеты в реках Карагинского залива и залива Корфа, а также нерки в заливе Корфа относительно контрольных значений, четко определить запасы и численность популяций всех видов и продемонстрировать, что наблюдения в “индикаторных” (реперных) реках являются репрезентативными для других популяций в пределах единицы управления.
Этапы	К началу первого ежегодного надзорного аудита клиент должен предоставить доказательства того, что существует план по удовлетворению этого условия. К началу второго ежегодного надзорного аудита клиент должен представить доказательства того, что план был выполнен. К началу третьего ежегодного надзорного аудита клиент должен продемонстрировать, что условие было выполнено, и в таком случае промысел получит не менее 80.
План действий Клиента	К началу первого надзорного аудита Клиент предоставит письменный отчет, детально описывающий целевые пропуски, которые фактически используются для управления запасами горбуши и кеты в заливах Карагинский и Корфа, а также нерки в заливе Корфа. В отчете также будут подробно описаны, какие реки (или речные секции) ежегодно наблюдаются, и как эта информация используется, чтобы оценить, как достигаются пропуски по отношению к их целевым значениям. В нем также будет предоставлен анализ того, каким образом реки/притоки, взятые под наблюдения, являются репрезентативными для рек/притоков, входящих в Единицу Оценки (UoA), но не взятых под наблюдение. К началу второго надзорного аудита, Клиент предоставит письменный отчет, чтобы продемонстрировать, что взятые под наблюдения “индикаторные” (реперные) реки продолжают являться репрезентативными для популяций на всей Единице сертификации, включая документацию по методологии, с помощью которой число наблюдений расширено таким образом, чтобы пропуски на нерест можно было непосредственно сравнить с их целевыми значениями.

Консультация по выполнению условия	Клиент будет работать с КамчатНИРО.

Условие 4

Показатель Эффективности	**<u>3.2.2 Процессы принятия решений</u> - Система управления, специализирующаяся на промысловой деятельности и ее оптимизации, включает в себя эффективные процессы принятия решений, которые приводят к мерам и стратегиям по достижению определенных целей, а также такая система имеет соответствующий подход к фактическим разногласиям в промысле.**
Балл	75
Обоснование	Мониторинг принятия решений по промыслу ограничен в связи с не постоянной доступностью информации за пределами местной системы управления. Результаты промыслового сезона и эффективность предпринятых действий по управлению регулярно обсуждаются органами управления, такими как Комиссия по регулированию добычи анадромных видов рыб, СВТУ и ФАР, а также на научных советах институтов рыбного хозяйства, таких как КамчатНИРО, ТИНРО-Центр и ВНИРО. Однако информация о размере подходов, вылове по времени и площади, действиям по управлению промыслом и пропускам обычно не выходит за пределы системы управления, за исключением редких случаев. Периодические публикации, содержащие соответствующую информацию (например, Shevliakov 2013b) представляют историческую перспективу, но недостаточны для отслеживания действий, основанных на результатах исследований и соответствующими рекомендациями. Непостоянная доступность ежегодной информации о подходах и промысле за пределами местной государственной системы управления ограничивает доступность информации о действиях или их отсутствии,основанных на результатах исследований и соответствующими рекомендациями; следовательно, промысел не набирает 80 баллов.
Условие	Продемонстрировать, что информация о результатах деятельности промысла и действиях по управлению рыболовством предоставляется по запросу, а также разъясняются любые действия или отсутствие таковых, связанных с выводами и соответствующими рекомендациями, вытекающими из исследований, мониторинга, анализа и обзора мероприятий.
Этапы	К началу первого ежегодного надзорного аудита клиент должен предоставить доказательства того, что существует план по удовлетворению этого условия. К началу второго ежегодного надзорного аудита клиент должен представить доказательства того, что план был выполнен. К началу третьего ежегодного надзорного аудита клиент должен продемонстрировать, что условие было выполнено, и в таком случае промысел получит не менее 80.
План действий Клиента	Ежегодно клиент будет предоставлять ежегодные отчеты с обоснованиями действий по управлению рыболовством, принятых в предыдущем промысловом сезоне, которые непосредственно влияют на промысел на единице сертификации. В отчете будут определяться начальные проходные дни, изменения в проходных днях, даты закрытия сезона, а также четко указываться ссылки на протоколы Комиссии по регулированию добычи анадромных видов рыб для данной зоны промысла. Отчет также может включать сведения об управления промыслом, принятые от другими органами управления и институтами.

Консультация по выполнению условия	Клиент будет работать с СВТУ, Министерством Рыбного Хозяйства Камчатского края, и КамчатНИРО.

Условие 5

Показатель Эффективности	**3.2.3. Соблюдение требований и обеспечение исполнения - Применяются и соблюдаются механизмы мониторинга, контроля и надзора, обеспечивающие меры по управлению промыслом и связанные с ними мероприятия по оптимизации промысла.**
Балл	75
Rationale	Этот стандарт не соблюдается, поскольку по имеющейся информации в этом районе все еще ведется незаконный промысел. Недавно в нескольких населенных пунктах, расположенных на территории единицы управления, были обнаружены значительные (несколько метрических тонн) хранилища нелегальной икры, что свидетельствует о наличии хорошо организованных распределительных сетей, несмотря на повышение уровня защиты прав. Кроме того, очень высокий уровень действий по борьбе с браконьерством, проводимых компаниями и государственными учреждениями, когда сообщается о многочисленных нарушениях, отражает высокую значимость проблемы незаконного промысла. Эффективное правоприменение возможно только при значительном финансировании и сотрудничестве между компаниями, занимающимися рыболовством, в зависимости от местных рыбных ресурсов. Хронический характер этой проблемы в некоторых районах Камчатки свидетельствует о том, что система мониторинга, контроля и наблюдения не продемонстрировала способность обеспечивать соблюдение соответствующих правил в рамках всей системы. Контроль не может считаться всеобъемлющим, поскольку заметный уровень незаконного рыболовства, по-видимому, все еще является значительным в некоторых районах.
Condition	Продемонстрировать, что система мониторинга, контроля и наблюдения внедрена в промысловую деятельность и связанную с ней оптимизацию, а также что данная система способна обеспечить соблюдение соответствующих мер управления, стратегий и/или правил.
Milestones	К началу первого ежегодного надзорного аудита клиент должен предоставить доказательства того, что существует план по удовлетворению этого условия. К началу второго ежегодного надзорного аудита клиент должен представить доказательства того, что план был выполнен. К началу третьего ежегодного надзорного аудита клиент должен продемонстрировать, что условие было выполнено, и в таком случае промысел получит не менее 80.
План действий Клиента	К началу первого надзорного аудита Клиент предоставит детальный план по оценке эффективности системы мониторинга, контроля и надзора на участках, входящих в единицу сертификации. В дополнение к документированию правоохранительных мер, проводимых СВТУ, рыболовными компаниями, а также репортажам в СМИ этот план также будет включать в себя некоторую методику оценки относительной эффективности правоохранительных мер. Например, такая методика может включать в себя антропологические/социологические исследования местных сообществ для оценки типов и масштабов различных незаконных видов деятельности, возможных путей сбыта, а также стратегии по уменьшению стимулов для таких видов деятельности. В ходе второго надзорного аудита Клиент представит доказательства того, что этот план был полностью реализован. Окончательный отчет о результатах,

	демонстрирующих эффективную систему мониторинга, контроля и соблюдения правил рыболовства, будет предоставлен в ходе третьего надзорного аудита.
Консультация по выполнению условия	Клиент будет работать с СВТУ, КамчатНИРО и консультантами академических кругов для разработки и реализации этого плана, а также будет консультироваться с ForSea Solutions LLC.

7.6 Surveillance

If the fishery is certified, the fishery surveillance program will be default Level 6, based on the conditions, and associated deliverables and timelines. Surveillances will be conducted according to program and timeline requirements specified in FCRV2.0 7.23.

Table 29. Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 6	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & re-certification site visit

Table 30. Timing of surveillance audit.

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1	TBD	During 2021 salmon season	Previous year's fishery information will be available and current year fishery can be observed.
2	TBD	During the 2022 salmon season	
3	TBD	During the 2023 salmon season	
4	TBD	During the 2024 salmon season	

Table 31. Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
1	On-site surveillance audit	2 auditors	From client action plan it can be deduced that information needed to verify progress towards conditions will require on site visits to review progress toward milestones and consult with the fishery client and representative of the management system who provide collaboration in meeting conditions.
2	On-site surveillance audit	2 auditors	
3	On-site surveillance audit	2 auditors	
4	On-site surveillance audit & recertification site visit		

7.7 Harmonised fishery assessments

There are five salmon fisheries currently MSC certified on the Kamchatka Peninsula. Three are located in NE Kamchatka: The Delta Fish Salmon Fishery is located on the Kamchatka River south of Karaginsky Bay, the Tymlat Salmon Fishery is located in Karaginsky Bay, and the Delfin Salmon Fishery is located in Olyutorsky Bay north of Karaginsky Bay (in the same management subzone). Two of them are located in SW Kamchatka (Vityaz-Avto-Delta Salmon Fisheries and Narody Severa-Bolsheretsk Salmon Fisheries). The Vityaz-Avto-Delta Salmon Fisheries overlap this fishery. Scores and conditions among assessments were reconciled to the extent possible recognizing specific circumstances in different rivers and additional or new information that has become available between assessments. In several cases, differences in scores reflect new information available to the assessment team.

Scoring differences for P1 are caused by some differences in stock status of target species (spawning escapement, coverage of information on escapement). Some differences in P3 scores are related to different level of poaching activities in the area, mostly caused by different development of transport infrastructure.

Table 32. Summary of PI Level Scores for Kamchatka salmon fisheries.

Principle	Species	VA-D W Kamchatka	NS-B W Kamchatka	Delta Fish Kamchatka R	Delfin Olyutorsky	Tymlat-Karaginsky
P1 – Target Spp.	Pink	82.9[a]	85.4	--	85.4	84.6
	Chum	82.9[a]	82.1	83.7	85.4	84.6
	Coho	82.9[a]	--	83.3	--	
	Sockeye	97.9	--	84.1	85.4	
	Chinook			83.3	--	
P2 – Ecosystem	All	85.7	84.7	85.0	87.3	87.3
P3 –Mgmt. System	All	81.9	81.2	80.2	82.3	81.7

[a] Reported as 81.9 (errata) in West Kamchatka assessment (MRAG 2016).

Table 33. Certified or under assessment salmon fisheries in Western Kamchatka.

			Vityaz-Avto Delta	Kamber-Pymta	Narody Severa et al.	Zarya-Kolpkovsky Sobolevo	ORKZ 55
Certification status			Certified 2016, scope extension 2019	Scope extension	Certified	In assessment	In assessment
Certification date			2016	2019	2018	--	--
PIs to harmonize			P3	P3	P3	P3	P3
River & Species	Icha	Pink, Chum	--	--	--	X	--
	Oblukovina	Pink, Chum	--	--	--	X	--
	Krutogorova	Pink, Chum	--	--	--	X	--
	Kolpakova	Pink, Chum	--	--	--	X	--
	Vorovskaya	Pink, Chum	X	--	--	X	--
	Kol	Pink, Chum, Coho	X	--	--	--	--
	Pymta	Pink, Chum	--	X	--	--	--
	Kikhchik	Pink, Chum	--	--	X	--	--
	Mukhina	Pink, Chum	--	--	X	--	--
	Khomutina	Pink, Chum	--	--	X	--	--
	Bolshaya	Pink, Chum	--	--	X	--	--
	Opala	Pink, Chum	X	--	X	--	--
	Golygina	Pink, Chum	X	--	--	--	X
	Kochegochek	Pink, Chum	X	--	--	--	X
	Ozernaya	Pink, Chum, Sockeye	X	--	--	--	X

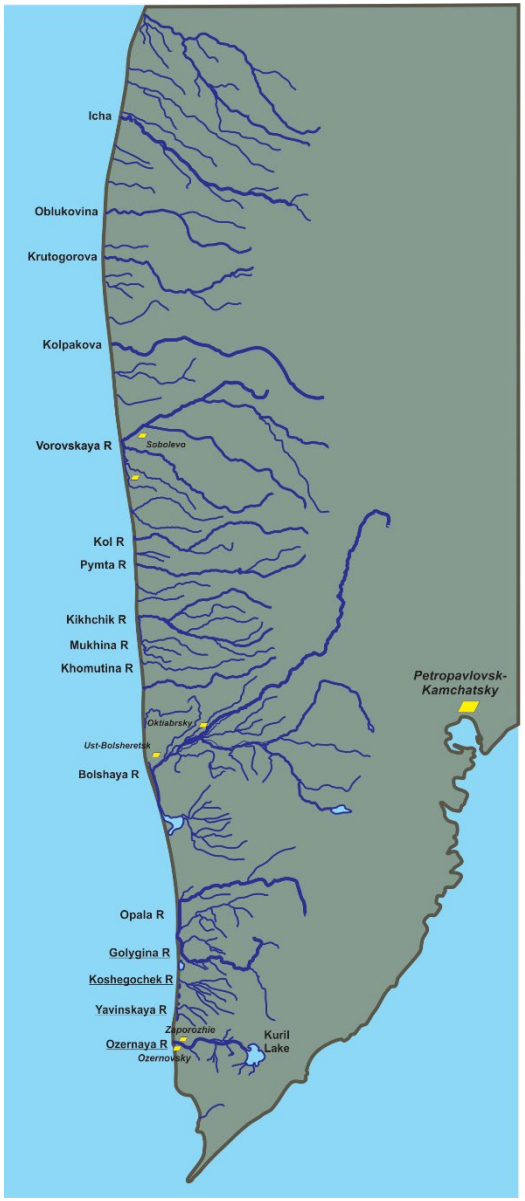


Table 34. Certified or under assessment salmon fisheries in Eastern Kamchatka.

			Delta Fish	Delfin	Tymlat	Vostochny Bereg Maksimovsy, Koryakmoreproduct, Nachikinskoe, Severo Vostochnaya	Kolkhoz Bekereva Ukinskij, Vyvenskoe Belorechensk
Certification status			Certified	Certified	PCDR		
Certification date			2018	2018	2019		
PIs to harmonize			P3	P3	P1, P2, P3	P1, P2, P3	P1, P2, P3
Kamchatsky Bay	Kamchatka R	Sockeye, Chum, Coho, Chinook	X	--			
Olyutorsky Bay	Rivers entering	Pink, Sockeye, Chum	--	X			
Korfa Bay	Rivers entering	Pink, Sockeye, Chum					X
Karaginsky Bay	Rivers entering	Pink, Chum			X	X	X

Table 35. Rivers and species included in certified or in assessment fisheries of eastern Kamchatka.

Bay	River	Species			VBMKNSV					KBULBV			
			Delfin	Tymlat	Vostochny Bereg	Maksimovsky	Koryakmoreprodukt	Nachinskoe	Severo Vostochnaya	Kolkhoz Bekereva	Ukinskij Liman	Belechensk	Vyvenskoe
Olyutorskiy	Anana	Pink, Chum, Sockeye	X										
	Apuka	Pink, Chum, Sockeye	X										
	Pakhacha	Pink, Chum, Sockeye	X										
	Imka	Pink, Chum, Sockeye	X										
	Impuka	Pink, Chum, Sockeye	X										
	Emet	Pink, Chum, Sockeye	X										
Korfa	Thahiybhiymayam	Pink, Chum, Sockeye											X
	Vyvenka	Pink, Chum, Sockeye											X
	Lingenmyvayam	Pink, Chum, Sockeye											X
	Gatymnvayam	Pink, Chum, Sockeye											X
Karaginsky	Khai-Anapka	Pink, Chum										X	
	Anapka	Pink, Chum										X	
	Virovayam	Pink, Chum		X								X	
	Belaya	Pink, Chum		X									
	Kichiga	Pink, Chum		X									
	Paklavayam	Pink, Chum		X									
	Tymlat	Pink, Chum		X									
	Vytvirovayam	Pink, Chum		X					X				
	Ossora	Pink, Chum		X					X				
	Karaga	Pink, Chum		X		X							
	Kayum	Pink, Chum		X		X							
	Makarovaka	Pink, Chum		X	X	X				X			
	Dranka	Pink, Chum		X	X	X				X			
	Ivashka	Pink, Chum			X					X			
	Sukhaya	Pink, Chum			X					X			
	Rusakova	Pink, Chum			X		X			X			
	Khaylyulya	Pink, Chum			X		X			X			
	Esmiyk	Pink, Chum					X			X	X		
	Nachiki	Pink, Chum					X			X	X		
	Uka	Pink, Chum									X		
	Malamvaya	Pink, Chum						X			X		
	Konskaya	Pink, Chum						X					

Table 36. Summary of PI levels scores for Kamchatka salmon fisheries.

	Component	PI	Performance Indicator (PI)	VA-D W. Kamchatka Pink	VA-D W. Kamchatka Chum	VA-D W. Kamchatka Coho (Kol)	VA-D W. Kamchatka Sockeye (Ozernaya)	NS-B W Kamchatka Pink	NS-B W Kamchatka Chum	Delta Fish Kamchatka Sock	Delta Fish Kamchatka Chum	Delta Fish Kamchatka Coho	Delta Fish Kamchatka Chnk
P1 - Target	Outcome	1.1.1	Stock status	70	70	70	100	80	80	70	70	70	70
		1.1.2	Stock rebuilding	80	80	80	na	na	Na	85	85	85	85
	Management	1.2.1	Harvest strategy	85	85	85	95	85	85	80	80	80	80
		1.2.2	Harvest control rules & tools	70	70	70	95	80	80	80	80	80	80
		1.2.3	Information & monitoring	65	65	65	90	65	65	65	65	65	65
		1.2.4	Assessment of stock status	75	75	75	95	75	75	75	70	65	65
	Enhancement	1.3.1	Enhancement outcome	100	100	100	100	100	100	100	100	100	100
		1.3.2	Enhancement management	100	100	100	100	100	80	100	100	100	100
		1.3.3	Enhancement information	100	100	100	100	100	90	100	100	100	100
P2 - Ecosystem	Primary species	2.1.1	Outcome	80			80	80		80			
		2.1.2	Management	90			90	90		80			
		2.1.3	Information	70			80	70		80			
	Secondary species	2.2.1	Outcome	100			100	100		100			
		2.2.2	Management	80			80	80		80			
		2.2.3	Information	80			80	85		80			
	ETP species	2.3.1	Outcome	85			85	85		85			
		2.3.2	Management	90			90	85		80			
		2.3.3	Information	80			80	80		80			
	Habitats	2.4.1	Outcome	95			95	95		95			
		2.4.2	Management	95			95	95		95			
		2.4.3	Information	80			80	80		80			
	Ecosystem	2.5.1	Outcome	90			90	80		90			
		2.5.2	Management	90			90	85		90			
		2.5.3	Information	80			80	80		80			

P3 - Mgmt	Governance & policy	3.1.1	Legal/customary framework	100	100	100	95
		3.1.2	Consultation, roles, etc.	85	85	85	80
		3.1.3	Long term objectives	80	80	80	80
	Management system	3.2.1	Fishery specific objectives	80	80	80	80
		3.2.2	Decision making processes	75	75	75	75
		3.2.3	Compliance & enforcement	70	70	65	70
		3.2.4	Performance evaluation	80	80	80	80

Continuation of Table 36-Summary of PI levels scores for Kamchatka salmon fisheries.

				Delfin Olyutorsky			Tymlat_Karaginsky	
	Component	PI	Performance Indicator (PI)	Pink	Chum	Sock	Pink	Chum
P1 - Target	Outcome	1.1.1	Stock status	80	80	80	70	70
		1.1.2	Stock rebuilding	na	na	na	85	85
	Management	1.2.1	Harvest strategy	80	80	80	80	80
		1.2.2	Harvest control rules & tools	80	80	80	80	80
		1.2.3	Information & monitoring	75	75	75	75	75
		1.2.4	Assessment of stock status	70	70	70	70	70
	Enhancement	1.3.1	Enhancement outcome	100	100	100	100	100
		1.3.2	Enhancement management	100	100	100	100	100
		1.3.3	Enhancement information	100	100	100	100	100
P2 - Ecosystem	Primary species	2.1.1	Outcome	100			100	
		2.1.2	Management	80			80	
		2.1.3	Information	95			95	
	Secondary species	2.2.1	Outcome	100			100	
		2.2.2	Management	80			80	
		2.2.3	Information	85			85	
	ETP species	2.3.1	Outcome	80			80	
		2.3.2	Management	80			80	
		2.3.3	Information	80			80	
	Habitats	2.4.1	Outcome	95			95	
		2.4.2	Management	95			95	
		2.4.3	Information	80			80	
	Ecosystem	2.5.1	Outcome	90			90	
		2.5.2	Management	90			90	
		2.5.3	Information	80			80	
P3 - Mgmt	Governance & policy	3.1.1	Legal/customary framework	95			95	
		3.1.2	Consultation, roles, etc.	85			85	
		3.1.3	Long term objectives	80			80	
	Management system	3.2.1	Fishery specific objectives	80			80	
		3.2.2	Decision making processes	75			75	
		3.2.3	Compliance & enforcement	80			75	
		3.2.4	Performance evaluation	80			80	