Marine Stewardship Council fisheries assessments

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FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River

Photo provided by the client: FTP Comandor JSC, 2019

Announcement Comment Draft Report

Conformity Assessment Body (CAB)	UCSL United Certification Systems Limited
Assessment team	Dr. Rob Blyth-Skyrme, Dr. Petr Vasilets, Dr. Mohamed Samy-Kamal
Fishery client	FTP Comandor JSC – “Fishing tinning plant “Comandor” Joint Stock Company (Russian Federation)
Assessment type	Initial Assessment
Date	April 2020

1 Contents

Table of Tables

Table of Figures

2 Glossary

Abbreviations & acronyms

CAB	Conformity Assessment Body
CFMC	Center of Fishery Monitoring and Communications
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	Exclusive Economic Zone
ERS	Electronic Recording and Reporting System
ETP	Endangered, threatened and protected species
FAO	Food and Agriculture Organization of the United Nations
FFA	Federal Fisheries Agency
FGBNU	Federal State Budgetary Research Institution
HCR	Harvest Control Rule
ICES	International Council for the Exploration of the Sea
ISBF	Introduced Species Based Fisheries
ITQ	Individual Transferable Quota
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported, Unregulated catch
MCS	Monitoring, Control and Surveillance
MSC	Marine Stewardship Council
NGO	Non-Governmental Organisation
PA	Precautionary approach
PAC	Pelagic Advisory Council
PCA	Permanent Court of Arbritation
PI	Performance indicator
RAC	Regional Advisory Council
RBF	Risk-based framework
SAM	State-Space Assessment Model
SG	Scoring guidepost
TBC	To be confirmed
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UoA	Unit of Assessment
UoC	Unit of Certification
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System
VNIRO	All-Russian Federal Research Institute of Fisheries and Oceanography
VPA	Virtual Population Analysis
WWF	World Wildlife Fund

Abbreviations Stock assessment (List of symbols and reference points)

B_{LIM}	Biomass limit reference point or minimum biomass below which recruitment is expected to be impaired or the stock dynamics are unknown
B_{MSY}	The level of stock biomass corresponding to the maximum sustainable yield (biological reference point); the peak value on a domed yield-per-recruit curve
B_{PA}	Precautionary biomass below which SSB should not be allowed to fall to safeguard it against falling to B_{LIM}
$B_{TRIGGER}$	Value of spawning stock biomass (SSB) that triggers a specific management action
CI	Confidence Interval
CPUE	Catch per unit effort: the quantity of fish caught (in number or in weight) with one standard unit of fishing effort; e.g. number of fish taken per 1000 hooks per day or weight of fish taken per hour of trawling. CPUE is often considered an index of fish biomass (or abundance). Sometimes referred to as catch rate
F	Instantaneous rate of fishing mortality
F_{LIM}	Limit reference point for fishing mortality (mean over defined age range). Fishing mortality rate over a long time that is expected to be associated with stock collapse
F_{MAX}	F where total yield or yield per recruit is highest (biological reference point)
F_{MSY}	F giving maximum sustainable yield (biological reference point) - the rate of fishing mortality that results in the maximum sustainable yield
F_{PA}	Precautionary buffer to preclude true fishing mortality being at F_{LIM} when the perceived fishing mortality is at F_{PA}
MSY	Maximum sustainable yield
MSY $B_{TRIGGER}$	Precautionary biomass level at which the management plan initiates specific harvest control rules to minimise the risk of further decline in biomass and concomitant risk to recruitment
PRI	Point of Recruitment Impairment
RAC (RC)	Recommended allowable catch (Recommended catch)
SSB	Spawning stock biomass
TAC	Total allowable catch
TRP	Target reference point
Yr	Year

3 Executive summary

Draft determination to be completed at Public Comment Draft Report stage

This report is the Announcement Comment Draft Report (ACDR) which provides details of the MSC assessment process for FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River. The ACDR was published in April 2021.

A review of information presented by the client has been reviewed and evaluated by the assessment team – **at the ACDR stage this does not represent a final scoring outcome or a certification decision**.

The provisional scoring presented in this report has not been reviewed by stakeholders, peer reviewers or the client – these steps will all take place from here onwards. Stakeholders are encouraged to review the scoring presented in this assessment and use the Stakeholder Input Form to provide evidence to the team of where changes to scoring are necessary.

Any stakeholder comments received will be published ahead of the site visit. Currently, this has not been scheduled, but is anticipated to be off-site in line with the current MSC Derogation for COVID-19[1]. Arrangements will be made for stakeholders to meet with the assessment team virtually if meetings cannot be held onsite.

The Target Eligibility Date for this assessment is the date of publication of the Public Comment Draft Report (PCDR) version of the assessment report.

The assessment team for this fishery assessment comprised of Dr. Rob Blyth-Skyrme (Team Leader and Principle 2 specialist), Dr. Petr Vasilets (Principle 1 specialist) and Dr. Mohamed Samy-Kamal (Principle 3 specialist).

Client fishery strengths

Principle 1:

- It is highly likely that the three salmon species under P1 are above the Limit Reference Point (LRP) as evidenced by stock assessments and relatively stable or increasing catches.
- The fishery has a management strategy that explains the stock status, population dynamics, management guidelines, fishing rules, limit and levels of changes in the recommended catch, goals for the following year.

Principle 2:

- The gear has a very low probability to interact or harm any ETP species (i.e. seabirds, sharks or marine mammals) that may be encountered in the fishing ground. The effects on species are likely to be within limits of national and international requirements for protection of ETP species.

Principle 3:

- The management system is generally consistent with local, national or international laws that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.
- 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 rights of fishery-dependent communities are explicitly stated in the Federal Fisheries Act (2004).
- Organisations and individuals involved in the management process have been identified.
- Functions, roles and responsibilities are explicitly defined and well understood.
- Russian salmon fishery management has transitioned over the last years, since 2008, from quota-based management to escapement-based management informed by pre-season forecasts. This change resulted in more flexible, responsive, in-season management of the resource.
- Since 2008, fishing companies have been awarded long-term leases to fishing parcels, reducing incentives for unreported catch in order to receive a larger allocation in the subsequent season.

Client fishery weaknesses

Weaknesses of the FTP Comandor JSC Salmon Fishery in the context of fully meeting the MSC Principles and Criteria for Sustainable Fisheries are.

Principle 1:

- No particular weaknesses were identified.

[1] https://www.msc.org/docs/default-source/default-document-library/for-business/program-documents/chain-of-custody-supporting-documents/msc-covid-19-guidance-for-cabs---fisheries.pdf

Principle 2:

- Almost no information was provided regarding the impact of the UoA on the sensitive habitats or ecosystems. Impacts are expected to be very limited, but it seems likely that no studies have been made to assess potential impacts in the fishing ground.
- P2 objectives are less well defined and measurable than the P1 objectives.
- The management measures to minimize the effect of the UoA on ETP species, sensitive habitats and vulnerable ecosystems are considered likely to work, based on plausible argument (e.g. general experience). However, there is no quantitative evidence (lack of confidence) that these measures are being implemented and working successfully, and that the UoA complies with its management requirements.

Principle 3:

- The precautionary approach is not mentioned explicitly in the Federal Fisheries Act (2004), but the requirement to protect aquatic biological resources and take the best scientific knowledge into account equals the requirements of the precautionary approach.
- It is difficult to demonstrate that the decision-making process responds to all issues to address P1 and P2 goals, mainly because of the unavailability of specific information explaining how and why these internal decisions by Russian governmental agencies were taken.
- Illegal, unregulated and unreported fishing is a problem in almost all Russian Pacific salmon fisheries, mainly by poaching and particularly in Kamchatka.

It is noted that information and scoring for all three Principles will be reviewed and verified throughout the assessment process, including during the site visit.

Summary of further information to be sought / clarified:

Principle 1:

- No specific information needs were identified.

Principle 2:

- PI 2.1.3: Any quantitative data on catches (or absence of catches) of primary species would support scoring.
- PI 2.2.1 – PI 2.2.3: More information on the technical features of the fishing gear that minimise their potential to catch birds and marine mammals would support scoring.
- PI 2.2.1 – PI 2.2.3: Any quantitative data on catches (or absence of catches) of secondary species would also support scoring.
- PI 2.3.1 – PI 2.3.3: More information on the technical features of the fishing gear that minimise their potential to catch birds and marine mammals would support scoring.
- PI 2.3.1 – PI 2.3.3: Quantitative data on catches (or absence of catches) of ETP species would also support scoring.

Principle 3:

- No specific information needs were identified.

Determination

On completion of the initial review of information and scoring, the assessment team neither concludes that no PI is likely to score below 60 nor weighted average score for any of the three principles to score below 80. Based on the ACDR provisional scoring this fishery is likely to pass the assessment against the MSC standard criteria, however, this is subject to client, peer and stakeholder review.

4 Report details

4.1 Authorship and peer review details

The assessment of the FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River was conducted by the following Team from UCSL United Certification Systems Limited:

Principle 1 Lead: Dr. Petr Vasilets

Petr Vasilets / Пётр Василец worked for more than 25 years as a fishery scientist in the Kamchatka branch of VNIRO (Russian Federal Research Institute of Fisheries and Oceanography). He received PhD in ichthyology in 2000 with a thesis on the "The smelts in the coastal waters of Kamchatka". He has over 50 scientific publications on various aspects of fisheries. In 2020, he successfully completed MSC online training, including MSC Risk Based Framework (RBF), for role "Fishery Team Member". Petr has participated in two assessment conducted by CAB Marine Certification LLC (now — UCSL), first as a trainee and then as a team member (expert on Principle 1). He has passed the Traceability and RBF training modules.

UCSL United Certification Systems Limited confirms that Dr. Petr Vasilets meets the Team Member competency requirements (Table PC2, MSC 2020a), and contributes towards the Audit Team meeting the Fishery Team competency requirements (Table PC3, MSC 2020a). It is also confirmed that Dr. Petr Vasilets has no conflicts of interest in relation to the fishery under assessment. A full C.V. of Dr. Petr Vasilets is available on request.

Team Leader and Principle 2 Lead: Dr. Rob Blyth-Skyrme

Rob (Robert) Blyth-Skyrme started his career in commercial aquaculture in 1996 but shifted focus subsequently to the sustainable management of wild fisheries. He completed his PhD in 2004, which studied the Inshore Potting Agreement off south Devon, UK, a co-managed fishery that survived as a voluntary agreement between industry sectors for more than 30 years. He then worked at the Eastern Sea Fisheries Joint Committee, one of the bodies managing inshore fisheries around the English coast, where he became the Deputy Chief Fishery Officer with responsibilities for fisheries management and enforcement. Dr. Rob Blyth-Skyrme's next role was at English Nature / Natural England, the statutory adviser to UK Government on nature conservation in England and English waters, where he led the team dealing with fisheries policy, science and nationally significant fisheries and environmental casework.

Dr. Rob Blyth-Skyrme now runs Ichthys Marine Ecological Consulting Ltd. As well as carrying out general fisheries consultancy, including providing advice on habitat and species impacts, reviewing the science supporting MPA designations, and assessing management regimes, he has worked as an MSC Lead Assessor, Principle 2 and Principle 3 expert team member, and peer reviewer across a wide range of MSC fisheries. Dr. Rob Blyth-Skyrme has also presented at various MSC workshops, including those covering Principle 2 in the Certification Requirements (CR) V2.0, changes in species and habitat requirements between Certification Requirements V1.3 and V.2.0, and the interactions between the MSC Standard and the EU Landing Obligation. He is a Trainer for the MSC's Capacity Building Programme, an original member of the Peer Review College, and is now a Third Party Expert for the Peer Review College.

UCSL United Certification Systems Limited confirms that Dr. Rob Blyth-Skyrme meets the Team Leader and Team Member competency requirements (Table PC1 and PC2, MSC 2020a), and contributes towards the Audit Team meeting the Fishery Team competency requirements (Table PC3, MSC 2020a). It is also confirmed that Dr. Rob Blyth-Skyrme has no conflicts of interest in relation to the fishery under assessment. A full C.V. of Dr. Rob Blyth-Skyrme is available on request.

Principle 3 Lead: Dr. Mohamed Samy-Kamal

Mohamed Samy-Kamal is a fisheries scientist. He was a scholarship holder of the research institution (IAMZ-CIHEAM) of Zaragoza for his MSc and of the Spanish Agency for International Development and Cooperation (MAEC-AECID) of Madrid for his PhD. His research experience focused on the evaluation of management measures applied to fisheries and the evaluation of fisheries policy and governance. His research areas are fisheries management especially multi-species demersal fisheries of Mediterranean Sea, trawl selectivity, Red Sea fisheries and MPAs. Dr. Mohamed Samy-Kamal has authored a number of scientific articles, regularly participates in international fisheries conferences (e.g. Iberian Symposium of Marine Biology Studies) and used to teach as well as to supervise MSc theses in the international master programme of Sustainable fisheries management organized by University of Alicante and IAMZ-CIHEAM. Dr. Mohamed Samy-Kamal has also taken numerous technical courses, including on MSC evaluation tools, MSC RBF and MSC Chain of Custody (CoC). During the last 5 years he has been involved in different MSC full-assessments and pre-assessments mainly in Russia and Estonia and has gained experience as MSC certification P3 assessor.

UCSL United Certification Systems Limited confirms that Dr. Mohamed Samy-Kamal meets the competency criteria for team members as specified in FCP v.2.2:

- He holds an MSc in Economics and Management of Fisheries and a PhD in Marine Science and Applied Biology and more than 3 years' research experience in fisheries;

- He has passed MSC Team Member training, including relevant updates;

- He has participated in more than 2 MSC fishery assessments in the last 5 years;

- He has more than 3 years' experience as a practicing fishery manager and/or fishery/policy analyst/consultant;

- He has passed the Traceability and RBF training modules.

UCSL United Certification Systems Limited confirms that Dr. Mohamed Samy-Kamal meets the Team Member competency requirements (Table PC2, MSC 2020a), and contributes towards the Audit Team meeting the Fishery Team competency requirements (Table PC3, MSC 2020a). It is also confirmed that Dr. Mohamed Samy-Kamal has no conflicts of interest in relation to the fishery under assessment. A full C.V. of Dr. Mohamed Samy-Kamal is available on request.

Use of the Risk-Based Framework (RBF):

Dr. Rob Blyth-Skyrme, Dr.Vasilets and Dr. Samy-Kamal have been fully trained in the use of the MSC's Risk Based Framework (RBF).

Peer reviewer information to be completed at Public Comment Draft Report stage.

Peer Reviewer 1:

Peer Reviewer 2:

4.2 Version details

The following MSC fisheries programme documents were used for this assessment (Table 1).

Table 1: Fisheries programme documents versions.

Document	Version number
MSC Fisheries Certification Process	Version 2.2
MSC Fisheries Standard	Version 2.01
MSC General Certification Requirements	Version 2.4.1
MSC Reporting Template	Version 1.2

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

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

5.1.1 Unit(s) of Assessment

Three Units of Assessment (UoAs) are described and assessed for FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River, as presented in Table 2, below.

Table 2: Units of Assessment (UoAs).

UoA 1	Description
Species	Pink salmon (*Oncorhynchus gorbuscha*) (Russian: горбуша)
Stock	FAO 61: Populations of Pink salmon spawning along the coast of Kamchatka-Kuril subzone on Western Kamchatka and adjacent rivers whose populations can be intercepted by the fishery.
Geographical area	Kamchatka-Kuril subzone (FAO 61.05.4): 1. Sea of Okhotsk; 2. Bolshaya River.
Fishing gear	1. Coastal trap nets (Russian: Ставной невод). 2. Beach seine (Russian: Невод закидной равнокрылый). 3. Floating (or drifting) gillnets (Russian: Сеть сплавная). 4. Anchored (or fixed) gillnets (Russian: Сеть ставная).
Client group	The client for the assessment is FTP Comandor JSC.
Other eligible fishers	Other Russian fishing companies operating commercially and using the same gears within the same geographic area.
UoA 2	**Description**
Species	Chum salmon (*Oncorhynchus keta*) (Russian: кета)
Stock	FAO 61: Populations of Chum salmon spawning along the coast of Kamchatka-Kuril subzone on Western Kamchatka and adjacent rivers whose populations can be intercepted by the fishery.
Geographical area	Kamchatka-Kuril subzone (FAO 61.05.4): 1. Sea of Okhotsk; 2. Bolshaya River.
Fishing gear	1. Coastal trap nets (Russian: Ставной невод). 2. Beach seine (Russian: Невод закидной равнокрылый). 3. Floating (or drifting) gillnets (Russian: Сеть сплавная). 4. Anchored (or fixed) gillnets (Russian: Сеть ставная).
Client group	The client for the assessment is FTP Comandor JSC.
Other eligible fishers	Other Russian fishing companies operating commercially and using the same gears within the same geographic area.
UoA 3	**Description**
Species	Sockeye salmon (*Oncorhynchus nerka*) (Russian: нерка or красная).
Stock	FAO 61: Populations of Sockeye salmon spawning along the coast of Kamchatka-Kuril subzone on Western Kamchatka and adjacent rivers whose populations can be intercepted by the fishery.
Geographical area	Kamchatka-Kuril subzone (FAO 61.05.4): 1. Sea of Okhotsk;

	2. Bolshaya River.
Fishing gear	1. Coastal trap nets (Russian: Ставной невод). 2. Beach seine (Russian: Невод закидной равнокрылый). 3. Floating (or drifting) gillnets (Russian: Сеть сплавная). 4. Anchored (or fixed) gillnets (Russian: Сеть ставная).
Client group	The client for the assessment is FTP Comandor JSC.
Other eligible fishers	Other Russian fishing companies operating commercially and using the same gears within the same geographic area.

UCSL United Certification Systems Limited as the Conformity Assessment Body confirms that FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River is in scope for MSC assessment through meeting the following scope requirements:

- The fishery does not target amphibians, reptiles, birds or mammals (7.4.2.1, MSC 2020a).
- The fishery does not use poisons or explosives (7.4.2.2, MSC 2020a).
- The fishery is not conducted under a controversial unilateral exemption to an international agreement (7.4.2.3, MSC 2020a).
- The client or client group does not include an entity that has been successfully prosecuted for a forced or child labour violation in the last 2 years (7.4.2.4, MSC 2020a).
- The client or client group does not include an entity that has been convicted for a violation in law with respect to shark finning (7.4.2.10, MSC 2020a).
- There is a mechanism for resolving disputes, and disputes do not overwhelm the fishery (7.4.2.11, MSC 2020a).

5.1.2 Units of Certification

It is anticipated that the Units of Certification (UoCs) will be the same as the UoAs, as detailed in Table 2, above. This will be confirmed in the Public Certification Report.

Table 3: Units of Certification (UoCs) (To be confirmed at PCR, but is anticipated to be the same as the UoAs in the Table 3).

UoC1	Description
Species	Pink salmon (*Oncorhynchus gorbuscha*) (Russian: горбуша)
Stock	FAO 61: Populations of Pink salmon spawning along the coast of Kamchatka-Kuril subzone on Western Kamchatka and adjacent rivers whose populations can be intercepted by the fishery.
Geographical area	Kamchatka-Kuril subzone (FAO 61.05.4): 1. Sea of Okhotsk; 2. Bolshaya River.
Fishing gear	1. Coastal trap nets (Russian: Ставной невод). 2. Beach seine (Russian: Невод закидной равнокрылый). 3. Floating (or drifting) gillnets (Russian: Сеть сплавная). 4. Anchored (or fixed) gillnets (Russian: Сеть ставная).
Client group	The client for the assessment is FTP Comandor JSC.
Other eligible fishers	Other Russian fishing companies operating commercially and using the same gears within the same geographic area.

UoC2	Description
Species	Chum salmon (*Oncorhynchus keta*) (Russian: кета)
Stock	FAO 61: Populations of Chum salmon spawning along the coast of Kamchatka-Kuril subzone on Western Kamchatka and adjacent rivers whose populations can be intercepted by the fishery.
Geographical area	Kamchatka-Kuril subzone (FAO 61.05.4): 1. Sea of Okhotsk; 2. Bolshaya River.
Fishing gear	1. Coastal trap nets (Russian: Ставной невод). 2. Beach seine (Russian: Невод закидной равнокрылый). 3. Floating (or drifting) gillnets (Russian: Сеть сплавная). 4. Anchored (or fixed) gillnets (Russian: Сеть ставная).
Client group	The client for the assessment is FTP Comandor JSC.
Other eligible fishers	Other Russian fishing companies operating commercially and using the same gears within the same geographic area.
UoC3	**Description**
Species	Sockeye salmon (*Oncorhynchus nerka*) (Russian: нерка or красная).
Stock	FAO 61: Populations of Sockeye salmon spawning along the coast of Kamchatka-Kuril subzone on Western Kamchatka and adjacent rivers whose populations can be intercepted by the fishery.
Geographical area	Kamchatka-Kuril subzone (FAO 61.05.4): 1. Sea of Okhotsk; 2. Bolshaya River.
Fishing gear	1. Coastal trap nets (Russian: Ставной невод). 2. Beach seine (Russian: Невод закидной равнокрылый). 3. Floating (or drifting) gillnets (Russian: Сеть сплавная). 4. Anchored (or fixed) gillnets (Russian: Сеть ставная).
Client group	The client for the assessment is FTP Comandor JSC.
Other eligible fishers	Other Russian fishing companies operating commercially and using the same gears within the same geographic area.

5.1.3 Scope of assessment in relation to enhanced or introduced fisheries

Pink, chum and sockeye salmon are a native species for in in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River and thus is eligible for MSC certification.

The fishery targets mainly naturally reproducing salmon stocks returning to rivers within the certification units. There are also two hatcheries located within the proposed certification units. Therefore, this is considered an enhanced fishery.

In the basin of the Bolshaya River (the western coast of Kamchatka) there are fishing parcels of the FTP Comandor JSC. Short descriptions of these salmon hatcheries, including photos, are available from North-Eastern branch of FSBI “Glavrybvod” website:

- The **Malkinsky Salmon Hatchery** (http://xn--b1aa5bc.xn--p1ai/rybovodnye-zavody/lrz-malki/) is located on the Klyuchyovka River (the Bolshaya and Bystraya rivers basins). Estimated production capacity is 1.28 million individuals of juvenile Pacific salmon, including:

  – 0.8 million of Chinook salmon with an average weight of 7 g for 1 specimen,

  – 0.48 million of Sockeye salmon with an average weight of 4 g for 1 specimen.

- The **Ozerki Salmon Hatchery** (http://xn--b1aa5bc.xn--p1ai/rybovodnye-zavody/ozerki/) is located on the Plotnikova River (the Bolshaya and Bystraya rivers basins). Estimated production capacity is 15.2 million individuals of juvenile Pacific salmon, including:

– 3.6 million of Chum salmon,

– 11.6 million of Sockeye salmon with an average weight of 0.8 g for 1 specimen.

The actual release (escape) of Pacific salmon juveniles by reproducible species from these salmon hatcheries slightly exceeds the estimated production capacity due to a decrease in the normative losses of hatchery products (eggs, larvae, juveniles) at all stages of the technological cycle.

Fish returns for each reproducible species of Pacific salmon are determined by processing and analyzing otolith marks. So, on Malkinsky Salmon Hatchery for Chinook salmon the return is 0.06%, for Sockeye salmon - 5.34%; at the Ozerki Salmon Hatchery for Chum salmon – 1.24%, and for Sockeye salmon – 0.14%.

Salmon hatcheries of the North-Eastern branch of the FSBI “Glavrybvod” (including Malkinsky and Ozerki hatcheries) work as integrated systems, i.e. with their releases of Pacific salmon which supplement the volumes of wild populations of Pacific salmon that live in the Bolshaya and Bystraya rivers basins. At the same time, the volumes of releases of Pacific salmon are strictly controlled by the regional fisheries research institute (KamchatNIRO – Kamchatka branch of the Federal State Budgetary Research Institution "VNIRO") by developing and approving at the Scientific Council of this institute recommendations on the receiving capacity of a particular water body (object) of fishery significance, into which reproducible juveniles are released for each species of Pacific salmon.

The Pacific salmon hatcheries of the North-Eastern branch of the FSBI “Glavrybvod” (including Malkinsky and Ozerki) are full-cycle hatcheries that carry out the entire technological process for the artificial reproduction of Pacific salmon juveniles, with all infrastructure required for these processes. The technological cycle of Pacific salmon hatcheries includes: capture of Pacific salmon producers (adult specimens of needed species of Pacific salmon), their maturation (holding of individuals to their maturation for breeding), slaughter and selection of sexual products (eggs and sperm), fertilization, incubation of eggs, larvae keeping, feeding and growing of juveniles with their subsequent release into the water body to achieve a given average weight parameter.

Establishing the optimal level of filling for wild spawning grounds of Pacific salmon is one of the determining measures for regulating the fishing of anadromous fish species, which include Pacific salmon. This measure is aimed at maintaining the population of a particular species of Pacific salmon at a level sufficient for both self-reproduction of the wild population and its exploitation by all types of fishing. At the same time, the optimal number of producers is their number that corresponds to the natural environmental capacity of a particular spawning reservoir.

The optimal number of producers is their number, which corresponds to the natural capacity of a particular spawning reservoir. The potential spawning area of each specific reservoir and the optimal degree of spawning grounds are determined on the basis of long-term monitoring of the status of aquatic biological resources (Pacific salmon) and their habitat, carried out jointly by the regional fisheries research institute (KamchatNIRO) and the basin fishery and conservation of aquatic biological resources institution (North-Eastern branch of FSBI “Glavrybvod”) according to the number spawning areas.

The total number of producers needed to pass into the river is distributed proportionally to the expected dynamics of spawning run for five days, or for decades (10 days) based on scientific data on the intra-population characteristics of individual spawning stock of Pacific salmon populations.

Here it is necessary to divide the salmon returning to the Bolshaya River (including the rivers entering its basin) according to species artificially reproduced and from natural (wild) spawning. As KamchatNIRO evaluates the approach of each species, this will be their total supply for each species.

Further, it is also necessary to divide the total catch of enterprises by these species. And separately show in the catch for FTP Comandor JSC.

Because these two Salmon hatcheries reproduce only Chum salmon, Sockeye salmon and Chinook salmon, any Pink salmon and Coho salmon will be natural spawning populations, only. Chinook salmon are also not a target species in the fishery, because there is a ban on commercial fishing for this species in the Bolshaya River.

The two remaining enhanced species of relevance to the assessment are Chum and Sockeye salmon. Forecasts for salmon in this region and separately for the Bolshaya River do not include complete information on the contribution of enhancement to the stocks of these species. However, considering that the return of salmon reproduced in these Salmon hatcheries back to spawning in the same river is a very small fraction (approximately hundredths or thousandths, and probably ten thousandths) of a percent, then knowing the total return to spawning of these species, it is possible to estimate the proportion of artificially reproduced salmon (with these Salmon hatcheries) within the total stocks, and in the fishery’s catch.

The purpose of allowing producers to spawn is primarily to achieve optimum filling of wild spawning grounds. In this case, –a key question is whether optimum filling of spawning grounds is achieved if the number of salmon that are naturally (wildly) reproduced and artificially reproduced (chum and sockeye salmon) are accounted for, this includes accounting for the number of salmon that are harvested for artificial reproduction in these Salmon hatcheries. In this

regard, there are some data on the number of producers caught for laying eggs in these hatcheries, and on the optimal filling of spawning grounds on the return of artificially reproduced salmon to the Bolshaya River.

Information characterizing the indicators released of Pacific salmon juveniles (escaped of juveniles) in 2019 from each of Salmon hatchery is presented in tabular form (Table 4).

Table 4: Artificial reproduction of Pacific salmon on hatcheries Malkinsky and Ozerki.

Indicator	Artificial reproduction of Pacific salmon on hatcheries			
	Malkinsky Salmon Hatchery		**Ozerki Salmon Hatchery**	
Species of Pacific salmon	Sockeye	Chinook	Chum	Sockeye
Volume of release (escape), millions of specimens	0,576	0,874	1,751	14,747
Standard weight, gram	4,0	7,0	0,8	0.8
Age	yearlings (0+)	yearlings (0+)	yearlings (0+)	yearlings (0+)
Place of release (escape)	Klyuchyovka River (the Bolshaya and Bystraya rivers basins)		Plotnikova River (the Bolshaya and Bystraya rivers basins)	
Estimated return, millions of specimens*	0.031	0,001	0,022	0.021

Note* – only for artificial juveniles from Salmon hatcheries (excluding representatives of the wild populations).

All hatcheries of the North-Eastern branch of the FSBI “Glavrybvod” produce otolith marking (tagging) of the entire volume of reproduced juvenile Pacific salmon. Thus, thermal tagging of otoliths is used at the Malkinsky hatchery (a tag on otoliths is formed due to periodic changes in water temperature, at which incubation of eggs for Sockeye salmon occurs, and juvenile rearing – for Chinook salmon). At the Ozerki hatchery the dry otolith tagging method is used, based on the ability of salmon eggs to develop normally in a humid atmosphere (for tagging, eggs are usually drained in incubators with daily frequency). Moreover, these tags are developed by the regional fisheries research institute individually for each year for each species of salmon.

The basis for determining the number of reproduced Pacific salmon from each of these hatcheries is the scientific recommendations of the regional fisheries research institute (KamchatNIRO – Kamchatka branch of the Federal State Budgetary Research Institution "VNIRO") on the receiving capacity of a particular water body of fishery value, into which reproductions of juveniles for each species of Pacific salmon are released.

But here it is necessary to show what percentage of the eggs caught for laying eggs on two reviewed Salmon hatcheries is taken from salmon of natural reproduction, and which – from salmon reproduced in these hatcheries and taken again for the selection of eggs for laying. Assessment team guess if the return of artificially reproduced salmon from these hatcheries is one thousandths or ten thousandths of a percent, then the probability that they can take salmon returning from their own hatcheries to be eggs will be so insignificant (these are already millions portions of a percent!), which is most likely to be taken into account. Assessment team has to conclude that every time they put eggs on these hatcheries only from wild-caught producers.

The salmon hatcheries of the North-Eastern branch of the FSBI “Glavrybvod” (including Malkinsky and Ozerki) act as integrated systems, with their releases supplementing the volumes of wild populations of Pacific salmon living in the Bolshaya, Bystraya rivers basin. Fodder migration, feeding and subsequent spawning migration of Pacific salmon (for both - origin wild and artificial forms) occurs on joint marine areas.

The Northeast branch of the FSBI “Glavrybvod” is not a participant in commercial or coastal commercial fishing. Nevertheless, as a member of the Commission for the Regulation of the Harvesting (Catching) of Anadromous Fish in the Kamchatka Territory, the North-Eastern Branch in its recommendations for fishing for Pacific salmon or for proposals for the introduction of restrictive measures is guided by the principle of priority for the conservation of aquatic biological resources before using them. All decisions are based on monitoring the status of aquatic biological resources and take into account the intrapopulation characteristics of individual spawning stocks of Pacific salmon. This allows the passage of salmon species to traditional spawning grounds in quantities determined by the rational use of aquatic biological resources, thereby avoiding the over-fishing burden on salmon populations exploited by the fishery.

Because neither KamchatNIRO nor FSBI “Glavrybvod” produce a special separation in the catch of salmon producing enterprises for wild and artificially reproduced salmon, it is difficult to judge the proportional capture (in shares) of wild

and artificially reproduced fish for individual species (Sockeye salmon and Chum salmon), given also that fishing according to both scientists and producers, it is based on producers of wild populations, and not artificially reproduced.

The number of wild producers allowed to go to spawning grounds to ensure their optimal filling is determined by the regulation of their pass (number of days passed, introduction of restrictions on fishing periods, etc.) by decisions of the regional anadromic Commission.

5.2 Assessment results overview

5.2.1 Determination, formal conclusion and agreement

To be drafted at Final Draft Report

To be completed at Public Certification Report

The report shall include a formal statement as to the certification determination recommendation reached by the assessment team on whether the fishery should be certified.

The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

Reference(s): FCP v2.2 Section 7.21

5.2.2 Principle level scores

To be drafted at Client and Peer Review Draft Report

The report shall include scores for each of the three MSC principles in the table below.

Reference(s): FCP v2.2 Section 7.17

Table 5: Principle level scores.

Principle	UoA 1	UoA 2	UoA 3
Principle 1 – Target species	**≥80**	**≥80**	**≥80**
Principle 2 – Ecosystem impacts	**≥80**	**≥80**	**≥80**
Principle 3 – Management system	**≥80**	**≥80**	**≥80**

5.2.3 Summary of conditions

To be drafted at Client and Peer Review Draft Report

The report shall include a table summarising conditions raised in this assessment. Details of the conditions shall be provided in the appendices. If no conditions are required, the report shall include a statement confirming this.

Reference(s): FCP v2.2 Section 7.18

Table 6: Summary of conditions

Condition number	Condition	Performance Indicator (PI)	Deadline	Exceptional circumstances?	Carried over from previous certificate?	Related to previous condition?
				Yes / No	**Yes / No / NA**	**Yes / No / NA**
				Yes / No	**Yes / No / NA**	**Yes / No / NA**
				Yes / No	**Yes / No / NA**	**Yes / No / NA**

5.2.4 Recommendations

To be drafted at Client and Peer Review Draft Report stage

If the CAB or assessment team wishes to include any recommendations to the client or notes for future assessments, these may be included in this section.

6 Traceability and eligibility

6.1 Eligibility date

The eligibility date for the FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River fisheries is the date of publication of the Public Comment Draft Report. This is permitted under MSC FCP v2.2 7.8 (MSC 2020a).

As the eligibility date is set before the certification date, any fish harvested after the eligibility date and sold or stored as under-assessment fish shall be handled in conformity with the following requirements (as per MSC FCP v2.2 7.8.2):

a. All under-assessment products shall be clearly identified and segregated from certified and non-certified products.
b. The client shall maintain full traceability records for all under-assessment product, demonstrating traceability back to the UoC and including the date of harvest.
c. Under-assessment products shall not be sold as certified or labelled with the MSC ecolabel, logo, or trademarks until fishery certification and product eligibility are confirmed.

The traceability and segregation systems in the fishery shall be implemented by the eligibility date.

6.2 Traceability within the fishery

To be completed at Public Certification Report stage

After catching salmon, the raw salmon is delivered to the vessels of the Fishing collective farm named after V.I. Lenin for the next processing stage. The raw salmon is accumulated in bunkers on the delivering vessel and sprinkled with ice. Raw salmon is then sorted by species and sizes. Later the fish is gutted, cut (using a special cutting machines) and cleaned, then sent to freezing rooms. Frozen, glazed fish is packed and sent for storage in a freezer warehouse with sections for the different owners. Shipment and transportation of finished frozen products from ships of the Fishing collective farm named after V.I. Lenin carried on sea refrigerated transport vessels. The sale of finished products is carried out in accordance with the concluded sales contracts in Russian Federation and for exports. The following types of fish products are sent to the sales markets of the Russian Federation and for export:

- Frozen Pink salmon gutted without a head,
- Frozen Pink salmon gutted with a head,
- Frozen Pink salmon entire / intact,
- Frozen Pink salmon caviar,
- Frozen Chum salmon gutted with a head,
- Frozen Chum salmon gutted without a head,
- Frozen Chum salmon caviar,
- Frozen Sockeye salmon gutted with a head,
- Frozen Sockeye salmon gutted without a head,
- Frozen Sockeye salmon caviar,
- Frozen salmon fish male gonads (without dividing by species – this will be clarified during the site visit),
- Frozen entire / intact Arctic char (Arctic char isn't including to UoAs and in scope of this MSC certification because it is a species of by-catch).

Taking into account the presence of IUU salmon fishing in the Russian Far East mainly by poaching, it is necessary to consider a robust chain of custody to reduce the risk of mixing between products from a non-certified source or that they enter the supply chain (Table 7). The chain of custody (CoC) should begin at the point of catch delivery to the processing facility (whether the processing facility is owned by the client or not) including the rest of the subsequent transshipment stages to ensure segregation and traceability to prevent mixing between certified and non-certified catch.

There is no risk of fishing outside of the UoC. Fishing parcels are allocated specifically and there is monitoring and inspection in place to ensure that catches are allocated to each fishing parcel in accordance with the allocated quota on it.

There is no at-sea processing in this salmon fishery. In the coastal waters after catching salmon in the trap nets, the raw salmon is delivered to the vessels of the Fishing collective farm named after V.I. Lenin with small boats and the

floating tanks towed by them with raw fish for the next processing stage on the board of these vessels and the next transporting to the fish factory of the Fishing collective farm named after V.I. Lenin in the Petropavlovsk-Kamchatsky.

There is no others transshipping in this fishery. Points of landing are as follows: Petropavlovsk-Kamchatsky.

Table 7: Traceability within the fishery.

Factor	Description
Will the fishery use gears that are not part of the Unit of Certification (UoC)? If Yes, please describe: • If this may occur on the same trip, on the same vessels, or during the same season; • How any risks are mitigated.	Not present – All gears that are used by the fishery are included in the UoA.
Will vessels in the UoC also fish outside the UoC geographic area? If Yes, please describe: • If this may occur on the same trip; • How any risks are mitigated.	Not present – each company has assigned fishing parcels where the vessels of the company are fishing. It is difficult that vessels fish outside these parcels because all catch from each parcel is recorded in logbooks and reported to inspection authorities for subsequent check and the reported volume should coincide with real catch from each parcel. The client does not buy any other salmon catch and therefore no catch from other sources outside the UoC. In addition, all catch must have documentation checked frequently by inspection authorities, and documentation of fish from other companies would easily be detected.
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities. • Transport • Storage • Processing • Landing • Auction If Yes, please describe how any risks are mitigated.	Not present – all the catch of the client is included in the UoA. All catch from the fishing parcels is reported and documented, in each stage of the CoC, including the fishing parcel location, quantities, dates, species, gear type, etc. and checked by inspection authorities, and therefore it is difficult to mix between certified and non-certified catch.
Does transhipment occur within the fishery? If Yes, please describe: • If transhipment takes place at-sea, in port, or both; • If the transhipment vessel may handle product from outside the UoC; • How any risks are mitigated.	Not present – as mentioned, the catch is separated and reported, documented and checked at each stage of until each landing and delivery to the processing facilities. The CoC should begin at the point of catch delivery to the processing facility including the rest of any subsequent transport and storage stages to ensure segregation and traceability to prevent mixing between certified and non-certified catch.
Are there any other risks of mixing or substitution between certified and non-certified fish? If Yes, please describe how any risks are mitigated.	An adequate system 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. Any other risks of substitution between fish from the Unit of Certification (certified catch) and fish from outside this

	unit (non-certified catch) before subsequent Chain of Custody is not present.

6.3 Eligibility to enter further chains of custody

To be completed at Public Certification Report stage

The report shall include a determination of whether the seafood product will be eligible to enter certified chains of custody, and whether the seafood product is eligible to be sold as MSC certified or carry the MSC ecolabel.

The report shall include a list of parties, or category of parties, eligible to use the fishery certificate, and sell product as MSC certified.

The report shall include the point of intended change of ownership of product, a list of eligible landing points, and the point from which subsequent Chain of Custody certification is required.

If the CAB makes a negative determination under FCP v2.2 Section 7.9, the CAB shall state that fish and fish products from the fishery are not eligible to be sold as MSC certified or carry the MSC ecolabel. If the client group includes other entities such as agents, unloaders, or other parties involved with landing or sale of certified fish, this needs to be clearly stated in the report including the point from which Chain of Custody is required.

Reference(s): FCP v2.2 Section 7.9

Table 8: Eligibility to enter further chains of custody.

Conclusion and determination
List of parties, or category of parties, eligible to use the fishery certificate and sell product as MSC certified
Point of intended change of ownership of product
List of eligible landing points (if relevant)
Point from which subsequent Chain of Custody is required

List of vessels used in fishing, processing and transportation of FTP Comandor JSC presents in the Table 47 of section “UoA companies and vessel’s list (maybe correct at time of ACDR production)”.

6.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stocks to enter further chains of custody

There are no inseparable or practically inseparable (IPI) stocks within this fishery. It is assumed that only salmon of local stocks and populations that reproduce in the rivers of the southwestern coast of the Kamchatka Peninsula, which flow into the Kamchatka-Kuril subzone, such as the Bolshaya River, are being developed for the UoAs under consideration. This issue is discussed in more detail in the background section for Principle 1.

Table 9: Identification of cause for inseparability.

Ref.	Clause/ Requirement	IPI- Y/N	Observation
FCP v2.2 7.5.9.1	The CAB shall only recognise stock(s) as being an IPI stock where the inseparability arises because either:		
a	The non-target catch is practicably indistinguishable during normal fishing operations (i.e., the catch is from a stock of the same species or a closely related species)	All UoA’s N	
b	When distinguishable, it is not commercially feasible to separate due to the practical operation of the fishery that would require significant modification to existing harvesting and processing methods.	All UoA’s	

		N	
c	The total combined proportion of catches from the IPI stock(s) do not exceed 15% by weight of the total combined catches of target and IPI stock(s) for the UoA;	All UoA's N/A	
d	The stocks are not ETP species	N	
e	The stocks are not certified separately	N	

7 Scoring

7.1 Summary of Performance Indicator level scores

The following draft performance indicator scores are provided (Table 10). These scores may change as the Assessment Team receives and responds to new information provided through the assessment process, and as later versions of the assessment report are produced.

Table 10: Draft Performance Indicator scores (at ACDR) FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River (Fishery Assessment Scoring Worksheet).

Principle	Component	Wt	Performance Indicator (PI)		Wt	Pink	Chum	Sockeye
						Score	Score	Score
One	Outcome	0.333	1.1.1	Stock status	1.0	≥80	≥80	≥80
			1.1.2	Stock rebuilding		NA	NA	NA
	Management	0.667	1.2.1	Harvest strategy	0.25	≥80	≥80	≥80
			1.2.2	Harvest control rules & tools	0.25	≥80	≥80	≥80
			1.2.3	Information & monitoring	0.25	60-79	60-79	60-79
			1.2.4	Assessment of stock status	0.25	≥80	≥80	≥80
	Enhancement		1.3.1	Enhancement outcome		≥80	≥80	≥80
			1.3.2	Enhancement management		≥80	≥80	≥80
			1.3.3	Enhancement information		≥80	≥80	≥80
Two	Primary species	0.2	2.1.1	Outcome	0.333	≥80	≥80	≥80
			2.1.2	Management strategy	0.333	≥80	≥80	≥80
			2.1.3	Information/Monitoring	0.333	≥80	≥80	≥80
	Secondary species	0.2	2.2.1	Outcome	0.333	≥80	≥80	≥80
			2.2.2	Management strategy	0.333	≥80	≥80	≥80
			2.2.3	Information/Monitoring	0.333	≥80	≥80	≥80
	ETP species	0.2	2.3.1	Outcome	0.333	≥80	≥80	≥80
			2.3.2	Management strategy	0.333	60-79	60-79	60-79
			2.3.3	Information strategy	0.333	60-79	60-79	60-79
	Habitats	0.2	2.4.1	Outcome	0.333	≥80	≥80	≥80
			2.4.2	Management strategy	0.333	≥80	≥80	≥80
			2.4.3	Information	0.333	≥80	≥80	≥80
	Ecosystem	0.2	2.5.1	Outcome	0.333	≥80	≥80	≥80
			2.5.2	Management	0.333	≥80	≥80	≥80
			2.5.3	Information	0.333	≥80	≥80	≥80
Three	Governance and policy	0.5	3.1.1	Legal &/or customary framework	0.333	≥80	≥80	≥80
			3.1.2	Consultation, roles & responsibilities	0.333	≥80	≥80	≥80
			3.1.3	Long term objectives	0.333	≥80	≥80	≥80
	Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	≥80	≥80	≥80
			3.2.2	Decision making processes	0.25	≥80	≥80	≥80
			3.2.3	Compliance & enforcement	0.25	60-79	60-79	60-79
			3.2.4	Monitoring & management performance evaluation	0.25	≥80	≥80	≥80

7.2 Principle 1

7.2.1 Principle 1 background

7.2.1.1 Overview of the fishery

This overview is largely based on the KamchatNIRO report (Bugaev *et al.*, 2020). If a source of information is not specified for some tables or figures, then the source is this report.

According to the North Pacific Anadromous Fish Commission (NPAFC), catches of Pacific salmon by all countries ranged from 331 to 1,137 thousand tonnes between 1925 and 2019 (Figure 1). Russian catches ranged from 33 to 676 thousand tonnes. In the catches of Russia in 1971-2019 the main species was Pink salmon (69%), in second place was chum salmon (21%), in third place was sockeye salmon (8%) (Figure 2). In Russian catches of Pacific salmon, about 90% of Chinook salmon, coho and sockeye salmon were caught in the waters of the Kamchatka Peninsula. On the coast of Kamchatka was harvested 50% of Pink salmon and 30% of chum salmon (Figure 3).

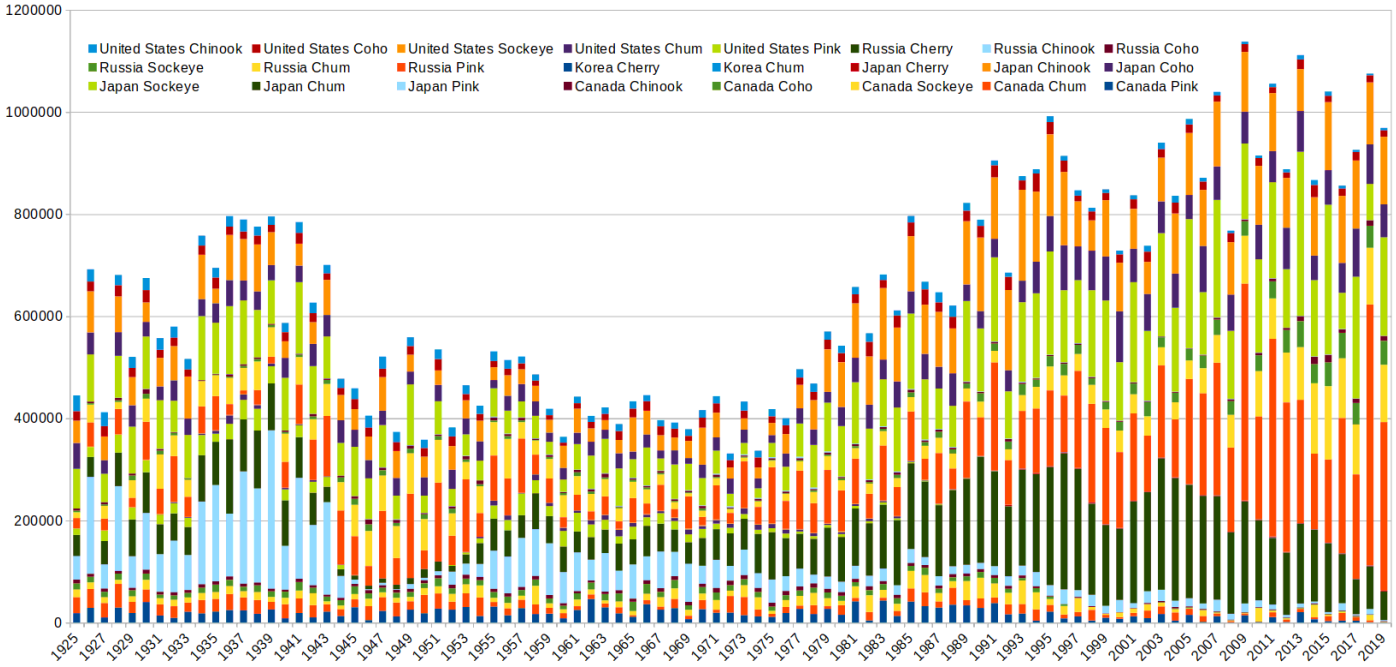

Figure 1: Dynamics of catches (tonnes) of Pacific salmon by species and countries in 1925-2019 (Data from NPAFC).

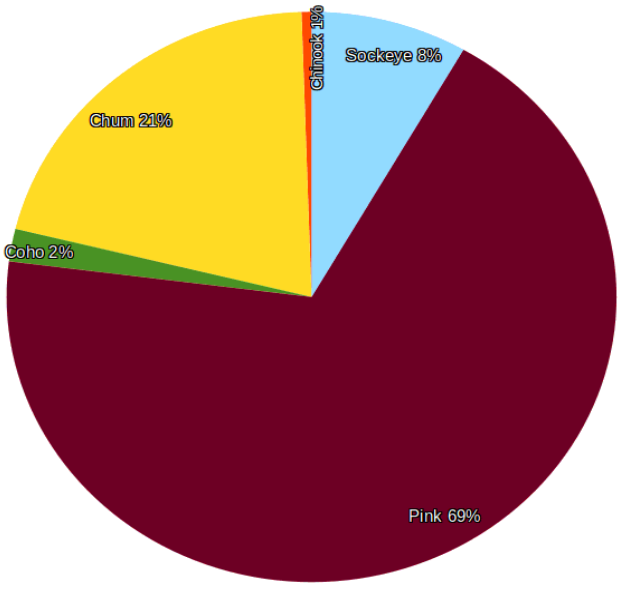

Figure 2: Shares of species in Russian commercial catch of Pacific salmon for 1971-2019 (Data of NPAFC).

Kamchatka is the main place of reproduction of the wild Pacific salmon in the Russian Far East. Kamchatka is the region which is reach in hundreds of rivers and lakes inhabited by the anadromous salmon species.

Large number of freshwater habitats on the peninsula provides spawning grounds for adults and nurseries, for fry of Pacific salmon before smoltification. The North Pacific Ocean also provides an enormous nutrition area to which the fish could return and close their reproductive and life cycles. Kamchatka is the only region of Russia inhabited by wild stocks of five Pacific salmon species (Pink, chum, sockeye, coho, and Chinook salmon) which are exploited at commercial level. In relative terms, the total catch of Pacific salmon species in the Far Eastern seas of Russia provided around 10% of the total catch of all aquatic biological resources in Russia in 2015-2017. Although, Pacific salmon species make 10% of the weight of all biological resources produced in Russia, its economic value as a food production exceeds this percent value, which ensures a rather valuable economic role of salmon in Kamchatka.

Pink, chum, and sockeye salmon are the main target species of commercial certified fishery. Within the period of 2001-2016 their share in the total catch made around 96.7%. The shares of coho and Chinook salmon are relatively low – 2.9 and 0.4% respectively. Nevertheless, the Asian stocks of both species are almost completely concentrated in Kamchatka Krai (coho salmon – 90%, Chinook salmon – 100%). These both species represent the most popular objective of sport and recreational fishery, which attracts large number of Russian and foreign tourists to the peninsula. Commercial fishing for Pacific salmon contributes around 50% of income in Kamchatka.

As of today, the fishery series makes over 100 years (1910-2016) and according to it the annual salmon harvesting makes around 100 thousand tonnes. In 2000s the catch made around 150 thousand tonnes. When expressed in percentage, it makes over 30%, and in some years – 50-60% of the total catch of Pacific salmon in the Far East. The historical maximum catches were registered in 2011, 2012, 2016 and 2017, when the harvesting level made around 230-250 thousand tonnes (Source: KamchatNIRO, access in October 2019).

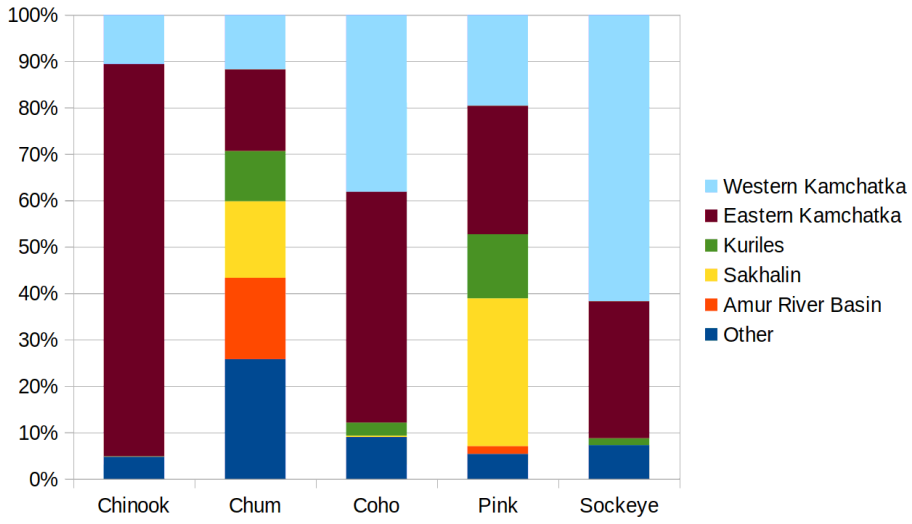

Figure 3: Shares of regions in Russian commercial catch of different species of Pacific salmon for 1971-2019 (Data of NPAFC).

In the Kamchatka-Kuril subzone, Pacific salmon stocks in the marine area are traditionally caught using trap nets, and in rivers they are caught using fixed (smooth) gill nets and throw nets. Until 2019, in the zone in the marine area, gill nets were also used. However, according to the new Fishing Rules in the Far Eastern Fisheries Basin, approved by the Ministry of Agriculture of the Russian Federation No. 267 dated 23.05.2019, starting from 2019, a ban on the use of these fishing gear in this region has been introduced.

Thus, in the Kamchatka-Kuril subzone, stocks of Pacific salmon (Pink salmon, chum salmon, sockeye salmon), as well as Arctic char (as bycatch), as already noted, are traditionally developed both in marine and river fishing areas (FA). In even-numbered years in the marine areas 63.7% is being developed, and in the odd-numbered year - 46.1% of the species. On average for the period from 2010 till 2019 - 58.7% of Pacific salmon were harvested in marine areas related to all types of fishing. On average 41.2% of Arctic char was caught over a ten-year period.

In the Kamchatka-Kuril subzone for the period 2010–2019 the maximum total catch of Pink salmon, chum salmon, sockeye salmon and Arctic char was recorded in the amount of 219 727.4 tonnes (2018), and the minimum – 29 525.7 tonnes (2011). On average, for this period, the annual catch of the considered species of Pacific salmon and Arctic char was 80 854.3 tonnes (Figure 4).

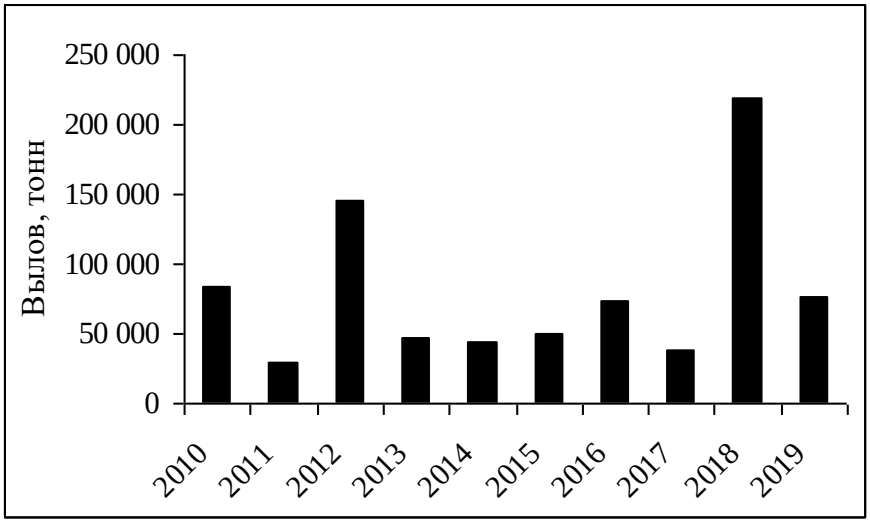

Figure 4: Dynamics of total catching of Pink salmon, chum salmon, sockeye salmon and Arctic char in the Kamchatka-Kuril subzone in 2010–2019. X-axis – years, Y-axis – catch in mt (Bugaev *et al*., 2020).

In 2010–2019, salmon fishing in this region is primarily based on the production of Pink and sockeye salmon, and secondly, chum salmon. In even-numbered years, the share of Pink salmon in catches was 67.3%, and sockeye salmon – 21.8%. In odd-numbered years, the proportion of Pink salmon decreased markedly – to 19.3%, and sockeye salmon, on the contrary, increased – 54.1%.

In general, the average long-term share of the catch (2010–2019) of the target species of Pacific salmon and Arctic char from the total salmon resources in the Kamchatka-Kuril subzone amounted to 96.6%. By species, the catch ratio was as follows: Pink salmon (even-numbered and odd-numbered years) – 53.1% (2.8–80.9%), chum salmon – 10.4% (4.8–25.8%), sockeye salmon – 31.4% (12.5–67.6%), Arctic char – 1.7 (0.2–4.6%).

In the area of fishing of FTP Comandor JSC in the basin and estuary zone of the Bolshaya River for the period 2010–2019 the maximum total catch of Pink salmon, chum salmon, sockeye salmon and Arctic char was recorded in the amount of 51,781.4 tonnes (2018), the minimum – 3,537.9 tonnes (2011). On average, during this period, the catch of the considered Pacific salmon and Arctic char was 16,039.9 tonnes.

The main object of fishery in the area of the Bolshaya River (sea and river fishing sites) is Pink salmon. On average, it accounted for 67.3% of the total catch of Pink salmon, chum salmon, sockeye salmon and Arctic char. The second largest catch was a chum – 17.1%. The share of sockeye salmon remained relatively low - 12.6%. The share of Arctic char fin catches in a minimum amounted 3.0%.

In the framework of the fishing activity of FTP Comandor JSC, Pink salmon were mainly caught in offshore fishing areas in the estuary zone of the Bolshaya River, where, on average, about 57.6% was harvested. The remaining species, as a rule, were mostly caught in river fishing sites. Here, on average, 60.2% of chum salmon, 65.5% of sockeye salmon and 57.6% of Arctic char were caught.

7.2.1.2 Fishing methods

The main fishing gears for Pacific salmon in the Kamchatka Krai are: gill (fixed, drift) nets, seine nets and marine trap nets. It should be noted that, starting in 2019, fishing using gill nets in the West Bering Sea zone, in the Karaginskaya, Petropavlovsko-Komandorskaya subzones (except for Avachinsky Gulf and the Avacha Bay) and Kamchatka-Kuril subzone, in inland marine water bodies, the territorial sea of the Russian Federation and the exclusive economic zone of the Russian Federation is prohibited by the Fishing Rules for the Far Eastern Fishing Basin, approved by order of the Ministry of Agriculture of the Russian Federation No. 267 dated May 23, 2019. The exception is the West-Kamchatska subzone, since active tidal processes and peculiarities of the bottom geomorphology do not allow setting marine trap nets in many places of this fishing region.

In the fishing area of Kamchatka-Kuril subzone trap nets are used everywhere in the coastal zone.

Fixed gillnets mainly used in coastal waters during pre-spawning migrations of Pacific salmon.

Nets belong to contact fishing gear and are widely used in the World Fisheries. In domestic fisheries, they were most actively used until 50s of the last century. Their operating principle is based on fish capture when trying to pass

through a netting due to enmeshment or entanglement. This is a highly selective fishing gear. Net selectivity, with specialized fishing of specific fishing objects, is achieved by regulating mesh size and thickness of netting. Mesh bar of the netting is determined based on biometric characteristics of the fishing objects. Thread thickness of the net web determines catch efficiency of nets, as the finer the thread is, the more tangible are nets.

With regard to environmental safety, the nets have the same disadvantage as other nets (fixed, drift, etc.) this is a possible bycatch of related objects.

The basis of the fixed net is rectangular netting, put on framing ropes and side strengthening lines. Netting is made of a thin synthetic thread or monofilament thread (fishing line). The top rope is equipped with foam floats, the bottom - with weight lead or steel rings. Ropes are usually made of a nylon cord. The ropes are made longer than the netting put on in such a way that 0.5-0.8 m long free ends remain on each side of the net. These ends, called eye splices, serve to connect the nets in line or fix bridles. Sometimes eye splices are made in the form of loops (eyes). In this case, the eye splices are interconnected by seizing, rather than nodes. Nets are framed for salmon fishing, as a rule, with a coefficient of 0.5 on framing ropes and 0.866 on side strengthening lines. The net dimensions are determined by the river depth and width. A separate net for salmon river fishing is 25–30 m long and 2–3 m high. In the process of fishing, the nets are connected in line, the number of nets in order is determined by the river width. Basic elements of the line of gillnets on anchors are shown in Figure 5.

Fixed nets in the process of fishing are rigidly connected to the bottom and shore by anchors and loading of the lower framing rope. Installation method is determined by nature of the reservoir and behaviour of the fishing object. Fixed nets can be installed at the surface, in the water column and at the bottom. Almost any fish can be caught using them: migrating and non-migrating, shoal and dispersed concentrations, as well as some non-fish objects.

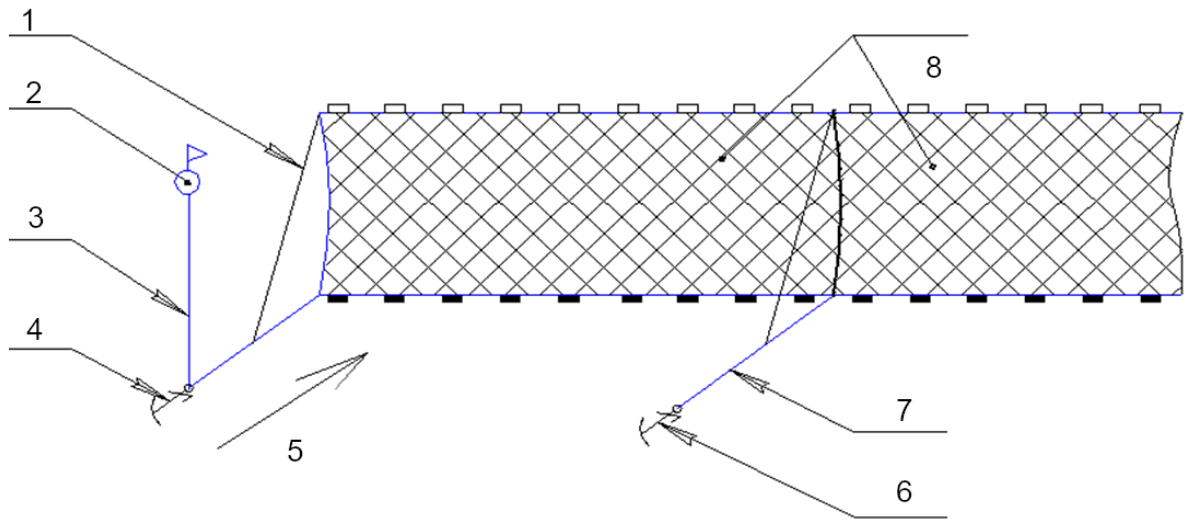

Figure 5: Line of fixed gillnets (Bugaev *et al*., 2020). 1 – bridle, 2 – pick-up buoy, 3 – buoy rope, 4 – end anchor, 5 – stream, 6 – intermediate anchor, 7 – backrope, 8 – net.

Fixed nets in the process of fishing are rigidly connected to the bottom and shore by anchors and loading of the lower framing rope. Installation method is determined by nature of the reservoir and behaviour of the fishing object. Fixed nets can be installed at the surface, in the water column and at the bottom. Almost any fish can be caught using them: migrating and non-migrating, shoal and dispersed concentrations, as well as some non-fish objects.

Drift gillnets. Design of the drift nets differs from the fixed nets only in minor details. As a rule, drift nets are not connected in line. The length of the net in hanging is 25–30 m and can reach 250–300 m, and height is 7–8 m. Bridles are attached to eye splices of the net, which connect the upper framing rope with buoy rope and ground warp. The buoy is used to monitor over float of the net and can be attached directly to the eye splice of the upper framing rope without using the bridle and buoy rope when the net is in surface mode.

While fishing, the drift nets move (swim) driven by stream flow. Mainly salmon is caught using drift nets in the Kamchatka Krai during their mass spawning run. Same as fixed nets, the drift ones can operate in various horizons in the process of fishing. Net running depth is regulated by load and float ratio. Basic elements of the drift net are shown in Figure 6.

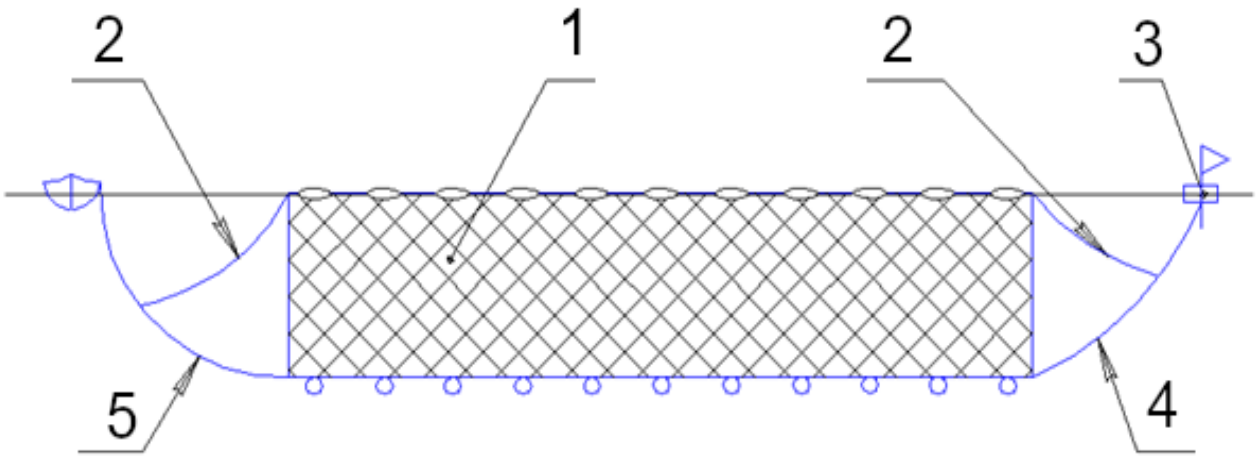

Figure 6: General layout of drift gillnets (Bugaev *et al*., 2020). 1 – net, 2 – bridles, 3 – pick-up buoy, 4 – buoy rope, 5 – ground warp.

Clause 32.25 of the Fishing Rules for the Far Eastern Fisheries Basin, approved by order of the Ministry of Agriculture of Russia No. 267 dated May 23, 2019 regulates dimensions of the nets for harvesting (catching) of Pacific salmon for inland sea waters of the Russian Federation and the territorial sea adjacent to the Kamchatka Krai - length in hanging is not more than 120 m, height in hanging is not more than 9 m, minimum mesh bar is 40 mm. Mesh bar of the netting is determined on the basis of the biometric characteristics of the fishing objects. In practice, depending on the species of salmon harvested, nets with a mesh bar of 55–100 mm are used in the Kamchatka Krai.

Seine nets. Seine nets are the most effective fishing gear for Pacific salmon during their spawning migrations and are quite productive when used in estuaries of rivers and littoral zone of the seas.

Seine nets belong to impounding (passive) net fishing gear of boat seine type. Fishing by seine nets is based on surrounding fish with the net wall with further dragging to the shore, ships, boats or ice holes and covering all water column in depth.

The operational efficiency of seine nets depends on many factors, the most important of which are geomorphology of the seacoast, hydrological regime in the region of seining, the behaviour and distribution of fish in it, weather conditions, fishing technique and strategies, as well as correspondence of the depth of fishing place to the height of the seine wall. Throw seining is distinguished by the simplicity of fishing gear and fishing technology. This method does not require significant energy costs, it can be easily mechanized. With the optimal organization of fishing, catches using seine nets are comparable to catches of fixed nets and, in some cases, may even exceed them. At the same time, their material consumption and cost are much lower. All this makes throw seining attractive for organizing the fishing of Pacific salmon, and under the conditions of the Kamchatka Krai, in the areas where fixed net fishing is difficult or impossible due to large amplitude of tides, makes it the only possible highly productive means of industrial fishing.

In recent years salmon fishing by seine nets on the seashore on “cross beams” like block nets, which are applied when catching fish near the shore, has been widely used. This method of working with marine seine nets is safer. It allows fishing even by strong oncoming sea and it is impossible to set a net from seiner.

The disadvantages of the modern organization of throw seining include the lack of mechanized stationary fishing sites (seine fishing grounds), which stipulates the use of motor and tractor transport in carrying out fishing operations when using seine nets, in particular for net lifting and discharging fish from cod end, which has the potential to cause impact the ecology of floodplains.

In general, the precondition for effective operation of seine nets is compliance with the features of seine fishing grounds and flow velocity. Dimensions and shape of seine net should be selected taking into account the specific conditions of the place of its application, as well as carrying capacity of the boats used for work. Owing to its undeniable technical advantages and environmental qualities, seine nets, as one of the main means for Pacific salmon harvesting, will maintain its relevance in industrial fishing in the near future.

Marine seine nets may be 300 to 2000–2500 m long. Mesh size of netting in seine nets for Pacific salmon fishing is 40-50 mm. By design features, seine nets are divided into symmetric or equiwinged seines and asymmetrical or non-equiwinged as well as bag and bagless seines.

Basic elements of seine net design are shown in Figure 7.

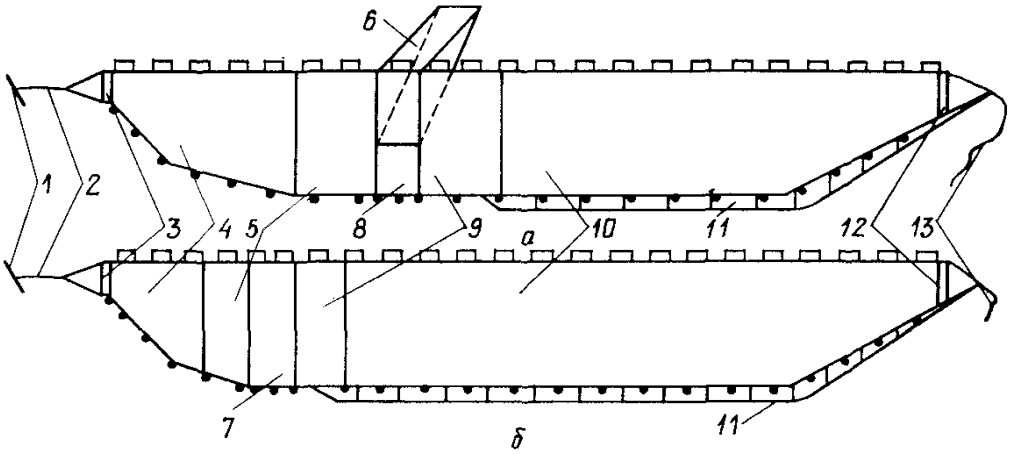

Figure 7: Main structures of seine nets (Bugaev *et al*., 2020). а – bag; б – bagless; 1 – shore post; 2 – shore line; 3 – shore brail; 4 – shore wing; 5 – shore drive; 6 – bag; 7 – discharge; 8 – jacket; 9 – tow drive; 10 – tow wing; 11 – operative framing rope; 12 – tow brail; 13 – tow line

Trap nets. Trap nets belong to stationary fishing gear - the class of traps (open traps). These are fishing gears of continuous, automatic action. They are especially effective for seining migrating fish in the coastal zone. The process of fishing by a trap net is automatic, due to the fact that natural fishing behaviour of fish is taken into account in the design of fishing gear, without the use of additional irritants and energy costs. This fishing gear does not have a harmful effect on the bottom fauna and flora, design features of the nets make it easy to control and regulate fishing. It is enough to raise the coastal part of the net wing and close input device of the trap so that fishing process is stopped, and the fish can freely leave the net area, continuing its spawning migration.

The coastal zone of Kamchatka is of truly enormous length. Moreover, along the whole coastline there is an arterial drainage, representing natural spawning grounds for salmon. This, on the one hand, creates excellent opportunities for large-scale salmon fishing with fixed nets, and on the other hand, determines the need to use various design features and methods to arrange and operate fixed nets, taking into account the diverging conditions of fishing areas.

As a rule, trap nets with two keep nets, with hearts, with internal lifting roads, having wing length 350 to 1100 m, are used. Mesh bar in the trap net: trap, keep nets and lifting roads - 30 mm; seine wing - 90–150 mm; coastal part of the wing - 30 mm. Basic elements of marine trap net design are shown in Figure 8.

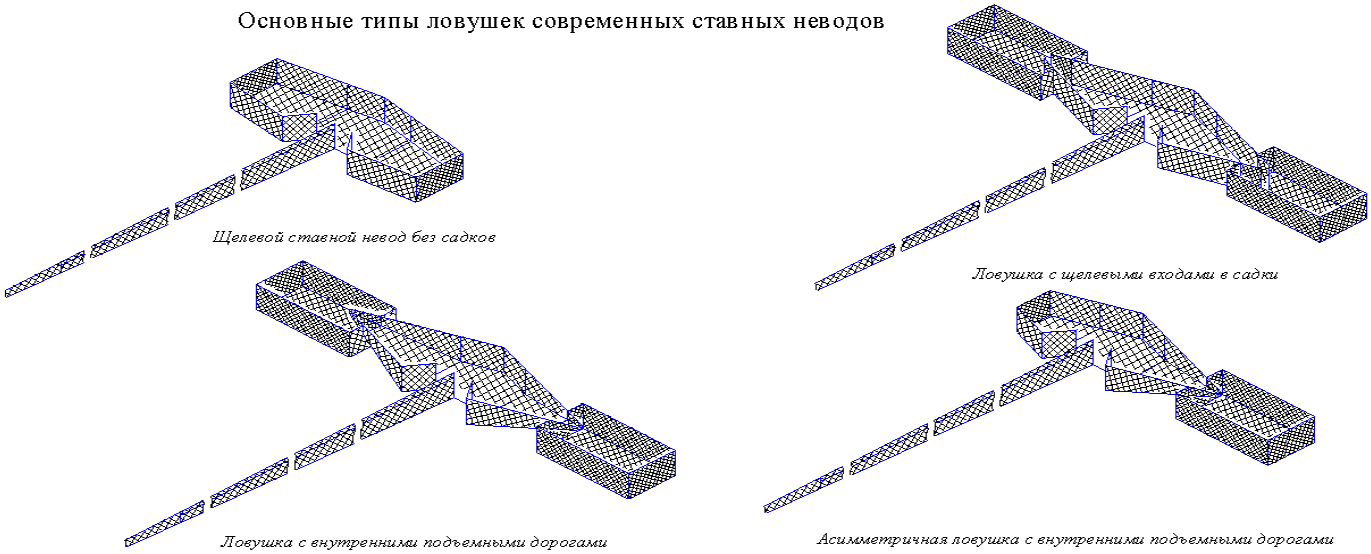

Figure 8: Basic types of traps of the modern trap nets. Top left – slotted trap net without keep; top right – trap with slotted entries to keep; bottom left – trap with internal lifting roads; bottom right – Asymmetrical trap with internal lifting roads (Bugaev *at el*., 2020).

The client uses in fishery all 4 types of gear: coastal trap nets (Figure 9), seine nets (Figure 10), drift and fixed gillnets (Figure 11).

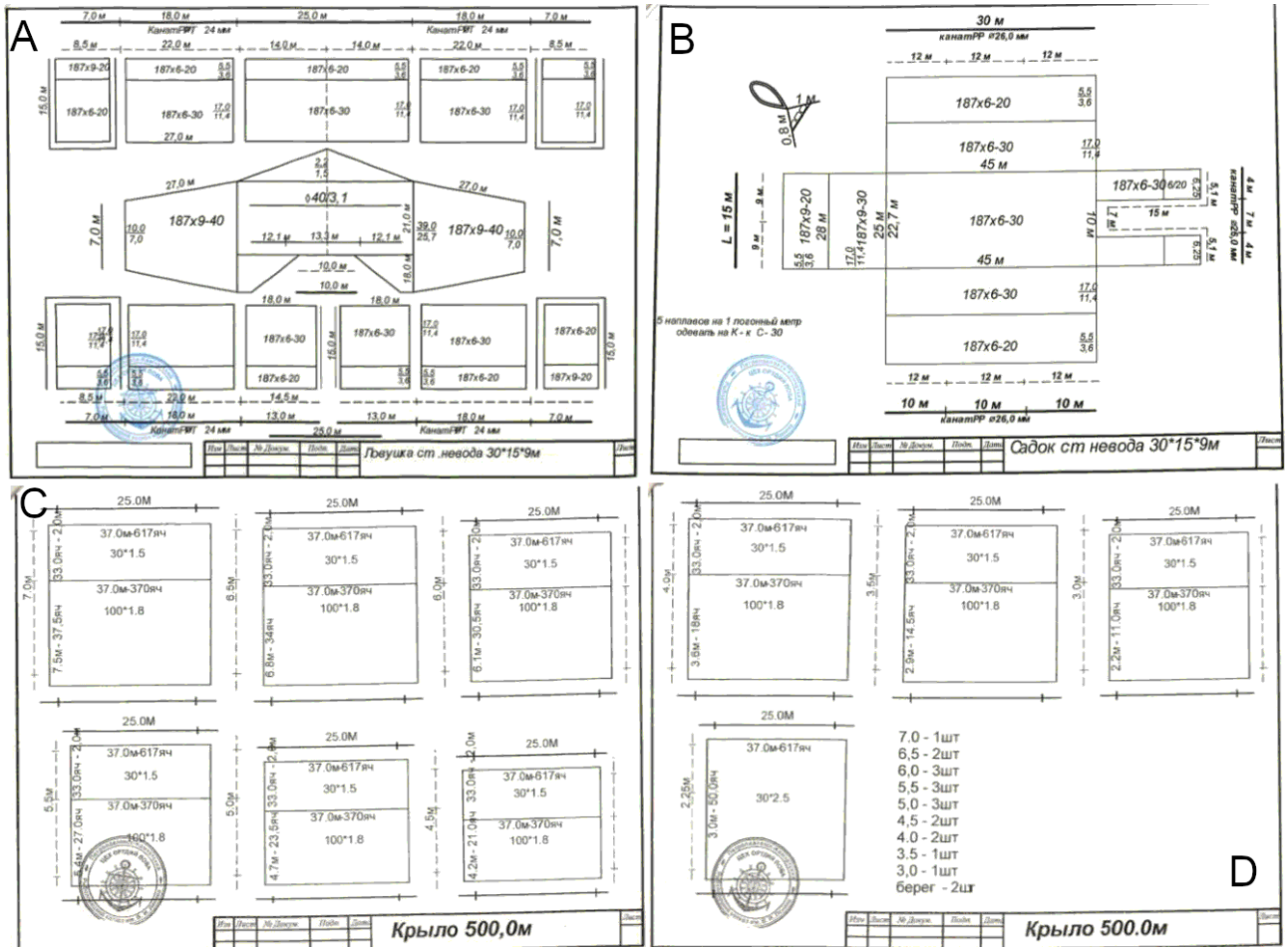

Figure 9: Schematic diagram shows the specification and measures of the coastal trap nets (Russian: Ставной невод) used by the client. A – trap, B – keep, C and D – wings. (Source: extracted from the fishing gear passport provided by the client).

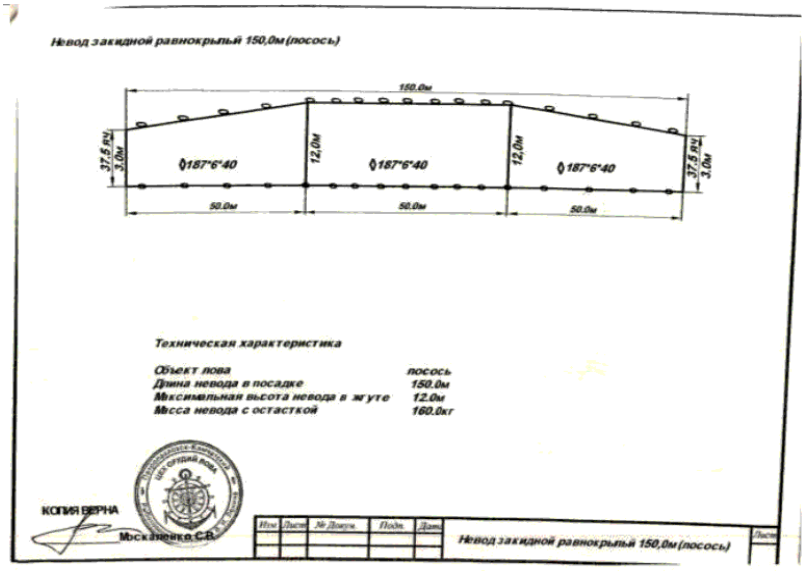

Figure 10: Schematic diagram shows the specification and measures of the seine net (in Russian: Невод закидной равнокрылый) used by the client (Source: extracted from the fishing gear passport provided by the client).

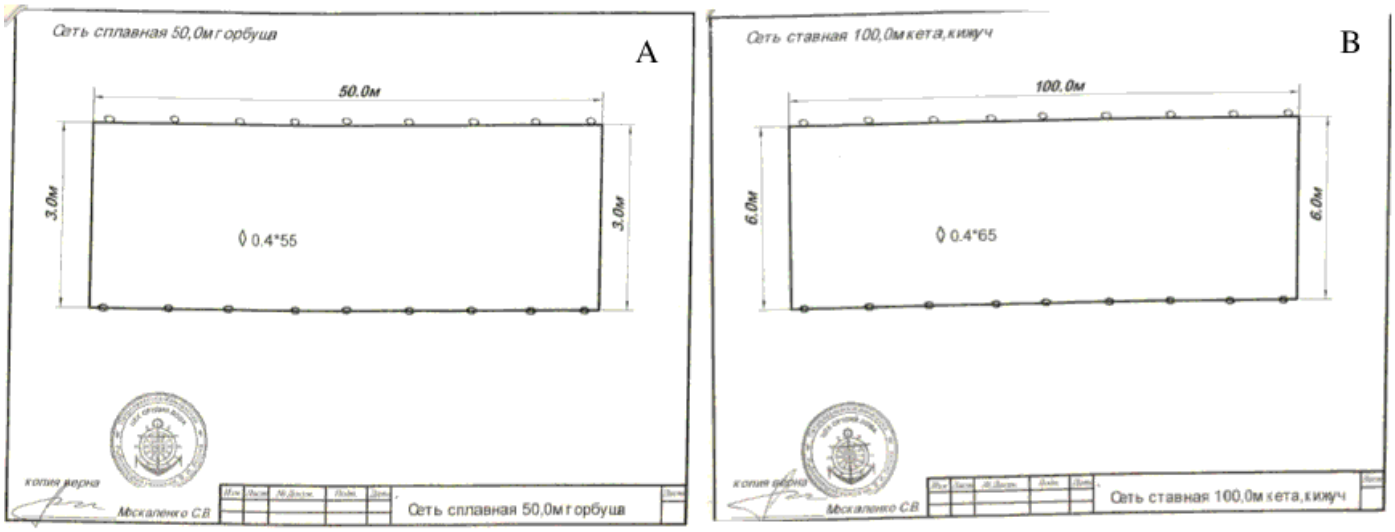

Figure 11: Schematic diagram shows the specification and measures of (A) drift gillnets (in Russian: Сеть сплавная) and (B) fixed gillnets (in Russian: Сеть ставная) used by the client (Source: extracted from the fishing gear passport provided by the client).

7.2.1.3 Fishery Description and Location

FTP Comandor JSC is a medium-sized fishing enterprise in the Kamchatka Region (Kamchatsky Krai) founded in 1998. The main activity is the extraction and processing of different marine bioresources in Kamchatka-Kuril subzone in Sea of Okhotsk. The company is managed by the General meeting. The stakeholders are the Fishing collective farm named after V.I. Lenin (in Russian: Rybolovetsky Kolhoz imeni Vladimira Il'icha Lenina) and Azov LLC. FTP Comandor JSC is an enterprise with a full-cycle processing of marine bio-resources. In the coastal waters of the Kamchatka Peninsula it supplied to the ships of the Fishing collective farm named after V.I. Lenin and it is planned to supply (after its reconstruction) to the own factory of FTP Comandor JSC. The salmon fisheries are managed by recommended catch and 'Olympic system'. Quotas are established for each salmon species for group of fishing parcels of different companies in one fishing area. Within the fishing area of each of these companies has Fishing license separately for each of its fishing parcels. Table 11 shows the fishing parcels number of different companies in Kamchatka-Kuril fishing subzone. Data on location of fishing parcels leased by FTP Comandor JSC, and catches of Pacific salmon in 2015-2019 are presented in Table 12 and Figure 12.

After the catch the raw salmon is delivered for processing with 4 (four) vessels owned by FTP Comandor JSC and 10 (ten) vessels freighted by FTP Comandor JSC to deliver raw fish to the on-shore facility of the 'Rybokonservnyi zavod Comandor' LLC, on-shore facility (on-shore fish processing factory) of the Fishing collective farm named after V.I. Lenin and 5 (five) processing vessels of the Fishing collective farm named after V.I. Lenin. The raw fish is accepted to the storage cooled receiving bins of the factories of the 'Rybokonservnyi zavod Comandor' LLC, on-shore facility (on-shore fish processing factory) of the Fishing collective farm named after V.I. Lenin, vessels of the Fishing collective farm named after V.I. Lenin and interspersed with ice. Raw fish is sorted by species and sizes. The dressing is performed on fish-dressing machines. After dressing the fish is sent to freezing in freezing chambers. The frozen glazed fish is packed and sent for the storage to the freezing warehouse with distribution among owners. Shipping and transportation of finished frozen products from the freezing warehouse of FTP Comandor JSC and freezing warehouse of the Fishing collective farm named after V.I. Lenin is performed into refrigeration containers and marine refrigeration transport vessels. The finished frozen products are shipped to marine refrigeration vessels from the vessels of the Fishing collective farm named after V.I. Lenin. The finished products are sold according to the concluded sales and purchase agreements and contracts.

FTP Comandor JSC carries out fishing activities exclusively in the regions, within the periods, in volumes and with the gears indicated in the permits issued by the North-Eastern Administration of the Federal Fisheries Agency of Russia.

Due to certification of fishery of the salmon species, the General Director of FTP Comandor JSC issued the order on establishment of the audit group to conduct internal audits in salmon fishery areas in the Sea of Okhotsk and on Bolshaya River.

Table 11: Fishing parcels number of different companies in Kamchatka-Kuril fishing subzone: Kikhchik, Mukhina, Khomutina, Utka, Mitoga, Bolshaya rivers. (Source: information from the client).

Name of company	Total number of fishing parcels
“FTP “Comandor” JSC	11
"Bolsheretck" LLC	8
"Loyd-Fish" LLC	5
Artel "Narody Severa" LLC	9
"Zapadnoe-M" LLC	4
RPK "SKOP-K" LLC	2
"Zuid" LLC	3
RK "Brig" LLC	1
"Dary Kamchatki" LLC	1
"Oktyabrsky rybokombinat" LLC	4
"Kromos K" LLC	1
RPK "SKOP" LLC	3
"ORK-2" LLC	1

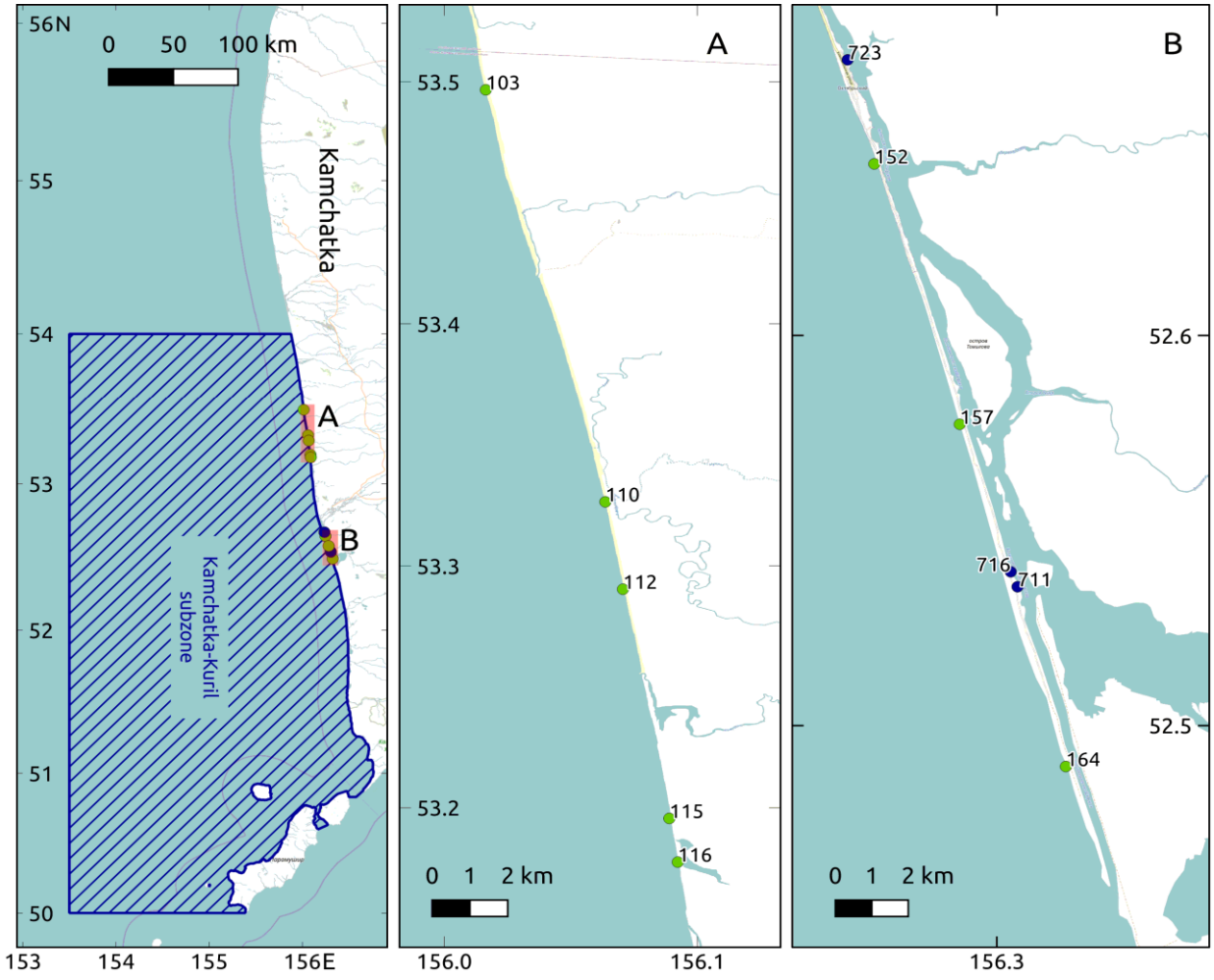

Figure 12: Locations of fishing parcels leased FTP Comandor JSC. Blue marks are parcels in Bolshaya River, green marks are offshore fishing parcels. Windows A and B are enlarged map fragments. (Source: data provided by the client).

7.2.1.4 Types of fishery

There are the following types of quota for fishing in Russia: industrial in seas, coastal, scientific (for research and monitoring), for educational and culturally purposes, for aquaculture, for amateur and sport recreational purposes, for small indigenous peoples of Siberia and Far East (KMNS), to support international treaties, foreign quotas in the Russian EEZ, industrial in reservoirs, and investment quotas. The quotas are allocated by FFA following the recommendations Far Eastern Industrial Fisheries Council, Far Eastern Scientific and Technical Council, and based on this order, territorial administrations of FFA issue permits to the fisheries allowing them to fish with indication of area, quota, period, fishing gear, target species and a name of the captain.

In salmonid catch statistics of the North Pacific Anadromous Fish Commission (NPAFC) are data about commercial (commercial in seas and coastal), Sport (for amateur and sport recreational purposes) and Subsistence (KMNS) fisheries of Pacific salmon in fishery in Western Kamchatka for the period 1995-2019. As shown in Figure 13 and Table 13, 67–98% of the salmon fishery in this region is commercial. The share of recreational (sport) fishery varies from 0.2 to 22.8% for different salmon species. The share of indigenous (subsistence) fishery varies from 0.57 to 10.16%. Chinook salmon is the most popular species for both sport and subsistence fisheries.

Table 12: Fishing parcels leased by FTP Comandor JSC, location and total catch (mt) of Pacific salmon in 2015-2020. (Source: data provided by the client).

Parcel	Latitude, N	Longitude, E	Length	Width	Y	Pink	Chum	Sockeye
711*	52° 32' 08"	156° 18' 30"	800	-	6	2797.372	830.874	518.292
716*	52° 32' 22"	156° 18' 20"	600	-	6	1386.31	279.913	150.833
723*	52° 40' 14"	156° 14' 23"	400	-	6	734.165	194.488	144.417
103	53° 29' 48"	156° 00' 59"	2000	300	4	4273.801	65.822	16.875
110	53° 19' 35"	156° 03' 49"	2000	300	3	3140.614	32.966	11.43
112	53°17' 25"	156° 04' 14"	2000	300	3	2432.52	22.753	6.67
115	53°11' 44"	156° 05' 20"	2000	300	3	2362.067	33.429	12.025
116	53° 10' 39"	156° 05' 32"	2000	300	2	431.363	35.054	25.836
152	52° 38' 38"	156° 15' 02"	2000	300	5	2018.98	229.754	157.654
157	52° 34' 38"	156° 17' 06"	2000	300	6	2763.359	294.774	230.157
164	52° 29' 22"	156° 19' 40"	2000	300	6	2403.895	502.239	385.692

* – fishing parcels located in Bolshaya River, Y – how many years fishing has been carried out in each of the fishing parcels.

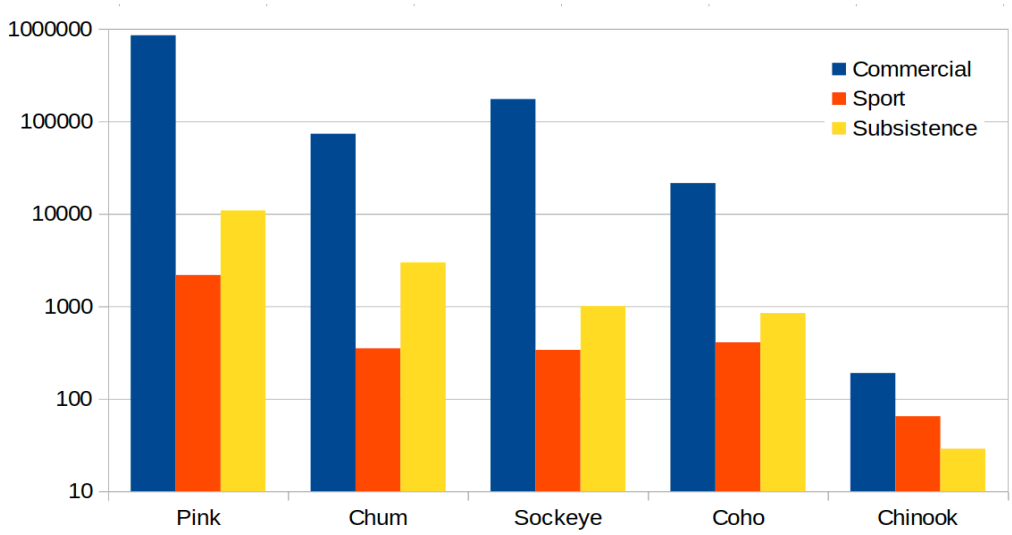

Figure 13: Main types of fisheries in the salmon fishery in Western Kamchatka for the period 1995 - 2019 (Based on data of NPAFC). Y-axis (logarithmic) – pieces.

Currently, there are 4 licensed amateur fishing sites of the following companies operating in the Bolshaya River basin: Andar LLC, BIG RIVER LLC, FISH TOUR LLC, the Northeast Branch of FSBI "Main Basin Administration for Fisheries and the Conservation of Aquatic Biological Resources". In addition, within this basin, 28 tribal communities of the indigenous peoples carry out harvesting of aquatic biological resources. Employees of FTP Comandor JSC carry out cooperation, as well as consultations with many representatives of these organizations when coordinating fish protection measures within the Bolshaya River basin. The basic consultations are related to monitoring the number of salmon passages directly to spawning grounds (filling spawning grounds). As a rule, these structures primarily respond to cases of non-passage of producers to traditional spawning sites.

Table 13: The ratio (%) of the main types of fisheries in the salmon fishery in Western Kamchatka for period 1995-2019 (Based on data of NPAFC).

Species	Fish (N)	Commercial	Sport	Subsistence
Pink	866,707,653	98.49	0.25	1.26
Chum	76,861,897	95.65	0.46	3.90
Sockeye	175,697,019	99.23	0.19	0.57
Coho	22,800,192	94.50	1.79	3.70
Chinook	284,301	67.03	22.81	10.16

In the history of biological monitoring of the Bolshaya River basin, specialists from KamchatNIRO have repeatedly received alarming signals about problems with the formation of spawning salmon stock in a particular tributary of this river system. As a rule, a collective request is formed on the basis of general information of several fishing organizations, as well as organizers of amateur fishing and representatives of the Indigenous small-numbered peoples of the North. As soon as the relevant information had been received by the Northeast Territorial Administration (or Department) of Federal Fisheries Agency, the Ministry of Fisheries of the Kamchatka Territory and KamchatNIRO took the corresponding measures to solve a specific problem.

7.2.1.5 Illegal fishing (IUU fishing)

According to available information during 2014–2018 the number of recorded violations of the law in the Kamchatka-Kuril subzone amounted 1270 cases. The annual picture of the distribution of violations and withdrawal of illegally caught fish (tonnes) was as follows: 2014 – 411 / 32 095; 2015 – 234 / 3 524; 2016 – 142 / 4 542; 2017 – 190 / 14 919; 2018 – 293 / 12 962.

It should be noted that from 2014 to 2018 there was a trend towards a decrease in the total number of violations and the actual withdrawal of illegally caught fish. However, in 2017 and 2018, these indicators increased slightly. Nevertheless, the actual withdrawal of illegal catches for all 5 years remained at a very low level, given the volumes of Pacific salmon harvested in the Kamchatka-Kuril subzone. In this connection, it can be assumed that the fixed level of IUU fishing cannot cause significant harm to salmon stocks, both the subzone as a whole and the Bolshaya River itself.

However, it should be borne in mind that the data presented here only accounted for the capture of poachers, so the real damage to salmon stocks of the Bolshaya River is hard to determine. The situation tends to become more complicated due to transport accessibility and the scale of the water distribution system of the basin the Bolshaya River. We consider that the actual IUU fishing in this water body is much higher.

However, in favor of reducing the influence of poaching on the stocks of Pacific salmon in the Bolshaya River, the growth indicators of their spawning stock in recent years should be taken into consideration. It should be emphasized that an important contribution to the positive development of the salmon protection system of this reservoir, along with representatives of the federal government (the Northeast Territorial Administration of Federal Fisheries Agency), were also played by fishing enterprises in this region, which in recent years have established their control over the basin of the Bolshaya River.

It should be emphasized that statistics on violations committed in the marine area of the 12-mile zone of territorial waters of the Russian Federation are not given here. This is due to the information protection, since the control of the sea is carried out by the Border Agency of the Federal Security Service of the Russian Federation. However, according to unofficial information obtained during the working groups and headquarters of salmon fishing seasons, there are no significant violations in the Kamchatka-Kuril subzone in the field of protection of aquatic biological resources in that could adversely affect regional stocks of Pacific salmon.

7.2.1.6 Management

The concept of “approach” or “return”, which include consolidated figures of number/weight of catching (fishing) and admission of producers to spawn is traditionally used as an indicator to determine Pacific salmon stock in the world. By standard situation of the harvesting (catching) of Pacific salmon, fish withdrawal by fishing from the general approach usually amounts to about 70–90%. As a rule, fish catches are higher concerning those local stocks (populations or groups of populations) that have a high abundance and compact range of reproduction. In cases where the fishery is focused on stocks of several local fish (different river basins) in relation to similar in number, withdrawal share is lower. This is also to a considerable degree due to the fact that in relation to small salmon stocks, more stringent fishing regulating measures are applied. Moreover, it is not a question of any kind of discrimination at various business levels, but simply large compact stocks of salmon are much easier to control, both by fishery and by allowing producers to spawn. In addition, significant attention of fishing science is paid to significant salmon stocks, which allows us to develop a wider range of measures to regulate their fishery.

Methods of stock assessment of Pacific salmon applied in the Kamchatka Krai by the specialists of KamchatNIRO are traditional and commonly-accepted (Babayan, 2000; Hilborn and Walters, 2001; Maksimenkov, Antonov, 2003). They are based on direct observations over the scope of industrial fishing (all species of Pacific salmon and Arctic char), information on the filling of spawning grounds (for Pacific salmon) as well as data on marine records of juveniles of Pink salmon and chum salmon, before its moving on to winter nursery grounds.

Industrial fishing of Pacific salmon and bycatch of Arctic char are carried out in the Kamchatka-Kuril subzone (south-west of the Kamchatka Peninsula) with the help of coastal sea seines and offshore river seines, and is carried out during the spawning period. The North-East Territorial Branch of the Federal Fisheries Agency receives information on the number of fish caught (in weight units) daily and forms five-day reports available for KamchatNIRO. Thus, the specialists of KamchatNIRO have an idea of the capacity of approaches and can quite quickly give recommendations for regulation of fishing intensity.

Value of common moving of Pacific salmon population to spawning rivers in any given year is defined as total catch and number of producers which have run. During the spawning run of Pacific salmon, KamchatNIRO employees collect their biological statistics (size and weight indicators, sex, maturity stage, productivity) and recording structures (scales and otoliths) to further determine the age composition. Samples are collected during the entire spawning run in the quantity of at least 300 specimen of each species. For water bodies of high commercial significance (the Kamchatka, Ozernaya (western), and Bolshaya rivers), the number of samples is about 700–1000 specimens. Based on biostatistics data on average weight of fish, weight units are converted into quantitative values. The latter is extremely important, since all mathematical calculations use exactly quantitative indicators as a criterion for adequate control of stock abundance dynamics.

The main method for direct accounting of Pacific salmon is aerial monitoring carried out in the regions of spawning grounds during their mass filling by producers (Ostroumov, 1962). Aerovisual surveys of spawning water bodies of The Kamchatka Krai (formerly Kamchatka Oblast and the Koryak Autonomous Okrug) have been carried out annually since 1957. Accounting covers all the main river and lake systems of Kamchatka - about 200 river systems, with a total length of water courses of more than 80 000 km. It is clear that works of this magnitude cannot be performed without aviation equipment. In The Kamchatka Krai, various types of helicopters are used as means of aviation exploration.

Annual volume of flight time for full accounting of producers in the rivers of Kamchatka until 2011 was about 600 hours. After 2011, due to a significant reduction in targeted funding for these works, the time of aerial surveys also decreased greatly. At the current stage, these studies are strongly supported by interested fishing enterprises of the Kamchatka Territory. FTP Comandor JSC is no exception in carrying out the corresponding work in the Kamchatka-Kuril subzone (south-west of Kamchatka). It should be taken into account that, with consideration to already accumulated series of observations on filling of the spawning grounds of the Kamchatka rivers with Pacific salmon producers, it is obvious that continuation of aerial accounting surveys in sufficient quantities remains a paramount objective for assessment of the spawning stocks of these biological resources in water bodies of the Kamchatka Territory.

Methodically, aerial monitoring program until the early 2000s provided for total registration of producers of all species of Pacific salmon in spawning grounds. Only masu salmon which until 2010s had an extremely low abundance and was found only occasionally in catches was not taken into account of all fish species of Oncorhynchus Genus living in Kamchatka. The remaining species were considered quite regularly, and the most valuable units of salmon stock were up to two or more times during the spawning period. This is necessary to take into account temporal structure of populations and subpopulations of one or another harvestable stock.

The share of the Kamchatka-Kuril subzone in the program of aerial surveys around the Kamchatka Territory accounted for 15–20% of the flight time. The area is inspected annually up to two to three times: during the spawning

season of early sockeye salmon and Chinook salmon, Pink salmon and summer chum salmon, autumn chum salmon and late sockeye salmon.

In the subsequent period – from 2003, and most significantly from 2008 to 2014, funding was reduced naturally due to rising prices for air carrier services. In the same period, a program was developed to estimate the number of Pacific salmon producers in the reproduction regions based on surveys of reference water bodies, a methodology was proposed, and reference rivers were identified (Shevliakov and Maslov, 2011). The program for assessment of filling of spawning grounds by producers in the referent rivers involves the allocation of separate reservoirs that determine the main contribution to reproduction of species in the definite fishing region. This was accomplished using the method of step-by-step exclusion of insignificant rivers from the general list with minimum quality losses.

Accounting of fish permitted for spawning on the control/pointer rivers allows, using the obtained dependences, to extrapolate numbers to the entire spawning stock in the reproduction areas under consideration. In addition, the strategy for salmon fishery with coastal trap nets and other fishing gear in the sea coast presupposes interception of the part of transit clusters leading to their spawning water bodies. That's why, salmon stock estimations are calculated for the most significant in number local populations or their groupings. It is impossible to forecast the number of producer returns for each specific local population (of one river), since catch data does not always represent the stock of this water body. This is a common practice for organizing forecast of Pacific salmon stock and fisheries, used internationally in the countries of reproduction of these biological resources – the USA, Canada and Japan.

The main method for stock forecast and determining biological reference points of Pacific salmon used in development of harvest control rules, both in domestic and international practice, is to determine relationship between the number of parents and descendants ("stock-replenishment" connection). This model was developed in the mid-twentieth century by W. Ricker (Ricker, 1954). Currently, there are many interpretations of this model, depending on the characteristic regional specific features of the reproduction of one or another population of Pacific salmon.

KamchatNIRO specialists in replenishment forecast use the resonance model (Feldman, Shevliakov, 2015), whereof particularity is existence of maximum survival capacity of populations depending on density. In addition to that, structural form of this model coincides with general structural model "stock-replenishment" shown by J. Shepherd (Shepherd, 1982).

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

where parameters mean:

a – limit of *R* replenishment by unlimited spawning stock S;

b – spawning stock necessary for producing replenishment a at maximum survival capacity;

S_0 – spawning stock ensuring maximum survival capacity of descendants (maximum survival index *R/S*).

Parameter *a* is measured in the same units as replenishment *R*, and parameters *b* and S_0 have the same units of measurements as parent stock S (Figure 14). These model peculiarities enable to divide the model that is common for several populations into private models of distinct subpopulations according to long-term average annual levels of producers' pass and replenishment and vice versa, adding together model parameters for distinct populations, to obtain general model for some region.

Taking into consideration, that data on filling spawning grounds for each species of Pacific salmon and particular rives are fragmentary in some cases, model parameters were estimated for the totality of populations of each species for the entire western coast of Kamchatka (Pink salmon), or for the entire Kamchatka-Kuril subzone (chum, sockeye salmon). Using long-term average annual percentage composition of producers and descendants for certain studied populations and parameters of general model, one can receive parameters for private cases, in other words, individual water courses. Herewith, parameters b and So are divided in proportion to shares of producers S and parameter a is divided in proportion to shares of descendants R.

Correspondingly, the level of filling of spawning grounds by producers, ensuring maximum sustainable yield S_{MSY} is estimated for the whole total of populations of each species. Maximum sustainable yield (MSY) for general model was determined by solving optimization problem. S_{MSY} levels for populations of referent rivers are determined using private models, whereof parameters were received in proportion to long-term average annual shares of producers and descendants, or river clusters.

Based on annually updated biological information, specialists from KamchatNIRO, together with representatives of the North-Eastern Territorial Administration of the Federal Fisheries Agency and the Ministry of Fisheries of the Kamchatka Territory, are preparing a fishery strategy for each fishing region of the Kamchatka Territory. A set of

measures is formed within the boundaries of fishing zones/subzones, as well as groups of fishing sites where certain units of stock are caught. Considering that the fishery of FTP Comandor JSC is carried out within the boundaries of the Kamchatka-Kuril subzone, the fishery regulating measures taken by the Commission for Regulation of Harvesting (Catching) of Anadromous Fish Species in the Kamchatka Territory (hereinafter referred to as the Commission) fully apply to this fishing enterprise.

The biological rationale for salmon fishing season on the west coast of Kamchatka (Kamchatka-Kuril and the West-Kamchatka subzones) in 2019 is given below as an example.

Salmon fishing on the western coast of Kamchatka is concentrated in two fishing regions – the West-Kamchatka and the Kamchatka-Kuril subzones. The first industrial district includes the following administrative districts of the Kamchatka Territory: Penzhinsky district, Karaginsky district, Tigilsky district, partially Sobolevsky district. The second industrial district includes: partially Sobolevsky district and Ust-Bolsheretsky district. The main objects of salmon fishing on the western coast of Kamchatka are Pink salmon of even-numbered line of reproduction, late chum salmon and sockeye salmon and, in recent years, Coho salmon. Concerning such species as: Pink salmon, chum salmon and Coho salmon, the main stocks are concentrated in the Sobolevsky and Ust-Bolsheretsky districts in relatively close water bodies. It allows them to be considered as a single stock for each species, for which similar fishing control measures are applied.

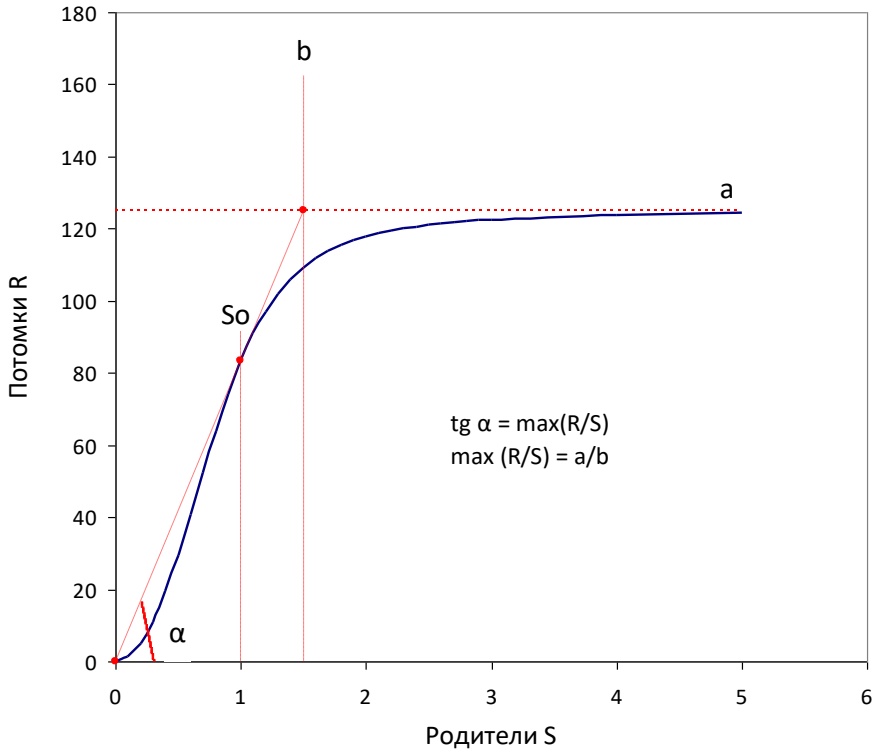

Figure 14: Graphic interpretation of parameters a, b and So of model. X-axis – Parents S, Y-axis – Descendants R. (Bugaev *et al*., 2020).

In general, according to the state of modern stocks of Pacific salmon in the Western Kamchatka, it can be noted that they are relatively high for all mass species. However, despite the regional stability of stocks, in some water bodies there is a tendency to reduce this or that type of salmon resources; thus, it requires the introduction of regulation of fishing, both in river and marine fishing grounds.

Pink salmon is the main fishing target on the western coast of Kamchatka in even-numbered years. Until the present time, Pink salmon of the line of odd-numbered years, since 1983, remained as weak-year class. The mass pass of Pink salmon to the region falls on the second – third decades of July, in rare cases – on the first decade of August (Figure 15). Salmon fishery, in particular Pink salmon, on the western coast of Kamchatka is carried out mainly in the sea coast by marine trap nets, which accounts for up to 70% of the total catch of Pink salmon. In the rivers of the west coast, full-fledged industrial salmon fishery is also carried out on river fishing. In significant amounts, Pink salmon is distributed from the Ozernaya River (western in the south and to the Khairyuzova River in the north. The modern centres of regional reproduction of the species are the water bodies of the northern part of the Ust-Bolsheretsky and

central-southern parts of the Sobolevsky districts. During the years of high-abundant passes of Pink salmon to the coast in Western Kamchatka, up to 150 fixed marine trap nets are exposed and river fishing is carried out on almost all rivers.

Chum salmon. This species also belongs to the abundant ones at the regional level. Over the past 10 years, annual catching of chum salmon on the western coast of Kamchatka, according to long-term average data, is about 16 thousand tonnes. The catch peak was observed in 2014 and 2015, when approximately 22 and 26 thousand tonnes were mined, respectively. The minimum catch for the period under review was noted in 2009 – 7 thousand tonnes. In general, the current state of chum salmon stocks of the Western Kamchatka is stable.

The mass anadromic course of chum salmon in dynamics is very close to that of Pink salmon (Figure 16). The main pass falls on the end of July – the end of August. Therefore, the regulatory measures for regional fishing of this species do not need a targeted approach.

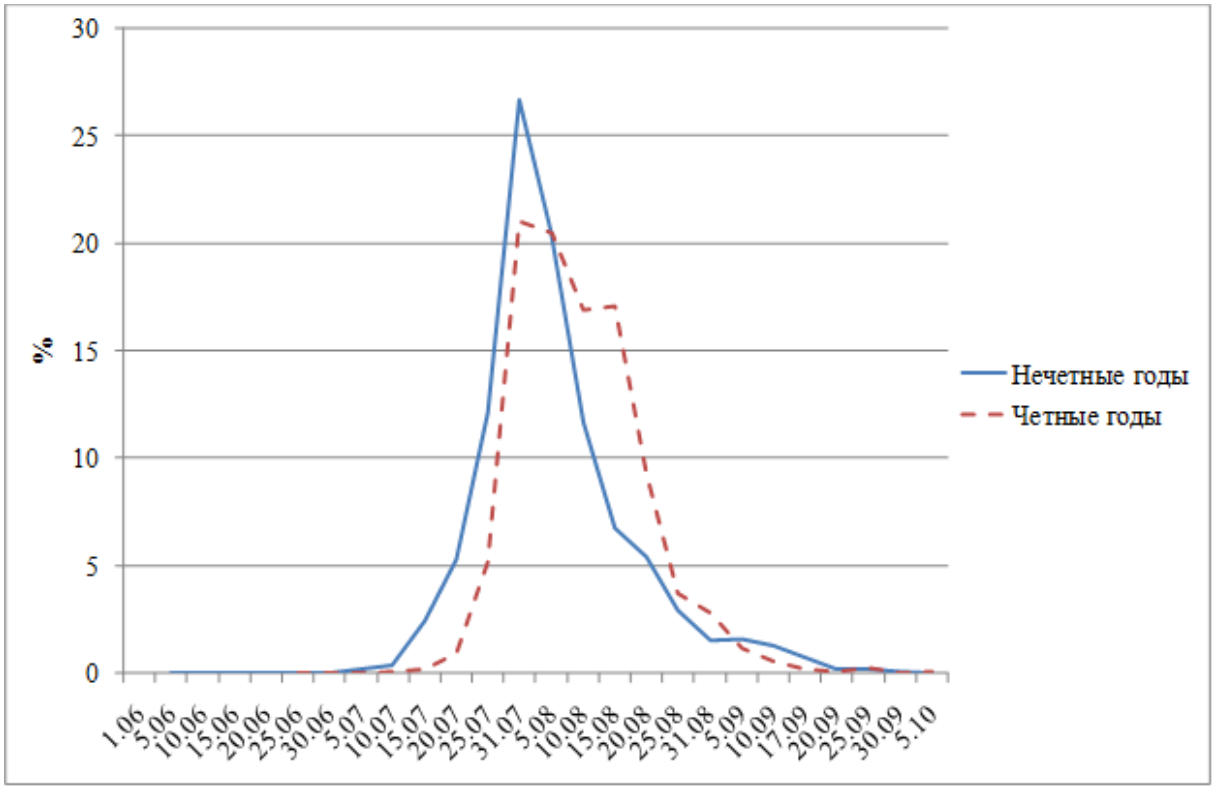

Figure 15: Average long-term pentadic dynamics of the ratio of the salmon catches of even-numbered and odd-numbered reproduction lines on the western coast of Kamchatka according to 2019-2018. Blue line – odd-numbered years, red line – even-numbered years (Bugaev *et al*., 2020).

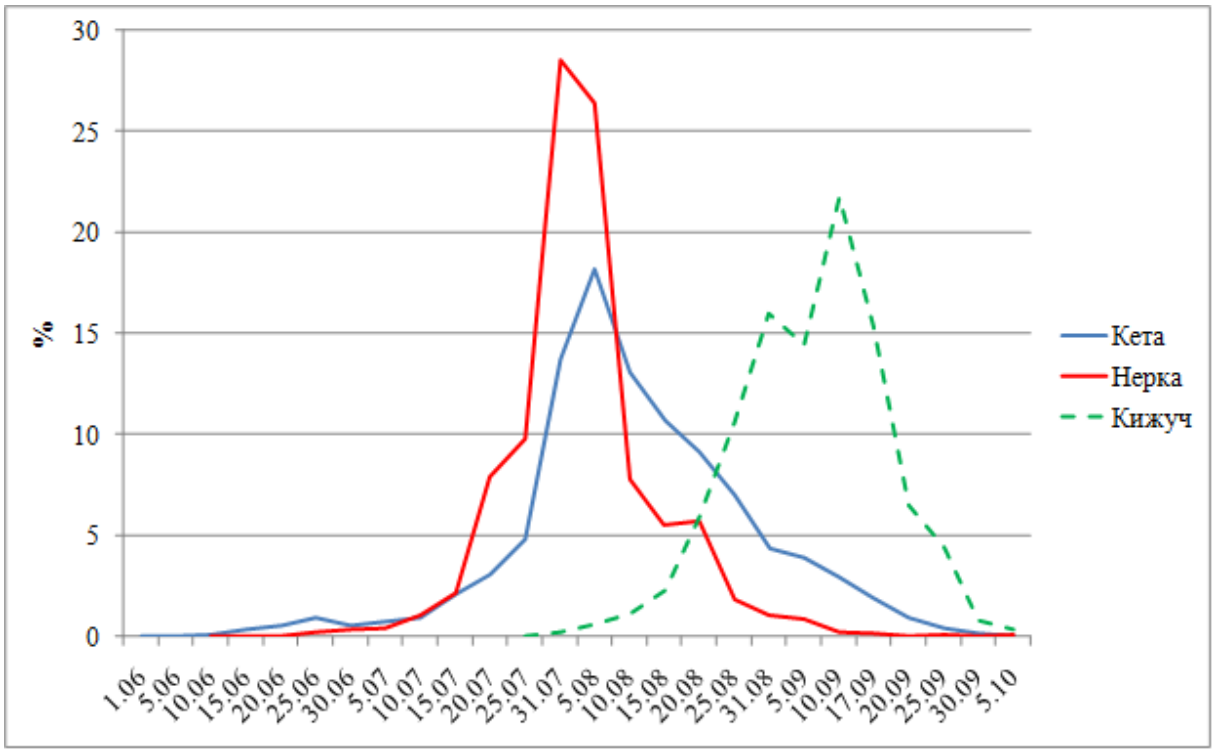

Figure 16: Average pentadic dynamics of the catch ratio of Pacific salmon (chum salmon, sockeye salmon, Coho salmon) on the Western coast of Kamchatka according to 2014–2018. Note: the dynamics of catches of sockeye salmon is shown without the stock of the Ozernaya River. Blue line – chum, red – sockeye, green – coho salmon (Bugaev *et al*., 2020).

Sockeye salmon. The main stocks of the species on the western coast of Kamchatka are concentrated in three reproduction centers - the basins of the Ozernaya, the Bolshaya and the Palana rivers (Bugaev *et al*., 2009; Bugaev, 2011). Directly in the Ozernaya River (the Kurilskoye Lake), the largest stock of sockeye salmon in Asia is reproduced. Its annual contribution to the formation of catches of sockeye salmon in the Western Kamchatka is about 20–25 thousand tonnes, which exceeds 90–95% of the total regional catch of the species. Therefore, the remaining stocks of the Western Kamchatka sockeye salmon are considered as secondary ones. Dynamics of shared catch of sockeye salmon of the Ozernaya River and the secondary stocks are shown in Figure 16 and Figure 17.

It should be noted that in both cases, the pentadic dynamics of the ratio of catches of sockeye salmon during fishery season is quite similar. Main run falls from the third decade of July to mid-August. However, the regulation of the fishery must be carried out differentially, due to the fact that the Ozernaya River has a clearly defined centre for reproduction of the species not only on the western coast of Kamchatka, but also on the entire Far East of Russia.

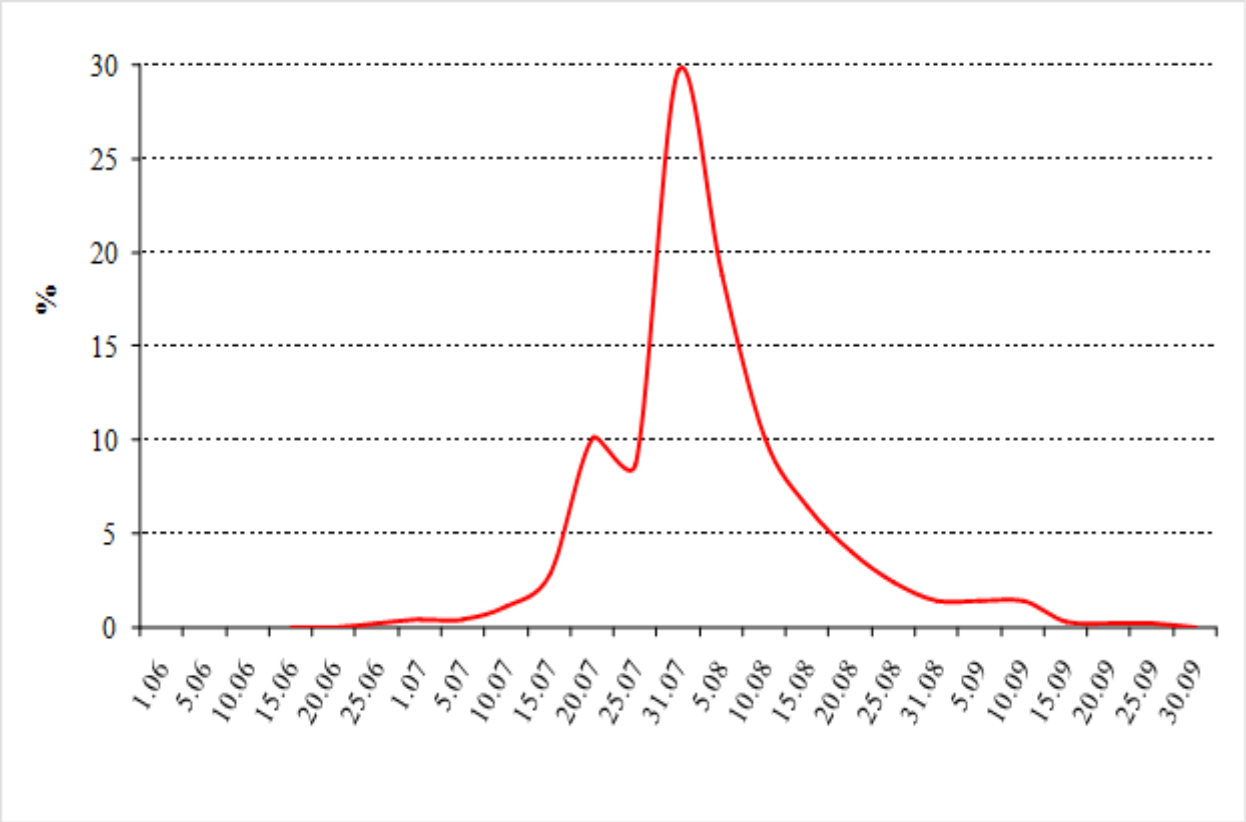

Figure 17: Average pentadic dynamics of the catch ratio of the sockeye salmon of the Ozernaya River according to 2014–2018 (Bugaev *et al*., 2020).

Fishery regulation measures

On the recommendation of KamchatNIRO, harvesting (catch) levels of Pacific salmon and Arctic char to carry out industrial fishing in water bodies and their parts are set by the Commission totally for river and sea fishing areas within the same fishing region (zone, subzone) / group (hereinafter referred to as the Group of Water Bodies) (Table 14) or individually, if the sites are not included in the Group of Water Bodies.

Based on the forecasting materials of KamchatNIRO, the Commission sets the volumes of harvesting (catching) of Pacific salmon and Arctic char for users in the fishing areas at individual FS or groups of FS. The catch of Pacific salmon and Arctic char on the assigned to FS users belonging to FS Group is carried out within the volumes totally not exceeding the volumes established by the Commission decision for this FS Group.

Table 14: Groups of fishing parcels (FP) to carry out commercial (coastal) fishing of Pacific salmon in the Kamchatka-Kuril subzone (Bugaev *et al*., 2020).

Water body	***FP situated at the water bodies***
KAMCHATKA-KURIL SUBZONE	
The Sea of Okhotsk, the Kol, the Pymta Rivers	85–94, 96–101, 1120–1124, 697, 699, 700
The Sea of Okhotsk, the Kikhchik, the Mukhina, the Khomutina, the Utka, the Mitoga, the Bolshaya rivers	102–118,150–152, 154–157, 159, 160, 162–164, 702–704, 706–713, 716–720, 723, 724, 727, 732, 734, 1075, 1080, 1084
The Sea of Okhotsk, the Opala, the Golygina, the Koshegochek, the Yavinskaya, the Ozernaya Rivers	165–204, 206–209, 738–740, 744–760, 1081, 1083

For efficient regulation of the fishery, KamchatNIRO advises the Commission to set an undistributed volume from the predicted volume by each species of Pacific salmon in each fishing subzone in order to carry out commercial (coastal) fishing and recreational fishing depending on fishing conditions in the fishing regions.

In accordance with the proposed structuring of reserves within the boundaries of the Kamchatka-Kuril subzone, 3 groups of water bodies are allocated, fishing within which is regulated separately - from north to south: 1) “Sea of Okhotsk, the Kol and the Pymta Rivers”; 2) “The Sea of Okhotsk, the Kikhchik, the Mukhina, the Khomutina, the Utka, the Bolshaya, the Mitoga”; 3) “The Sea of Okhotsk, the Opala, the Golygina, the Koshegochek, the Yavinskaya, the Ozernaya Rivers”. Let us clarify that the Okhotsk Sea FS group means marine areas adjacent to the estuarine zones of the above-mentioned river basins.

Concerning the areas of reproduction, to which, due to the specific conditions of salmon passes and fishing, it is recommended to use special regulatory measures, it is necessary to distinguish FP of the Ozernaya River and a group of marine FPs (No. 189–209) located on the migration routes of sockeye salmon to the river. The organization of fishing in this FP group is differentiated for river and sea sections.

In the basin of the Bolshaya River, the river fishing region (the part of the river occupied by fishing sites, usually the lower part of the river, including the estuary) has a large length relative to the main watercourse (channel), so salmon producers cannot pass it in one day. It is proposed to divide this river fishing site into two sections. The length of the estuary zone of the Bolshaya River is about 25–30 km, and the adjacent section of the pre-estuary zone is still about 5–10 km. It is here that the basic mass of industrial fishing sites is concentrated.

In this case, a step-by-step regime is set up providing for the introduction of 3 passing days per week for the lower part of the considered site (from the estuary to FP No. 723) and sequentially 3 passing days per week for the upper section of the fishing site (from FP No. 724 and higher the current of the river). At the same time, the second passing day in the first site and the first day in the second in terms of time overlap, as a result of which spatial “escorting” of producers is organized as they pass the most caught section of the river.

Thus, the recommended fishing regime for Pacific salmon and Arctic char on the western coast of Kamchatka is as follows:

1) Opening of fishing:

– on the sea and river FPs of the Tigilsky district in connection with the pass of the early chum salmon **from June 01.** In the Tigil, the Voyampolka and the Palana Rivers in connection with the ban on the fishing of Chinook salmon – **from June 20;**

– on the river FPs of the Ozernaya River in connection with the pass of the early sockeye salmon – **from June 20;**

– on other sea and river FPs of the West-Kamchatka (Penzhinsky, Karaginsky and partly Sobolevsky districts) and the Kamchatka-Kuril (partially Sobolevsky and Ust-Bolsheretsky districts) subzones – **from mid-July;**

– in the Kamchatka-Kuril subzone on sea FPs No. 189 (inclusive) to the south to FP No. 209 – **from mid-July.** It is assumed that by this time the pass of sockeye salmon producers into the basin of the Ozernaya River (Lake Kurilskoye) will reach at least 300 thousand producers;

2) Closing of fishing:

– The West-Kamchatka (Penzhinsky, Karaginsky, Tigilsky and Sobolevsky districts) and the Kamchatka-Kuril (Sobolevsky and Ust-Bolsheretsky districts) subzones – not later than **September 30;**

– The term for completion of recreational fishing on FP for the organization of recreational fishing, in which, in accordance with the concluded agreements on the provision of a fishing site where only pole-and-lining instruments (spinning rods and fishing rods) will be used as fishing gear, is not later than **the second decade of October;**

3) Passing days:

– For all types of fisheries (with the exception of recreational fishing, research and reproduction purposes), the following passing days regime is recommended:

On sea FS:

– In the West-Kamchatka and Kamchatka-Kuril subzones, with the exception of the water area from FS No. 189 (inclusive) to the south till FS No. 209 (inclusive), from the beginning of fishing to July, 25 and no later than from August, 26 to the end of fishing – **3 days weekly.** During the period of mass passes of Pink salmon, passing days are not established (in the years of high-abundant returns).

On river FS:

– In the rivers and lakes of the West-Kamchatka (Penzhinsky, Karaginsky, Tigilsky, Sobolevsky and Ust-Bolsheretsky districts), with the exception of the basins of the Bolshaya and Ozernaya (western) Rivers, from the beginning of fishing to July, 25 and no later than from August, 26 to end of fishing – **3 days a week;**

– In the rivers and lakes of the West-Kamchatka (Penzhinsky, Karaginsky, Tigilsky, Sobolevsky and Ust-Bolsheretsky districts), with the exception of the basins of the Bolshaya and Ozernaya (western) Rivers, in the period from July, 26 to August, 25 – **2 days a week;**

– On the part of the water area of the Bolshaya River and its estuary to the fishing site No. 722 (inclusive) – **3 days a week (Monday, Tuesday, Wednesday);**

– On the part of the water area of the Bolshaya River and its estuary to the fishing parcel No. 723 and higher up the river current, including its tributaries – **3 days a week (Tuesday, Wednesday, Thursday);**

– In the basin of the Ozernaya (western) River, passing days are set **in the regime of 2 days of fishing after 2 days of pass.**

Upon confirmation of the high abundance of the Western Kamchatka Pink salmon, for the period of its massive passes to the coast (tentatively: late July-late August), passing days on river FPs of Sobolevsky, Ust-Bolsheretsky and, partially, Tigilsky districts can be canceled.

7.2.1.7 Operative HCR

As a rule, operative regulation of the fishery in the Kamchatka Territory is based on the data of biological monitoring carried out within the government task by KamchatNIRO. While performing it at initial stage, general fishery strategy is made (ref. Chapter 3) and then on the basis of received current information on dynamics and capacity of Pacific salmon approaches to the coast, the system of operative changes of periodicity of pass days, adjustments of the volumes of predicted catch as well as closing of fishing if required, is formed. As an example we introduce actions taken by the Commission for Regulation of Harvesting (Catching) of Anadromous Fish Species in the Kamchatka Territory in the period of salmon fishing season in 2019.

21.05.2019, Report № 5

– To determine terms of the beginning of industrial, traditional fishing as well as recreational and sport fishing on the water area in relation to Pacific salmon and Arctic char.

– In Kamchatka-Kuril subzone: Sobolevsky district, Ust-Bolsheretsky district, with the exception of the Ozernaya River and the adjacent sea water area; From: July 11: To specify pass days for industrial, coastal, traditional fishing:

In sea water area:

- From the beginning of fishing until July, 25 and from August, 26 till the end of fishing – Monday, Tuesday, weekly.

In inland water bodies, in the rivers and lakes of the Western Kamchatka (Penzhinsky, Karaginsky, Tigilsky, Sobolevsky and Ust-Bolsheretsky districts), with the exception of the basins of the Bolshaya and the Ozernaya (western) Rivers:

- From the beginning of fishing till July, 25 and from August, 26 till the end of fishing – Monday, Tuesday, Wednesday, weekly,
- From July, 26 till August, 25 – Monday, Tuesday, weekly; – On the part of the water area of the Bolshaya River from its estuary to the fishing site No. 721 (inclusive) – Monday, Tuesday, Wednesday, weekly.

18.07.2019 Report № 12

- To cancel the passage day on July 23 at the marine fishing sites of industrial, traditional fishing in the Kamchatka-Kuril subzone.

24.07.2019 Report № 14

– To change the previously established regime of passing days, determine the passing days in the fishing sections of the Bolshaya River for organizing amateur and sport fishing using net fishing gear Monday, Tuesday, Wednesday, weekly.

09.08.2019 Report №20

– To determine in the water area of the Bolshaya River days of passage for industrial, traditional fishing, as well as amateur and sport fishing using net fishing gear August 22, 23, 24, 25.

- To cancel the previously established days of passage in the water area of the Bolshaya River for industrial, traditional fishing, as well as amateur and sport fishing using net fishing gear August 19, 20, 21, as well as August 26, 27, 28, 29.

17.09. 2019 Report № 27

- To determine the time limits for the prohibition of industrial and traditional fishing (communities and individuals) in relation to Pacific salmon and Arctic char:

- in the West-Kamchatka and Kamchatka-Kuril subzones from 00 hours on September 23.

7.2.1.8 Information and Monitoring

Environmental monitoring of the fishery by the government is required under chapter 5, article 42 in Federal Law of 20.12.2004 No. 166-FZ (as amended on 24.04.2020), which explicitly mentions the distribution, abundance, quality and reproduction of aquatic bio resources and habitats, the fishery and preservation of aquatic bio resources. According to the law, the fishery research institute KamchatNIRO performs annual research in the waters of Kamchatka waters to collect data on the species composition of fish community, length, weight, age, sex, fertility, maturity, quality of environment, and etc. KamchatNIRO conducts research of food reserve for juvenile and adult fishes. The data are collected and analysed to estimate the stock structure and calculate possible catch for Pacific salmon.

The fishing companies maintain daily catch records that are monitored on a routine basis to determine the cumulative catch against the allocated quota. The companies must also submit statistical reports to the controlling organizations twice a month. These measures enable strict control over the catch to prevent the quota being exceeded.

There is good information on the fleet composition. Detailed information on the characteristics (length, tonnage, etc.) of each of the vessels engaged in the fishery. A list of these vessels was provided to the auditors. Information on removals from the stock by other commercial fisheries is regularly provided to the Fisheries Administration. Recreational and Indigenous catches are recorded. An expert assessment of illegal catches is also carried out.

Russia annually provides NPAFC with biostatistical Information on salmon catches, escapement and enhancement production. This is an example of such information for 2019 (Klovach *et al*., 2020).

7.2.1.9 Escapement

Salmon escapement is the number of salmon that “escape” fisheries (i.e., are not harvested) and return to fresh water to spawn. Knowledge of escapement (i.e., the number of spawners) is necessary to develop spawner recruit relationships and forecast the production of the next generation, including the number of salmon potentially available to harvest. In addition, knowledge of total run-size for a population (escapement plus catch) is required to compute the survival and productivity of the previous salmon generation and to monitor trends in abundance and/or productivity.

Escapement can be estimated using counting fences, mark recapture, visual surveys including area-under-the-curve, and electronic, video, and hydro-acoustic counters. Escapement data are a basic element in salmon fisheries management, including forecasting adult returns to fisheries.

Escapement Monitoring and Estimation in the Russian Far East (by N. Klovach, VNIRO, https://npafc.org/salmon-escapement/).

Survey methods used to estimate Pacific salmon escapement abundance throughout the Russian Far East can be divided into three groups: visual survey, remote sensing, and aero-visual methods. Each method has its advantages and disadvantages. Therefore, selection of a survey method depends on several conditions, and foremost among them is the geographical location, accessibility, particular geomorphology, and hydrology of the river basin as well as the financial capabilities of the monitoring agency.

Visual surveys include visual foot surveys and surveys with fishing gear, enumeration fences, and mark-recapture programs.

Visual foot survey: this method is applicable to small streams where total enumeration is possible. Random enumeration is conducted in conditions of abundant Pacific salmon runs or in large river watersheds. In the latter case, monitoring sites are selected in a river channel or on the spawning ground where enumeration is performed, and collected data are extrapolated to the total spawning ground area of the watershed.

Several monitoring sites are selected in the reference river drainage. Location and dimensions of monitoring sites should be representative of the whole reference river, for example representative of the main river channel or tributaries, and comprise not <20% of their length. For a large river drainage (length >400 km) monitoring sites are

usually selected in tributaries, which serve as reference rivers. In this situation, monitoring sites can comprise a lesser portion of the drainage area but not <10%.

Surveys with fishing gear: escapement is estimated based on CPUE (catch per unit effort) indices: numbers of fish per trap-hour, by beach seine, or weight of fish per fishing-day by stationary pound net. There is a strong correlation between in-river net CPUE and daily escapements in the vicinity. This method is used to estimate chum salmon escapement in the Anadyr River. Estimates can be corrected on the basis of visual survey data collected at monitoring sites along the Anadyr River.

Mark-recapture: a portion of fish captured is marked and released, normally near the river mouth. Later, another portion(s) is captured upstream and the numbers of marked and unmarked individuals are counted. The proportion of marked to unmarked fish is used estimate escapement. This method is used to estimate Amur River chum salmon escapement.

Enumeration fences: this method strives for total counts of adult salmon passing through the barrier in route to the spawning grounds and also can regulate abundance on the spawning grounds. Enumeration fences can be erected on small streams, or second and third-order tributaries, where the river channel is gentle enough for a net to be stretched across it and risks of flood are minimal. This method is used on the Ozernaya River to estimate Kurilskoye Lake sockeye salmon escapement.

Other approaches used to estimate escapement include remote sensing techniques such as hydro-acoustics and video and photo recording methods.

Hydro-acoustic methods: hydro-acoustic techniques involve counting the fish as they travel within the range of the hydro-acoustic detection system. The mobility of hydro-acoustic units, simplicity of installation and maintenance in the river at almost any site in the watershed, and operational efficiency in data processing are advantages of using hydro-acoustics. A serious drawback for full implementation of hydro-acoustics is the high cost of the units. Hydro-acoustic systems are used to enumerate fish in the rivers of the Kamchatka Peninsula, continental coast, and Chukotka, and rivers draining into the Sea of Okhotsk.

Remote sensing with video and photo recording: the use of video equipment for recording Pacific salmon escapement began in 2012. A video survey was conducted in the Iska River watershed (Sakhalin Bay of the Sea of Okhotsk). This method is still in the developmental stage.

A third set of techniques to estimate escapement include aero-visual methods.

Aero-visual methods: these methods allow for efficient coverage over vast areas by observing a large number of watersheds quickly. This factor is extremely important for large river drainages, especially where the ground-transportation infrastructure is poorly developed, as is the case along the continental coast in the northern part of the Sea of Okhotsk and in Kamchatka.

Fish counting at a particular site within a river or lake is the basis of this method. Salmon aggregations are counted by tens, hundreds, or thousands, depending on fish abundance and density. Counting accuracy depends on fish density, distribution in the river channel, light conditions, tree crown density, river depth, and water transparency. Small aircraft or helicopters travelling at speeds of 100-120 km/hr at a height of 100-150 m are usually used to perform these surveys.

Aero-visual surveys of salmon spawning watersheds are usually conducted close to completion of the main portion of the run for each salmon species to minimize errors in estimating escapement. If possible, aero-visual surveys are usually followed by photo documentation at particular spawning sites.

On the Kamchatka Peninsula, aero-visual methods have been used since 1950. More than 50 years of aero-visual survey experience has been gained by observations on the northern coast of the Sea of Okhotsk. A comprehensive system estimating total salmon escapement throughout the Kamchatka Peninsula has existed until 2005. Every year there was funding available for 500-600 flight hours. Currently, lower funding has reduced the survey period to 250 flight hours. Reference watersheds are surveyed and data are extrapolated to the whole region with similar conditions for salmon reproduction.

Estimating escapement is the basis for the preseason salmon-run forecast. Total salmon enumeration provides for maximum accuracy in estimates, however, this method has a random character. Estimates of escapement based on enumeration of referent rivers, which are extrapolated to regions of similar conditions for salmon reproduction, reflect salmon stock status.

7.2.1.10 Enhancement

In Kamchatka region, currently, there are only five governmental salmon hatcheries that work to artificially reproduce Pacific salmon stocks (Figure 18). Three of them named after: Ketkino, Paratunsky and Viljuisky are located on the

eastern coast of the Kamchatka Peninsula. Two other hatcheries: Malkinsky and Ozerki are located on the west coast of the Kamchatka Peninsula in the basin of the Bolshaya River. Only these two last hatcheries have an impact on the wild salmon stocks, which are considering in this assessment. The number of juveniles released by the hatcheries in 1998 – 2019 is shown in Figure 19. The ratio of the release of juvenile chum and sockeye salmon into the Bolshaya River to the release of juvenile salmon of other hatcheries in the North Pacific region is shown in Figure 20.

Figure 18: Locations of the 5 Pacific salmon hatcheries in the Kamchatka Krai (Malkinsky, Ozerki, Paratunsky, Ketkino and Viluysky). RU=Russia, AK=State of Alaska, CA=Canada, US=United States of America, SH=Salmon Hatchery (Zaporozhets, Zaporozhets, 2011a).

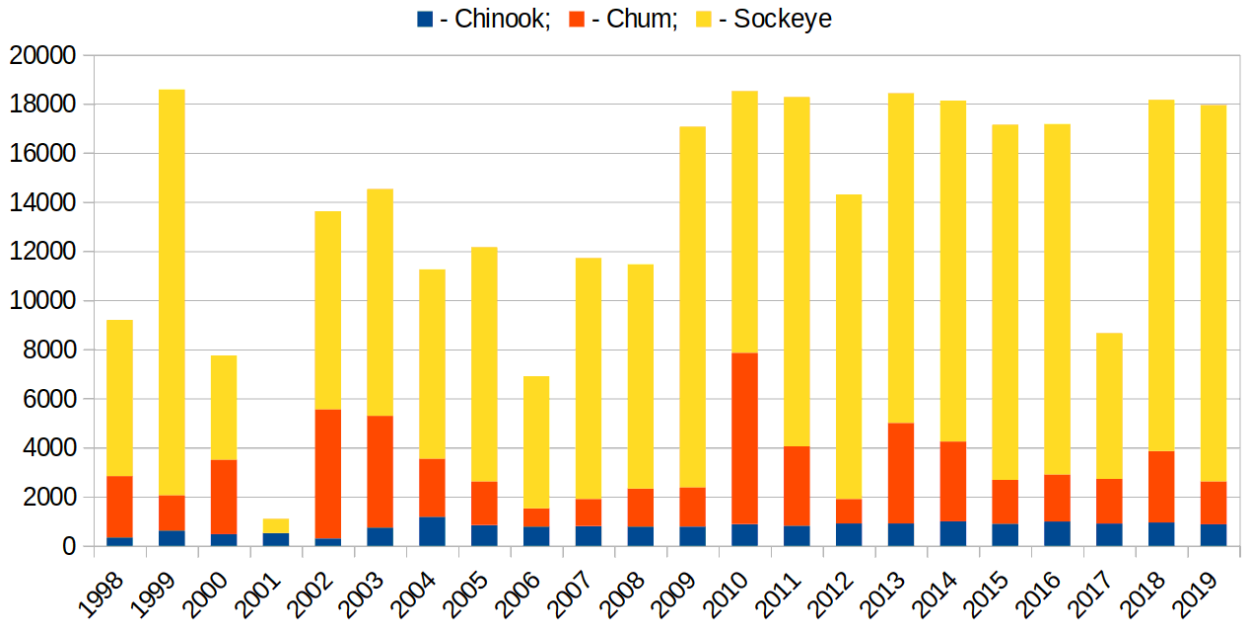

Figure 19: Release of juvenile salmon by the Malkinsky and Ozerki hatcheries in the basin of the Bolshaya River in 1998–2019 (data from NPAFC).

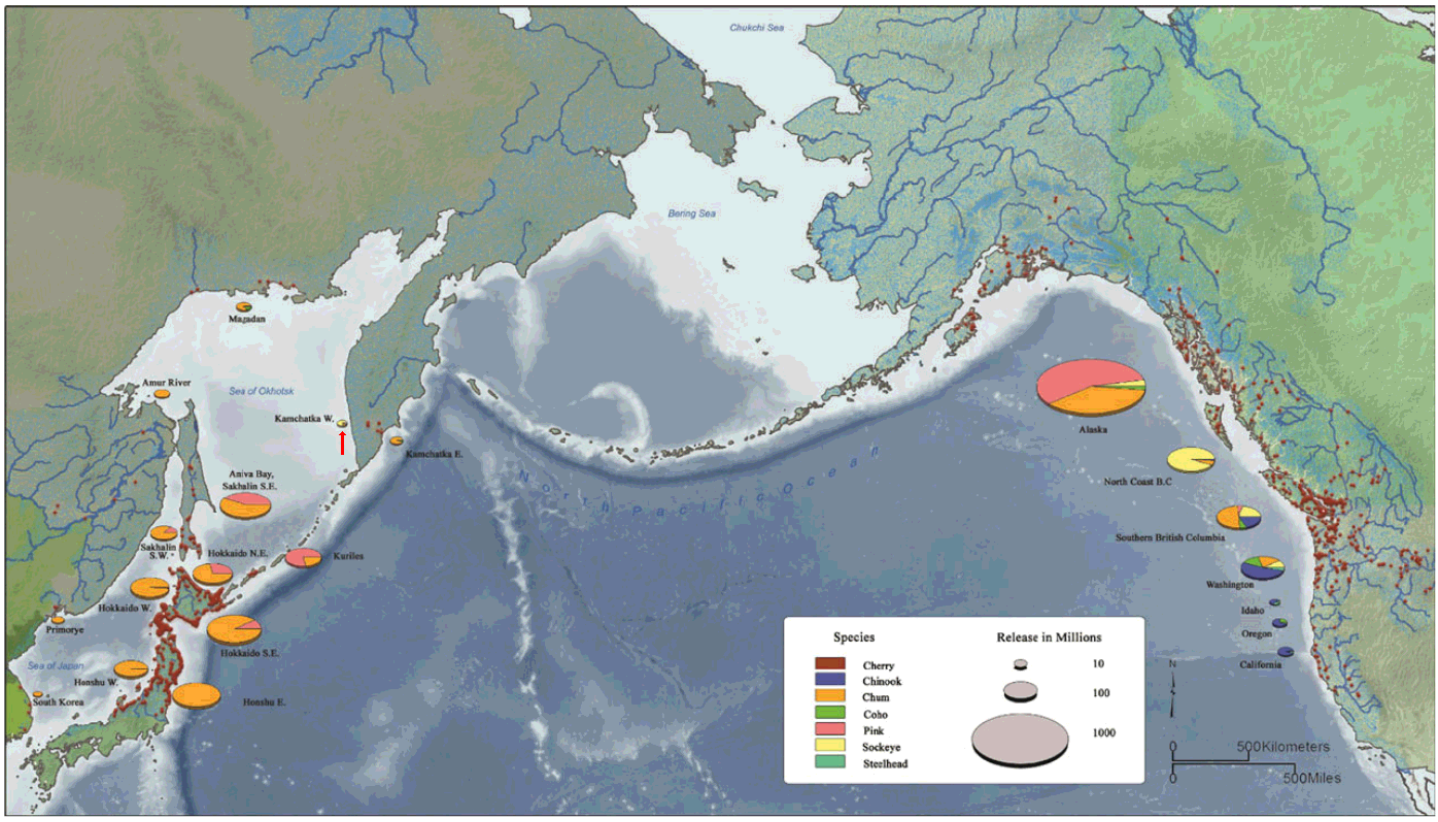

Figure 20: Map of the North Pacific region depicting location (red points) and magnitude (scaled pie charts by species) of hatchery releases of Pacific salmon during 2005 (Rand *et al*., 2012). Red arrow off the western coast of Kamchatka marks the chart of the releases of the Malkinsky and Ozerki hatcheries.

Although the aggregate hatchery production of Pacific salmon in the Kamchatka region of the Russian Federation is very low (< 0.5% of total harvest, with five hatcheries releasing approximately 41 M juvenile salmon annually), but contributions in certain rivers can be substantial. Enhancement programs in these rivers may influence fitness and

production of wild salmon. In paper by Zaporozhets and Zaporozhets (2011a) was documented divergence in demographic traits in hatchery salmon populations in the Bolshaya River (Figure 21) and was estimated the proportion of hatchery chum salmon in the total run in the Paratunka River (Eastern Kamchatka) to demonstrate the magnitude of enhancement in this system.

Was observed a reduction in the expression of life history types in hatchery populations (ranging from 1 to 9 types) compared to wild populations (17 types) of sockeye salmon in the Bolshaya River. This reduced life history diversity may make these fish less resilient to changes in habitat and climate. Was made conclusion that as hatchery fish increase in numbers at natural spawning sites, this hatchery production may affect wild salmon production. Nevertheless, to date, no evidence has been found of a significant impact of the hatcheries on the wild stocks of chum and sockeye salmon in the Bolshaya River.

The results of the work of the Malkinsky hatchery are shown in Table 15, and the Ozerki hatchery – in Table 16. At the hatchery, juvenile salmon are marked. Volumes of released and marked juveniles of chum salmon from the Ozerki hatchery in 2011-2014 are shown in Table 17. Images of marked otoliths of juvenile sockeye salmon from the releases of the Malkinsky hatchery and chum salmon from the releases of the Ozerki hatchery are shown in Figure 22.

In 2011-2014 otoliths were collected in the sea of Okhotsk from 7604 chum salmon juveniles. Among them, 337 marked otoliths were found, including only 6 otoliths marked by the Ozerki hatchery (Shevlyakov and Chistyakova, 2017).

The return rate of hatchery salmon was 4.82% for sockeye salmon of the Malkinsky hatchery, 0.18% for sockeye salmon and 2.24% for chum salmon of the Ozerki hatchery. The average long-term occurrence of hatchery Pacific salmon in mixed catches in the Bolshaya River, based on the results of otolith marking, was 3% for chum and 10% for sockeye salmon (Bugaev *et al*., 2018).

Table 15: Number of incubated eggs and released juveniles of chum and sockeye salmon (in thousands) and their average weight at Malkinsky hatchery in 1982–2010 (on data by Zaporozhets and Zaporozhets, 2011).

Year of		Chum			Sockeye		
incubate	release	eggs	juveniles	M	eggs	juveniles	M
1982	1983	15.4	5	3.2	-	-	-
1983	1984	11	6.4	7.3	10.0	0.8	3.5
1984	1985	8.5	6.8	5.0	-	-	-
1987	1988	16.4	6	5.3	-	-	-
1988	1989	14	10	11.3	-	-	-
1989	1990	47	44	3.2	-	-	-
1990	1991	241	188	3.2	22.8	20.0	2.8
1996	1997	-	-	-	395.4	332	7.3
1997	1998	-	-	-	878.5	717	5.6
1998	1999	-	-	-	709.2	592	4.4
1999	2000	-	-	-	870.0	725	4.2
2000	2001	-	-	-	785.2	576	4.9
2001	2002	-	-	-	1183.2	412	5.7
2002	2003	-	-	-	614.2	524	2.2
2003	2004	-	-	-	631.0	576	4.4
2004	2005	-	-	-	797.0	710	4.8
2005	2006	-	-	-	625.0	561	5.6
2006	2007	-	-	-	590.0	533	5.4
2007	2008	-	-	-	605.0	534	5.8
2008	2009	-	-	-	606.0	574	5.7
2009	2010	-	-	-	660.0	605	5.2

M – Average weight of juveniles at release, g

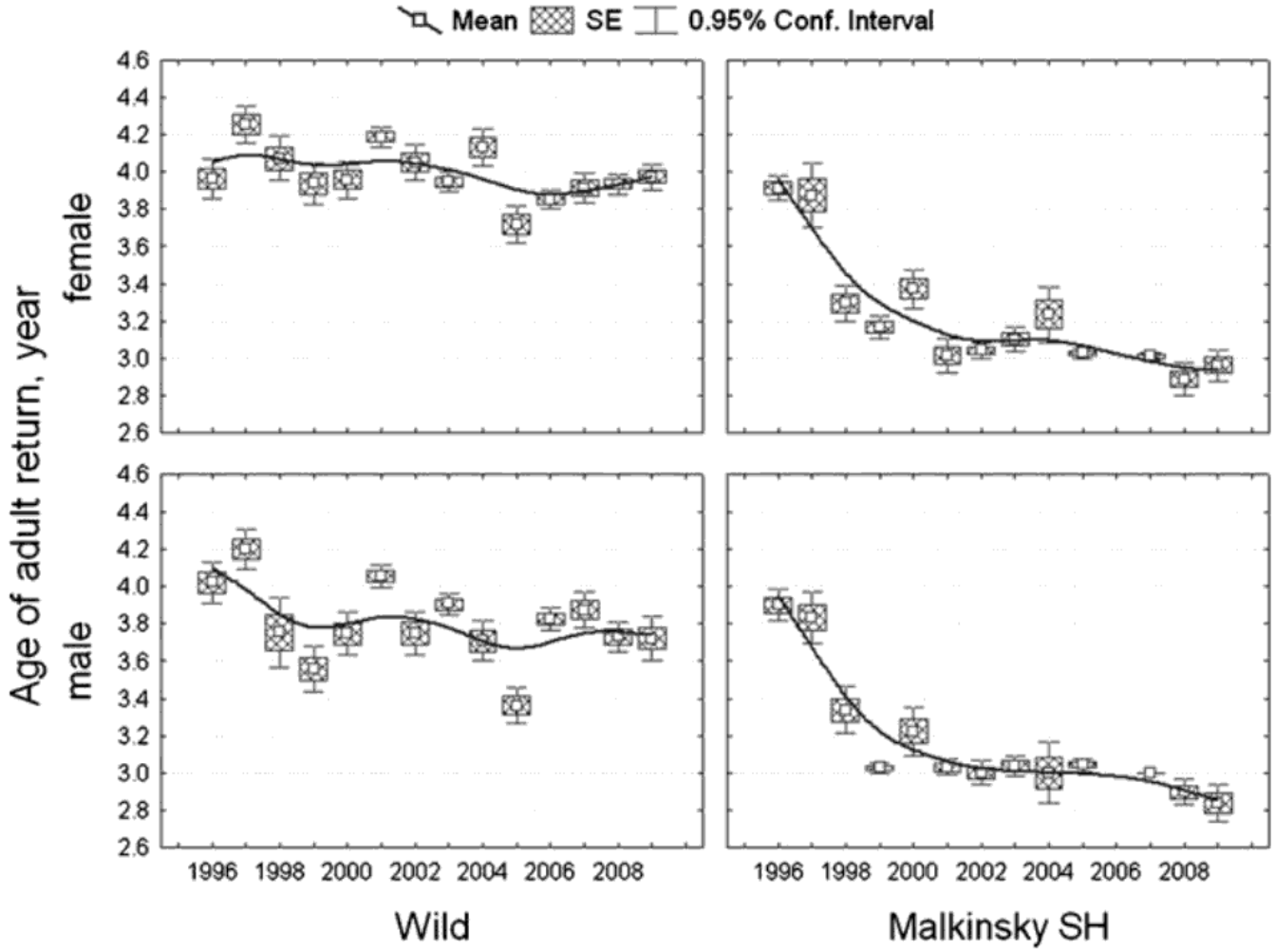

Figure 21: Mean total age at return (sum of freshwater and sea age) and smoothed trends by sex of wild- and hatchery- origin sockeye salmon returning to the Bolshaya River during 1996–2009. SH=Salmon Hatchery (Zaporozhets and Zaporozhets, 2011a).

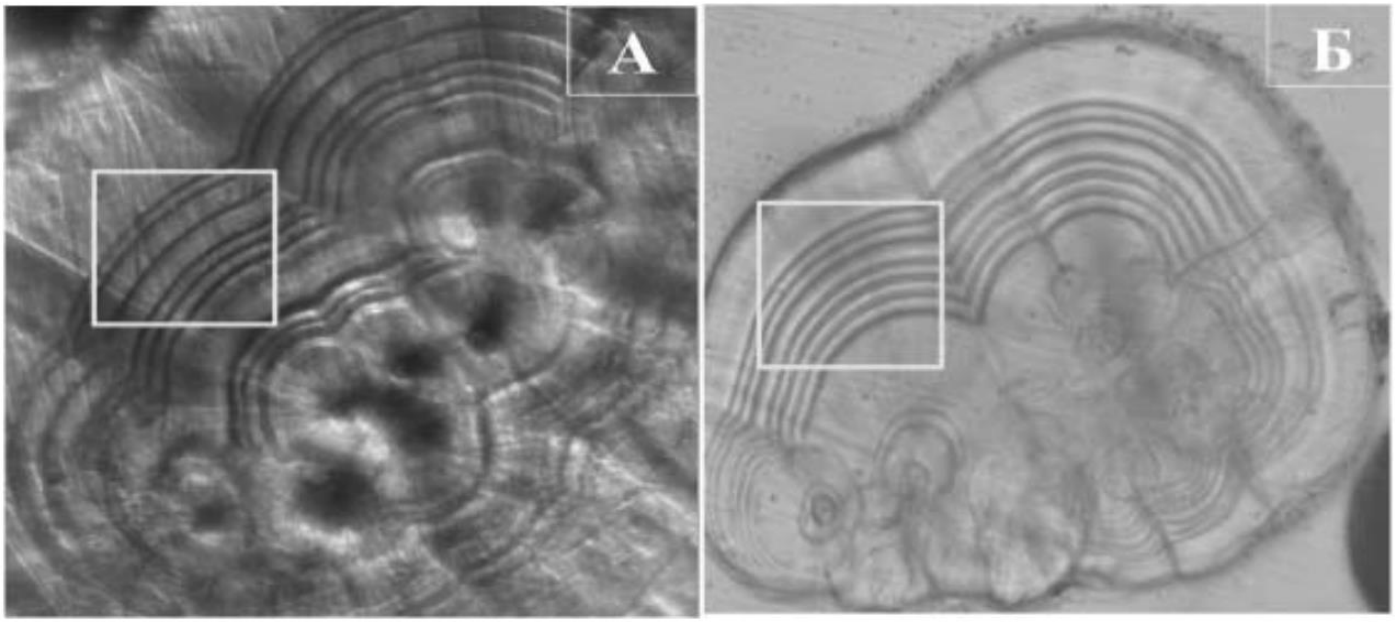

Figure 22: Images of otolith marks. А – juvenile sockeye salmon, Malkinsky hatchery; Б – juvenile chum salmon, Ozerki hatchery (Bugaev *et al*., 2018).

Table 16: Number of incubated eggs and released juveniles of chum and sockeye salmon (in thousands) and their average weight at Ozerki hatchery in 1982 – 2010 (on data by Zaporozhets and Zaporozhets, 2011).

Year of		Chum			Sockeye		
incubate	release	eggs	juveniles	M	eggs	juveniles	M
1997	1998	2656	2502	0.8	6312	5643	0.5
1998	1999	1563	1441	0.9	16430	15335	0.4
1999	2000	3226	3030	4.4	3831	3528	0.5
2001	2002	5862	5257	0.9	8758	7656	0.8
2002	2003	5020	4551	1.0	9760	8713	0.8
2003	2004	2602	2372	0.9	11860	7129	0.7
2004	2005	1891	1783	0.8	9771	8830	0.5
2005	2006	788	744	0.8	5435	4825	0.5
2006	2007	1265	1109	0.9	10198	9283	1.0
2007	2008	1689	1548	0.9	9752	8605	0.9
2008	2009	1739	1573	0.9	9895	9052	1.1
2009	2010	1216	1117	4.4	11111	10052	1.0

M – Average weight of juveniles at release, g

Table 17: Volumes of released and marked juveniles of chum salmon from Ozerki hatchery (Western Kamchatka) (Shevlyakov and Chistyakova, 2017).

Year	Released, million fish	Marked, million fish	Share of marked fish, %
2011	3.24	3.24	100
2012	0.99	0.99	100
2013	4.09	2.66	65.1
2014	3.25	1.89	58.2

7.2.2 Pink Salmon

Pink (=Humpback) salmon - *Oncorhynchus gorbuscha* – Salmonidae – SALMONIFORMES (not a LTL species) (Figure 23). The position of Pink salmon in the phylogenetic tree of salmonids is shown in Figure 24.

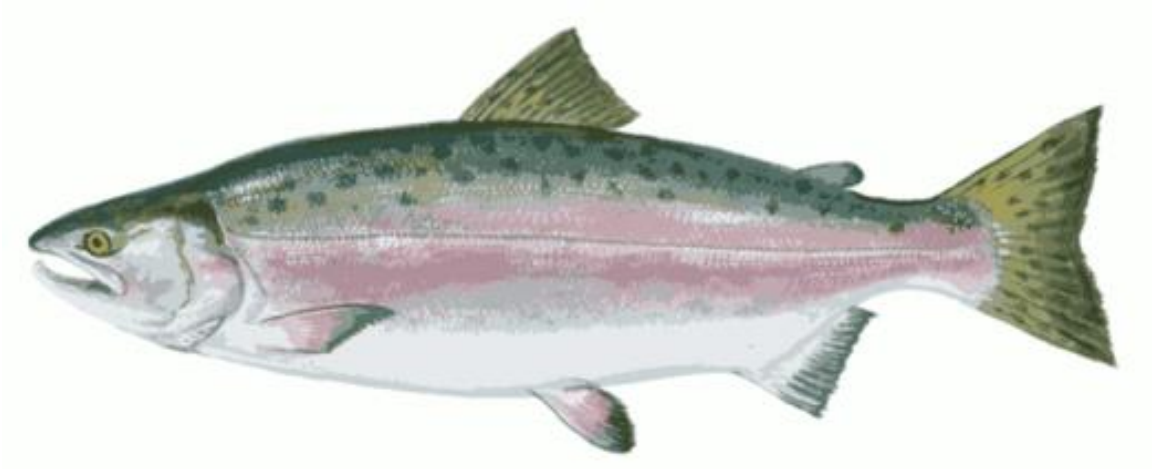

Figure 23: Pink salmon *Oncorhynchus gorbuscha*. Source: https://igfa.org/game-fish-database.

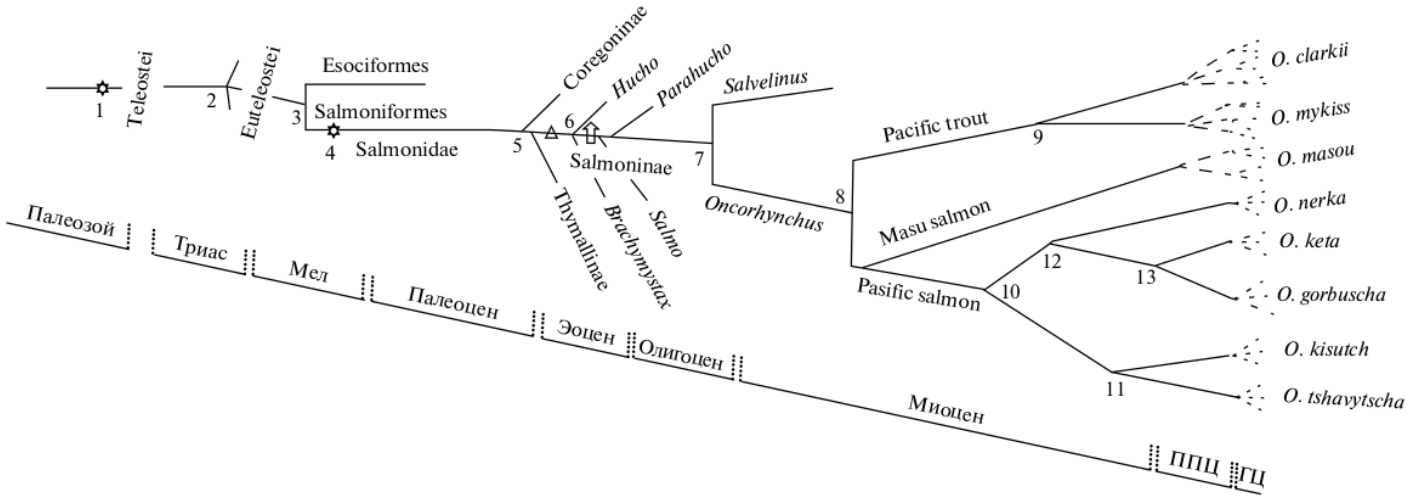

Figure 24: Phylogeny of salmonids, main evolutionary events and dates according to data on the nucleotide sequences of mitochondrial DNA fragments and nuclear genes (Zhivotovsky, 2015).

7.2.2.1 Distribution

Pink salmon is a Pacific fish (from rivers of the eastern Korean Pen., eastern Hokkaido to northern California, and also from the Lena River to the Mackenzie River in the Arctic Sea). This species was introduced into rivers of the White and Barents Sea (1956-1963, 1967-1975), and is now more widespread, the stocks maintained by both natural spawning and further stocking; it is well established in rivers from Ob to Finmark, but straying further south; records from southern Norway and south-eastern Sweden may have been strays from stocking in Bay of Riga. Feeding migrants are not rare along the coast of northern Japan and the Sea of Japan (Figure 25).

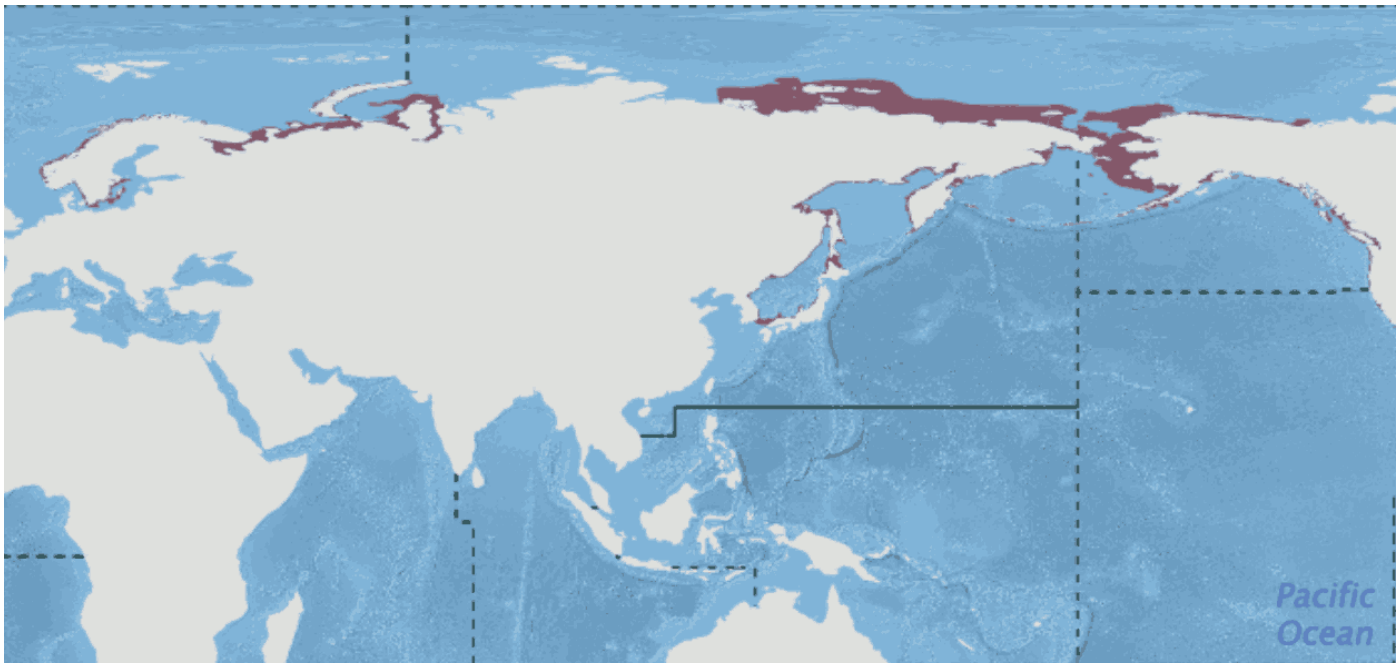

Figure 25: Distribution of Pink salmon. Source: http://www.fao.org/fishery/species/2116/en.

Figure 26 presents one of the maps (Pink salmon) of known ocean ranges of major stocks of Pacific salmon as shown by recoveries of tagged fish reported to the former International North Pacific Fisheries Commission (INPFC) and to the North Pacific Anadromous Fish Commission (NPAFC). Distribution plots were prepared for all coastal recoveries (1956-1995) of fish tagged with external (high-seas) tags during INPFC- and NPAFC-related tagging experiments in the North Pacific Ocean (Myers *et al*., 1996).

The overwintering grounds for all species, stocks, and age-maturity groups originating from the three major coastal salmon production regions (Okhotsk Sea, Bering Sea, Gulf of Alaska), covered vast and broadly overlapping oceanic regions (Myers *et al*., 2016). In the article also projected climate-change effects on thermal habitat areas of high seas salmon in three oceanic regions. It is shown that the range for Pink salmon in Subarctic will shrink (Figure 27).

7.2.2.2 Life History

Pink salmon are the most abundant species of Pacific salmon and originate both in Asia and North America. Upon emergence, Pink salmon fry migrate quickly to the sea and grow rapidly as they make extensive feeding migrations. Pink salmon have a fixed two-year life cycle. After a year in the ocean, where they feed on plankton, other smaller fish, squid, and the occasional aquatic insect, maturing fish return to their river of origin to spawn. Fecundity typically averages about 1,500 eggs per female. An odd-year dominance cycle of Pink salmon exists in many regions of the North Pacific, meaning that the number of adults returning to freshwater in an odd-numbered year is much higher than the number returning in an even-numbered year. Adults are the smallest Pacific salmon and range from 45–55 cm in length and 1.0–2.5 kg in weight. Pink salmon die after spawning (semelparous).

Various fish and birds prey on juvenile Pink salmon. Sharks, sea lions and seals, and orcas eat adult Pink salmon at the ocean. In freshwater spawning habitats, bears and some other animals are predators of adult Pink salmon.

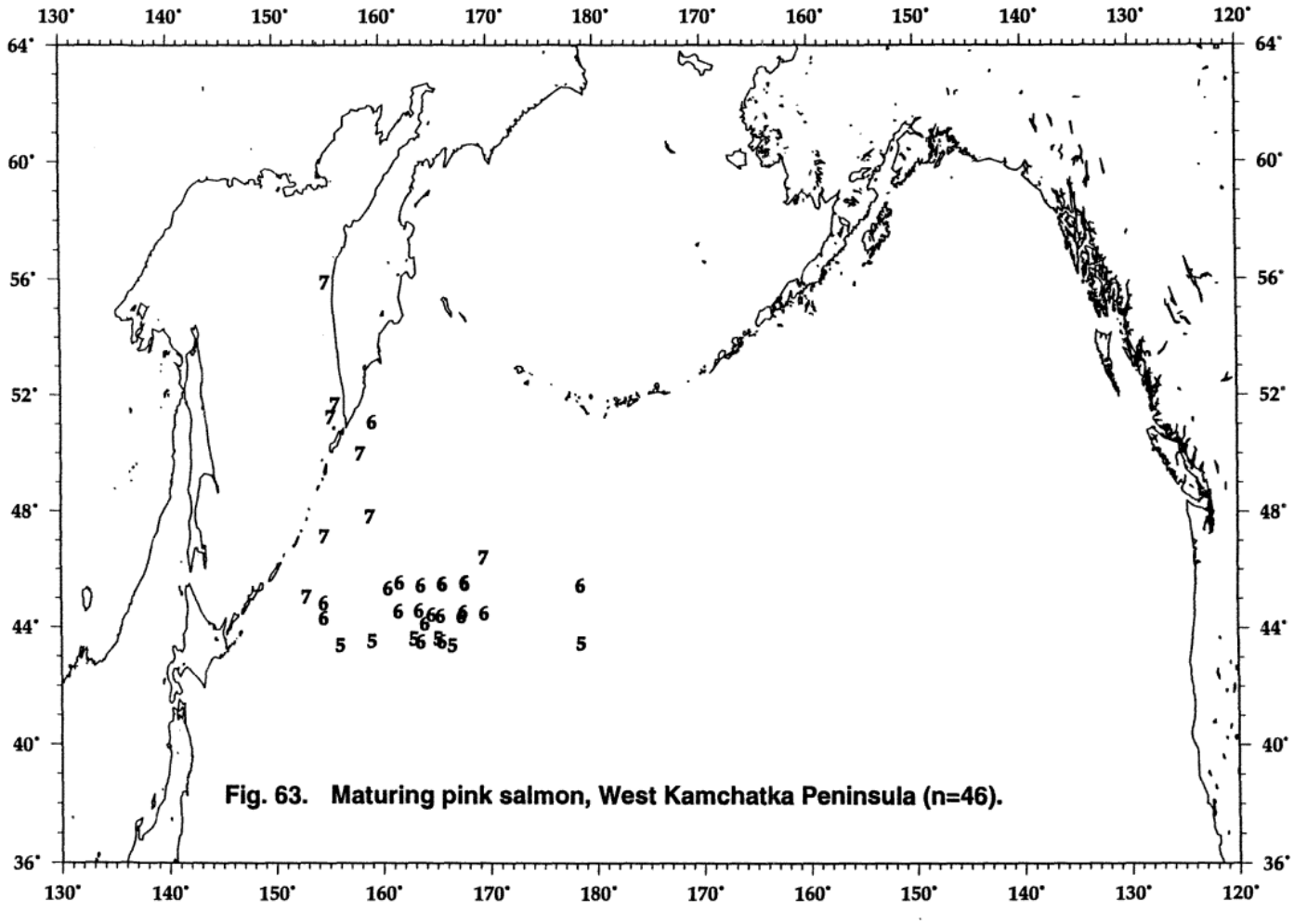

Figure 26: Maturing Pink salmon, Western Kamchatka (n=46) (Myers *et al*., 1996). The numbers indicate the month of release from 1 (January) through 12 (December).

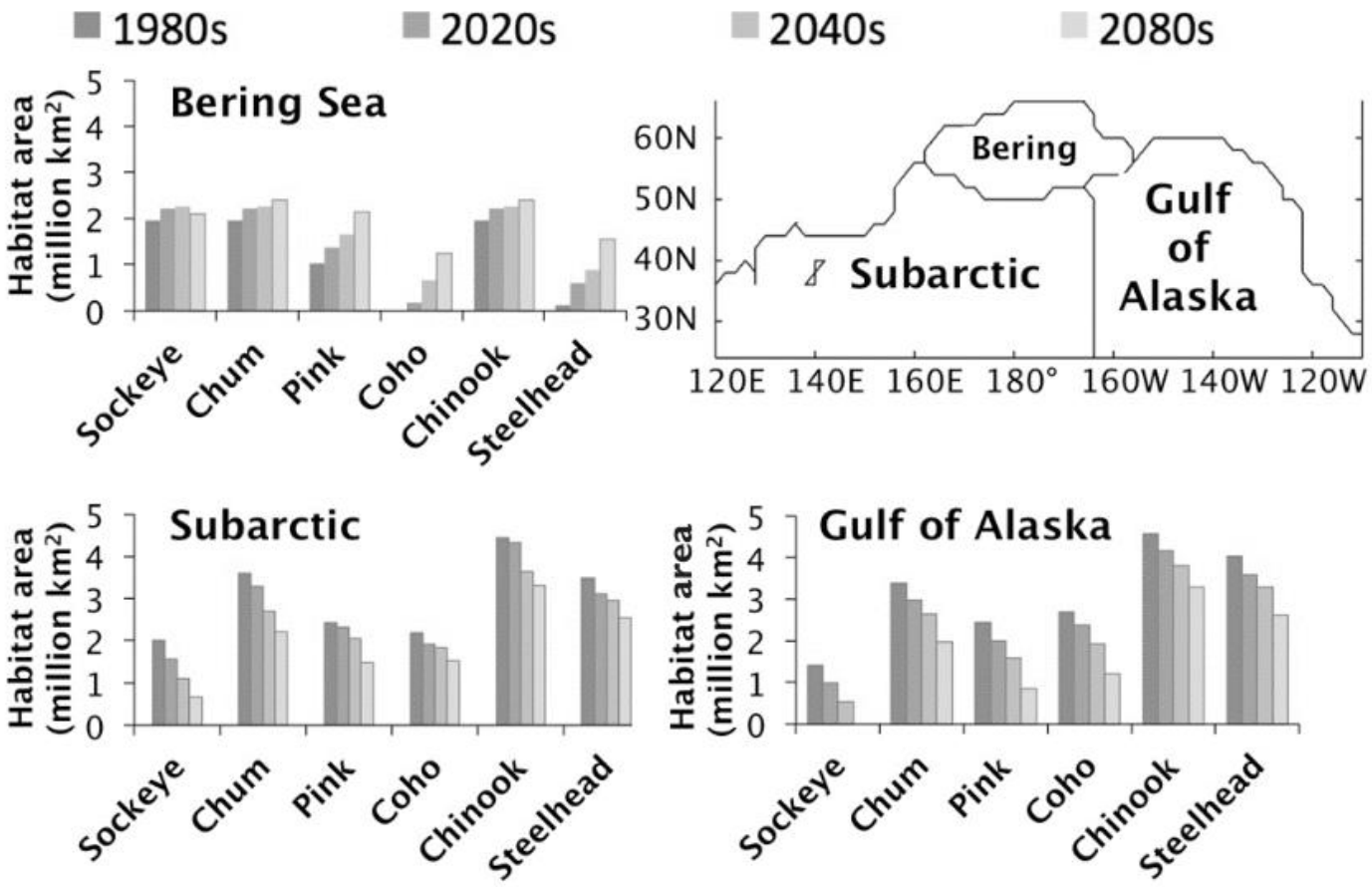

Figure 27: An example of projected climate-change effects on thermal habitat areas of high seas salmon and steelhead in three oceanic regions. (Data source: Abdul-Aziz *et al*., 2011; Myers *et al*., 2016).

7.2.2.3 Stock status

It is known that the most significant reproductive isolation for Pink salmon exists between generations of even and odd years. Consequently, there are at least two separate populations of Pink salmon in each river. In addition, Pink salmon is believed to have the least pronounced homing among Pacific salmon. There is even a theory of fluctuating stocks (Kaev, Zhivotovsky, 2016), which speaks of the return of Pink salmon not only to non-native rivers of its range, but even anadromous migration to other regions. This makes Pink salmon quite resistant to accidental overfishing in one separate river.

KamchatNIRO conducts research on genetic identification in total catches from trawl surveys in the Okhotsk Sea of juvenile Pink salmon from streams in western Kamchatka, the continental coast of the Okhotsk Sea, Sakhalin and the Kuril islands, the Amur River, and Primorye (Shpigalskaya *et al*., 2011; 2012; 2013; 2016; Bugaev *et al*. 2012).

Within the Kamchatka Territory, the main centres of Pink salmon reproduction are the northeastern (Karaginskaya subzone) and western (West-Kamchatka and Kamchatka-Kuril subzones) coasts. Each of the regions has a characteristic dynamics of the number of this species, expressed in the alternation of productive generations along the line of even and odd years. In Eastern Kamchatka, generations of Pink salmon of odd years of reproduction are historically productive, and in Western Kamchatka, since 1983, a high number is characteristic of generations of even years.

The total catch of Pink salmon in the Kamchatka Territory in 2019 amounted to 287,441 tonnes, which corresponded to the 122% level of development of the initial volume of projected catch – 236,400 tonnes (Figure 28). In comparative share terms, the catch of Kamchatka Pink salmon reached approximately 88% of the total catch of the species in the Far East fishery basin (329,352 tonnes). The similar figure in 2018 was about 81%. This indicates that at present Kamchatka, both in even and odd years, is becoming the main centre of Pink salmon reproduction in the Russian Far East.

In the Kamchatka-Kuril subzone for Pink salmon of odd-numbered (weak year) classes, catches were around 2,000 tonnes until 2015, after which there was an increase in 2017 (more than 3 times) and in 2019 (maximum – 34,767.3

tonnes). In even-numbered years, a noticeable increase in Pink salmon catches was recorded in 2012, then a sharp decrease in 2014 and again an increase to the maximum level (177,713.5 tonnes) in 2018 (Figure 29).

In the area of the Bolshaya River for Pink salmon of odd-numbered (weak year) classes in 2010–2017 catches averaged 668.0 tonnes. In 2019, its catches increased by 10 times, reaching 6 793.2 tonnes. The Pink salmon of even-numbered (strong year) classes; it should be noted, an increase in catch in 2010–2012, and then a sharp decrease in 2014. After this period, catches of this species increased again to a maximum of 46 320.2 tonnes in 2018 (Figure 30).

In the article by Zaporozhets *et al*. (2017) it is said that Pink salmon in the Bolshaya River have three races - early summer, summer and late summer. Information on the Pink salmon catches by FTP Comandor JSC in 2014 - 2020 is presented in Table 18.

KamchatNIRO conducted a survey of the Pink salmon fry that came down from the rivers at sea and reported that the level of the number of migrating fry in 2020 (from the spawning of fish in 2019) in most rivers of the western coast of Kamchatka is higher than the average long-term for generations of odd years (http://www.kamniro.ru/presscenter/news/uchet_pokatnoj_molodi_gorbushi_na_zapadnoj_kamchatke).

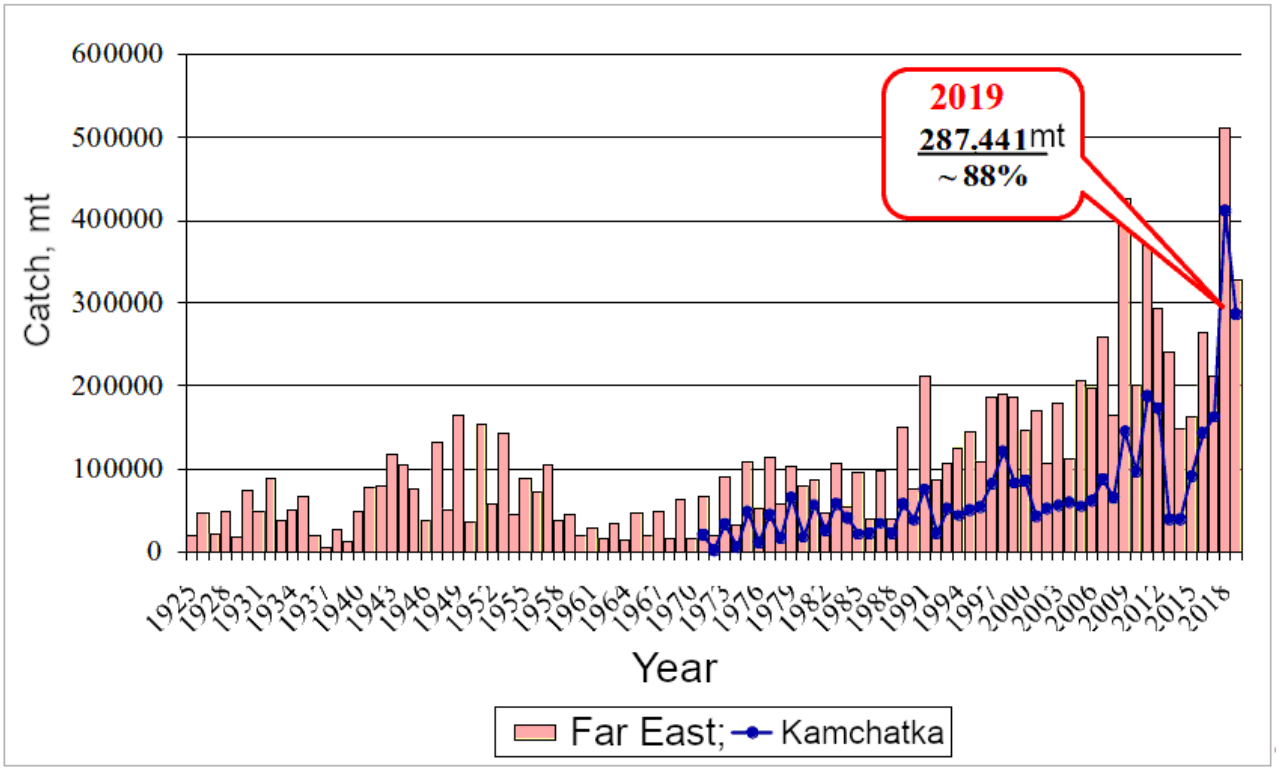

Figure 28: Comparative dynamics of Pink salmon catches in the Far East in 1925–2019 and Kamchatka in 1971–2019 (Bugaev *et al*., 2019).

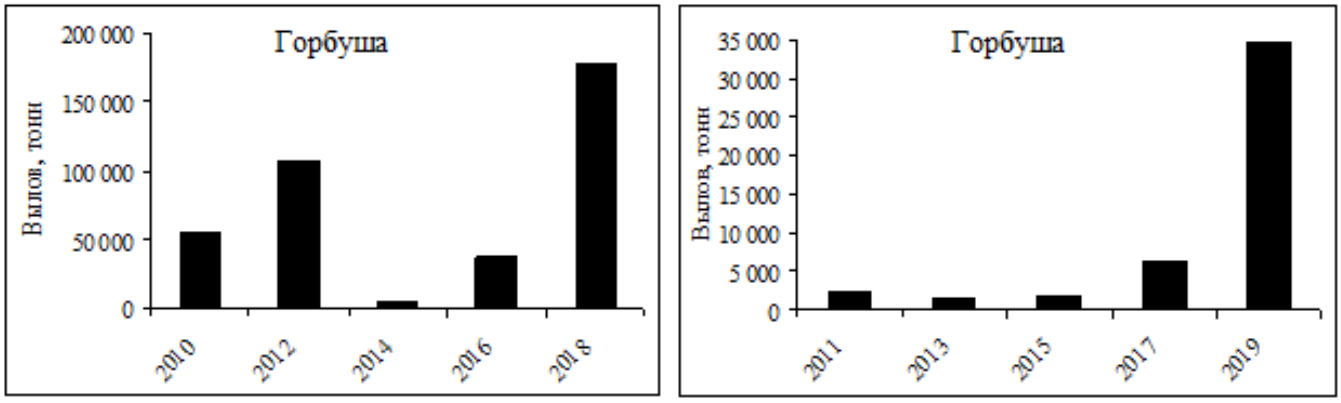

Figure 29: Dynamics of catch of Pink salmon in the Kamchatka-Kuril subzone in 2010–2019. X-axis – years, Y-axis – catch in mt (Bugaev *et al*., 2020).

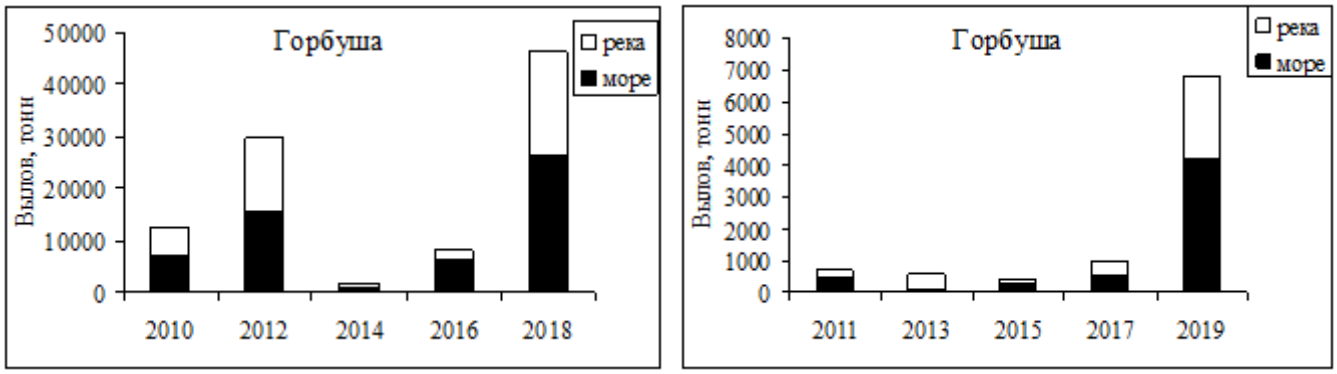

Figure 30: Dynamics of catch of Pink salmon on sea and river sections of the Bolshaya River in 2010–2019. X-axis – years, Y-axis – catch in mt. Black bar – sea, White bar – river (Bugaev et al., 2020).

Table 18: FTP Comandor JSC, catch of Pink salmon by parcels in 2015-2019, mt (Information from the client, January 2021).

Fishing Parcel No.	2015	2016	2017	2018	2019	2020
711*	7.230	200.840	44.380	1774.712	322.01	448.2
716*	3.250	52.600	7.200	963.760	73.000	286.5
723*	0.780	10.710	4.140	436.685	68.450	213.4
103	–	767.931	–	2762.712	521.676	221.482
110	–	–	–	2508.161	427.348	205.105
112	–	–	–	1901.132	413.123	118.265
115	–	–	–	2061.044	264.589	36.434
116	–	–	–	–	337.015	94.348
152	–	170.150	27.126	1514.836	168	138.868
157	17.990	320.274	10.600	2034.872	192.723	186.9
164	9.320	357.552	22.050	1521.433	242.44	251.1
Sum	38.57	1880.057	115.496	17479.347	3030.374	2200.602

7.2.2.4 Pass for spawning (Escapement)

Collection of data on the condition of spawning stocks of Pacific salmon has its own regional peculiarities depending on the number of local stock and abundance of individual species. In the Kamchatka-Kuril subzone, the main objects

of aerial surveys are two mass species - Pink salmon and chum salmon. The remaining species refer to the concurrent ones, that is, they are recorded along the way during flight inspections of the spawning grounds of two main species.

However, for the main regional stock of sockeye salmon, which is reproduced in the basin of the Ozernaya River (Lake Kurilskoye), registration of spawned producers is carried out at the fish counting barriers (FCB) at the source of the Ozernaya River, as well as using the BioSonics sonar system.

In this regard, the information level of air monitoring in various rivers of the Kamchatka-Kuril subzone of various types may slightly differ. However, in connection with the objectives of the MSC certification program of Pacific salmon fishing on the western coast of Kamchatka more and more attention is being paid to such relatively small species in the region as sockeye salmon (secondary herds) and coho salmon. In addition, in recent years, research on Chinook salmon spawning sites has been carried out as a target for air monitoring. To a large extent, the latter is connected with a slight increase in the reserves of this species in the region.

On the western coast of Kamchatka, the main reserves of Pink salmon are concentrated in river systems in the area from the Icha River to the Bolshaya River, while the largest reproductive potential of the species is concentrated in the rivers located in the northern part of the Kamchatka-Kuril subzone: Kikhchik, Pymta and Kol. The total share of these rivers in the spawning fund of Pink salmon in this fishing region over the past 10 years averaged 71%. Therefore, it is clear that these water sites determine the dynamics of the spawning stock of this species in the Kamchatka-Kuril subzone. The size of the spawning stock of Pink salmon in the Bolshaya River, for the same period, is estimated at 13.6%. Thus, the main abundance (85%) of Pink salmon in the Kamchatka-Kuril subzone is formed by 4 watercourses: the Kikhchik, the Pymta and the Kol and the Bolshaya River (Figure 31).

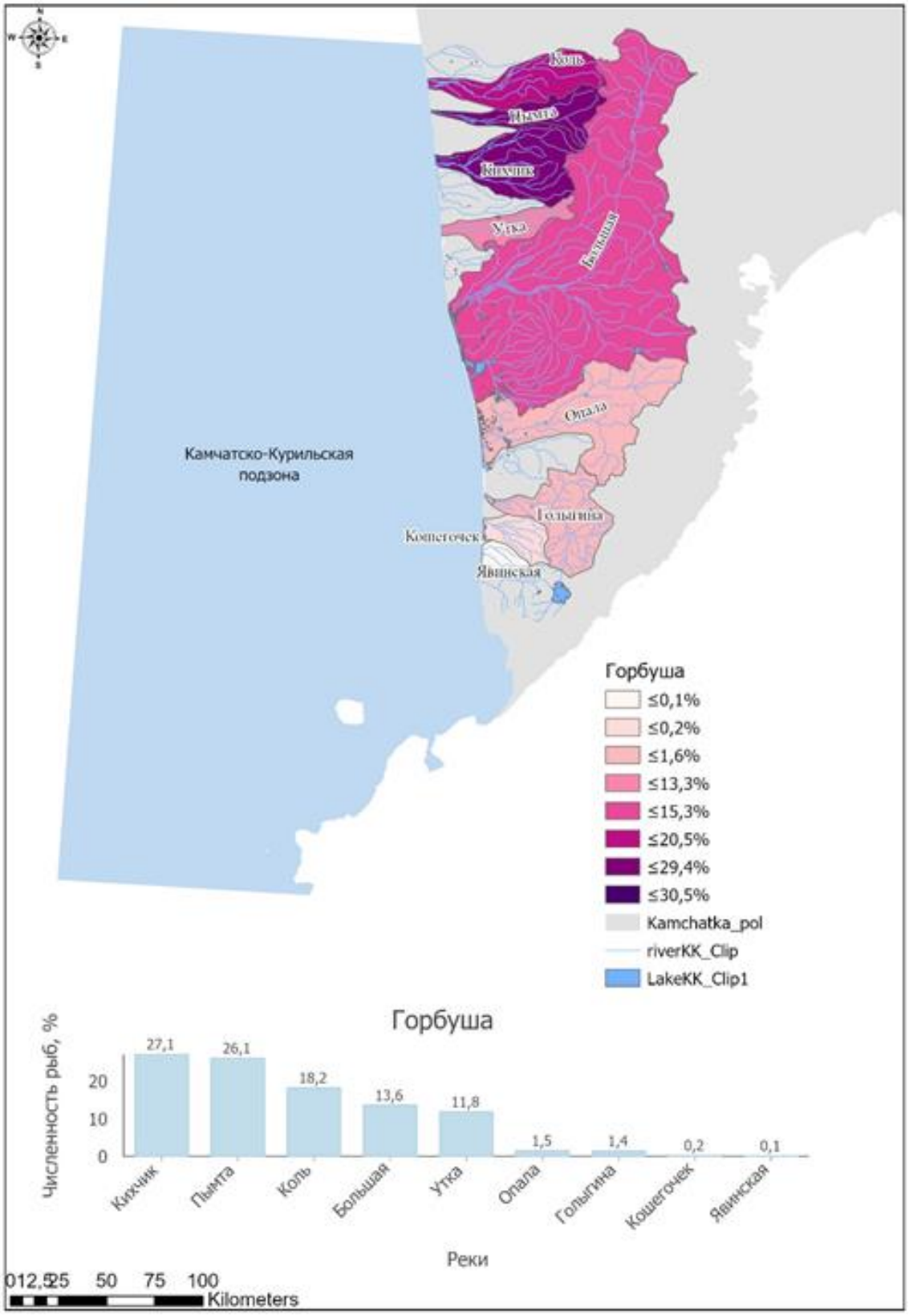

Figure 31: The distribution density of the spawning stocks of Pink salmon in the river basins of the Kamchatka-Kuril subzone in 2010–2019. Большая = Bolshaya River, the histogram shows the number of spawners in index rivers (% of their total number in the Kamchatka-Kuril subzone) (Bugaev *et al*., 2020).

In addition to the above-mentioned, in the Kamchatka-Kuril subzone there are 15 most significant river systems where Pink salmon is reproduced. Monitoring of the assessment of the state of spawning stocks, on a regular basis, is

carried out in 9 river basins, which are reference (control). The list of these rivers is as follows: the Kikhchik, the Pymta, the Kol, the Utka, the Bolshaya, the Opala, the Golygina, the Koshegochek, and the Yavinskaya.

Over the period under review (2010–2019), the abundance of Pink salmon in the rivers of the Kamchatka-Kuril subzone varied from 206.2 thousand to 59,893.0 thousand fish. In particular, for weak year classes over the past 5 reproduction cycles, the number of Pink salmon producers in spawning grounds varied from 209.4 thousand to 9,813.1 thousand fish. Accordingly, for strong year-classes, this indicator ranged from 206.2 thousand to 59,893.0 thousand fish. Moreover, in the dynamics of the spawning stock of both generative lines, in the last 2 cycles, an increase in the fish population was noted.

In addition to the quantitative data presented, it should be noted that in 2014, the abundance of Pink salmon at the spawning grounds of the rivers of the Kamchatka-Kuril subzone was assessed in a reduced format. Therefore, the presented pass values can be underestimated in relation to real data. In 2015, due to the lack of funding for this area of research, monitoring of Pink salmon spawning grounds was not carried out. Assessment of the status of the spawning stock of Pink salmon is carried out relative to certain target pass reference points for this species. It is carried out in accordance with the current scenario of reproduction, characteristic for classes of Pink salmon of odd-numbered (weak year) and even-numbered (strong year) years.

Characterizing the status of the stocks of the generative line of Pink salmon of odd-numbered years, it can be stated that until 2017 the size of the producers' pass to spawning grounds corresponded to the level of depressed classes. Starting from 2017, a positive trend was identified in the pass dynamics, and in 2019, the number of Pink salmon approached the level of productive classes (Figure 32).

Generations of Pink salmon of even-numbered years, after a change in quantitative dominants in 1983, are attributed to a large (strong-year) class. In a series of 5 adjacent years (with the exception of 2014, for the reasons mentioned above), the number of spawning stocks reached the upper (highly productive) stratum (Figure 33). The value of the Pink salmon pass in 2018 corresponded to the extra-abundant class, thereby exceeding the pass indicators in 1983.

In this situation, it would be logical to expect a reverse of the dominant lines of reproduction towards odd-numbered years, as happened after 1983. However, there is reason to believe that such a scenario is unlikely to happen again. This assumption is supported by the data of the hydrological regime, characterized by high water levels in the second half of 2018. The abundance of rainfall contributed to the release of riverbeds from an excessive amount of dormant fish, which led to a reduction in the eutrophication of watercourses and could positively affect the survival of spawn. In addition, the data on registration and fry-accounting works carried out in the basins of the referent rivers of the Kamchatka-Kuril subzone (the Bolshaya, the Utka, the Kikhchik, the Pymta, the Kolpakova Rivers) in May - June 2019 confirm the high survival rate of Pink salmon fry. In total, about 1 billion specimens of juveniles of this species were recorded in all control water sites.

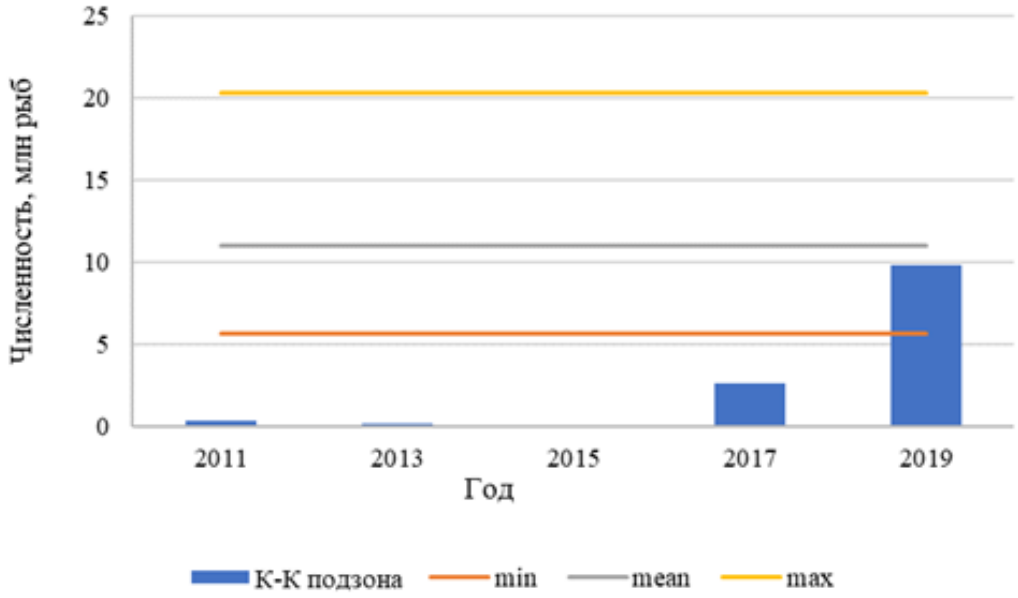

Figure 32: Dynamics of the pass of Pink salmon of odd-numbered years of reproduction in the rivers of the Kamchatka-Kuril subzone relative to the stratified target pass reference points. X-axis – years, Y-axis – escapement in millions. Blue bar – escapement, red line – Slim, grey line – S_{MSY}, yellow line – S*MSY (Bugaev *et al*., 2020).

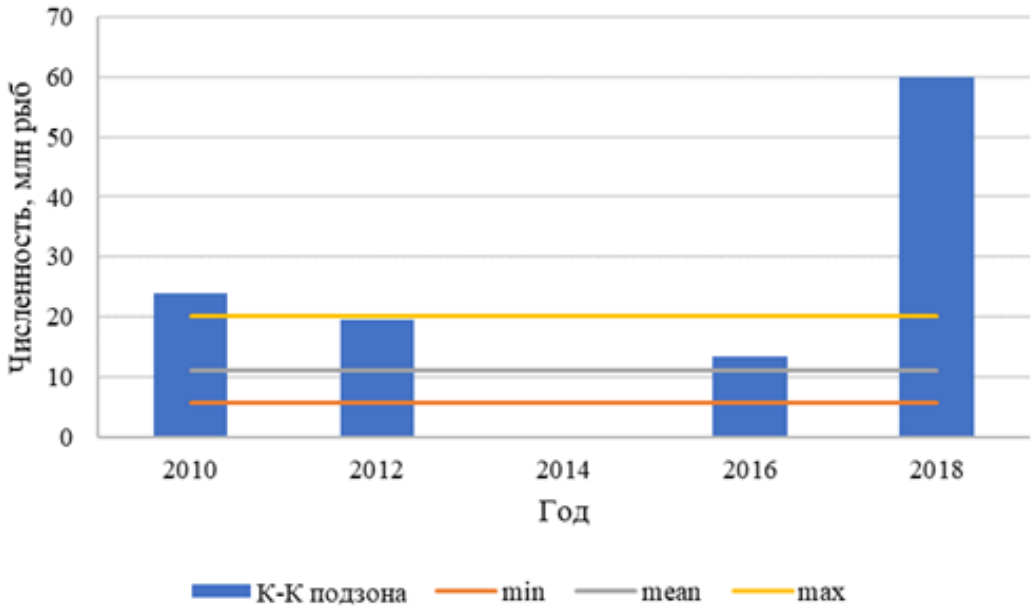

Figure 33: Dynamics of the pass of Pink salmon of even-numbered years of reproduction in the rivers of the Kamchatka-Kuril subzone relative to the stratified target pass reference points. X-axis – years, Y-axis – escapement in millions. Blue bar – escapement, red line –Slim, grey line – S_{MSY}, yellow line – S*MSY (Bugaev *et al*., 2020).

The geographical location of the Bolshaya River basin contributed to the development of infrastructure in this area, which, in turn, led to the development of fishing both legal and non-legal. Moreover, until recently, IUU fishing (illegal, unreported and unregulated) has reached alarming proportions. With the introduction of restrictive measures and the strengthening of protective measures carried out both by state authorities (the North-Eastern Territorial Administration of the Federal Agency for Fishery) and interested fishery owners, the situation with passing salmon for spawning gradually began to improve, and the level of illegal fishing significantly decreased. All this had a positive effect on the stocks of Pacific salmon reproduced in the basin of the Bolshaya River.

The number of Pink salmon producers in the spawning grounds of the Bolshaya River basin during the period under review varied from 0.003 million to 6.2 million fish. The range of values for the target reference points of the pass was calculated in the range from 1.68 to 6.06 million fish and is a stratified model that determines the required pass value based on the productivity of the classes under consideration.

The population of Pink salmon of the Bolshaya River has a distinct alternation of two generations (productive and low-productive). Accordingly, the state of the spawning stock of the species should be considered separately for each generative line.

The spawning abundance of Pink salmon of even-numbered years over the past five cycles has consistently increased from 4.2 million to 6.2 million fish (average 4.9 million fish). In 2018, the pass rate reached a highly productive stratum. At the same time, the average pass value was always in the field of target values of the two upper strata, which characterizes the state of spawning stock of Pink salmon of even-numbered years at the level of strong year-classes (Figure 34).

In odd-numbered years, the size of the pass of Pink salmon to the Bolshaya River basin for 5 adjacent odd years is estimated by the producers as critically low. Thus, with the required minimum of 1.61 million according to producers' point of view, the average pass amounted to 0.2 million fish, and the maximum - 0.6 million fish (Figure 35). This indicator, it would seem, may indicate a depressive state of the Pink salmon of odd-numbered line of reproduction of the Bolshaya River. However, for the entire period of aero-visual studies (since 1957), the spawning stock of Pink salmon of a weak year class of this stock was estimated at an average of 0.15 million fish. Moreover, for more than 50 years, it did not undergo significant changes, even after changing the dominant lines of reproduction. These data may support the fact that the mechanisms of the natural environment and, to a lesser extent, the influence of fishing are fundamental in the formation and regulation of the abundance of classes.

Nevertheless, KamchatNIRO believe that there is every reason to for the transition of the next classes of the depressive line to a higher productive level. For which purpose it is necessary to increase the producers pass into the

river to the level of at least the lower stratum. Moreover, at present time (since 2016), the coexistence of two strong year-classes of Pink salmon of the Eastern Kamchatka has been confirmed. At the same time, a similar process of reaching a previously weak-year class to the level of the strong year-class was already noted in the Western Kamchatka in 2019, when about 61 thousand tonnes of this species were produced in the region.

It should be noted that *So* – spawning stock ensuring maximum survival capacity of descendants (see Figure 14) is higher than the point where recruitment would be impaired (PRI). Slim (So) = 1.61 million producers is the same for even and odd generations of Pink salmon. And for chum salmon in Bolshaya River, precautionary S_{MSY} = 84.1 thousand fish. The average individual fecundity of a Pink salmon female is about half that of a chum salmon. It turns out that the limit reference value (Slim) for Pink salmon is almost an order of magnitude higher than the precautionary target value (S^*_{MSY}) for chum salmon, despite the fact that the spawning ecology of both species is very similar. It would be more logical to take the average escapement for 5 adjacent odd generations (0.2 million fish) as the PRI (LPR).

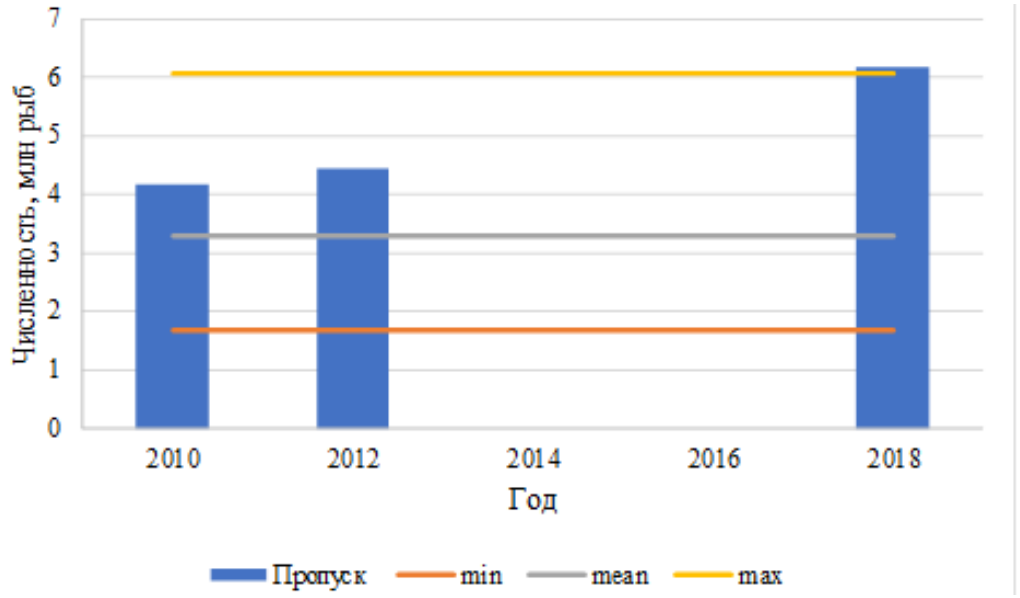

Figure 34: Dynamics of the passage of Pink salmon of even-numbered years into the Bolshaya River with respect to the stratified targets reference points of the pass of the permit (in 2014, 2016, due to the lack of funding, air monitoring of spawning grounds in the Bolshaya River basin was not carried out). Blue bar – escapement, red line – Slim, grey line – S_{MSY}, yellow line – S*MSY (Bugaev *et al*., 2020).

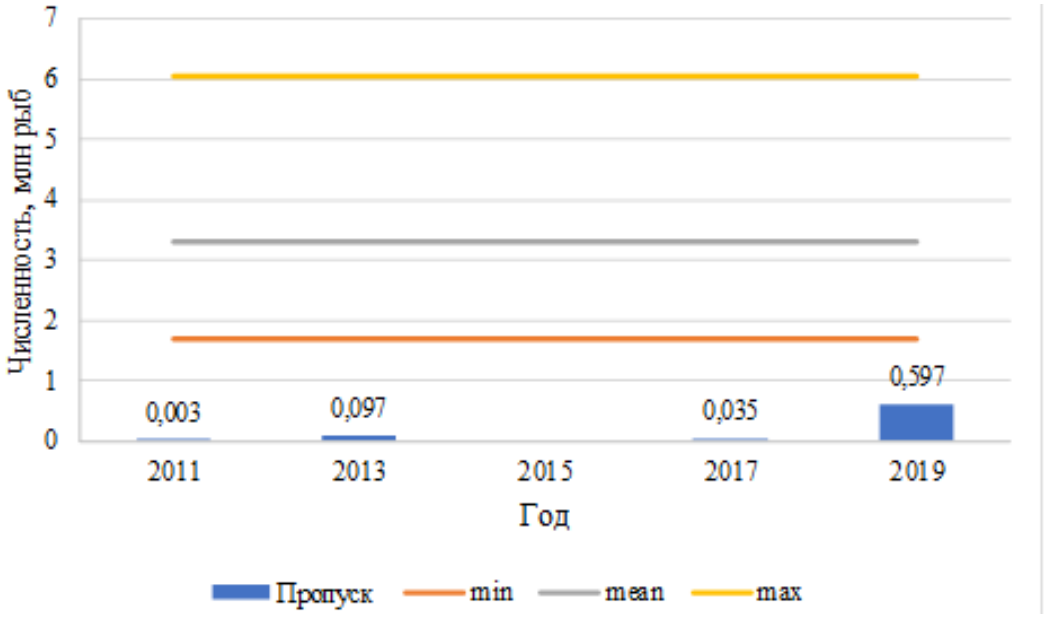

Figure 35: Dynamics of the passage of Pink salmon of odd-numbered years into the Bolshaya River with respect to the stratified targets reference points of the pass of the permit (in 2014, 2016, due to the lack of funding,

air monitoring of spawning grounds in the Bolshaya River basin was not carried out). Blue bar – escapement, red line –Slim, grey line – S_{MSY}, yellow line – S*MSY (Bugaev *et al*., 2020).

7.2.2.5 Management

For all species of Pacific salmon, except for Pink salmon, the forecast of abundance of older age groups is based on a linear connection with total number of fish of this age cohort that has already returned in past years – sibling method (Peterman, 1982). Moreover, on the one hand, the older age cohort is, the stronger is connection, and the forecast of its abundance is more substantiated, and on the other hand, share and contribution of this group to overall forecast of the approach decreases. The forecast of abundance of younger age groups when the sibling method becomes unreliable is based on "stock-replenishment" model.

Forecasting the state of Pink salmon stock, despite simple age structure is more complicated. It is impossible to pick out periods of time for reproduction levels like for other Pacific salmon species, however, it is possible to pick out the very levels, but influenced by external factors, they change very quickly. Consequently, dynamics of abundance or reproduction index of Pink salmon may be used as a predictor for forecasting other salmon species (Feldman et al., 2014). Currently, two ways are implemented by us to predict Pink salmon approaches. The first way consists in direct assessment of the approach using methodology of general regression model (GRM), where survival values of each Pink salmon generation simulated according to resonance model like "stock-replenishment" as well as climatic indicator readings in critical periods serve as predictors (Feldman, Shevliakov, 2015).

The second way is predicting the abundance level using a stratified resonance model, i.e., essentially, by solving classification problem (Figure 36). The data of climate indicators act as predictors in this approach. The current machine learning method is used for the second way: random forest of decision trees – *Random Forest* (Breiman, 2001). This method is based on the use of many simple models-classifiers (decision trees) and thus it is multimodel or ensemble. Stratum forecast is determined by a simple majority of votes.

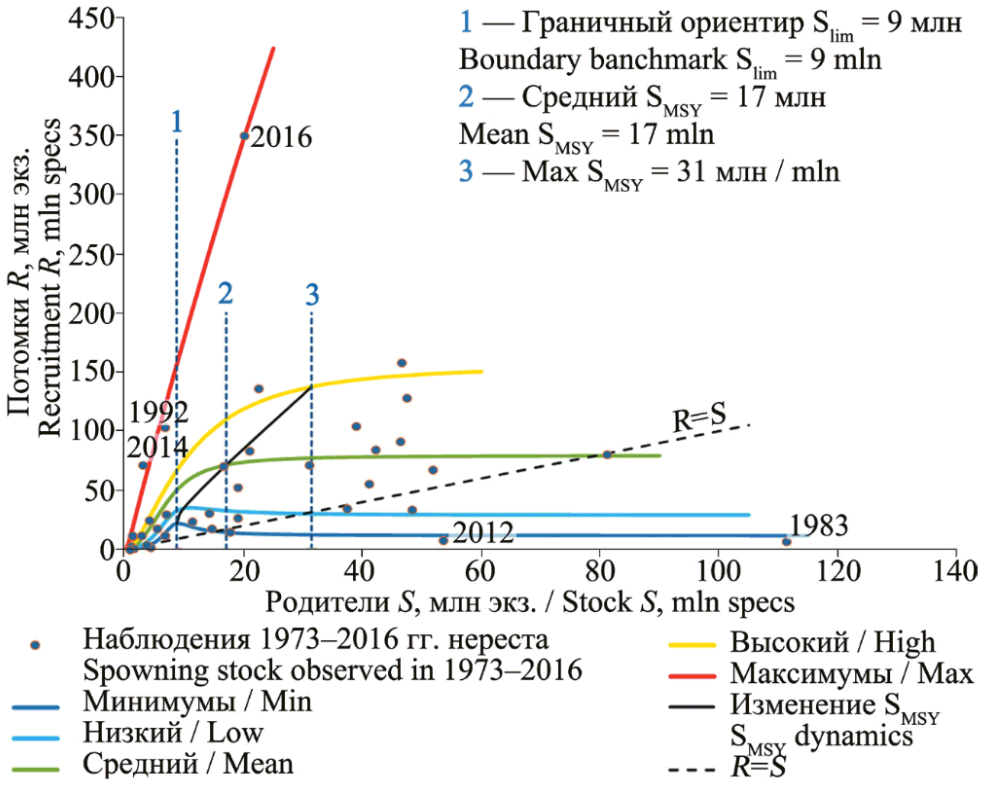

Figure 36: Stratified model parents-progeny for Pink salmon on the west coast of Kamchatka. Observations for spawning in 1973–2016 (Feldman *et al*., 2019).

Using the stratified model for Pink salmon in the Western Kamchatka, the control parameters are determined: the border pass reference is about 9 million specimens, and the pass target is in the range of 17–35 million specimens.

The reference points for Pink salmon escapement in of Kamchatka-Kuril subzone and Bolshaya River are given in Table 19.

Table 19: The boundary (Slim), targeted (S_{MSY}) and precautionary targeted (S*MSY) reference points for Pink salmon escapement in rivers of Kamchatka-Kuril subzone, million specimens (Feldman *et al*., 2019).

Region	Slim (So)	S_{MSY}
Kamchatka-Kuril subzone (minimum)	8.32	8.7
Kamchatka-Kuril subzone (middle)	8.32	17.1
Kamchatka-Kuril subzone (high abundant)	8.32	31.4
Bolshaya River (minimum)	1.61	1.68
Bolshaya River (middle)	1.61	3.29
Bolshaya River (high abundant)	1.61	6.06

7.2.3 Chum Salmon

Chum (=Keta =Dog) salmon – *Oncorhynchus keta* – Salmonidae – SALMONIFORMES (not a LTL species) (Figure 37). The position of chum salmon in the phylogenetic tree of salmonids is shown in Figure 24.

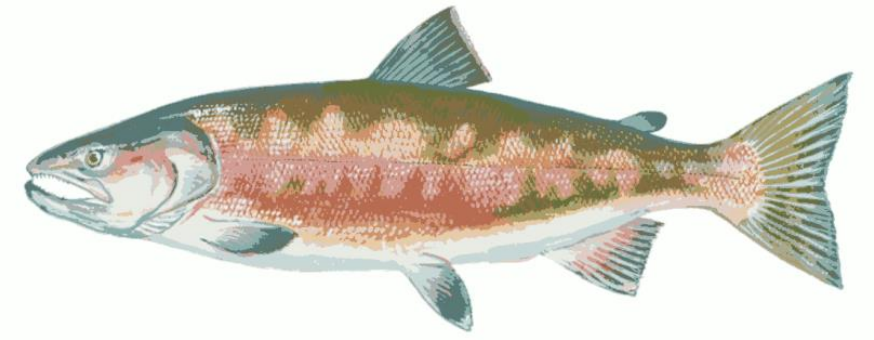

Figure 37: Chum salmon *Oncorhynchus keta*. Source: https://igfa.org/game-fish-database.

7.2.3.1 Distribution

From the rivers of Chôshi and the eastern Korean Pen., to northern California. Chum salmon consist of two large races (Ida, 1984), Asiatic and North American. The Asiatic is divided into Japanese and Okhotsk populations, and the latter into Alaskan and British Columbia to Oregon populations. Autumn populations from Pacific introduced into rivers affluent to White and Barents Seas (1930-45, 1957-62), but maturation too late in year (September/October) and none have survived (Figure 38).

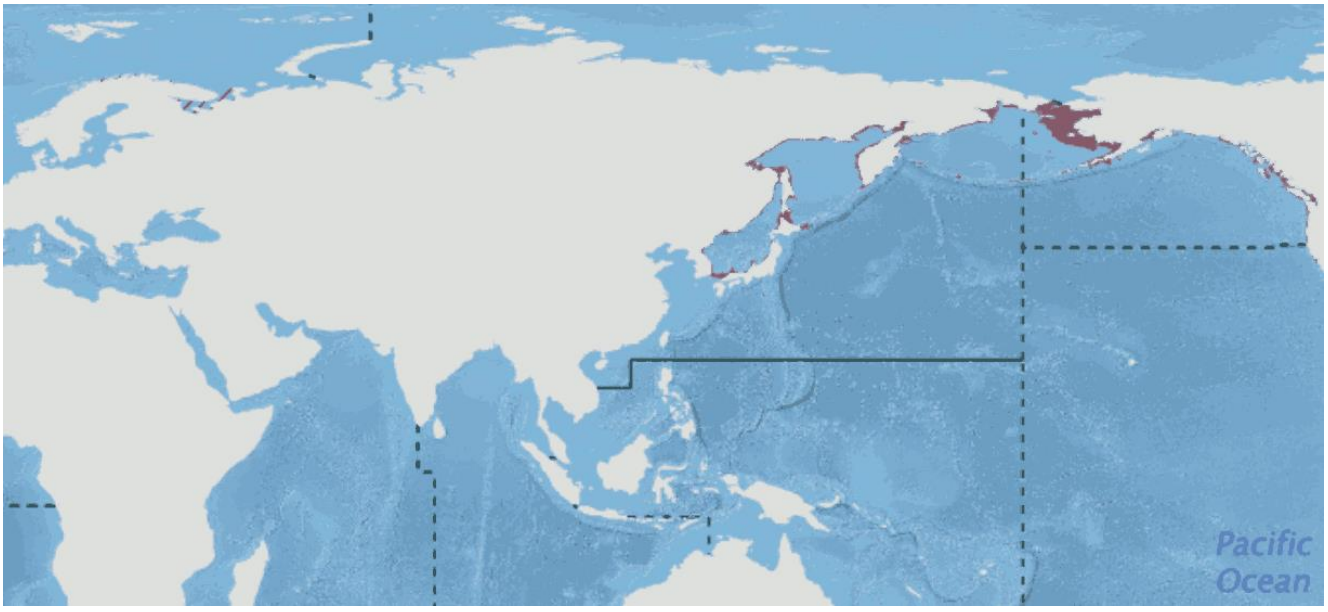

Figure 38: Distribution of chum salmon. Source: http://www.fao.org/fishery/species/2931/en.

Figure 39 presents one of the maps (chum salmon) of known ocean ranges of major stocks of Pacific salmon as shown by recoveries of tagged fish reported to the former International North Pacific Fisheries Commission (INPFC) and to the North Pacific Anadromous Fish Commission (NPAFC). Distribution plots were prepared for all coastal recoveries (1956-1995) of fish tagged with external (high-seas) tags during INPFC- and NPAFC-related tagging experiments in the North Pacific Ocean (Myers *et al*., 1996).

In the article by Katherine W. Myers *et al*. (2016) projected climate-change effects on thermal habitat areas of high seas salmon in three oceanic regions. It is shown that the range for chum salmon in Subarctic will shrink (See figure 27).

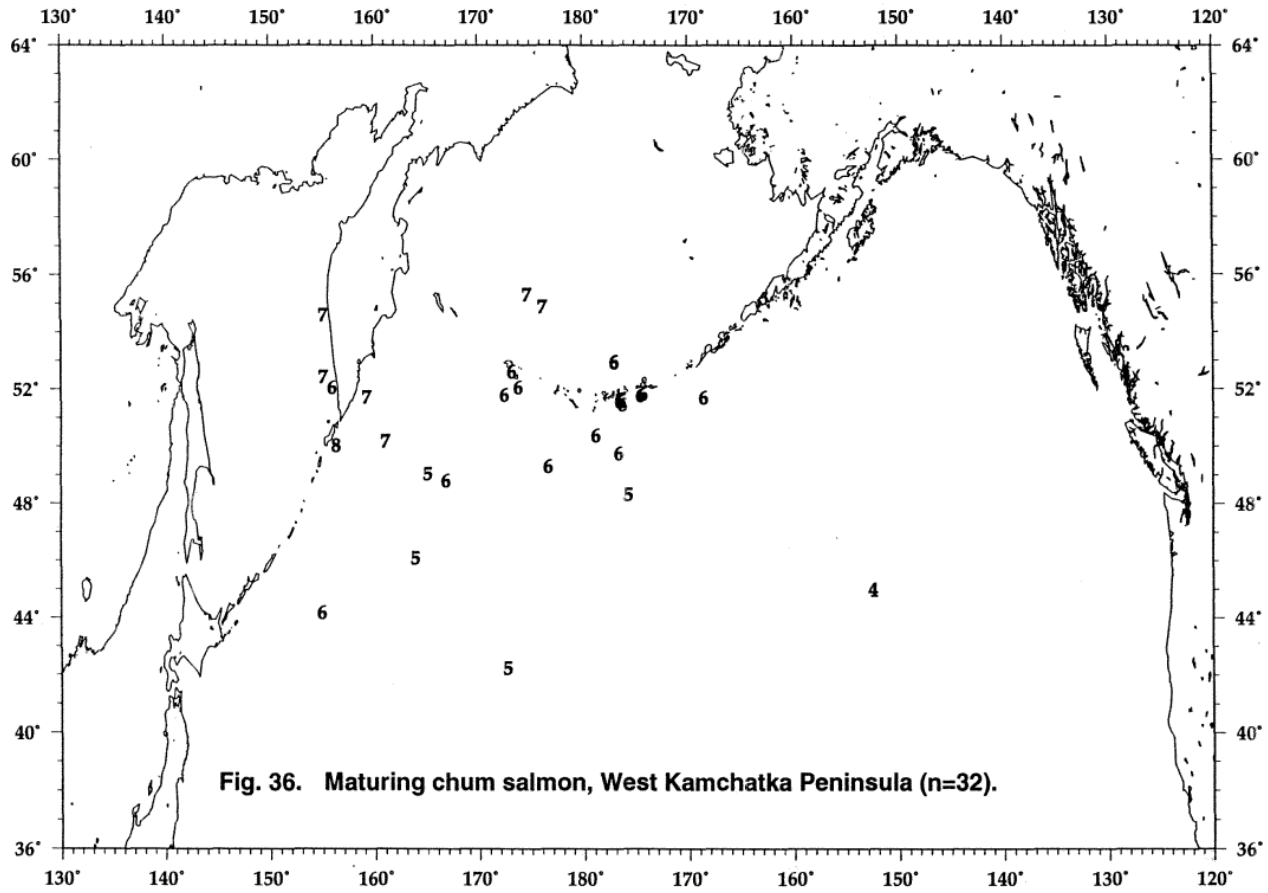

Figure 39: Maturing chum salmon, Western Kamchatka (n=32) (Myers *et al*., 1996). The numbers indicate the month of release from 1 (January) through 12 (December).

7.2.3.2 Life History

Chum salmon are the second most abundant species of Pacific salmon and originate both in Asia and North America. The fish spawn in streams and the fry migrate to the sea soon after emergence from the gravel. Immature chum salmon distribute themselves widely over the North Pacific Ocean and the maturing adults return to their home streams in summer or autumn at various ages, usually after spending 2 to 5 winters at sea. Adults have been reported up to 108.8 cm in length and 20.8 kg in weight. Chum salmon die after spawning (semelparous). Female chum salmon typically have 2,000 to 4,000 eggs.

Young chum salmon feed on insects as they migrate downriver and on insects and marine invertebrates in estuaries and near-shore marine habitats. Adults eat copepods, fish, squid, and tunicates. Various fish and birds prey on juvenile chum salmon. Sharks, sea lions and seals, and orcas eat adult chum salmon. In freshwater spawning habitats, bears and some other animals are predators of adult chum salmon.

There are genetic studies of chum salmon from the northern part of its geographic range. In the northern part of the range of Asian chum salmon, the following groups of samples are clearly distinguished: Magadan oblast, Northern Kamchatka, Penzhina River, and Anadyr River basin. There is a positive relationship between the latitude and the average expected heterozygosity in this part of the range. Chum salmon of the Penzhina River shows close genetic relationship to chum salmon from the Anadyr River basin, probably because of gene flow (Afanas'ev *et al*., 2011; Shitova *et al*., 2020).

7.2.3.3 Stock status

In the article by Ivankov & Ivankova (2020), the following structure of intraspecific ecological and temporal differentiation of populations in chum and sockeye salmon is given (

Figure 40).

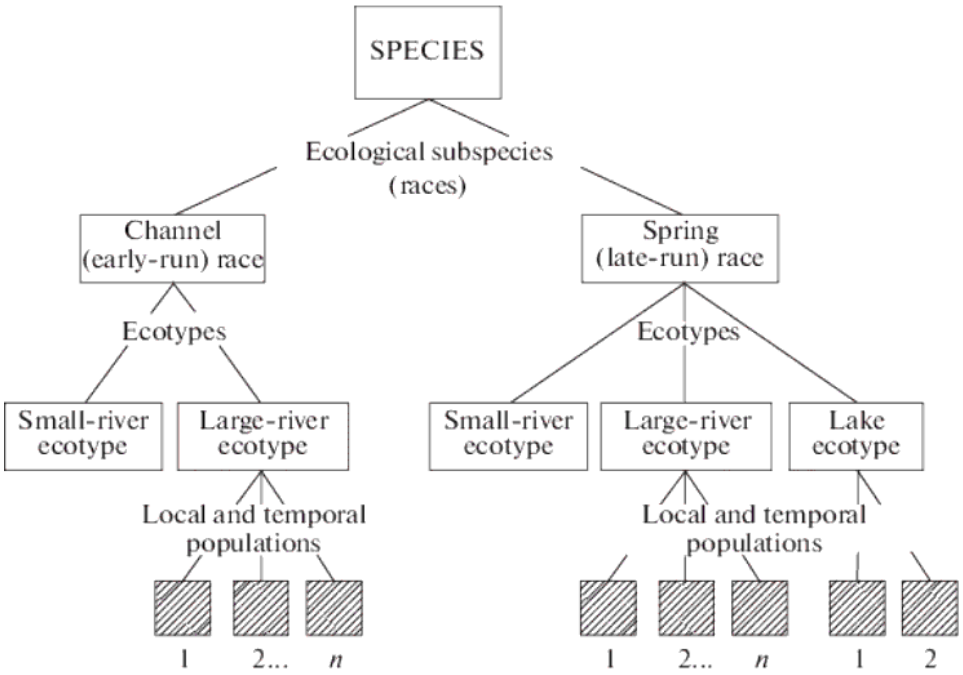

Figure 40: Intraspecific ecological and temporal differentiation of populations in chum and sockeye salmon (Ivankov, Ivankova, 2020).

In the Kamchatka-Kuril subzone for chum salmon after 2010, there was a decrease in catches in 2011 and a further increase until 2015, then a decrease in catches by 2 times in 2016 and a further increase. In 2019, a fall in catches of chum salmon was observed (

Figure 41).

In the area of the Bolshaya River for chum salmon, an increase in catches from 2011 to 2014 to the maximum level for a decade – 4 454.1 tonnes, then a fall in 2015–2016 and again an increase in 2017–2018. On average, catches of chum salmon have been around 3 000 tonnes since 2015 (Figure 42).

Information on the chum salmon catches by FTP Comandor JSC in 2014 - 2020 is presented in Table 20.

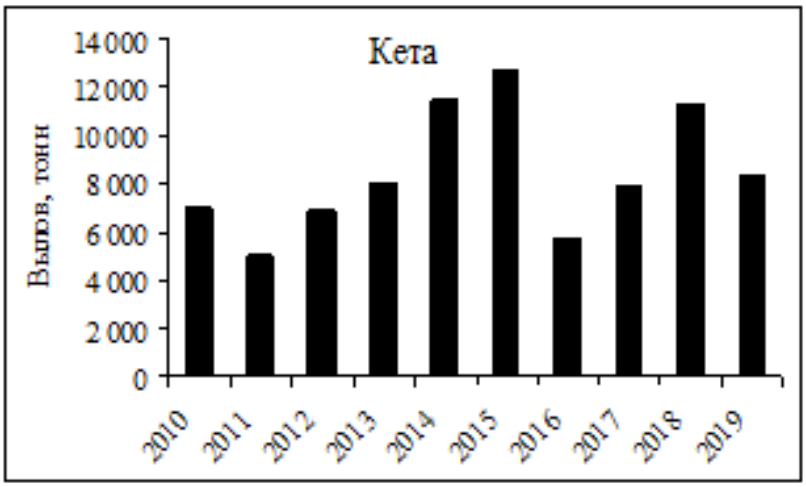

Figure 41: Dynamics of catch of chum salmon in the Kamchatka-Kuril subzone in 2010–2019.X-axis – years, Y-axis – catch in mt (Bugaev *et al*., 2020).

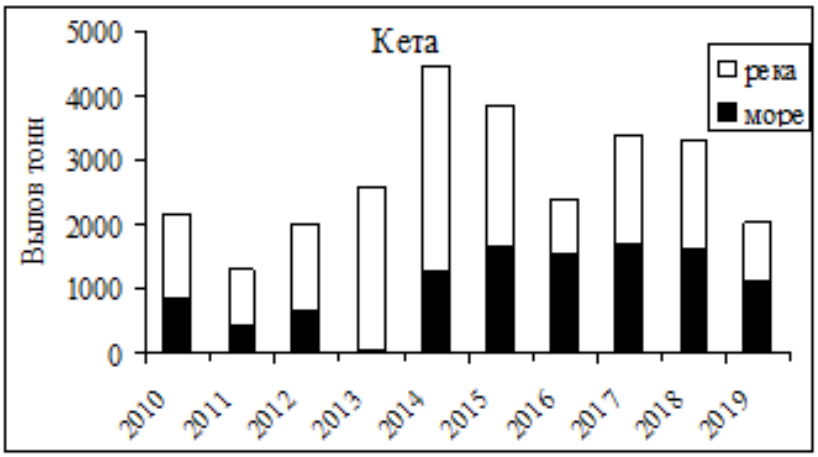

Figure 42: Dynamics of catch of chum salmon on sea and river sections of the Bolshaya River in 2010–2019. X-axis – years, Y-axis – catch in mt. Black bar – sea, White bar – river (Bugaev *et al*., 2020).

Table 20: FTP Comandor JSC, catch of chum salmon by parcels in 2015-2020, mt (Information from the client, January 2021).

Fishing Parcel No.	2015	2016	2017	2018	2019	2020
711*	158.920	71.995	158.144	261.820	78.445	101.550
716*	37.000	19.800	32.120	71.278	52.065	67.650
723*	32.183	22.970	19.505	26.980	29.250	63.600
103	–	7.466	–	19.356	26.245	12.755
110	–	–	–	12.708	12.251	8.007
112	–	–	–	8.288	10.707	3.758
115	–	–	–	18.483	11.573	3.373
116	–	–	–	–	20.547	14.507
152	–	51.000	112.756	34.014	22.200	9.784
157	94.520	55.844	18.885	64.766	34.859	25.900
164	109.600	112.872	77.980	84.087	69.900	47.800
Sum	432.223	341.947	419.390	601.780	368.042	358.684

7.2.3.4 Pass for spawning (Escapement)

In the Kamchatka-Kuril Subzone, the stock of the chum salmon (over a 10-year period) is formed by the stock of the Opala River, which accounts for an average of 40% of all chum salmon reproduced in the subzone. The second largest stock is the chum salmon of the Bolshaya River; its share is 16%. The northern group of rivers (rivers: the Kikhchik, the Pymta and the Kol) with relatively equal proportions is about 38% of the total regional spawning reserve of chum salmon (Figure 43). The remaining rivers of this fishing region account for no more than 4% of this value.

In the Kamchatka-Kuril subzone, two temporary forms of chum salmon are reproduced – early and late, of which the first prevails. The spawning course is characterized by a long period and lasts from June to October. The beginning of spawning migration of early chum salmon into the rivers is observed in the third decade of June and ends in late August. Main run is in late July – early August. Chum salmon of late run begins to enter the rivers in the second half of August and by the third decade of October the course ceases. The main run is observed since the second half of September.

The presented brief description of the spawning run of chum salmon in the rivers of the Kamchatka-Kuril subzone is necessary for understanding the difficulty in solving problems when assessing producers in these spawning grounds. In this case, the complicating factor is the duration of the spawning run of chum salmon. Given this circumstance, monitoring work is planned in such a way as to simultaneously cover the maximum number of producers in spawning grounds. For this, the flight is organized during the second phase of spawning for each of the temporary forms. The

proposed format of aerial imaging studies is a necessary measure and is explained by limited funding for the work. Nevertheless, under the current conditions, this approach to determining the state of spawning stock, even taking into account that **the obtained data can be considered a priori underestimated**, gives a clear idea of the dynamics of spawning stocks of the species in the region.

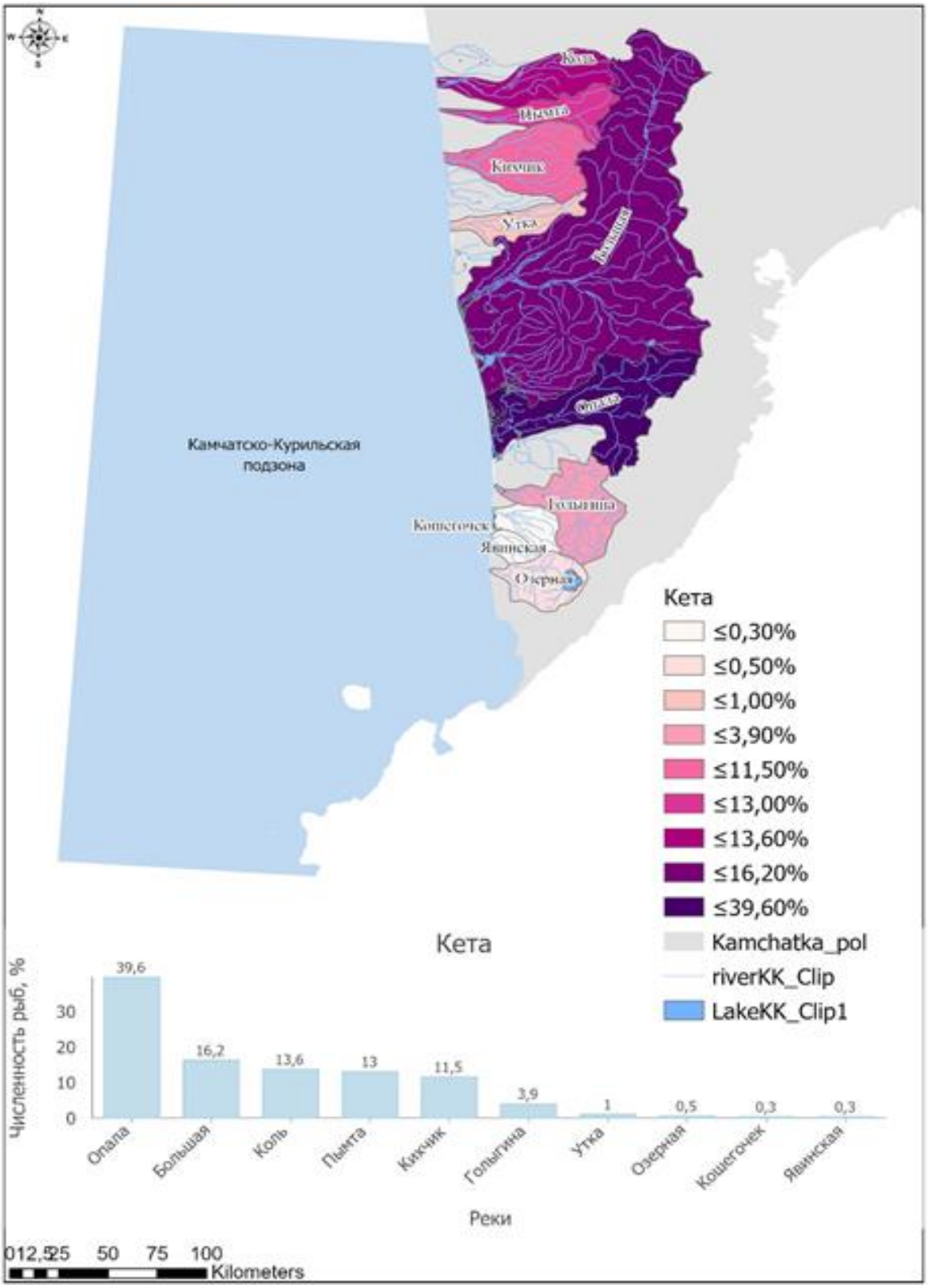

Figure 43: Distribution density of spawning stocks of chum salmon in the river basins of the Kamchatka-Kuril subzone in 2010–2019. Большая = Bolshaya River, the histogram shows the number of spawners in index rivers (% of their total number in the Kamchatka-Kuril subzone) (Bugaev *et al*., 2020).

During 2010–2019 spawning numbers of chum salmon producers in the Kamchatka-Kuril subzone varied from 132 thousand to 542 thousand fish and averaged 324 thousand fish. Pass target reference points were calculated based on ensuring the most sustainable catch (MSY) ranging from 300 thousand fish (S_{MSY}) to 373 thousand fish with MSY based on the precautionary approach connected with the uncertainties of model parameters (Feldman *et al*., 2019) (Figure 44). As a result, the abundance of spawning stock of chum salmon in the subzone is estimated in the field of optimal values. Despite the fact that, in the interannual aspect, fluctuations in numbers, relative to optimal values, have not reached target reference points in a number of years. The logical sequence of these changes may indicate intrapopulation processes (endogenous factor) affecting the dynamics of chum salmon abundance in the Kamchatka-Kuril subzone.

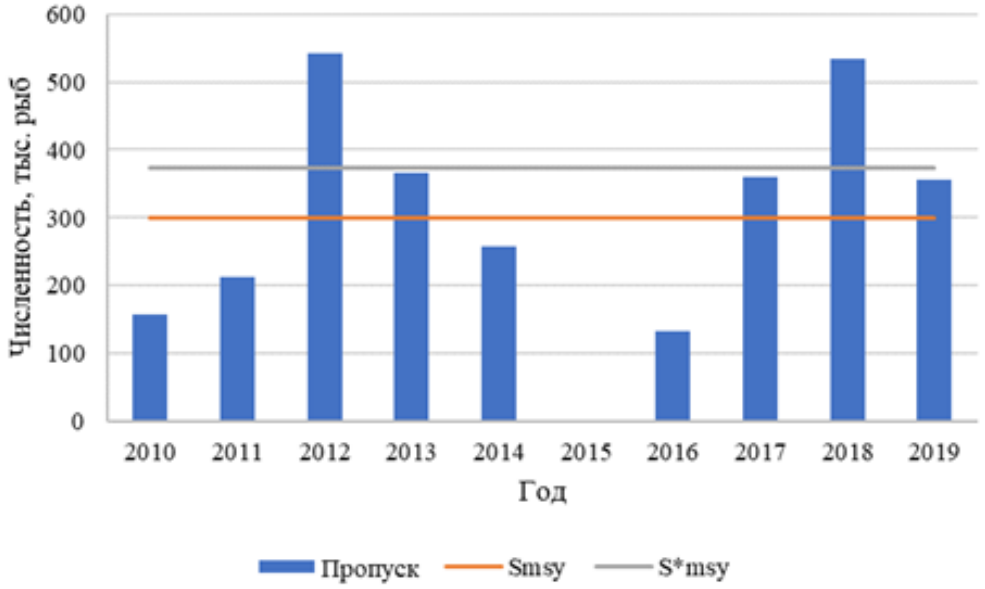

Figure 44: Dynamics of chum salmon pass in the rivers of the Kamchatka-Kuril subzone relative to the stratified pass target reference points. X-axis – years, Y-axis – escapement in thousands. Blue bar – escapement (Bugaev *et al*., 2020).

In the basin of the Bolshaya River, the most significant reserve of chum salmon is reproduced for the entire western coast of Kamchatka. The spawning potential of the watercourse is extremely large and is the largest on the entire coast for this species. In particular years, the abundance of registered producers on spawning grounds exceeded 100 thousand, and the historical maximum was fixed at around 350 thousand fish.

Nevertheless, taking into account the statistics of pass during 2010–2019, the size of the spawning stock of chum salmon, despite the fact that in some years it reached the target pass values, still remains unstable (Figure 45). For the indicated period (with the exception of 2011, 2013–2015), the abundance of chum salmon in the Bolshaya River varied from 15.7 thousand to 69.5 thousand fish, averaging 37.9 thousand fish. We believe that in order to bring the chum salmon population to a stable, highly productive level, at least 70 thousand producers must be allowed to spawn.

The above is an analysis of the filling of the spawning grounds in Bolshaya River by sockeye producers based on aero-visual surveys data. As mentioned earlier, this data is underestimated. Therefore, we made an assessment of the escapement of chum salmon into the Bolshaya River in 2018 - 2019 based on the ratio chum and sockeye salmon in catches in river parcels of the FTP Comandor JSC and the sockeye spawners number in Lake Nachikinskoye. Lake Nachikinskoye is located in the basin of the Bolshaya River. Data on quantitative distribution of spawners of sockeye salmon in the Lake Nachikinskoye basin were collected using quadcopter (Zaporozhets *et al*., 2020). The basic idea is that the ratio of species in the escapement should be approximately equal to the ratio of the species in catches.

The number of late spawners of sockeye salmon in the lake in 2018 was estimated at about 140,000 and in 2019 at 130,000 individuals. Average weight of late sockeye salmon is about 2.5 kg, chum salmon about 3.5 kg. 360 tonnes (102,000 specimens) of chum salmon and 107 tonnes (42,800 specimens) of sockeye salmon were caught by the FTP Comandor JSC on the river parcels in 2018. In 2019 it was 159 tonnes (45,600 specimens) of chum salmon and 172 tonnes (68,800 specimens) of sockeye salmon. Based on these data, the escapement of chum salmon to

spawning grounds of Bolshaya River should be estimated at 336,000 specimens in 2018 and 86,000 in 2019. This is more than KamchatNIRO recommends as the precautionary escapement. Therefore, we believe that the chum salmon escapement in Bolshaya River in 2017–2019 is at the S_{MSY} level.

The spawning escapement to the Bolshaya River of 336,000 chum salmon (about 1176 tonnes) in 2018 does not seem overstated to us. The catch in the sea and river areas of the Bolshaya River in 2018 amounted to 3,500 tonnes. That is, the catch was about 75% of the chum salmon run, escapement was 25% of the run, which is in line with the KamchatNIRO's strategy of salmon fishery management.

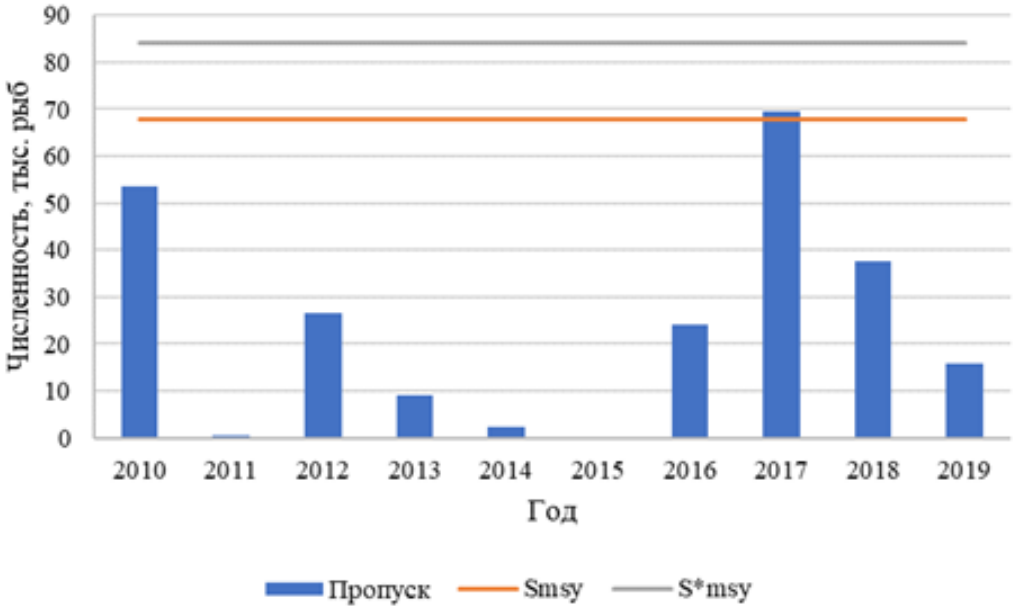

Figure 45: Dynamics of the passage of chum salmon into the Bolshaya River relative to the stratified target reference points of the pass (in 2011 and from 2013 to 2015, spawning grounds were monitored in an abbreviated format, therefore, data for these years should be considered only as additional information). X-axis – years, Y-axis – escapement in thousands. Blue bar – escapement (Bugaev *et al*., 2020).

7.2.3.5 Management

In the model, the data for the chum salmon of the Kamchatka-Kuril subzone were divided into two time clusters: the cluster of 1987–1994, characterized by a low level of reproduction and the cluster of 1995-2007, characterized by a higher level of reproduction. Two observations (1989 and 1992 concerning spawning), however, were also assigned to the next cluster as having higher survival rates, and the 1994 observation was generally excluded, because when using it, the parameters for each of the strata were estimated unreliably. Perhaps this observation cannot be attributed to any of the temporary clusters and should be read as transitional (Figure 46). The boundary reference point for the passage of chum salmon from the Kamchatka-Kuril subzone is set at 170 thousand specimens, and the target should be in the region of 300–373 thousand specimens (Bugaev *et al*., 2020).

The reference points for chum salmon escapement in of Kamchatka-Kuril subzone and Bolshaya River are given in Table 21.

Table 21: The boundary (Slim), targeted (S_{MSY}) and precautionary targeted (S*MSY) reference points for chum salmon escapement in rivers of Kamchatka-Kuril subzone, thousand specimens (Feldman *et al*., 2019).

Region	Slim (So)	S_{MSY}	S*MSY
Kamchatka-Kuril subzone	172	300	-
Kamchatka-Kuril subzone (precautionary)	277	–	373
Bolshaya River	38.7	67.7	–
Bolshaya River (precautionary)	62.5	–	84.1

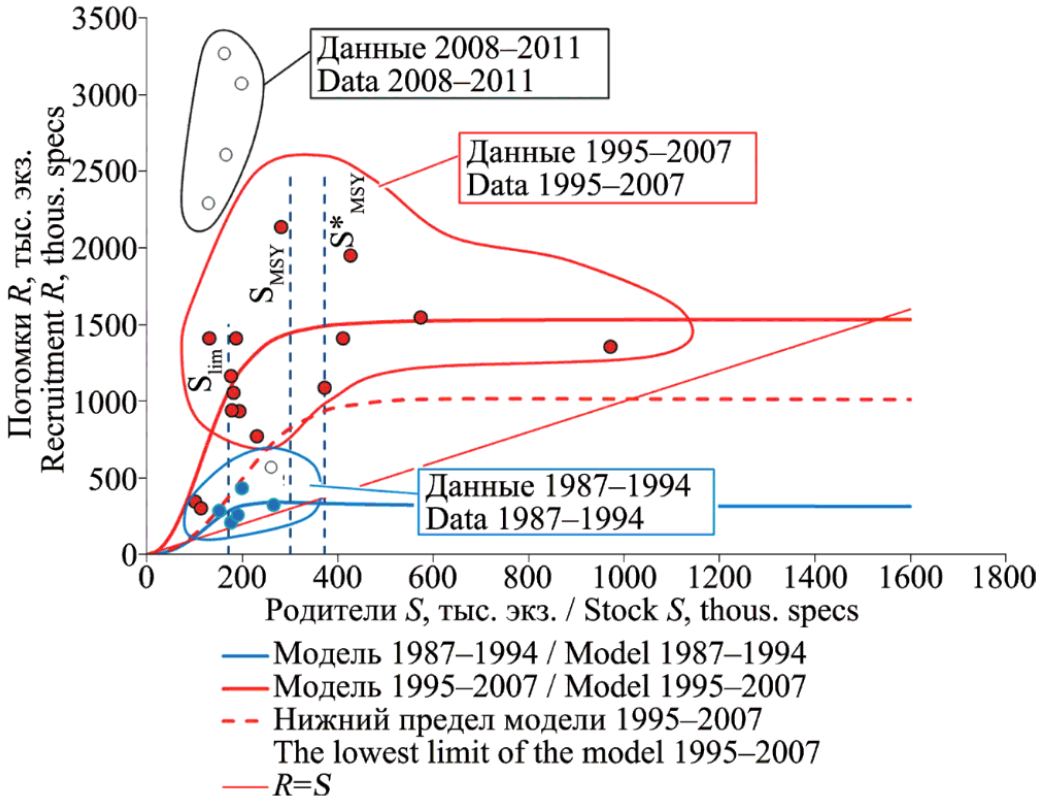

Figure 46: General model of the correlation between recruitment and parental stock of chum salmon in the Kamchatka-Kuril subzone (Feldman *et al.*, 2019).

7.2.4 Sockeye Salmon

Sockeye (=Red) salmon – *Oncorhynchus nerka* – Salmonidae – SALMONIFORMES (not a LTL species) (Figure 47). The position of sockeye salmon in the phylogenetic tree of salmonids is shown in Figure 24.

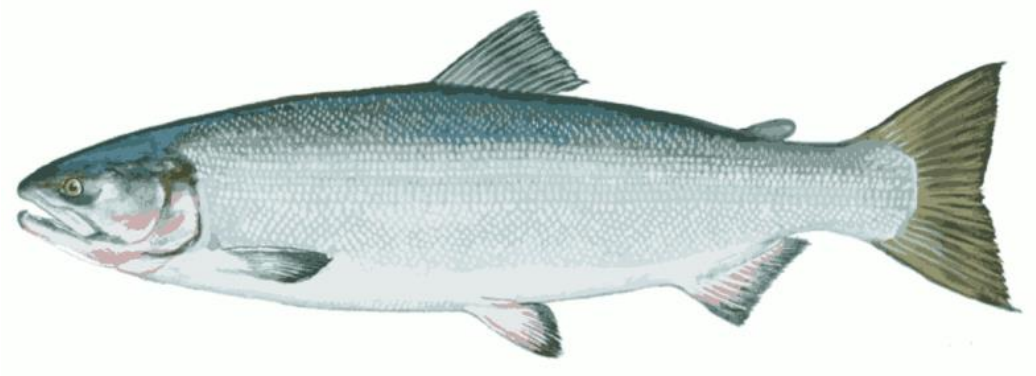

Figure 47: Sockeye salmon *Oncorhynchus nerka*. Source: https://igfa.org/game-fish-database.

7.2.4.1 Distribution of sockeye salmon

A Pacific fish from Hokkaido, through Okhotsk Sea, Kamchatka, and Alaska to northern California; rare in streams south of the Columbia River system. The land-locked form was introduced to several lakes, such as lake Shikotsu, Towada, Cûzenji, and Saiko (Japan) (Figure 48). Moreover, the overwintering grounds for sockeye salmon (Figure 49) covered vast oceanic regions (Myers *et al*., 2016).

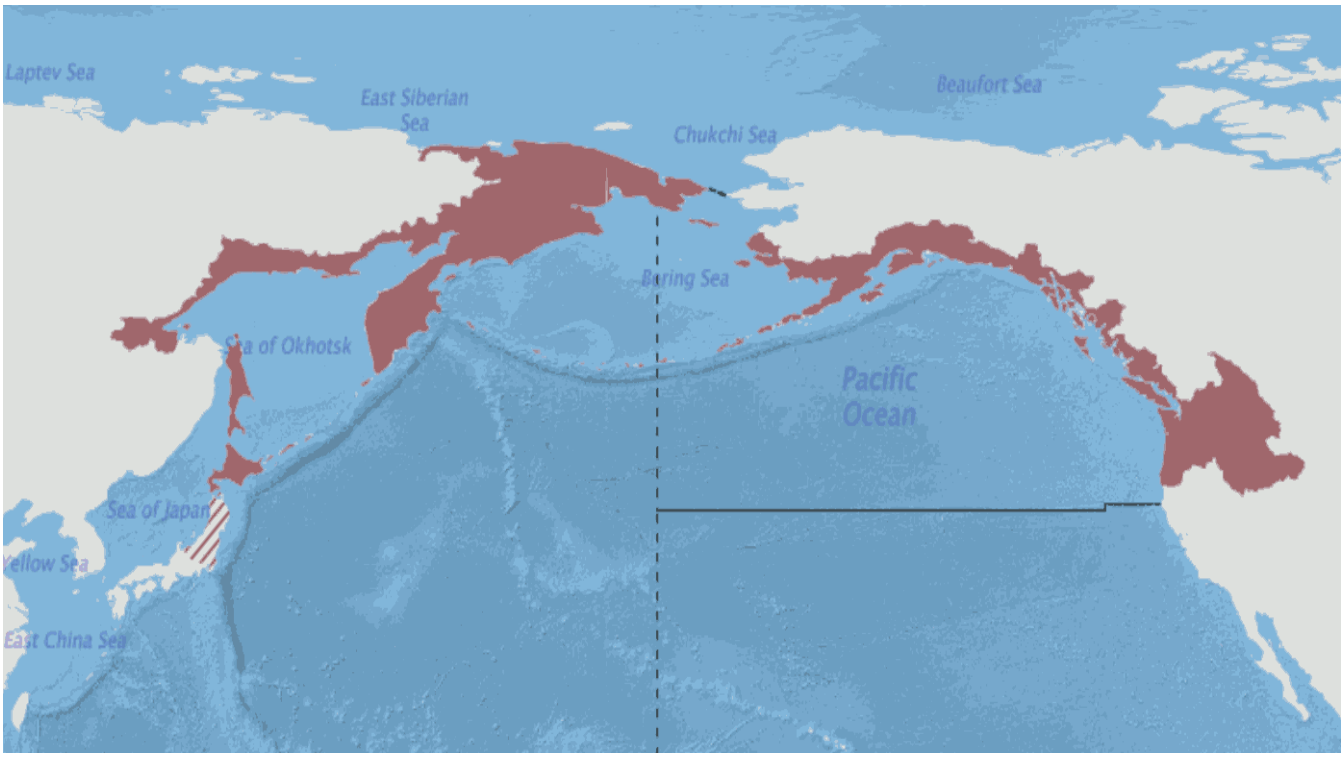

Figure 48: Distribution of sockeye salmon. Source: http://www.fao.org/fishery/species/2117/en.

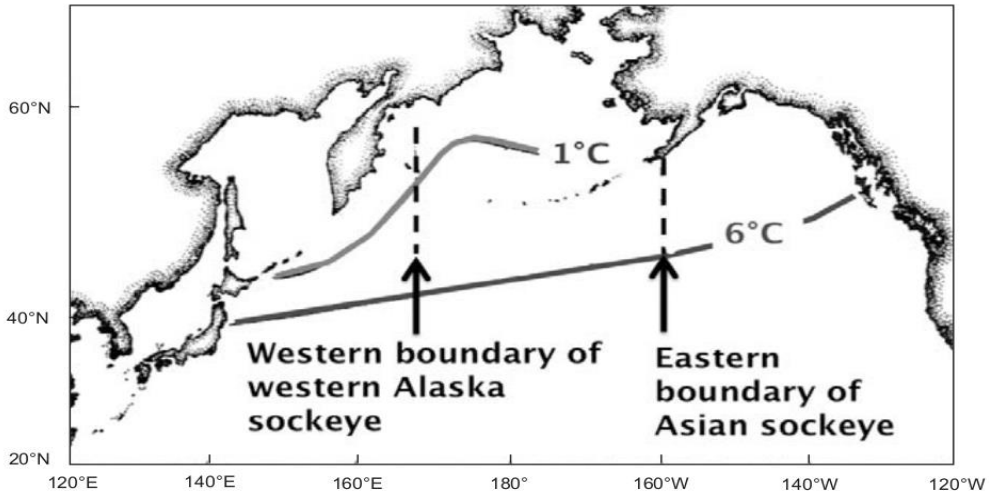

Figure 49: An illustration of the thermal tolerance hypothesis for sockeye salmon distribution in winter. Within the northern and southern latitudinal temperature limits of each species' thermal tolerance, regional stock groups exhibit east-west longitudinal boundaries with overlap in distribution in the central North Pacific (Myers *et al*., 2016).

In the article by Katherine W. Myers *et al*. (2016) projected climate-change effects on thermal habitat areas of high seas salmon in three oceanic regions. It is shown that the range for sockeye salmon in Subarctic will shrink (see Figure 27).

7.2.4.2 Life History

Sockeye salmon are the third most abundant species of Pacific salmon and originate both in Asia and North America. Typically, juvenile sockeye salmon utilize lakes as rearing areas for one to three years after emergence from the gravel, but some populations (including the Bolshaya River) can utilize stream areas for rearing and may migrate to sea soon after emergence. Female sockeye salmon typically have 2,000 to 4,500 eggs. Sockeye salmon spend 1–5 years in the ocean before returning to fresh water to spawn. Body size of adults is variable and can range 45–60 cm in length and 1.6–3.2 kg in weight. Sockeye salmon die after spawning (semelparous).

While in fresh water, juvenile sockeye salmon feed mainly on zooplankton, amphipods, and insects. In the ocean, sockeye salmon continue to feed on zooplankton but also eat larval and small adult fishes and occasionally squid.

Various fish and birds prey on juvenile sockeye salmon. Sharks, sea lions and seals, and orcas eat adult sockeye salmon. In freshwater spawning habitats, bears and some other animals are predators of adult sockeye salmon.

7.2.4.3 Stock status

In the stock age structure of the sockeye salmon in the Bolshaya River, there are fish that have spent in fresh water from 0 to 3 years and in the sea from 1 to 5 years. For both early and late seasonal races, on average, individuals who spent one year in fresh water and 3 years in the sea prevail (Bugaev *et al*., 2002).

According to Antonov et al. (2007), in the Bolshaya River, the early run of sockeye salmon was presented mainly by the mature age groups 1.3 (46.3 %) and 2.2 (25.8 %) in 1986-1999, and the late run was presented mainly by the age groups 1.3 (64.8 %) and 2.3 (6.0 %). The fish of late run often migrated to the sea being under yearlings, in opposite to the fish of early run: that is why they returned in the age 0.3 and 0.4. In 2000-2006, the share of the age group 1.3 reduced and the share of the age group 0.3 increased in the late run. Average body length, weight and absolute fecundity of the Bolshaya River' sockeye in the late run were less in 2000-2006 than in the earlier period 1994-1999. The fish of early spawning were in average 55% of the whole Bolshaya River' stock, the fish of late spawning - 45 %. Decreasing of the sockeye size-weight indices in the river is obviously related to substantial increasing of the Ozernaya River sockeye salmon stock. For the Palana sockeye, stable two-year fluctuations are observed since 1978 for number of generations, abundance of mature stock, runs to the river mouth, and abundance of spawned fish, possibly caused by Pink salmon abundance fluctuations. Fluctuations of the Bolshaya River' sockeye salmon stock are more complex and unpredictable because of minor stocks occurrence in the same basin: in some tributaries and in Nachikinskoye Lake, which have different dynamics.

The issues of seasonal growth of juvenile salmon in the Bolshaya River were studied in the work of Bugaev *et al*. (2018a). In the part of the basin of the Bolshaya River from the "cable" to the "bridge across the Bystraya River" (30–

60 km from the mouth of the Bolshaya River) the time of restarting the seasonal growth of sockeye salmon yearlings having no additional zones of adjacent sclerites (ZAS) is evidenced by united data as the 1st decade of May. It follows from the regression line that formation of one sclerite on scale during intense growth of sockeye salmon yearling in the year of migration to sea takes 16,9 days (13,4 days according to more accurate S-type correlation; restarting the seasonal growth according to the correlation takes place in the 2nd decade of May). As for sockeye salmon yearling having additional ZAS on the scales, the time of restarting growth evidenced is the very beginning of May. The regression line says that one sclerite on scale during intense growth of sockeye salmon yearling gets formed for 20,9 days (too early for more accurate estimation).

In the Kamchatka-Kuril subzone, catches of sockeye salmon in 2010–2013 were maximum for the entire considered period of years – 31,341.1 tonnes. In 2014–2019 catches as a whole slightly decreased (21,265.1–29,277.1 tonnes) (Figure 50).

In the area of the Bolshaya River for sockeye salmon, catches in 2010–2014 did not exceed 2,000 tonnes and averaged 1,706.3 tonnes, the average catch of sockeye salmon in 2015–2019 – 2,344.5 tonnes (Figure 51).

Information on the sockeye salmon catches by FTP Comandor JSC in 2014 - 2020 is presented in Table 22.

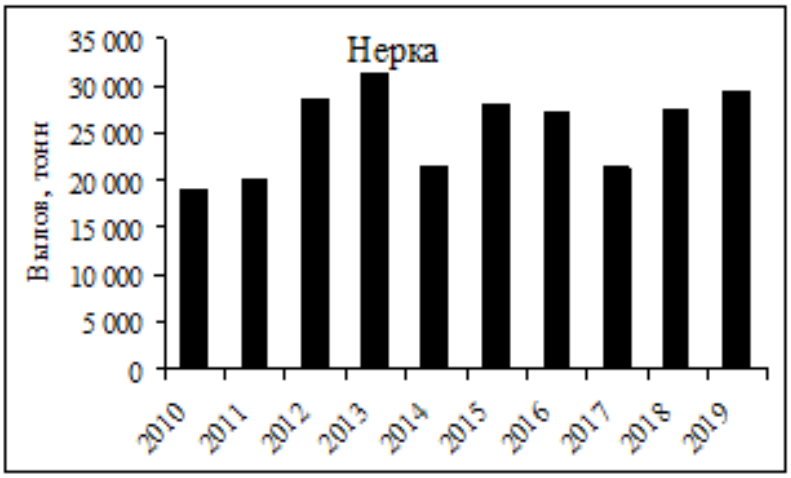

Figure 50: Dynamics of catch of sockeye salmon in the Kamchatka-Kuril subzone in 2010–2019.X-axis – years, Y-axis – catch in mt (Bugaev *et al*., 2020).

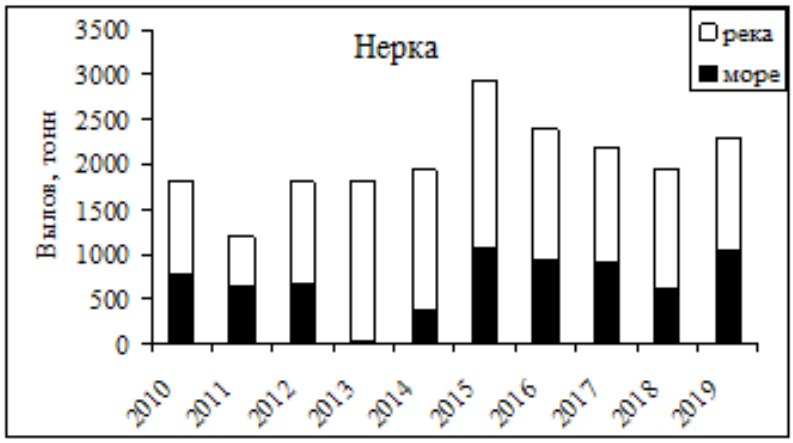

Figure 51: Dynamics of catch of sockeye salmon on sea and river sections of the Bolshaya River in 2010–2019. X-axis – years, Y-axis – catch in mt. Black bar – sea, White bar – river (Bugaev *et al*., 2020).

Table 22: FTP Comandor JSC, catch of sockeye salmon by parcels in 2015-2020, mt (Information from the client, January 2021).

Fishing Parcel No.	2015	2016	2017	2018	2019	2020
711*	118.45	47.522	54.302	63.123	104.995	129.9
716*	22.000	12.500	8.000	31.206	35.527	41.6
723*	27.916	13.665	5.076	12.510	31.450	53.8
103	-	5.477	-	0.823	5.485	5.09
110	-	-	-	0.395	3.590	7.445
112	-	-	-	0.395	3.709	2.566
115	-	-	-	0.271	8.888	2.866
116	-	-	-	-	16.760	9.076
152	-	24.950	54.892	5.400	44.400	28.012
157	94.790	16.148	6.895	10.204	55.820	46.3
164	64.960	91.423	65.500	16.286	88.123	59.4
Sum	328.116	211.685	194.665	140.613	398.747	386.055

The spawning stock of sockeye salmon of the Kamchatka-Kuril subzone forms a stock of the Ozernaya River, whose share is estimated at 95% of the total number of species in the region. The sockeye salmon of the Bolshaya River (4%) makes up a noticeable smaller share. For the remaining rivers, the sockeye salmon pass value does not exceed 1% (Figure 52).

The dynamics of the abundance of sockeye salmon in the Kamchatka-Kuril subzone primarily depends on the power of return of sockeye salmon of the Ozernaya River. The success of the sockeye salmon fishing in adjacent marine fishing sites located north of the estuary of the Ozernaya River depends to some extent on this, because the gill nets partially intercept the transit fish, performing cyclic pre-spawning migration in the coastal waters of the Kamchatka-Kuril subzone along the route directly to the reproduction reservoir. As a result of this, the fishing statistics data for marine fishing sites (up to the estuary of the Bolshaya River) do not give an objective assessment in determining whether the caught sockeye salmon belongs to a particular water site within the subzone.

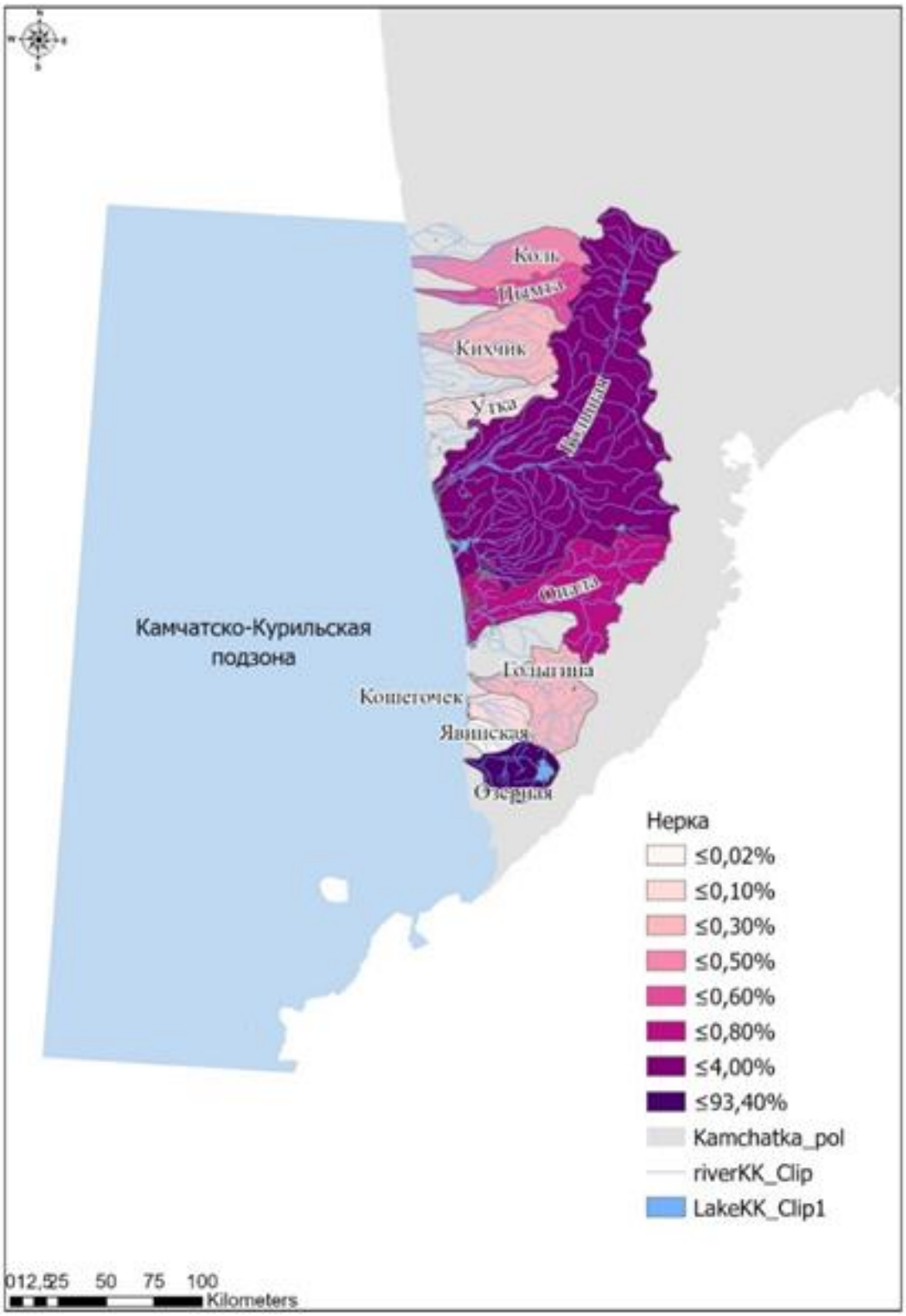

Figure 52: Distribution density of spawning stocks of sockeye salmon in the river basins of the Kamchatka-Kuril subzone in 2010–2019. Большая = Bolshaya River, the histogram shows the number of spawners in index rivers (% of their total number in the Kamchatka-Kuril subzone) (Bugaev *et al*., 2020).

7.2.4.4 Pass for spawning (escapement)

In this sense, an estimate of the size of producers' passes into rivers gives an idea of the abundance of local populations at the level of spawning stock. While maintaining the methodology for conducting these monitoring works,

the changes are objectively described in the dynamics of the number of approaches that are considered separately for the regional local stages of sockeye salmon.

Taking into the account the commercial significance of the stock of sockeye salmon of Ozernaya River for the formation of common salmon catches in the Kamchatka-Kuril subzone, it is logical to show the pass targets reference points for the main and secondary local stocks separately. Based on long-term information for the sockeye salmon of the Kamchatka-Kuril subzone (excluding the Ozernaya River), the pass target reference points were defined in the value field from 207 thousand to 978 thousand fish (Feldman *et al*., 2019), and for the Ozernaya River – from 1,100 thousand to 1,900 thousand fish (Dubynin, 2012).

Since 2010, the spawning abundance of sockeye salmon of secondary local stock has varied from 26 thousand to 268 thousand fish (average 128 thousand fish). At the same time, a general trend of increasing abundance was noted. It should be noted that in the first half of the decade under review, the pass level corresponded to the lower level of optimal values, then, starting in 2017, the spawning stock of sockeye salmon of the secondary stock complex of the Kamchatka-Kuril subzone has reached the level of high-numbered classes (Figure 53) (Bugaev *et al*., 2020). Feldman *et al*. (2019) give higher estimates of the abundance of sockeye salmon spawners on South-Western Kamchatka in 2010–2016 (Figure 54). According to these data, the escapement of sockeye salmon in rivers of Kamchatka-Kuril subzone in 2010-2019 was higher than the S_{MSY}.

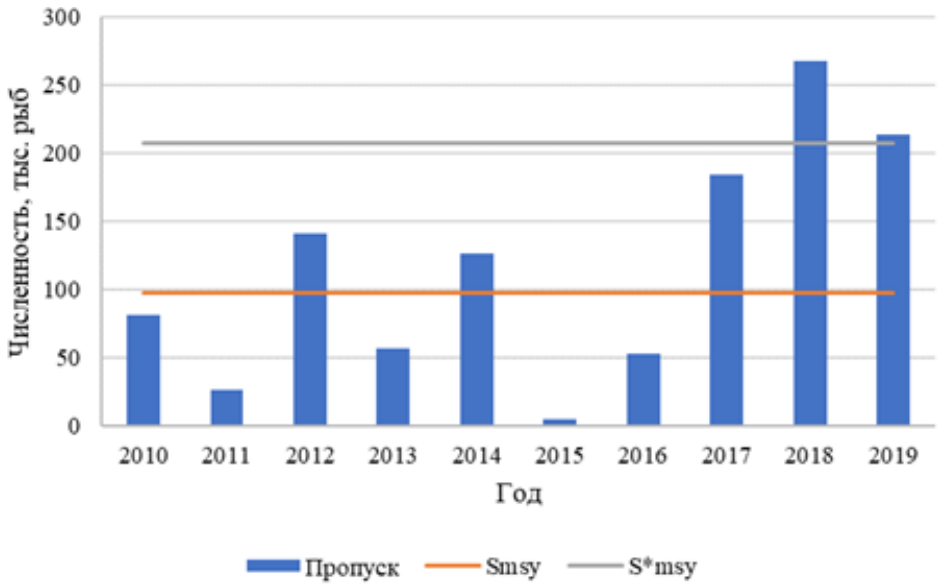

Figure 53: Dynamics of the pass of sockeye salmon in the rivers of the Kamchatka-Kuril subzone (excluding the Ozernaya River) relative to the stratified target reference points of the pass. X-axis – years, Y-axis – escapement in thousands. Blue bar – escapement (Bugaev *et al*., 2020).

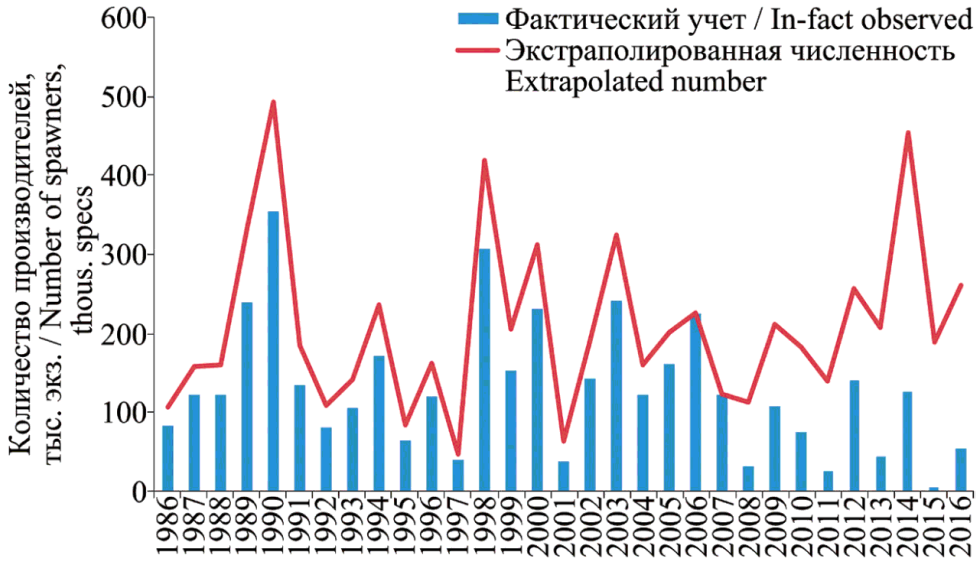

Figure 54: Observed and extrapolated abundance of sockeye salmon in Kamchatka-Kuril subzone (Feldman *et al*., 2019).

There is no data on escapement of sockeye salmon in Bolshaya River in report of KamchatNIRO (Bugaev *et al*., 2020). But in article by Zaporozhets *et al*. (2020), is data on dynamics of early and late sockeye spawners number in Lake Nachikinskoye (basin of Bolshaya River) in 1957–2019 (Figure 55). In 2018 only in Lake Nachikinskoye was counted 170 thousand and in 2019 – 180 thousand sockeye salmon producers. This is even more than the precautionary target point for all the Bolshaya River basin. In addition, one must also take into account the presence of sockeye salmon in other bodies of water in the Bolshaya River.

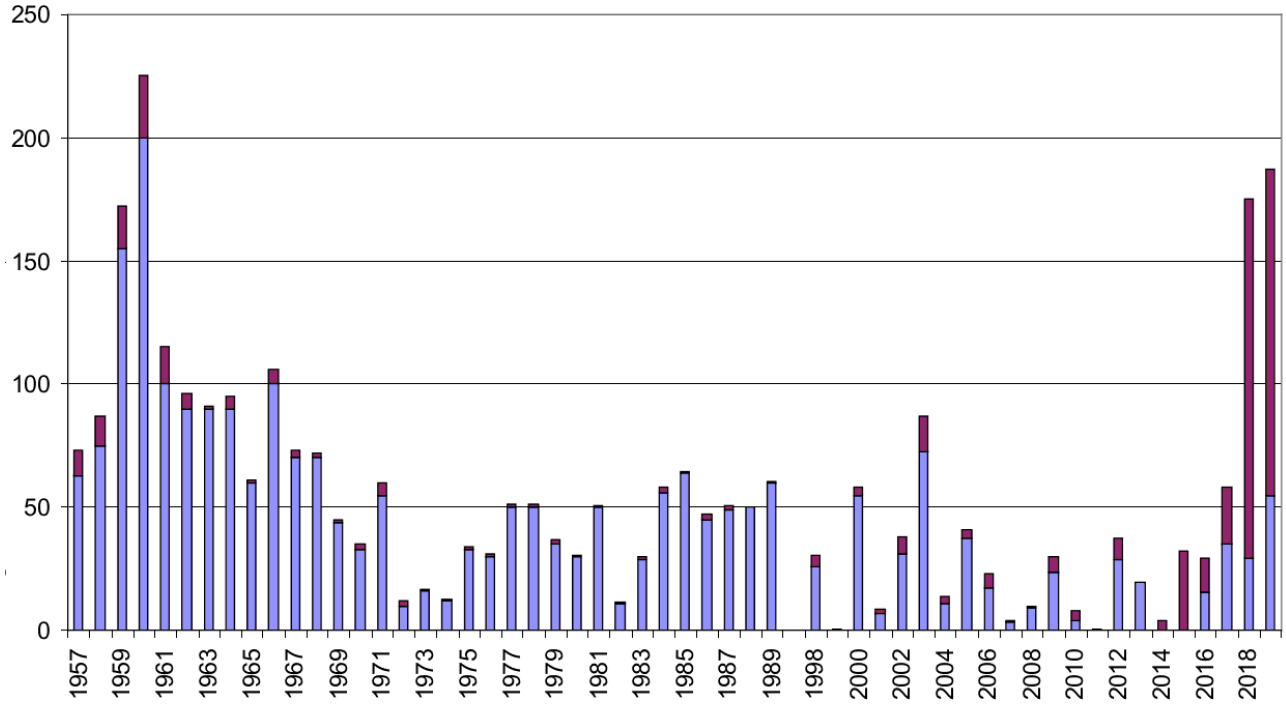

Figure 55: Dynamics of early (blue bar) and late sockeye (red bar) spawners number in Lake Nachikinskoye in 1957–2019 (Zaporozhets *et al*., 2020).

7.2.4.5 Management

The data for the sockeye salmon of the Kamchatka-Kuril subzone (with the exception of the salmon of the Ozernaya River, which is considered as a separate reserve) were divided into three temporary clusters: 1986–1991 with a low level of reproduction, 1992-2002 with an average level of reproduction and the modern period 2003–2010 with a high level of reproduction. Each of the clusters was described by separate models having unique parameters *a* and *b,* and a common parameter S_0, i.e. parental level providing maximum pup survival (estimated by R / S relative survival rate). The boundary reference point of the pass is determined to be about 45 thousand specimens. The target reference point will be determined by the range between the pass level that ensures the maximum sustainable catch of S_{MSY} (95 thousand specimens) and, given the uncertainty, its upper estimate S*MSY (204 thousand specimens) (Figure 56) (Feldman *et al*., 2019).

The reference points for sockeye salmon escapement in of Kamchatka-Kuril subzone and Bolshaya River are given in Table 23.

Table 23: The boundary (Slim), targeted (S_{MSY}) and precautionary targeted (S*MSY) reference points for sockeye salmon escapement in rivers of Kamchatka-Kuril subzone, thousand specimens (Feldman *et al*., 2019)

Region	Slim (So)	S_{MSY}	S*MSY
Kamchatka-Kuril subzone	43	95	–
Kamchatka-Kuril subzone (precautionary)	80	–	204
Bolshaya River	16	35.7	–
Bolshaya River (precautionary)	30.4	–	77

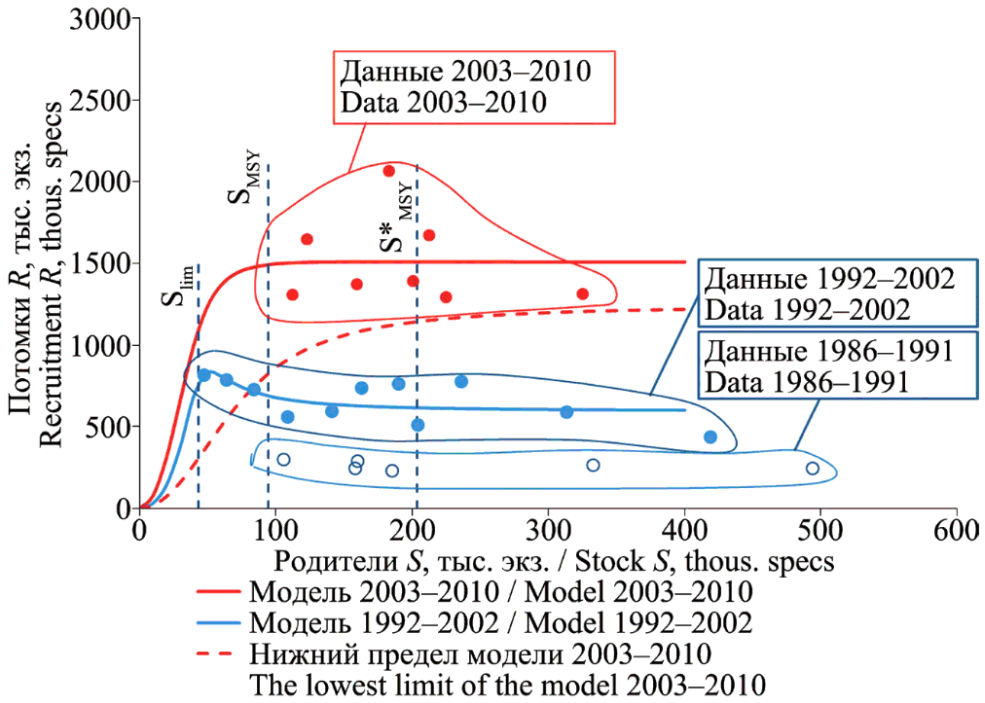

Figure 56: General model of the correlation between sockeye salmon recruitment and parental stock in Kamchatka-Kuril subzone (Feldman *et al*., 2019).

7.2.5 Catch profiles

Catch profiles are available in Figures 29-30 and in Tables 18 for Pink, in Figures 41-42 and Table 20 – for chum, in Figures 50-51 and Table 22 – for sockeye salmon.

7.2.6 Total Allowable Catch (TAC) and catch data

There is no recommended catch for any salmon species within the Kamchatka-Kuril subzone. Annual catches by the UoA of Pink salmon, chum salmon and sockeye salmon for the period 2015-2020 are presented in Table 24.

Table 24: Total Allowable Catch (TAC) and catch data.

	Year	Pink	Chum	Sockeye
Recommended Catch*	NA	NA	NA	NA
UoA share of Recommended Catch*	NA	NA	NA	NA
UoC share of Recommended Catch*	NA	NA	NA	NA
Total green weight catch by UoC, mt	2020	2200.602	358.684	386.055
	2019	3030.374	368.042	398.747
	2018	17479.347	601.78	140.613
	2017	115.496	419.39	194.665
	2016	1880.057	341.947	211.685
	2015	38.570	432.223	328.116

* – Not applicable: fishery managed based on annual escapement of spawners rather than a prescribed total allowable catch or recommended catch.

7.2.7 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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

The escapement of spawners to spawning grounds is used as **reference points**. In **Kamchatka-Kuril subzone,** for Pacific salmon the LPR (S_0) is (in thousand fish): Pink – 8,320, chum – 172, sockeye – 43.

In **Bolshaya River**, which is the index river for assessing the filling up of the spawning grounds by Pacific salmon producers in area where the FTP Comandor JSC carries out salmon fishing, the LPR is equal (thousand fish): Pink: So – 1,610 and PRI - 200; chum (So) – 38.7; sockeye (So) – 16.

According the data of KamchatNIRO (Bugaev *et al.*, 2020) in **Kamchatka-Kuril subzone** spawning escapement was (in thousands spawners): sockeye (in 2017-2019) – 180 – 270, Pink even generation (2016, 2018) 12,000 – 60,000; Pink odd generation (2017, 2019) 3,000 – 10,000; chum (2017-2019) 360 – 540.

Aerial surveys of the spawning grounds in the **Bolshaya River** in the decade under consideration were carried out fragmentarily; therefore, additional sources of information are used for sockeye and chum salmon.

For even generation of **Pink salmon** in the **Bolshaya River** escapement was estimated in 4,000 – 6,000 thousands spawners. In 2018, the pass rate reached a highly productive stratum. At the same time, the average pass value was always in the field of target values of the two upper strata, which characterizes the state of spawning stock of Pink salmon of even-numbered years at the level of strong year-classes. In odd-numbered years, the size of the pass of Pink salmon to the Bolshaya River basin for 5 adjacent odd years was quite low, 200 thousands in average. For the entire period of aero-visual studies (since 1957), the spawning stock of Pink salmon of a weak year class of this stock was estimated at an average of 0.15 million fish. It did not undergo significant changes, even after changing the dominant lines of reproduction. So it may depend on the mechanisms of the natural environment. In 2019, a positive trend was identified in the pass dynamics; escapement in Bolshaya River reached 597 thousands fish.

There is no data on escapement of **sockeye salmon** in Bolshaya River in report of KamchatNIRO (Bugaev *et al*., 2020). But in article by Zaporozhets *et al*. (2020), is data on dynamics of early and late sockeye spawners number in Lake Nachikinskoye (basin of the Bolshaya River) in 1957–2019. In 2018 only in Lake Nachikinskoye was counted 170 thousand and in 2019 – 180 thousand sockeye salmon producers. This is even more than the precautionary target point for all the Bolshaya River basin.

The **chum salmon** escapement in Bolshaya River was estimate by aerial surveys in 70 thousands in 2017, 38 thousands in 2018 and 16 thousands in 2019 (Bugaev *et al*., 2020). But the estimation based on the ratio of the chum and sockeye salmon in the catches in the Bolshaya River and the number of late spawners of sockeye salmon in the Lake Nachikinskoye showed much higher numbers. The escapement of chum salmon to spawning grounds of Bolshaya River should be estimated at 376,000 specimens in 2018 and 96,000 in 2019. This is more than

KamchatNIRO recommends as the precautionary approach. Therefore, it is highly likely that Pink, chum and sockeye salmon SMUs are above LRP. The SG60 and SG80 are met for **all 3 species**.

All species.

There is not a high degree of certainty that the SMU is above the LRP. The SG100 is not met **for all 3 species**.

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?		**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

The escapement of spawners to spawning grounds is used as reference points. In **Kamchatka-Kuril subzone,** for Pacific salmon the TPR (S_{MSY}) is (in thousand fish): Pink – 8,700 – 17,100; chum – 300-373, sockeye – 95-204.

In **Bolshaya River**, which is the index river for assessing the filling up of the spawning grounds by Pacific salmon producers in area where the FTP Comandor JSC carries out salmon fishing, the LPR is equal (thousand fish): Pink: – 1,680 – 3,290; chum – 67.7-84.1; sockeye – 35.7-77.

Information on the salmon escapement are provided in PI 1.1.1 a.

For chum and sockeye salmon in recent years and for Pink salmon in all even years escapement is higher than target reference point (S_{MSY}). For Pink salmon of odd years (weak) generation escapement is lower than S_{MSY}, but there is an upward trend. In 2019 the Pink salmon escapement in the Bolshaya River was 3 times higher than the historical average.

Salmon are characterized by years with low run and escapements in some rivers. The long-term viability of the population and the sustainability of the salmon fishery are maintained under these conditions due to the diverse structure of meta-population, including multiple, interacting populations and subpopulations (McElhany *et al*., 2000). Freshwater habitats in Bolshaya River basin are good for salmon production.

Over the last decade, the federal fishery scientific institute (KamchatNIRO) has been refining the scientific basis for salmon management by developing productivity functions for Pink and chum stocks and populations throughout Kamchatka. With this work, KamchatNIRO has been formalizing estimation and application of quantitative reference points including optimum spawning levels and limit reference points. Spawning escapements were historically assessed each year relative the target values and in-season management is used to regulate fishing intensity in order to achieve spawning objectives. Fishing effort was scaled by practice over a period of time to sustain high levels of production on average. Consistent high levels of Pink and chum salmon production over the last decade confirm that the management strategy based on target reference points has effectively maintained the reproductive capacity of the aggregate stock of each species.

With the introduction of restrictive measures and the strengthening of protective measures carried out both by state authorities (the North-Eastern Territorial Administration of the Federal Fisheries Agency) and interested fishery owners, the situation with passing salmon for spawning gradually began to improve, and the level of illegal fishing significantly decreased. All this had a positive effect on the stocks of Pacific salmon reproduced in the basin of the Bolshaya River.

Therefore, there is evidence that the SMUs of sockeye, chum and Pink salmons are fluctuating around their TRPs. The SG80 is met.

There is no 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.

The SG100 is not met.

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

Rationale

There is no strong evidence that the majority of component populations in the SMU are within the range of expected variability. The SG100 is not met.

References

Bugaev *et al*., 2020; McElhany *et al*., 2000; MRAG 2018, 2020; Shevlyakov *et al*., 2019; Zaporozhets *et al*., 2020.

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 S_{lim}*	*Thousands spawners*	*Thousands spawners*
	Pink		
	Kamchatka-Kuril subzone	8,320	60,000 in 2018; 10,000 in 2019
	Bolshaya River	PRI – 200	6,000 in 2018; 597 in 2019
	Chum		
	Kamchatka-Kuril subzone	172	540 in 2018; 360 in 2019
	Bolshaya River	38.7	336 in 2018; 86 in 2019
	Sockeye		
	Kamchatka-Kuril subzone	43	270 in 2018; 215 in 2019
	Bolshaya River	16	170 in 2018; 180 in 2019
Reference point used in scoring relative to TRP (SI b)	*Escapement S_{MSY}*	*Thousands spawners*	*Thousands spawners*
	Pink		
	Kamchatka-Kuril subzone: even	17,100	60,000 in 2018
	odd	8,700	10,000 in 2019
	Bolshaya River: even	3,290	6,000 in 2018
	odd	1,680	597 in 2019
	Chum		
	Kamchatka-Kuril subzone	300	540 in 2018; 360 in 2019
	Bolshaya River	67.7	336 in 2018; 86 in 2019
	Sockeye		
	Kamchatka-Kuril subzone	95	270 in 2018; 215 in 2019
	Bolshaya River	35.7	170 in 2018; 180 in 2019

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**NA**

PI 1.1.2 – Stock rebuilding

PI 1.1.2		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?	**N/A**		**N/A**
Rationale				

All species.

SMUs of Pink, chum and sockeye salmon of Bolshaya River are not reduced and this PI is not applicable.

b	**Rebuilding evaluation**			
	Guide post	Monitoring is in place to determine whether the fishery-based rebuilding strategies are effective in rebuilding the SMU within the specified timeframe.	There is **evidence** that the fishery-based rebuilding strategies are being 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.**	There is **strong evidence** that the rebuilding strategies are being 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?	**N/A**	**N/A**	**N/A**
Rationale				

All species.

Scoring of PI 1.1.2 is required only for scores less than 80 in PI 1.1.1.

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?	**N/A**	**N/A**	**N/A**

Rationale

All species.

Enhancement activities are not used as a stock rebuilding strategy for target SMUs. The SG60, SG80 and SG100 are met.

References

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

Draft scoring range	**NA**
Information gap indicator	**Information sufficient to score PI**

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

Overall Performance Indicator score	
Condition number (if relevant)	**NA**

PI 1.2.1 – Harvest strategy

PI 1.2.1		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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

A harvest strategy is based on fishing seasons; scheduled passing days of no fishing; gear specifications; in-season monitoring of harvest, species composition, biological indicators, and spawning escapements; and in-season fishery management is expected to achieve management objectives. SG60 is met.

Strategy include the annual SMUs status forecast and determining limit and target reference points of spawning escapement for filling of spawning grounds with producers by aerovisual surveys. During the spawning run of Pacific salmon, KamchatNIRO employees collect their biological statistics (size and weight indicators, sex, maturity stage, productivity) and recording structures (scales and otoliths) to further determine the age composition.

On initial stage, general fishery strategy is made and then on the basis of received current information on dynamics and capacity of Pacific salmon approaches to the coast, the system of operative changes of periodicity of pass days, adjustments of the volumes of predicted catch as well as closing of fishing if required, is formed. 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. SG80 is met.

There is no strong evidence that the harvest strategy in the Kamchatka-Kuril subzone and Bolshaya River is responsive to the state of the SMU and is designed to achieve SMU management objectives reflected in PI 1.1.1 SG80. Therefore, SG100 is not met.

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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

There is good filling of the spawning grounds with Pink, chum and sockeye salmon in the rivers of Kamchatka-Kuriil subzone and for populations in the Bolshaya River in the last years. That confirms that the management strategy has effectively maintained the reproductive capacity of the aggregate stock of each species. Occasional poor run years and escapements into portions of some systems are characteristic of salmon. Long term population viability and fishery sustainability for salmon is maintained under these circumstances by a diverse meta-population structure including multiple, interacting populations and subpopulations (McElhany *et al*., 2000).

The SG60 and SG80 are met.

There is no strong evidence that the performance of the harvest strategy in the Kamchatka-Kuril subzone and Bolshaya River has been fully evaluated and evidence exists to show that it is achieving its objectives. 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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**		
Rationale				

All species.

The fishermen have to complete the logbook after each fishing operation and every day submit statistical reports to the controlling organizations. Biological parameters and stock status are in-season monitored. Annually are conducted trawl surveys for a census of juvenile and adult fish. Monitoring is therefore in place that is expected to determine whether the harvest strategy is working based on run strength, harvest and spawning escapement. SG60 is met.

d	**Harvest strategy review**			
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

There is no strong evidence that the harvest strategy is periodically reviewed and improved as necessary.

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?	**N/A**	**N/A**	**N/A**

Rationale

Sharks are not a target species and therefore this scoring issue is not scored.

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?	**N/A**	**N/A**	**N/A**

Rationale

There is no unwanted catch of the target stock.

References

Bugaev *et al*., 2020; McElhany *et al*., 2000.

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**NA**

PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**HCRs design and application**			
	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

Generally understood HCRs are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as SMU limit reference points are approached. The SG60 is met.

Well defined control rules include time and area fishery 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. 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 the local fishery manager. Exploitation rates are reduced at low abundance to ensure that escapement goals are generally met. HCRs are generally sufficient to keep the SMUs fluctuating around S_{MSY} although the escapement goal cannot be achieved every year on every river. The SG80 is met.

It is not certain that the HCRs are keeping the SMUs 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. The SG100 is not met.

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?		**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

The HCRs are likely to be robust to the main uncertainties which are primarily related to run strength and timing. While run forecasts are made based on brood year escapements and recent production patterns, recommended harvest levels based on these forecasts are utilized primarily as preseason planning tools. 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). Once the fishing season begins, management to control exploitation rates is based on in-season data. In-season management utilizes indicators based on biological characteristics of the harvest to avoid the potential problems. The SG80 is met.

There is no conclusive evidence that the HCRs take into account a wide range of uncertainties, including the ecological role of the SMUs, and there is evidence that the HCRs are robust to the main uncertainties. The SG100 is not met.

	HCRs evaluation			
c	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

Catch per effort, fish size, sex ratio, and distribution are all utilized as indicators. The fishery is managed on a daily basis to regulate harvest consistent with escapement targets. Fisheries are restricted as appropriate based on actual run size. The escapement objectives are usually achieved. Occasional poor run years and escapements into portions of some systems are characteristic of wild salmon. Long term population viability and fishery sustainability for salmon is maintained under these circumstances by a diverse meta-population structure including multiple, interacting populations and subpopulations (McElhany *et al*., 2000). The SG60 and SG80 are met.

There is no strong evidence that clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs. The SG100 is not met.

	Maintenance of wild population components			
d	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

Only wild populations of Pacific salmon live in the mostly rivers of Kamchatka-Kuril subzone but at the Bolshaya River's basin there are two salmon hatcheries. Diversity in salmonids is represented among stocks and populations inhabiting different rivers. Therefore, all HCRs and tools are used to maintaining the diversity and productivity of the wild component populations. The management practice of establishing weekly passing days maintains diversity by protecting escapements in all rivers and across the duration of the run. 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. Stock assessment data indicates this system is generally effective. The SG60 and SG80 are met.

There is no a high degree of certainty that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component populations. The SG100 is not met.

References

Bugaev *et al*., 2020; McElhany *et al*., 2000.

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**NA**

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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

A large amount of sufficient relevant information is collected to support the harvest strategy: data on SMUs structure and productivity, biological characteristics of fish, run timing, and spawning escapement. Assessments also include direct estimates of natural stock productivity by salmon species. There is artificial reproduction of salmon in the two rivers of the Bolshaya River's basin on two hatcheries; therefore not all salmon populations are wild here. The fishing companies maintain daily catch records that are monitored on a routine basis to determine the cumulative catch. This enables strict control over the catch to prevent the quota being exceeded. Environmental monitoring of the fishery by the government is required under chapter 5, article 42 in Federal Law of 20.12.2004 No. 166-FZ (RG, 2004), which explicitly mentions the distribution, abundance, quality and reproduction of aquatic bio resources and habitats, the fishery and preservation of aquatic bio resources. According to the law, VNIRO performs annual research surveys to collect data on the species composition, length, weight, age, sex, fertility, maturity of fish, food supply, quality of environment etc. Therefore, 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. The SG60 and SG80 are met.

There is no strong evidence that a comprehensive range of information is available, including estimates of the impacts of fishery harvests on the SMUs and the majority of wild component populations. The SG100 is not met.

b	**Monitoring**			
	Guide post	SMU wild abundance and UoA removals are monitored and at **least one indicator** is available and monitored with	SMU wild abundance and UoA removals are **regularly monitored at a level of accuracy and coverage**	**All information** required by the harvest control rule is monitored with high frequency and a high degree

		sufficient frequency to support the harvest control rule.	**consistent with the harvest control rule,** and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

All legal fishermen must complete the logbooks after each fishing operation and every day submit statistical reports to the controlling organizations. The controlling organizations can check the logbooks at any time. Extensive data on catch, escapement and fish biological parameters is collected during the harvest season. Based on these data, harvest goals are regulated. Annually are conducted trawl surveys for a census of juvenile and adult fish. Therefore, SMU wild abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the HCR. The SG60 is met.

There is no strong evidence that 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. The SG80 and SG100 are not met.

C	**Comprehensiveness of information**			
	Guide post		There is good information on all other fishery removals from the **SMU**.	
	Met?		**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	
Rationale				

All species.

KamchatNIRO has conducted extensive studies on illegal salmon fishery in Kamchatka waters (Shevlyakov, 2013; Bugaev *et al*., 2020). That was a significant problem in Kamchatka salmon fisheries but it has been greatly reduced with management system changes. In 2008, was introduced the ‘Olympic system’ and individual quotas disappeared. With that disappeared a motivation to exceed the quota and illegal catches have decreased. Harvest of Kamchatka salmon also historically occurred outside the UoC in commercial drift gillnets 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. Recreational and indigenous catches are recorded in the statistics.

The SG80 is met.

References

Bugaev *et al*., 2018, 2020; Shevlyakov, 2013.

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

Draft scoring range	**Pink = 60-79** **Chum = 60-79** **Sockeye = 60-79**
Information gap indicator	**Information no sufficient to score PI.**

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

Overall Performance Indicator score	
Condition number (if relevant)	**1**

PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
Scoring Issue		SG 60	SG 80	SG 100
a	**Appropriateness of assessment to stock under consideration**			
	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?		**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

The estimation of harvest dynamics, catch per effort, biological characteristics is used to assess the state of the SMUs. There are the limit and target reference points for of spawning escapement that have been implemented in HCR. Aerial survey is used to estimate the numbers of spawners on spawning grounds in different water bodies and the results are published in the public domain (Shubkin *et al*., 2020). Spring scientific surveys of downstream migration of salmon fry from rivers to the sea are carried out. Autumn scientific surveys of juvenile salmon in the sea are carried out. Therefore, the assessment is appropriate for the SMUs and HCRs for the all 3 salmon species. The SG80 is met.

There is no evidence that the assessment takes into account the major features relevant to the biology of the species and the nature of the UoA. The 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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

There are explicitly defined limit and target reference points (escapement goals) for each species based on spawner-recruit analyses. Management based on spawning escapement reference points is a standard and effective practice in salmon fisheries throughout the Pacific. Therefore, the assessment estimates stock status relative to generic reference points appropriate to salmon. The SG60 is met.

Information has been provided by KamchatNIRO (Bugaev *et al*., 2020) about the relation between the status of stocks in indicator streams and other populations they represent within the management unit as inferred from historical data. The SG80 is met.

There is no conclusive evidence that the assessment estimates with a high level of confidence stock status and reference points that are appropriate to the SMUs and wild component populations. The SG100 is not met.

	Uncertainty in the assessment			
c	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

The stock assessment has identified major sources of uncertainty including environmentally-driven variability in productivity; annual variability in run timing and distribution; and heterogeneity in productivity of major stock subcomponents. The SG60 is met.

The assessment takes major uncertainty into account. Harvest dynamics and fish biological characteristics are controlled in real-time. There are aerial spawning ground surveys that bring data on spawning escapement. In-season assessments allow fisheries to be regulated based on normal annual variability in productivity and run timing. Assessments incorporate spatial and temporal 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*., 2020). These goals include explicit precautionary safety factors based on statistical analysis of uncertainty. The SG80 is met.

There is no evidence that assessment is evaluating stock status relative to reference points in a probabilistic way. The SG100 is not met.

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

All species.

There is no information about exploration of alternative hypotheses and assessment approaches. The SG100 is not met.

	Peer review of assessment			
e	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?		**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

Scientists of KamchatNIRO conduct the assessment of SMUs status. Results are presented and reviewed at institutes' Scientific Councils. This peer review is internal. The assessment is modified in light of comments at the above review and forwarded to the head of the fisheries research institute (VNIRO). The in-season assessment information is internally discussed as part of the annual management process overseen by the Anadromous Fish Commission. The SG80 is met.

External peer review is limited. The SG100 is not met.

	Representativeness of indicator stocks			
f	Guide post	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some scientific basis** for the indicators selection.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some evidence of coherence** between the status of the indicator streams and the status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity (i.e., those with a higher conservation risk) to match those of the representative SMU where applicable.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, the status of the indicator streams are **well correlated** with other populations they represent within the management unit, including stocks with lower productivity (i.e., those with a higher conservation risk).
	Met?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**
Rationale				

All species.

The stock assessment historically surveyed representative areas of most river systems for each species. Indicators were selected for their representative nature based on analysis of a fuller complement of historical survey areas. The SG60 is met.

Information has been provided by KamchatNIRO (Bugaev *et al*., 2020) about the relation between the status of stocks in indicator streams and other populations they represent within the management unit as inferred from historical data. The SG80 is met.

There is no strong evidence that the status of the indicator streams are well correlated with other populations they represent within the management units.

The SG100 is not met.

	Definition of Stock Management Units (SMUs)			
g	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – No** **Chum – No** **Sockeye – No**

Rationale

All species.

The SMUs for Pink, chum and sockeye salmon are defined with a clear rationale for conservation, fishery management and stock assessment requirements. There is description of their geographic location, migration patterns, limit and target reference points, and HCRs. The SG60 is met.

Stocks of west Kamchatka salmon are comprised of subcomponents including substocks (e. g., early and late runs), demographically-independent populations (e.g. species returning to home rivers or lakes), and with a spectrum of natural diversity expressed in run timing and spatial distribution. Stocks including major populations are well defined based on river system, run timing, and spawning distribution. Assessments are made of the major component stocks and management and include considerations for each. The SG80 is met.

There is no unambiguous description of each SMU with a clear rationale for conservation, fishery management and stock assessment requirements. The SG100 is not met.

References

Bugaev *et al*., 2020; Shubkin *et al*., 2020.

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 1.3.1 – Enhancement outcomes

PI 1.3.1	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?	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – Yes** **Sockeye – Yes**	**Pink – Yes** **Chum – No** **Sockeye – No**
Rationale			

Pink.

No hatchery enhancement of Pink salmon occurs in unit of certification systems. The SG60, SG80 and SG100 are met.

Chum and sockeye.

There are two salmon hatcheries in the Bolshaya River basin, which release only chum, sockeye, and Chinook salmon. The salmon hatchery program is relatively small and low productive. For chum salmon, the share of hatchery fish is 3% of the return of wild fish to the Bolshaya River, and for sockeye salmon only 10% (Bugaev *et al*., 2018). The impact of hatchery salmon on wild salmon stocks in the Bolshaya River is monitored (Zhaporozhets, Zhaporozhets, 2011a). Nevertheless, to date, no evidence of a significant influence of the hatcheries on the wild stocks of chum and sockeye salmon in the Bolshaya River. The SG60 and SG80 are met.

There is not 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. The SG100 is not met.

References

Bugaev *et al*., 2018; Zhaporozhets, Zhaporozhets, 2011, 2011a.

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 1.3.2 – Enhancement management

PI 1.3.2		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?	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**	**Pink - Yes** **Chum - No** **Sockeye - No**
Rationale				

Pink.

No hatchery enhancement of Pink salmon occurs in unit of certification systems. The SG60, SG80 and SG100 are met.

Chum and sockeye.

The rivers in basin Bolshaya River are managed as wild systems. Hatchery production is limited. This is a partial strategy to protect wild stocks of chum and sockeye from significant negative impacts of enhancement. The SG60 and SG80 are met.

There is no information on the existing comprehensive strategy to protect wild chum and sockeye salmon stocks of Bolshaya River from significant negative impact of enhancement. The SG100 is not met.

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?	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**	**Pink - Yes** **Chum - No** **Sockeye - No**
Rationale				

Pink.

No hatchery enhancement of Pink salmon occurs in unit of certification systems. The SG60, SG80 and SG100 are met.

Chum and sockeye.

The restricted character of chum and sockeye hatcheries gives some objective basis for confidence that the strategy is effective. The SG60 and SG80 are met.

There is no clear evidence that the comprehensive strategy is successfully protecting wild chum and sockeye salmon stocks of Bolshaya River from significant detrimental impacts of enhancement. The SG100 is not met.

References

Bugaev *et al*., 2018; Zhaporozhets, Zhaporozhets, 2011, 2011a.

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 1.3.3 – Enhancement information

PI 1.3.3		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?	**Pink – Yes** **Chum – Yes** **Sockeye– Yes**	**Pink – Yes** **Chum – Yes** **Sockeye– Yes**	**Pink – Yes** **Chum – No** **Sockeye– No**
Rationale				

Pink.

No hatchery enhancement of Pink salmon occurs in unit of certification systems. The SG60, SG80 and SG100 are met.

Chum and sockeye.

Relevant sufficient information is available on the contribution of enhanced fish to the fishery harvest, total escapement and hatchery broodstock. The SG60 and SG80 are met.

There is no evidence that a comprehensive range of relevant quantitative information is available on the contribution of enhanced fish to the fishery harvest, total escapement and hatchery broodstock. The SG100 is not met.

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?	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**	**Pink - Yes** **Chum - Yes** **Sockeye - Yes**
Rationale				

Pink.

No hatchery enhancement of Pink salmon occurs in unit of certification systems. The SG60, SG80 and SG100 are met.

Chum and sockeye.

Assessments of the enhancement activity on the wild stocks status of chum and sockeye salmon in the Bolshaya River are sufficient for routinely use by decision makers. From time to time, the government plans to increase the capacity of the salmon farms. But scientific institutions based on a comprehensive analysis of relevant information do not support them. The SG60, SG 80 and SG100 are met.

References

Bugaev *et al*., 2018; MRAG, 2018; Zhaporozhets, Zhaporozhets, 2011, 2011a.

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

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

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

Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

7.2.8 Principle 1 References

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7.3 Principle 2

7.3.1 Principle 2 background

Principle 2 assesses the impact of the fishery on all bycatch and associated species not included under Principle 1, as well as on habitats and the wider ecosystem. For non-target species that are not endangered, threatened or protected (ETP), the MSC assessment criteria further differentiate between the species identified in Principle 2 depending on the catch level, where 'main' species are those that comprise 5% or more of the catch by weight, or 2% or more of the catch by weight if the species is 'less resilient' (SA3.4.2, MSC 2018).

FTP Comandor JSC uses 4 types of fishing gear in its work. Fixed and beach seines are employed at 7 parcels along the coast of western Kamchatka (Kamchatka-Kuril subzone – 61.05.04) in the sublittoral zone, in a narrow coastal strip, mainly at depths of 10 to 20 m, less often up to 50, on the migration routes of Pacific salmon. Fixed and floating gillnets are then employed in 3 sections in the lower reaches of the Bolshaya River.

In the marine areas, gently sloping sandy soils prevail, which are subject to active wave (especially during storms) and tidal effects. In this regard, benthic communities are relatively poor, and sessile vulnerable forms of epifauna are practically absent. The bottom of the river sections is formed by gravel-pebble soils with local deposits of sand and silt.

Two species have been reported as by-catch in this fishery over the past 5 years; Coho salmon (*Oncorhynchus kisutch*) and migratory Arctic char (*Salvelinus malma*), which is targeted in traditional fisheries. The quota for this species has not been established by the anadromous commission, and it is allowed to be caught as by-catch.

It is possible that Chinook salmon (*Oncorhynchus tshawytscha*) may also occur in catches, but there are no data showing this is the case. This is apparently due to the fact that the fishery begins in mid-June, when the Chinook salmon has already completed its course.

Starry flounder (*Platichthys stellatus*), Saffron cod (*Eleginius gracilis*) and Asian smelt (*Osmerus mordax dentex*) may also be caught in the trap nets and beach seines as minor by-catch (primary) species in the offshore areas, but the client does not retain them and so no reports are made. The main part of the by-catch of these species is released live in the fishery after the target catch is handed.

Fixed and drifting nets that are employed in river sections have a large mesh, and smaller species are not meshed in these gears.

Catches of diving seabirds and mammals (seals, Steller sea lions and, potentially, killer whales) with trap nets are possible however given that this fishing gear is static, the likelihood of these animals and birds getting stuck in the netting, injuring or dying is extremely low. The client also does not report the by-catch of marine mammals, and such data are not available.

Among seals, contacts with fixed nets are possible with the most numerous species in the Russian Far East – the spotted seal or larga (*Phoca largha*). These seals are not ETP species and concentrate near river estuaries and headlands to feed almost exclusively on salmon during salmon spawning. They often enter set nets, eat or damage fish, and then freely leave the nets. No accidental entanglement of these seals and Steller sea lion have been observed and reported.

The rest of the marine mammals in the area are killer whales and baleen whales. There was no mention of these marine mammals caught or killed in these gears by government officials or representatives of the fishing industry. The peculiarities of the set-up seine arrangement significantly reduce the possibilities of contact with these marine mammals.

The costal trap nets are a stationary passive fishing gear. It does not capture the target and by-catch species, but let them move along the wing to enter the trap (Datcun *et al*., 1999). Marine mammals (cetaceans) do not enter the trap or become entangled in the netting mesh. On river fishing parcels cetaceans do not get into fixed and drifting gillnets because they do not live in fresh water and do not move to the river. Spotted seal can be caught in gillnets in the river parcels but this is reported to occur very rarely.

When working with a trap net, marine mammals do not approach the fishing gear during a fishing operation and the probability of being caught is practically excluded.

Fixed and drifting gillnets are exhibited only on river sections in the river in most case where no marine mammals and diving birds. The mesh size is based on mature salmon breeders that migrate from the sea to spawning grounds, and there are no other by-catch species in the catches.

7.3.2 Primary Species

In accordance with MSC Fisheries Standard v2.01 (MSC 2018a), top priority by-catch species are defined as those species that are in scope but are not targeted (P1), “where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points” (SA3.1.3, MSC 2018a).

The main by-catch species are non-target fish species caught during the fishery for Pink salmon, chum and sockeye salmon, the volumes of which account for at least 5% of the total catch. As noted at the beginning of the chapter, only two species of by-catch were recorded in by-catch: coho salmon and char.

The share of coho salmon by-catch to the total catch over 5 years in the fishing parcels of Client, from 2015 to 2018, varied in a wide range, from 7.2% to 0, and averaged 4.1% (Table 25). The exception is 2014, when the by-catch of coho salmon amounted to 44,9%. For 3 years, 2014, 2015 and 2017, its share exceeded 5%, respectively, in these years it can be considered the primary main, but in 2016 and 2018 Coho salmon were practically absent in the catches. In this case, it becomes a secondary species. Its share is also less than 5% on the average for five years.

Thus, it can be attributed to both primary and secondary species of by-catch, but if compared for individual years, it more often had the status of a primary species.

The second recorded species is the Arctic char, the volume of its catch for the period from 2014 to 2018 varied in an even wider range, from 12.3% to 0, and on average amounted to 6.2%, that is, more than 5% (Table 25). Moreover, in the first 4 years, catches ranged from 4.5 to the maximum, and only in the last year, for some unknown reason, it was absent.

Therefore, this species should rather be attributed to the primary main by-catch species (with the exception of 2018, which may be associated with problems in its registration).

Table 25: Composition of the catch by years during 2014-2018. (Source: Data provided by the client).

Year	Species	Reported catch, kilograms	% of species per year
2014	Chum salmon	783	0,31
	Sockeye salmon	281	0,11
	Pink salmon	247	0,10
	Arctic char	137 353	54,61
	Coho salmon	112 843	44,87
	Total	251 509	100,00
2015	Chum salmon	432	1,12
	Sockeye salmon	328	0,85
	Arctic char	120	0,31
	Coho salmon	56	0,14
	Pink salmon	37 791	97,58
	Total	973 472	100,00
2016	Pink salmon	1 445 991	77,15
	Chum salmon	248 621	13,27
	Sockeye salmon	174 273	9,30
	Arctic char	5 315	0,28
	Coho salmon	60	0,00
	Total	1 874 259	100,00
2017	Chum salmon	309 400	61,98
	Sockeye salmon	121 239	24,29
	Coho salmon	36 831	7,38
	Pink salmon	27 214	5,45
	Arctic char	4 538	0,91
	Total	499 222	100,00
2018	Pink salmon	16 516 551	97,26

	Chum salmon	313 269	1,84
	Sockeye salmon	120 839	0,71
	Coho salmon	31 741	0,19
	Total	16 982 399	100,00

7.3.2.1 Coho salmon (primary main)

Forecasts of coho salmon entering the rivers of Western Kamchatka are based on data on catches of this species in all areas of fishing activity, based on information on the filling of spawning grounds by producers and other characteristics.

The most productive region of the Far East for all species of Pacific salmon is the western coast of Kamchatka. Kamchatka coho salmon is found in almost all water sources and on the western coast, mainly in commercial quantities in a number of rivers from Palana in the north to Kambalnaya in the south. The largest number of sites falls on the Bolshaya River, where there are 3 sites of FTP Comandor JSC, and rivers of the central-western region, including: Vorovskaya, Krutogorova, Pymta, Kikhchik.

The Bolshaya River is one of the main areas of Coho salmon reproduction, on which more than 21% of the area of all rivers and key spawning grounds on the western coast of Kamchatka is located.

Coho salmon stocks in Western Kamchatka over the past few years have generally been at a high level and reached a historical maximum in 2014–2015, amounting to 9198 and 9630 tonnes, respectively. In 2016-2017 there was a slight decrease in Coho salmon catches in Western Kamchatka, but, nevertheless, catches remain at a fairly high level (Figure 57 - Figure 59).

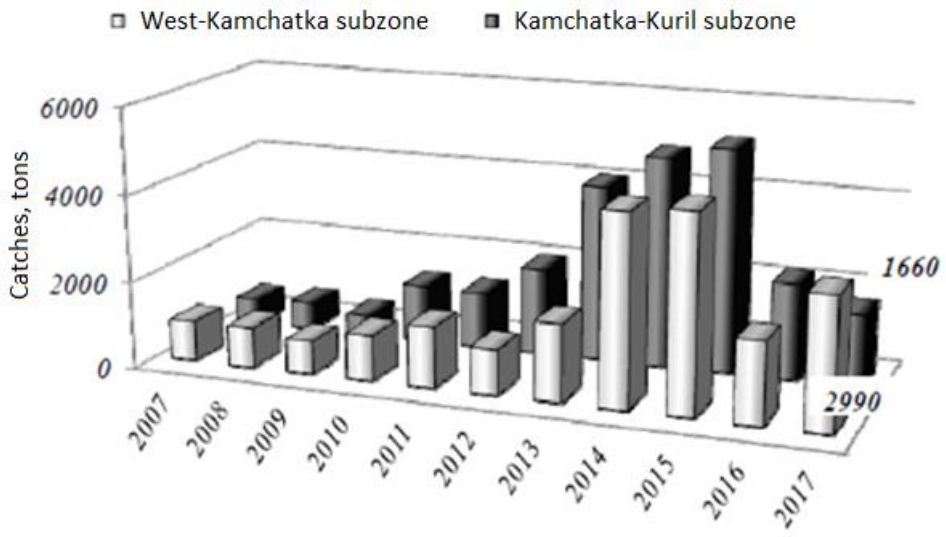


Figure 57: Dynamics of coastal coho salmon catches in Western Kamchatka in 2007–2017.

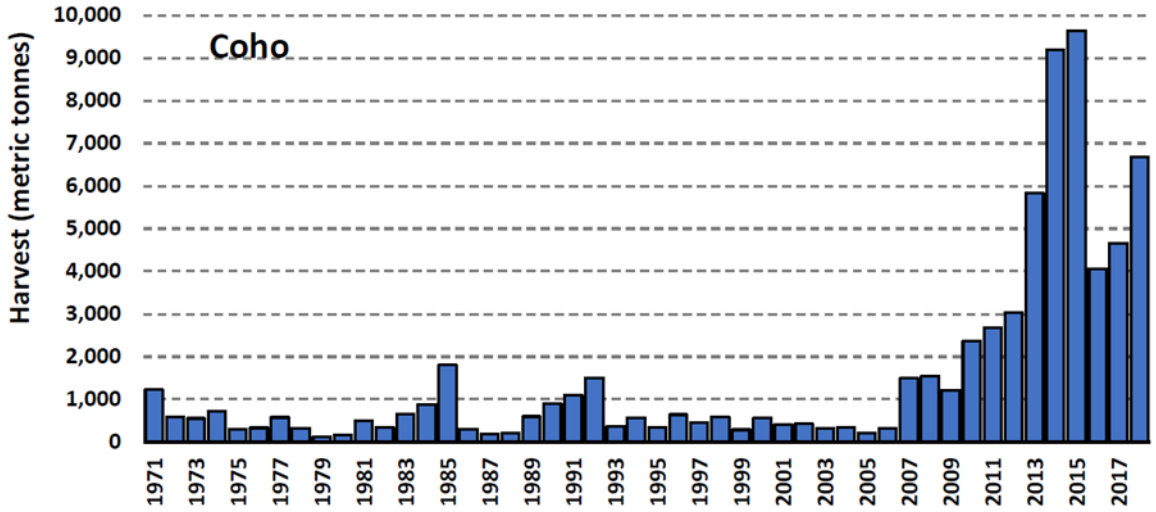


Figure 58: Total annual catch of coho salmon in Western Kamchatka in 1971-2017 (source: North Pacific Anadromous Fish Commission).

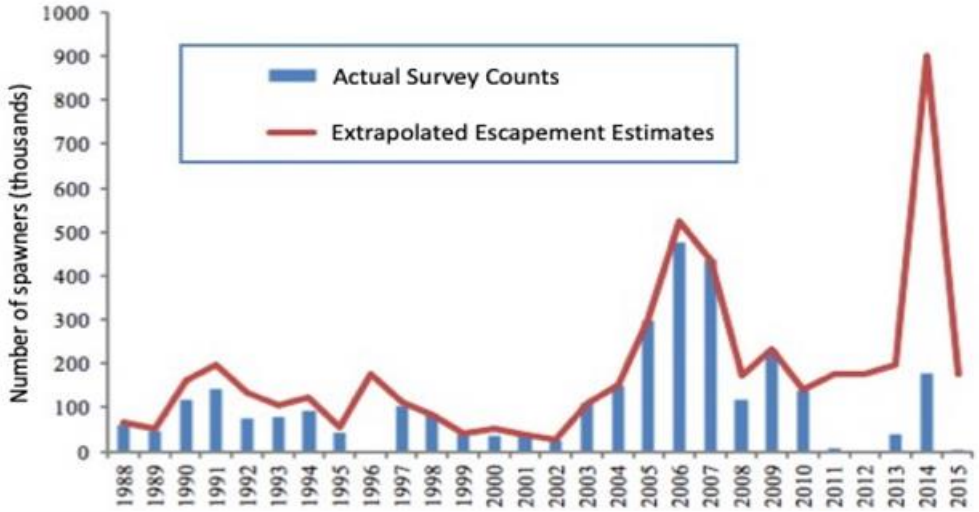


Figure 59: Actual and extrapolated number of Coho salmon producers in the subzones of Western Kamchatka, 1988-2015. (Source: Bugaev *et al*., 2018).

In 2015-2017 Due to insufficient funding for aerial photography, only episodic data were collected on the number of spawning fish, which were insufficient for a reliable assessment of the spawning intensity of Coho salmon in this region. In 2017, the escapement of Coho salmon to the spawning grounds of Western Kamchatka was estimated at no less than 195 thousand individuals. The filling of spawning grounds in the Bolshaya River basin is kept at an extremely low level from year to year. In 2017, the number of breeders on this river was about 26 thousand individuals. The total optimal range of calls for coho salmon spawners at the spawning grounds of rivers in Western Kamchatka is estimated at 250-320 thousand individuals.

According to the forecasts of the Recommended Catch, with a possible harvesting of up to 81%, the producers (spawners) of coho salmon in the amount of 272 thousand will be passed to go to spawning grounds. Such a pass to spawning grounds will ensure expanded reproduction and is outside the risk zone of population decline. In this case, the catch may amount to 1.161 million individuals. With an average weight of 2.9 kg per one fish over the last 5 years of observations, the Recommended Catch for the rivers of the western coast of Kamchatka (subzones 61.05.4 and 61.05.2) amounted to 3367 tons of coho salmon.

Accordingly, the recommended catch for 2018 in the subzone of the West Kamchatka region was about 60% of the total catch of Coho salmon, which is about 2,020 tons, and in the Kamchatka-Kuril subarea, about 1.347 thousand tons (Table 26).

Table 26: Recommended catch of coho salmon on the western coast of Kamchatka in 2018, thousand tons.

Region, Zone, Subzone	Recommended catch
Western Kamchatka	**3,367**
Subzone 61.05.2 - West Kamchatka	2,020
Subzone 61.05.4 - Kamchatka-Kuril	1,347

7.3.2.2 Arctic char (*Salvelinus malma*)

Arctic char is the second main primary species in the fishery, which is widespread and abundant throughout Kamchatka. It is believed that the abundance of char in the region is increasing (Figure 60) however, as shown in Table 25 it is apparent that the share in by-catch has significantly decreased in recent years.

The biological cycle of this species is diverse and includes anadromous and sedentary individuals, but it is the impact of the fishery on the anadromous population that is relevant. Char usually migrate upstream after Coho salmon in late summer and return downstream along with downstream migration of young salmon in spring.

The char is usually caught as a by-catch in the salmon fishery. It is caught throughout the fishing season, but catch volumes vary from month to month. The catch rates for char are determined on the basis of historical catch data, i.e. there are some controls for this species, but the research supporting this control is not as fundamental as for Pacific salmon. Independent fishery information on char stock is not collected (Shevlyakov *et al*., 2017).

Migrating Arctic char (Dolly Varden char) in Kamchatka is one of the traditional fishing targets. However, the lack of capacity for processing fish, especially during the period of anadromous migrations of Pacific salmon, does not allow the full use of its stocks. Typically, the bulk of Arctic char is caught during the Pacific salmon fishing season, mostly as by-catch. In the autumn-winter period and in spring, during the migration to the sea, Arctic char is not harvested in significant quantities, which is partly due to the difficulties in delivering raw fish to the consumer, as well as to unfavorable weather conditions (Tiller, 2017).

Traditionally, Arctic char is mainly caught on the western coast of Kamchatka. In the entire history of the fishery, its largest amount on the west coast was caught in the mid-1950s (Figure 60 and Figure 61). Until the end of the 1990s, the fishing of Arctic char in Kamchatka was mainly carried out by several large fish factories and fishing collective farms. With the development of private enterprises, fish processing plants and most collective farms were closed. Currently, dozens of fishing companies catch Arctic char. However, the nature of the fishery has not changed. The main part of the annual quota of Arctic char comes from seines established during the spawning migration of Pacific salmon. A feature of the biology of the migrating Arctic char is that the char spends part of its life in fresh water, hibernates in rivers and feeds in the summer months.

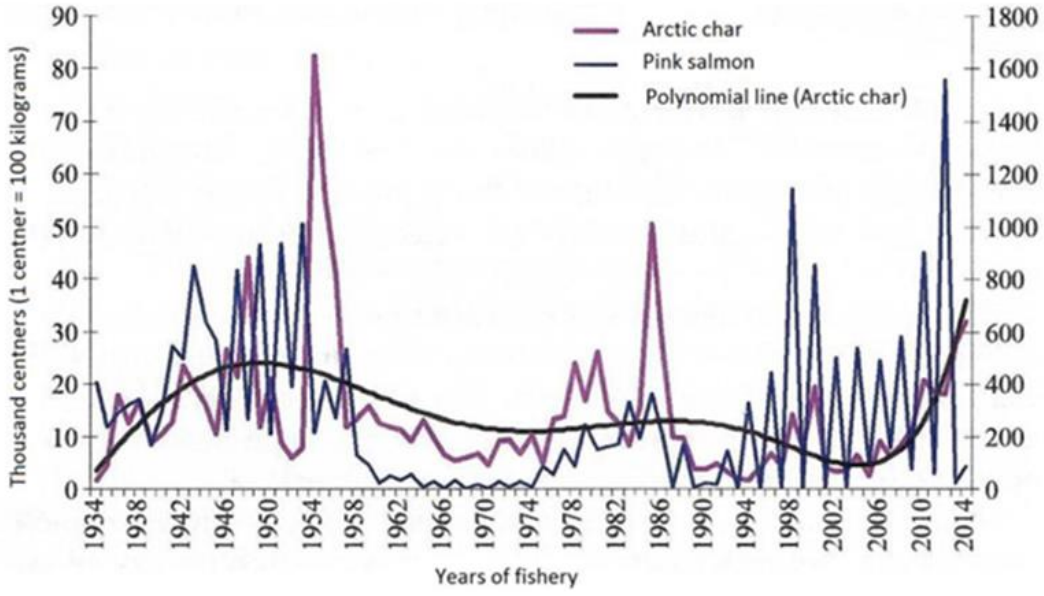


Figure 60: Dynamics of catches of migratory Arctic char and Pink salmon on the western coast of Kamchatka.

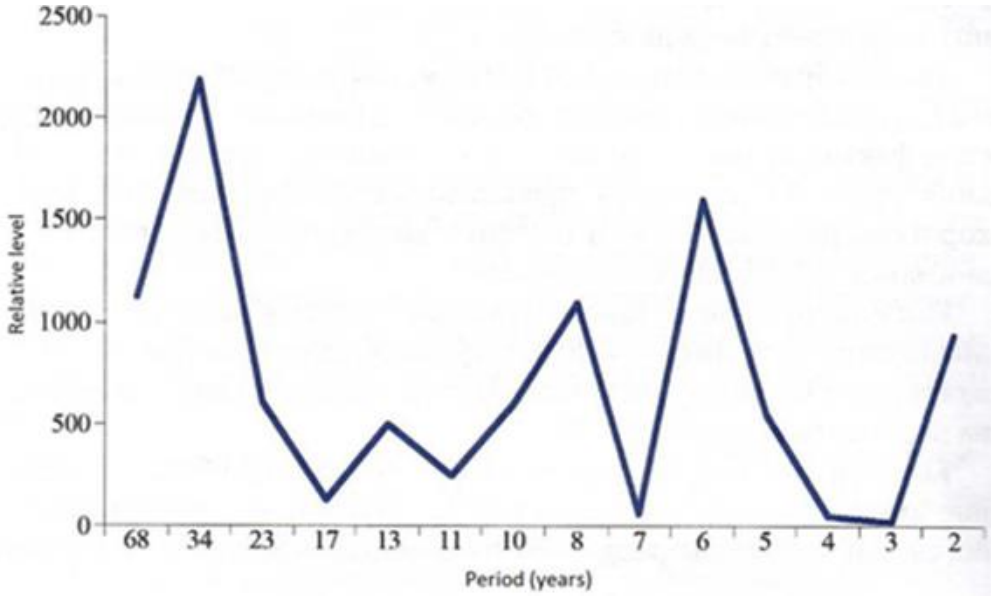


Figure 61: Dynamics of the number of generations of migrating Arctic char on the east coast of Kamchatka.

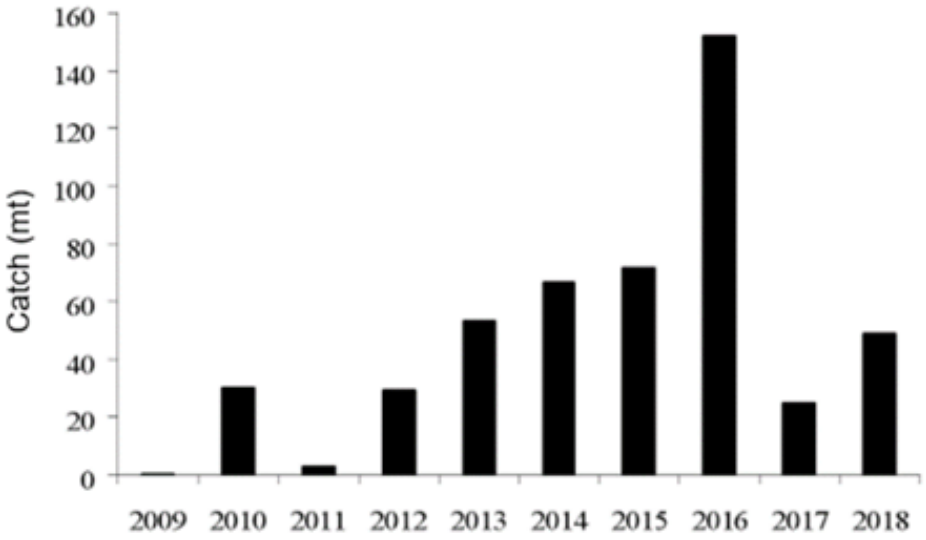


Figure 62: Commercial catch of Arctic char on target rivers in the southern part of Karaginsky Bay, 2009-2018. (Source: Bugaev *et al*. 2018a).

Catches of char appear to have increased in recent years, although this is probably due to improved reporting following the introduction of a new recommended catch system in 2008, rather than due to an expansion of the fishery. Rather significant fluctuations in the intensity of Arctic char catches on the northeastern coast of Kamchatka indicate irregular fishing in this area, but with the advent of mass recruitment, the intensity of catches has increased significantly.

The Bolshaya River, as the largest watercourse, provides a significant part of the Arctic char catch on the western coast of Kamchatka. The catch trends in this river follow the total catch schedule closely, and a 30-year cycle is most noticeable in both (Figure 63 and Figure 64). During the observation period, the largest stock of Arctic char in the Bolshaya River was recorded in 1983–1985, however, the intensity of fishing in these years was the lowest. Further, with the beginning of the decline in the number of Arctic char, the intensity of fishing increased to unacceptable values.

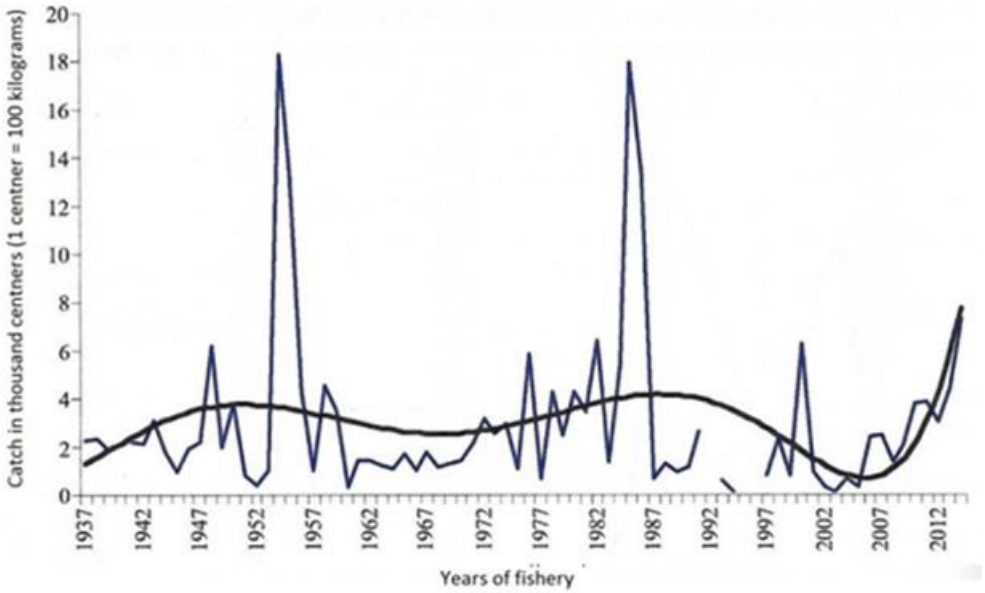


Figure 63: Dynamics of catches of migrating Arctic char on the Bolshaya River (western coast of Kamchatka).

It is highly probable that the Arctic char stocks are above the biological limits corresponding to the Point of Recruitment Impairment (PRI), according to historical trends in catch rates and the age composition estimated by KamchatNIRO from a commercial sampling survey. The catch seems to hover around the long-term averages. KamchatNIRO also concluded that current catch rates are robust based on the relatively stable size and age composition of these heterogeneous species.

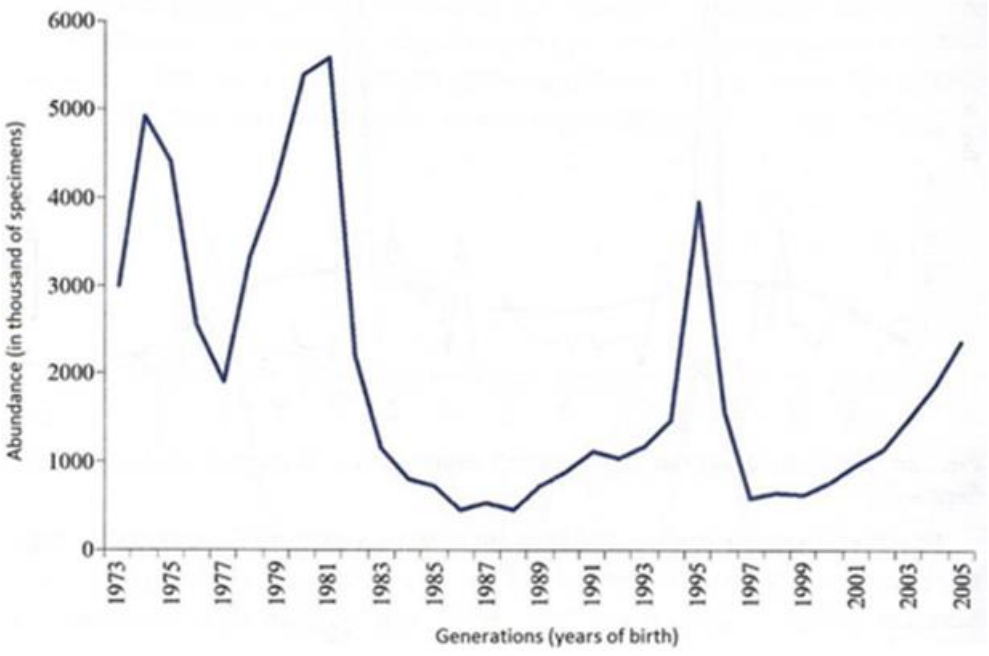


Figure 64: Dynamics of the number of generations of migrating Arctic char on the west coast of Kamchatka.

Management using a recommended catch system designed to control catch rates for char is not well-founded by scientific research and is not comprehensive as for salmon, but is based on fishery data on historical catch rates. Typically, the total catch of char by commercial fisheries ranges from 70-80% of the recommended catch. In years with a high abundance of Pink salmon, the catches of chars are much lower than in other years, due to the limited processing possibilities for including chars.

7.3.3 Secondary species

Secondary species are defined by the MSC as species in the catch that do not meet the definition of a “primary” species, or species that are outside the scope of the program (i.e., birds, mammals, reptiles and amphibians) for which an Endangered, Threatened or Protected Species (ETP) definition does not apply (SA3.1.4, MSC 2018). (The assessment team notes that any non-ETP birds and seals would include in main secondary species, so this may need review after site visit).

Spotted seal are found commonly in onshore and estuarine areas of the region, and the most recent estimates indicate the total population is growing across the North Pacific and Arctic Ocean, and that the population in the Sea of Okhotsk numbers around 180,000 (Boveng, 2016). There is anecdotal information that this species regularly depredate upon salmon found in the trap nets and gillnets employed in the fishery, but that they are able to do this at will and are not entangled or otherwise harmed in the process.

Retained species are those that have a sufficiently significant commercial value to be guaranteed to be in demand for processing and sale (there is an economic incentive for capture). All remaining fish supplied to the factories for processing and sale is weighed and reported to the authorities. Conserved species information is collected by the Fisheries Research Institute.

Other species that are not normally harvested commercially are considered uncontrolled by-catch. Some by-catch species are released in the fishing grounds, in addition, additional sorting takes place at processing plants.

It should be noted that the by-catch may differ between different fishing gears in the sea and river areas.

By-catch of non-retained species in offshore areas in both set and seine nets constitutes an insignificant part of the catch in this fishery. Due to the very low percentage of by-catch relative to the target salmon species, “main” secondary fish species have not been identified. Minor secondary species can include many marine and freshwater species, including flounder (*Platichthys stellatus*, probably with other Pleuronectidae spp.), sculpins (mostly from Genus *Myoxocephalus sp.*), and jellyfish (Blikshtein, 2011; Semenov *et al*., 2016; Bugaev *et al*., 2018a).

The seine nets used in this fishery usually keep the entire catch of all target and non-target species alive until it is loaded onto boats and sent for processing. The first sorting of by-catch usually takes place in the fishing parcels, with the remainder transported to the fish processing facilities along with the target species. On-site fishermen do not perform a thorough sorting process, as the whole catch is transferred from the net to the slot, but they try to remove by-catch species during the hauling process whenever possible.

All bottom by-catch species (flounders, sculpins) remain in the lower part of the seine and, after the completion of the fishing operation, are released into the sea. They are very resistant to such operations and remain alive after release (MRAG 2020).

In seines, the catch is formed in the process of its towing to the shore, so all caught objects are kept alive and not damaged.

In fixed and drifting nets, there is no by-catch from this group at all, smaller fish species pass through a large mesh, and benthic species characteristic of marine areas are absent here.

By-catch species delivered to processing facilities are sorted at the start of the processing line. Their quantity usually does not exceed 15 or 20 kg per delivery. All non-target species delivered to the enterprises are usually processed to obtain fishmeal together with the heads and intestines of the commercial catch, which is in demand on the Russian market.

Due to the small volume, by-catch is not assessed either by the fishery or by the management system. There are no official data on the by-catch of cod, flounder and smelt in these fisheries (Shevlyakov, 2014). By-catch species are reported to be plentiful throughout the region and that such catch rates do not significantly affect these species. KamchatNIRO considers the catches of these species in this fishery unit to be very small or absent (Shevlyakov *et al*., 2017).

Thus, these by-catch species are abundant within the habitat boundaries, and random catch volumes from the salmon fishery do not pose a threat to by-catch species (Shevlyakov *et al*., 2016).

No specific information was available on other secondary species in this fishery.

Thus, it is practically impossible that the catch of any of the secondary species is 5% or more of the total catch. Therefore, for the purposes of this assessment, there are no main secondary species.

The star-shaped flounder *Platichthys stellatus* is probably the most abundant of the secondary species. Flounder is abundant within habitat boundaries and is managed according to TAC for commercial fisheries. According to KamchatNIRO, when fishing for salmon during the check of gear, fish by-catch is usually released alive (Bugaev *et al.*,

2018). The stock of flounder is in satisfactory condition as it is not the dominant species among flounders in the commercial fishery. A distinctive feature of the flounder dynamics is the absence of frequent quantitative changes in age groups and general populations, which ensures a stable long-term commercial catch with scientific support (Antonov, 2011).

7.3.4 ETP species

7.3.4.1 Management and information

The FTP Comandor JSC Pacific salmon fishery has the potential to catch different marine mammals, seabirds and fish that are threatened with extinction under the influence of various negative factors, characterized by low abundance and thus taken under the protection of both international and Russian legislation. Under international law, such species are listed on the Red List of the International Union for Conservation of Nature (The IUCN Red List of Threatened Species, 2016). IUCN is an international non-profit organization that aims at protection of the biodiversity, organizes congresses in different countries, presents news and lists of species that need special level of protection. The organization has observer status with the UN General Assembly. IUCN unites 82 countries (including the Russian Federation represented by the Ministry of Natural Resources and Ecology), 111 government agencies, more than 800 nongovernmental organizations and about 10,000 scientists and experts from 181 countries of the world. Since 1963, IUCN has maintained an international list of endangered species of animals and plants (The IUCN Red List). It distinguishes between the following degrees of threat to ETP species:

- *Extinct* (EX);
- *Extinct in the Wild* (EW);
- *Critically Endangered* (CR);
- *Endangered* (EN);
- *Vulnerable* (VU);
- *Near Threatened* (NT);
- *Least Concern* (LC);
- *Data Deficient* (DD);
- *Not Evaluated* (NE).

As a result of a resolution of the International Union for Conservation of Nature (IUCN) for protection of ETP species, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was signed in 1973 in Washington. The agreement entered into force on 1 July, 1975. The purpose of the Convention is to ensure that international trade in wild animals and plants does not endanger the survival of species. This agreement provides various degrees of protection for more than 33,000 species of animals and plants. Russia became a party to the Convention in 1992 as the successor of the Soviet Union, which signed this document in 1976. The convention requires each participant to assign a governmental body for the control over the licensing process, and a scientific organization responsible for expertise of the efficiency of measures.

The relevant international regulatory acts for the conservation of whales were developed under the International Convention on the Regulation of Whaling of 2 December, 1946 in Washington, USA. The Soviet Union ratified this Convention of July 15, 1948 (the successor to Russia since 1992). The International Whaling Commission (IWC) (https://iwc.int/) operates under this Convention. The main objective of the Convention is to ensure the proper conservation of whale populations in order to enable the orderly development of whaling. The main task of the International Whaling Commission is to monitor and, if necessary, adjust the measures outlined in the appendix to the Convention and regulating whaling in the world. The populations of many large whales were largely undermined by unregulated fishing. In 1975, the IWC adopted a new concept for whale management, aimed at bringing populations to a state capable of ensuring their sustainable long-term use. However, taking into account the lack of knowledge about the size and condition of populations, the IWC in 1982 decided to introduce a moratorium on commercial whaling of all kinds, starting from 1985-1986. This moratorium does not affect indigenous communities of Chukchi Peninsula of Russia (gray and bowhead whales.

Some ETP species are protected by various bilateral and multilateral governmental agreements, such as the Polar bear under the Agreement of 6 October, 2000, between the Russian Federation and the United States of America on the conservation and use of the Chukchi-Alaskan polar bear population, and the multilateral Agreement on the Conservation of Polar Bears (1973, Oslo), signed by Denmark, Canada, Norway, the Soviet Union (Russia) and the USA. The protection of different rare migratory species is also carried out under the Bonn Convention (http://www.cms.int/sites/default/files/instrument/CMS-text.en_.PDF). This is an international treaty concluded within the framework of the United Nations Environment Program, aimed at preserving wildlife and animal ranges on a global scale. The Convention was signed in 1979 in the city of Bonn and entered into force in 1983. A number of rare marine migratory birds are protected under bilateral agreements concluded by Russia with the USA, Japan, the Republic of

Korea, the China and other countries. Some rare marine birds are included in the Red Book of birds and key ornithological territories of Asia (works on the materials of the conference of the same name, Khabarovsk, April 1996 - Kondratyev, 1997; Nechaev, 1998 and others).

At the federal level, rare and endangered species of animals are listed in the Red Book (RB) of the Russian Federation (RB RF, http://www.mnr.gov.ru/regulatory/detail.php?ID=128273) and are protected by Federal Law of 24 April, 1995 No. 52 "On the Animal World" (http://base.garant.ru/10107800/#ixzz4JhWjr4SD); on the regional level – In the Red Book of the North of the Russian Far East (RB NRFE, 1998); at the level of the administrative division of the Far Eastern Federal District – to local entities: Red Book of Chukotka Autonomous Okrug (RB ChAO, 2008), Kamchatsky Territory (Krai) (RB KK, 2006), Magadan Oblast (RB MO, 2008), Khabarovsk Territory (Krai) (RB KT, 2006), Sakhalin Oblast (RB SO, 2015) and Primorsky Territory (Krai) (RB PK, 2005).

Table 27 provides the comparison between the protection statuses of species and populations defined by IUCN and by the Red Book of the Russian Federation:

Table 27: Protection statuses of species and populations of IUCN and the Red Book of the Russian Federation.

IUCN	Red Book of the Russian Federation
RE — Extinct	0 — Extinct
CR — Critically endangered	1 — Endangered
EN — Endangered	2 — Reducing in numbers
VU — Vulnerable	3 — Rare
NT — Near Threatened	-
LC — Least Concern	-
DD — Data Deficient	4 — Status not defined
(not present)	5 — Recovered and recovering

Possible risk coming from the bottom longline fisheries in almost all fishing areas of the Far Eastern Region may include: creating anxiety for marine mammals; physical contact of whales with vessels engaged in fishing and transport operations; accidental interception of mammals, birds and fishes with fishing gears; pollution of the environment by shipboard debris (including plastic) and the disposal of damaged fishing gear (net, various ropes, etc.).

If the protected species of fish are found in the catches, they should be immediately released into the natural habitat with the least damage in accordance with the Fishing Rules for the Far Eastern Fisheries Basin, Order of the Ministry of Agriculture of the Russian Federation dated 21 October, 2013 № 385.

7.3.4.2 Distribution and status of ETP species of the UoA

The Far Eastern seas of Russia are the most important areas of summer-autumn feeding, seasonal concentrations and reproduction of 19 rare species of marine mammals (15 species of whales, 2 species of seals and 2 species of higher predators). Most of these species are protected by international agreements and national legislation and are also listed in the Red Books of the coastal administrative entities of the Far Eastern Federal District.

On the western coast of Kamchatka, a large number of ETP species live, however, due to the peculiarities of the fishing gear used, which determine their high selectivity, especially in the fixed seine, most of these species do not come into contact with this fishery, or this contact does not harm them (because there is no retention and escape or live release is normal. Therefore, it is possible to distinguish only 4 ETP species, which to one degree or another contact or can contact with this fishery, two of them are presented in Table 28.

Table 28: Red Data Book animals and birds in Western Kamchatka that can be found in the fishing area.

1	Steller sea lion**:** *Eumetopias jubatus*  (Source: http://www.nhm.org/site/explore-exhibits/permanent-exhibits/north-american-mammals/stellar-sea-lion)	In the waters of Russia, it is distributed from the Bering Strait to Japan. On the coast of Kamchatka and the Komandorsky (Commander) Islands, it occurs all year round (4–9). The distribution in different seasons of the year varies markedly. In winter, animals live both in coastal waters, and at the ice edge and in the areas of trawl fishing for pollock and herring in the open sea.	IUCN Red List (NT), Red Book(RB) of Russian Federation (2), RB of Northern regions of Far East of Russia, RB of Chukotsky AO, RB of Kamchatsky Krai, RB of Magadanskaya oblast, RB of Sakhalinskay oblast, RB of Khabarovsky Krai, RB of Primorsky Krai.
2	Steller's sea eagle: *Haliaeetus pelagicus*  (Source: https://ru.wikipedia.org/wiki)	Nested on the Kamchatka Peninsula, Onekotan Island in the Kuril Islands, in the coastal zone around the Sea of Okhotsk, in the lower reaches of the Amur River, in the north of Sakhalin and on the Shantar Islands. Most of these birds winter south of their range - in the southern Kuril Islands, in the Khabarovsk Territory, Primorye, Sakhalin, and Hokkaido in Japan.	Red Book (RB) of Russian Federation

Although there is no permanent observation program for fisheries, federal scientists, managers and inspectors regularly visit fishing grounds and processing facilities throughout the season. For many years of fishing operations, none of these species have been adversely affected. Fisheries authorities have determined that the fishery has such a low impact that it does not require the collection of specific data on interactions with ETP species (MRAG, 2020).

Information on the number of populations of marine mammals in Kamchatka is well documented in the scientific literature (Burkanov, 1986, 1988; Lagerev, 1988; Kosygin *et al*., 1986).

Steller sea lion lives on the coast of eastern Kamchatka all year round, but its distribution and number varies depending on the season. In autumn, when the air and water temperatures drop, some of the animals probably migrate from the northern half of the coast to the southern. In winter, sea lions concentrate on those areas of the fishing fleet where it is probably easier for animals to get food (KamchatNIRO, 2017). Large males sometimes break the nets to get to the salmon. In Russia, the main sea lion rookeries were protected by the law on the conservation of northern fur seals and sea otters in the late 1950s. In 1994, they were included in the Red Book of Russia as endangered species (category 2), and their extraction was prohibited. These measures had a positive impact on the western part of the range, as the population increased in the area of Sakhalin Island, the Kuril Islands and in the northern part of the Sea of Okhotsk.

The Steller's sea eagle feeds on a variety of animals such as aquatic birds, small mammals, marine invertebrates, but they mainly prey on Pacific salmon. They feed on both live and dead fish. In general, the population of this species is stable (Red Book of Kamchatsky Krai, 2006).

There are also two fish species in this list:

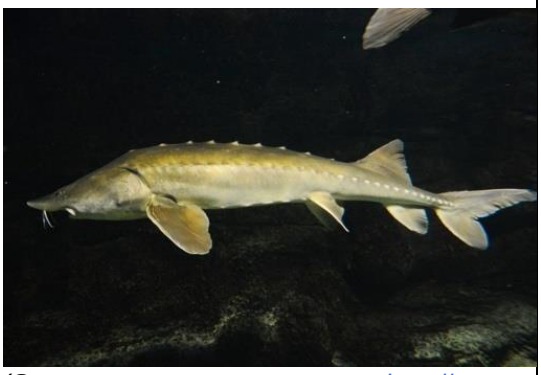
Kamchatka salmon *Parasalmo penshinensis* (Pallas, 1814)

Dwindling in numbers, this is a rare species that is endemic to Northeast Asia. In some basins of the Kamchatka rivers (Bolshaya, Mitoga, Utka) it is endangered. Lives in the rivers of Western Kamchatka from the Bolshaya River in the south to the Penjina River in the north. There is information about the occurrence of the species in some water bodies

of the eastern coast of Kamchatka – Khalaktyrka River near Avachinskaya Bay, area north of the Ozernaya River, Kamchatka River. Single finds are known in the Lankovaya River (mainland coast of the Sea of Okhotsk) and in the Amur estuary.

3	Kamchatka steelhead: *Parasalmo penshinensis*  (Source: The Red Book of the Kamchatsky Krai (2006).)	Decreasing, rare species. Endemic to Northeast Asia. In some basins of the Kamchatka rivers (Bolshaya, Mitoga, Utka) it is considered an endangered species. It lives in the rivers of Western Kamchatka from the Bolshaya River in the south to the Penzhina River in the north. There is information about the occurrence of the species in some bodies of water on the eastern coast of Kamchatka - the Halaktyrka River near Avacha Bay, an area north of the Ozernaya and Kamchatka rivers. Singly met in the Lankovaya River (mainland coast of the Sea of Okhotsk) and in the Amur Liman.	Red Book (RB) of Russian Federation (2), RB of Northern regions of Far East of Russia, RB of Kamchatsky Krai, RB of Magadanskaya oblast

Kaluga *Huso dauricus* (Georgi, 1775), Res List (RL) IUCN-2010 (CR), RB RF (1), RB NRFE RF, RB KK, RB SO

4	Kaluga: *Huso dauricus*  (Source: http://amur-heilong.net/http/03_species/0304kaluga_sturgeon.html)	The native range is located entirely in the Amur river, rarely found off the coast of Sakhalin, Hokkaido and the northern coast of the Sea of Okhotsk. It occurs on the Kamchatka coast singly, but relatively regularly in the estuarine spaces of the rivers of Western Kamchatka (rivers Palana, Bolshaya, Vorovskaya, Kolpakova). Since 1958, there has been a ban on the fishing of kaluga in Russian waters, and several hatcheries in Russia and China were introduced. Nevertheless, due to the poaching and pollution of the river, stocks haven't not being restored, and since 2004, their numbers have been reduced.	IUCN Red List (NT), Red Book (RB) of Russian Federation (1), RB of Northern regions of Far East of Russia, RB of Kamchatsky Krai, RB of Sakhalinskay oblast

The native area is entirely located in the Amur River basin; rare off the coast of Sakhalin, Hokkaido and the northern coast of the Sea of Okhotsk. Near the coast of Kamchatka, it occurs singly, but relatively regularly in the estuarine areas of rivers of Western Kamchatka (the Palana, Bol. Vorovskaya, Kolpakova rivers). Since 1958, a ban has been in effect on fishing for kaluga in Russian waters; on a small scale, fish hatcheries in Russia and China release juveniles. Despite the long ban on catching and releasing juveniles in the Soviet (now Russian) part of the Amur basin, due to the poaching press and pollution of the Amur, Kaluga stocks are not restored; since 2004, a decrease in its number has been noted. Young Kaluga feeding in the Amur Estuary off the western coast of Sakhalin Island.

On the western coast of Kamchatka, a large number of ETP species habitat, however, due to the peculiarities of the trap net, which determine its extremely high selectivity, and unlike the hook line or trawl, most of these species do not

come into contact with this fishery, or this contact does not harm them. Therefore, it is possible to distinguish only 4 ETP species, which to one degree or another are impacted by or may be impacted by the fishery.

Although there is no permanent observing program for fisheries, federal scientists, managers and inspectors regularly visit fishing grounds and processing plants throughout the season. For many years of fishing operations, none of these species have been recorded as adversely affected. Fisheries authorities have determined that the fishery has such a low impact that it does not require the collection of specific data on interactions with ETP species (MRAG, 2020).

7.3.5 Habitats

In general, human settlements are located in few sites and therefore the subsequent impact is concentrated only in these places. The magnitude of human footprint including road construction and other development activities in Kamchatka is very small, and its impact on the basin and river functions is very limited. Coastal habitats are influenced mainly 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 have very limited impact of coastal habitats, especially when it comes to a static/passive fishing gears such as traps, seines and gillnets. Any effects of these gears are generally local and temporary and therefore they do not have a significant long-term impact on the basin and river functions and its associated habitats. It is unlikely that fishery will reduce the structure and function of the habitat to the extent that significant or irreparable damage will occur.

7.3.6 Ecosystem – Ecosystem Structure and Function

The life cycle of Asian Pacific salmon combines freshwater and marine ecosystems: rivers and lakes, open waters of the Far Eastern seas and the North Pacific Ocean. During the marine life, salmon migrate thousands of miles and return to their native rivers and lakes, which are the main spawning and development sites for juveniles of their numerous populations. After the end of the freshwater life cycle, juveniles migrate to the sea or ocean, where they accumulate more than 90% of their biomass, before returning to fresh water for spawning (Groot and Margolis 1991).

The nutrients accumulated in the sea, in the form of decaying salmon carcasses after spawning, have a significant impact on freshwater and coastal communities (Gende *et al*., 2002; Schindler *et al*., 2003). It is known that these nutrients form the basis for the development of zooplankton in coastal areas, which serve as food for juvenile salmon immediately after migration downstream. According to Russian scientists, each Pink salmon carcass consists of 0.5% organic phosphorus (Kizevetter, 1971), and in the years of mass visits of Pink salmon, these carcasses provide the ecosystem with a large amount of nutrients. According to KamchatNIRO, in 1994, Pink salmon brought about 110,000 tons of organic matter or 550 tons of organic phosphorus to the ecosystem (Shevlyakov, 2014). Some of the dead fish flow into the sea, while the rest remains in the floodplains, where it breaks down into organic material that is included in food chains.

The catch of Pacific salmon has certain implications for river ecosystems. The relationship between salmon and population dynamics of their land-based predators is well understood (Gende *et al*., 2002). The most obvious connection can be traced between the abundance of salmon and populations of wild animals and birds of prey, in the diet of which salmon going for spawning are important: brown bear (*Ursus arctos*), Kamchatka fox (*Vulpes vulpes*), sable (*Martes zibellina*), ermine (*Mustela erminea kanei*), mink (*M. vison*), Steller's sea eagle (*H. pelagicus*), Pacific gull (*Larus schistisagus*), whooper swan (*Cygnus cygnus*) and many other mammals and birds.

The number of Kamchatka bears is inextricably linked with the abundance of spawning salmon entering rivers. During periods of high salmon abundance, the bear population grows due to an increase in the birth rate and survival of the offspring, and, conversely, during the depression years of salmon stocks, the number of both young and adult bears decreases. With the introduction of large-scale salmon fishing, trophic relationships in the ecosystems of the Kamchatka Peninsula have changed. It is assumed that in a wild ecosystem without human influence, fluctuations in salmon abundance were higher than now (Krasheninnikov, 1949; Steller, 1999).

In this regard, the sustainable use of this resource based on scientific modeling and forecasting is extremely important, which directly depends on the sustainability of each fishery unit.

In different years, depending on the periods of exploitation and the methods of accounting used, the number of brown bears 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 from the Agency for Forestry and Nature Protection of Kamchatka, there are about 21.5 thousand individuals.

This indicates that the population of Kamchatka bears is in good condition, and even there is a slight increase, which indirectly indicates the stability of the salmon fishing in Kamchatka.

Salmon also plays an important role in marine ecosystems. It is obvious that salmon is included in the food chains in the North Pacific Ocean and actively affects them, although this influence varies widely and depends on many factors (Naidenko, 2009).

Russian scientific institutes have conducted extensive research on juvenile anadromous individuals in oceanic ecosystems, on the stocks of anadromous species in the Bering and Okhotsk Seas, as well as in the ecosystems of the Western Subarctic Gyre and the Gulf of Alaska (Temnykh *et al*., 2010). This work also included monitoring and research of ecosystem relationships, including species composition and dynamics of the food web.

At the same time, the Far Eastern branches of VNIRO carry out regular long-term research and monitoring of the river ecosystems of the Kamchatka Peninsula, where a network of seasonal research stations operates.

The MSC defines 'key ecosystem elements' as the features of an ecosystem considered as being most crucial to giving the ecosystem its characteristic nature and dynamics, and are considered relative to the scale and intensity of the UoA. They are features most crucial to maintaining the integrity of its structure and functions and the key determinants of the ecosystem resilience and productivity (MSC 2018).

Given that the Pacific salmon have a major role in the productivity of aquatic and associated terrestrial life in the freshwater ecosystems of Kamchatka, by transferring marine nutrients to freshwater for fertilizing and enhancing productivity, the key ecosystem element for the FTP Comandor JSC Pacific Salmon fishery in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River is therefore considered to be salmon as a key food and nutrient source for the Bolshaya River and linked terrestrial and marine system.

7.3.7 Principle 2 Scoring elements

The Principle 2 scoring elements for FTP Comandor JSC Pacific Salmon fishery in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River are presented below in Table 29.

Table 29: Scoring elements.

Component	Scoring elements (common and scientific name)	Scoring elements (Russian name)	Designation	Data-deficient
Target species and Primary species	Pink (*Oncorhynchus gorbusha*)	Горбуша	Main	No
	Chum *(Oncorhynchus keta)*	Кета	Main	No
	Sockeye (*Oncorhynchus nerka*)	Нерка	Main	No
Primary species	Coho salmon (*Oncorhynchus kisutch*)	Кижуч	Main	No
	Arctic char (*Salvelinus malma)*	Голец или мальма	Main	No
	Saffron cod (*Eleginus gracilis)*	Навага	Minor	No
	Starry flounder (*Platichthys stellatus)*	Камбала звёздчатая	Minor	No
	Asian smelt (*Osmerus mordax dentex)*	Корюшка азиатская зубастая	Minor	No

Component	Scoring elements (common and scientific name)	Scoring elements (Russian name)	Designation	Data-deficient
Secondary species	Spotted seal (*Phoca largha*)	Пятнистая нерпа или ларга	Main	No
	Various non-commercial species in very small quantities (flounders, sculpins, jellyfish)	Камбалы, бычки, медузы	Minor	Yes
ETP species	Steller sea lion **(***Eumetopias jubatus***)**	Сивуч	N/A	No
	Steller's sea eagle: *Haliaeetus pelagicus*	Белоплечий орлан	N/A	No
	Kamchatka steelhead: *Parasalmo penshinensis*	Камчатская сёмга	N/A	No
	Kaluga *Huso dauricus*	Калуга	N/A	No
Habitat	Fine / Flat / No significant flora or fauna	N/A	Common encountered habitat (Main)	No
	VME	N/A	N/A	N/A
Ecosystem	Salmon as a key food and nutrient source for the Bolshaya River and linked terrestrial and marine system.	N/A	N/A	No

7.3.8 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome (for all UoAs)

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

According to MSC FS v2.01 SA 3.1.3.3, primary species are those species within the scope of the MSC program for which there are management tools and measures in place, intended to achieve stock management objectives reflected either in limit or target reference points.

Main primary species are those which account for at least 5% of the total catch. In this case two valuable species are present in the by-catch in such volumes: Coho salmon and Arctic char, the share of which in most cases exceeds 5%.

SG 60 and SG 80 are achieved because Coho and Arctic char stocks have been in good condition for many years.

Coho salmon stocks in Western Kamchatka over the past few years have generally been at a high level and reached a historical maximum in 2014–2015, amounting to 9198 and 9630 tonnes as respectively. In 2016-2017 there was a slight decrease in Coho salmon catches in Western Kamchatka, but nevertheless they are at a fairly high level.

Most of the Coho salmon stock enters after the end of the Pink and Chum salmon fishery. Therefore, the catch of Coho salmon in this fishery has very little effect on its spawning stock.

According to KamchatNIRO data the stability of the char catch is confirmed by a wide range of sizes and relatively stable sizes, as well as the age composition of this species. The total commercial catch of char is usually 70-80% of the recommended catch in the salmon season, that is, in fact, this species is underutilized and there is no threat to overfishing.

SG 100 is reached. It is highly probable that the Arctic char stocks are above the biological limits corresponding to the Point of Recruitment Impairment (PRI), according to historical trends in catch rates and the age composition estimated by KamchatNIRO from a commercial sampling survey. Catches hover around long-term averages. KamchatNIRO also concluded that current catch rates are robust based on the relatively stable size and age composition of these heterogeneous species.

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? All UoAs			**Yes**

Rationale

There are no limits for other non-salmon by-catch species in this fishery, as catch volumes are considered extremely low. The long-term dynamics and age composition of the populations of these species are well studied; catches of Starry flounder, Asian (Rainbow) smelt and Saffron cod fluctuate around long-term averages, which is consistent with the TAC. In addition, these species are partially released live in the fishing parcels.

Due to the small volume, by-catch is not quantified either by the fishery or by the management system. By-catch species are reported to be plentiful throughout the region and that such catch rates do not significantly affect these species. KamchatNIRO considers the catches of these species in this fishery unit to be very small or absent (Shevlyakov *et al*., 2017).

The impact of this fishery on these species is extremely small, specifically because of the lack of targeting and because of the short season and small footprint of the fishery relative to the range of these species. Even if below the PRI, the UoA would not hinder the recovery and rebuilding of these by-catch species. SG 100 is met.

References

- Shevlyakov *et al*., 2017.

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	
Condition number (if relevant)	**N/A**

PI 2.1.2 – Primary species management strategy (all UoAs)

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**	**Yes**
Rationale				

SG 60, SG 80 and SG100 are met. Forecasts of Coho salmon entering to the rivers of Western Kamchatka are based on data on catches of this species in all areas of fishing activity, information on the filling of spawning grounds by producers and data and other characteristics. The management system for all species of Pacific salmon, which includes coho salmon, has been successfully operating for several decades. Although catches of coho salmon may periodically fall below optimal levels, historical evidence indicates that natural mechanisms are sufficient to sustain significant production and harvest, especially during years of favourable environmental conditions.

Catches for Arctic char are determined based on historical catch data. Catches and age composition of char are monitored annually to identify any changes in abundance indicative of overfishing (Shevlyakov *et al*., 2016).

Management with a recommended catch system designed to control catch rates for char is not well founded by scientific research and is not comprehensive as for salmon, but is based on historical catch rates from the fishery.

Other primary by-catch species (Starry flounder, Saffron cod, Asian smelt), according to KamchatNIRO data, are numerous within the habitat boundaries, they are usually released at the catch site alive, and random amounts of catch in the salmon fishery are not dangerous for them (Shevlyakov *et al*., 2016). Given the very low catch of minor species, the measures for managing the fishery's impact (short season, mesh size, live release) are considered to comprise a strategy for minor species.

Therefore, a management strategy for minor priority species (by-catch) is in place and SG 100 is 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**	**Yes**
Rationale				

Fishing takes place in the local areas of the Client in a narrow coastal strip and in the Bolshaya River. Fishing effort, fishing gear, as well as territorial and time restrictions are applied within the framework of compliance with the requirements of the fishery protection of the territorial administration of the FFA and are easily controlled. Most species are abundant. Both main species (coho salmon and Arctic char) received a score for PI 2.1.1 above SG 80, SG 60 and SG 80 are respected.

Primary species are the object of the fishery and are actively used in other fisheries. The primary species are currently at a sustainable level of reproduction in Western Kamchatka.

Given this information and ongoing monitoring of the various by-catch stocks, the Assessment Team believes that there is some objective basis for confidence that the Fisheries Management Strategy will work. The SG 60, SG 80 and SG 100 requirements are expected to be 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 overall objective as set out in scoring issue (a).
	Met?		**Yes**	**No**

Rationale

There is evidence that the Strategy is being implemented, since most of the stocks of by-catch species according to long-term observations of KamchatNIRO are in good condition, control is carried out by representatives of the territorial administration of the FFA. However, there are no catch data specifically from the UoA, so while SG80 is met, SG100 is not.

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

There are no sharks in the catch. This scoring issue is N/A.

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? DT	**Yes**	**Yes**	**No**

Rationale

There is no unwanted by-catch of the main primary species – SG60 and SG80 are met.

SG100 is not met – the fishery management system includes specific measures to minimize unwanted by-catch mortality. These measures are periodically reviewed, but not every two years, so SG100 cannot be achieved. There are no main priority species in the fishing parcels of the Client, therefore there is no unwanted catch of such species, therefore SG60 and SG80 are achieved.

References

- Shevlyakov *et al*., 2016.

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	
Condition number (if relevant)	**N/A**

PI 2.1.3 – Primary species information (all UoAs)

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				
A large amount of quantitative information is collected on coho salmon and char as main primary species: on stock structure, productivity, size composition, biological characteristics and dynamics of spawning migrations. Regular catch registration and reporting is carried out. Changes in the management system over the previous decade ensure the accuracy of the catch, and the incentives for inaccurate accounting for tax evasion have been removed. Catch data are reported in real time during the fishing season. Estimates also include direct estimates of natural stock productivity on a regional and population basis. SG60 and SG 80 are reached. SG100 is not met. Due to insufficient funding for aerial photography, only episodic data were collected on the number of spawning spawners, which were insufficient for a reliable assessment of the spawning intensity of coho salmon in this region.				
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				
Changes in the management system over the previous decade ensured accurate reporting of catches, eliminating incentives for inaccurate accounting for tax evasion. Catch data are reported in real time during the fishing season. For minor species (Starry flounder, Saffron cod, Asian smelt), stock assessment programs are in place. Catches of these species in offshore areas are small due to the high specialization and timing of salmon fishing, while in river areas they are generally absent. SG 100 is met.				

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. Information on the catch of primary by-catch species is generally sufficient for a partial management strategy for the main primary by-catch species. SG100 is not met because the aerial photography system is not functioning for the assessment of main primary by-catch species, while the by-catch of Starry flounder, Saffron cod and Asian smelt is very small but is not reported by the Client.
References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**Any quantitative data on catches (or absence of catches) of primary species would support scoring.**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 2.2.1 – Secondary species outcome (all UoAs)

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

No secondary fish species comprises more than 5% of the total catch, which would require them to be classified as main species, and no secondary species is less resistant.

Spotted seals may interact with the fishery, specifically by depredating salmon from within the trap nets and gillnets employed. However, it is reported that these animals are able to undertake their activities freely and without being taken or otherwise harmed by the gears employed in the fishery. The global population of spotted seals appears to be growing, and the population in the Sea of Okhotsk was most recently estimated at around 180,000 animals (Boveng, 2016).

No by-catch of birds has been reported or observed in this fishery, and the technical features of these fishing gears generally minimises the possibility of entanglement and mortality in seabirds. But the assessment team will have to confirm this and get more evidence about during the site visit.

Overall, it is highly likely that main secondary species are above biologically-based limits – SG60 and SG80 are met. The lack of quantified observational data for catches in the fishery prevents a higher score.

b	**Minor secondary species stock status**			
	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 Utah does not hinder the recovery and rebuilding of secondary species.
	Met?			**Yes**

Rationale

SG100 – Minor secondary species (e.g., flounder and sculpin species, jellyfish mentioned in Principle 2 background section above) account for a very small proportion of the catch. It is considered that no secondary species are harvested in sufficient quantities to affect status. In terms of by-catch, the fishery is extremely selective, which is ensured by the characteristics of the fishing gear, short season and limited footprint of the fishery.

Biological limits for selected non-salmon species have not been established in this fishery, as the levels of exploitation in the salmon fishery are considered to be so low that they do not significantly affect the status of these minor or unexploited species.

Other secondary by-catch fish species have no commercial value, are widespread throughout the region and the impact of fishing from fixed and seine nets is very small compared to the distribution of this species. In fixed and drift nets these species of by-catch are generally absent in river sections. This information provides qualitative evidence that the by-catch of other minor secondary fish species in this fishery is at a score of SG 100.

References

- Being, 2016.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**More information on the technical features of the fishing gear that minimise their potential to catch birds and marine mammals would support scoring.** **Any quantitative data on catches (or absence of catches) of secondary species would also support scoring.**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 2.2.2 – Secondary species management strategy (all UoAs)

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 Utah 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 Utah does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the Utah 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 Utah does not hinder their recovery.	There is a **strategy** in place for the Utah for managing main and minor secondary species.
	Met?	**Yes**	**Yes**	**No**
Rationale				
Spotted seals are a main secondary species that interacts with the fishery, but the trap nets and beach seines employed in areas where these species occur pose a low risk to these species, and the technical features of these fishing gears generally minimises the possibility of entanglement and mortality in seabirds. This will be more clarified during the site visit. As such, SG60 and SG80 are reached. Limited catch monitoring confirms the generally very high selectivity of the fishing gear in relation to by-catch of incidental catch of minor species in the salmon fishery. Minor secondary species are rarely used in processing and many are released alive. SG100 is not met because no overarching strategy for managing secondary species has been defined. The management system considers strategies to reduce by-catch below existing levels to be unnecessary as current levels of mortality are considered insignificant.			
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				
The very low occurrence of secondary species in the catch provides an objective basis for the effectiveness of this strategy. There is also an objective belief that this strategy is effective for flounder and other fish for which there is a management strategy for these species. The coastal salmon fishery takes a very small part of the total flounder catch. The only major secondary species in this assessment are spotted seals and diving seabirds, however as described				

in PI 2.2.1, fishing gear used on offshore parcels are extremely unlikely to cause mortality in these species, and they are not present in river.

SG 100 is not met as there is no regular quantitative by-catch sampling program for other species, many of which are not conserved or are partially conserved.

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 – based on observer data across the region, the fishery strategy for catching salmon with a minimum catch of other secondary species has been successfully confirmed, as set and seine nets have low by-catch rates and allow the live release of non-target by-catch species. On river parcels in the net catches, there are practically no other types of by-catch, since the mesh size in the nets is intended specifically for returning salmon.

SG 100 is not met as there is no regular quantitative by-catch sampling program for other species, many of which are not or are partially preserved.

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?	**N/A**	**N/A**	**N/A**

Rationale

There are no sharks present in the catch, and so this SI is not applicable.

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 Utah-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 Utah-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 Utah-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	**Yes**	**Yes**	**No**

Rationale

There is considered to be a negligible interaction with seals and diving seabirds as main secondary species – SG60 and SG80 are met (GSA3.5.3, MSC 2018).

SG100 is not met. There are considered to be very few undesirable minor secondary species by-catch. There is periodic confirmation from scientific, management and enforcement officials of the effectiveness of measures to reduce by-catch mortality. The effectiveness and practicality of alternative measures to minimize fishery-related mortality from undesirable harvests of all minor species are tested for effectiveness and practicality, but not every

two years, as the level of impact is negligible.	
References	
• MSC, 2018.	
Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**More information on the technical features of the fishing gear that minimise their potential to catch birds and marine mammals would support scoring.** **Any quantitative data on catches (or absence of catches) of secondary species would also support scoring.**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 2.2.3 – Secondary species information (all UoAs)

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				
Spotted seals and diving seabirds are considered main secondary species. However, spotted seals are reported as able to undertake their activities freely and without being taken or otherwise harmed by the gears employed in the fishery, while no by-catch of birds has been reported or observed in this fishery, and the technical features of these fishing gears generally minimise the possibility of entanglement and mortality in seabirds. But the assessment team will have to confirm this and get more evidence about during the site visit. Unlike gillnets, trap nets use thick threads to keep birds from entangling, while the towing speed when hauling a seine net is extremely low and the birds, if they accidentally find themselves inside the catch, can freely leave the catch. The only danger to seabirds is represented by gillnets (fixed and drifting), but in this fishery they are exposed only in river areas away from the sea where these species live. It is considered that SG60 and SG80 is met, but in the absence of detailed quantified data it is not possible to say that the impact of the UoA on main secondary species can be assessed with a high degree of certainty – SG100 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				

All objective data from observers of different status convincingly confirm the high selectivity of this fishery, especially the set seine, and that catches of minor species are very small. Available information also indicates that this category of by-catch is generally released at sea in a live form.

However, these catches are not reflected in fishery statistics, their species composition is not determined, and a quantitative assessment is not performed by species. The requirements at SG100 are not met.

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

Spotted seals and diving seabirds are considered main secondary species. There is reliable information from periodic observations by scientific, management and enforcement officials that confirms the high selectivity of this fishery, the absence of mortality of main secondary species and the very low catches of minor secondary species. However, catch volumes and species composition of by-catch are not quantified and are not reflected in fishery statistics, fishery logbooks and observer reports. SG60 and SG80 are met, but not SG100.

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**More information on the technical features of the fishing gear that minimise their potential to catch birds and marine mammals would support scoring.** **Any quantitative data on catches (or absence of catches) of secondary species would also support scoring.**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 2.3.1 – ETP species outcome (all UoAs)

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/stock within national or international limits, where applicable**			
	Guide post	Where national and/or 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?	**N/A**	**N/A**	**N/A**
Rationale				
Russian legislation does not set limits for the ETP species, and so this SI is scored N/A.				
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 and SG80 are met. According to KamchatNIRO data (2018), sea lions and seals often climb into nets, eat and damage fish from the catch. But the design features of the set and back nets exclude the risks of getting entangled in the netting, perishing or getting injured. Steller's sea eagles do not dive for fish, therefore, dangerous contacts for these large birds with fishing gear are practically excluded. Therefore, there is a high degree of confidence that the interaction of these animals with this fishing gear does not pose any threat to them. When working with a seine net, Steller sea lions are usually seen to withdraw from the gear, but even if a sea lion observed within the gear it poses minimal risk since they are able to leave the nets at will. The nets set in river sections have no contact with Steller sea lion or Steller's sea eagles. SG60 and SG80 are met for these species. The FTP Comandor JSC company's policy prohibits the use of firearms while fishing. However, fishers may attempt to scare or drive the sea lions away from the gear when seen. Although it seems extremely unlikely that this would cause a detrimental effect (given the animals benefit from the easy foraging available within the nets), in the absence of better information on these practices, and following a precautionary scoring approach, SG100 is not				

considered met.

In addition, there is no program of systematic observations of these ETP species in the fishing grounds. Information on direct impact assessments and condition monitoring is limited.

If Kamchatka salmon or kaluga were taken in the gear then it is apparent that live release could occur from trap net and seine gears, while the probability of occurrence in the river parcels is extremely low. It is considered that SG0 and SG80 are met, but there are no data on the catches (or absence of catches) of these species, so 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**	**Yes**

Rationale

There is no realistic way in which the UoA is likely to interact indirectly with the Kamchatka salmon or the kaluga, for example through disruption of feeding or spawning behaviours, through the disruption to food supply or damaging key habitats.

For Steller sea lions and Steller's sea eagles, some indirect impact is possible as a result of harvesting salmon, which are the main food source for these species, as well as indirectly on all river and marine ecosystems with which the target objects of this fishery interact. However, the entire management system of the salmon fishery is aimed at maintaining its stability, and specifically to avoid over-harvesting, which is beneficial for the populations of these ETP species – SG80 is reached.

It is considered that SG100 is not reached – while it is clear that the fishery is at least highly unlikely to create unacceptable indirect impacts, these have not been investigated specifically and so form a precautionary position it is not possible to say there is a high degree of confidence that there are no significant indirect effects.

References

- KamchatNIRO, 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**More information on the technical features of the fishing gear that minimise their potential to catch birds and marine mammals would support scoring.** **Quantitative data on catches (or absence of catches) of ETP species would also support scoring.**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 2.3.2 – ETP species management strategy (all UoAs)

PI 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 and SG80 are met. National legislation provides for the protection of the ETP species included in the Red Book of Russia. Catching any species listed in the Red Data Book is prohibited in Russia, and if caught, they must be released immediately. If these rules are violated, a system of administrative and criminal penalties operates. The fishing strategy is aimed at reducing the threats and risks from fishing for these species: the design features of the fishing gear and the fishing regime ensure minimal interaction with ETP species. The strategy includes the controlling and minimising the length of season and areas in which fishing can occur, the ban on taking these species (including with rifles), as well as the technical features of the fishing gear that minimise the possibility of interacting with these species in a harmful way. All this is aimed at minimizing contacts with ETP species and reducing threats to them. SG100 are not achieved, as there is no specially designed comprehensive fisheries management strategy that would combine all possible protection mechanisms to protect ETP species.			
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?	N/A	N/A	N/A
Rationale				

As SIa is scored, this SI is not scored.

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 fisheries/species).	There is an **objective basis for confidence** that the measures/strategy will work, based on **information** directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a **quantitative analysis** supports **high confidence** that the strategy will work.
	Met?	**Yes**	**Yes**	**No**

Rationale

SG60 and SG80 are met. The current national system of legislation for the protection of ETP species fulfils its functions. Observations by management, scientific and enforcement officials strongly support the absence of negative impacts of fishing on ETP species and the effectiveness of measures that work to protect these species from fishing. There are no objective data indicating the negative impact of fishing on Steller sea lions, Steller's sea eagles, Kamchatka salmon and kaluga.

SG100 is not met. Information on ETP species is not collected systematically in this fishery, and there is no guarantee that fishermen will not apply tough measures to protect their catch from Steller sea lions and seals.

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 is met. SG80 reached. KamchatNIRO data and independent observer reports from other salmon fisheries in the region provide strong evidence that the measures and strategy are effective. It is reported that interaction with sea lions and Steller's sea eagle with fishing gear does not pose any threat to them. The probability of catching a kaluga or Kamchatka salmon (*Parasalmo penshinensis* or *P. mikyss*) is close to zero.

As far as the Evaluation Team knows, there is no overarching Strategy for the management of ETP species by the Units of Assessment (UoA) fishery. SG 100 requirements are 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**	**No**	**No**

Rationale
SG60 is met. The effectiveness of the protection of ETP species is regularly reviewed in the course of planned work by the regional territorial administration of the PAR and state environmental protection authorities. But regular and biennial reviews of the potential effectiveness and practicality of alternative measures to minimize in the Units of Assessment (UoAs) related mortality of ETP species is not planned every as a regular base and as every two years and are not being implemented. The requirements at SG80 and SG100 are not met.
References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**60-79**
Information gap indicator	**Quantitative data on catches (or absence of catches) of ETP species would support scoring.**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**2**

PI 2.3.3 – ETP species information (all UoAs)

PI 2.3.3		**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. 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.	Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA and associated 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.	Quantitative information is available to assess with a high degree of certainty the magnitude of UoA- and associated enhancement related impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	**Yes**	**Yes**	**No**
Rationale				
SG60 and SG80 are met. There is sufficient information available on interactions between the fishery and ETP species, as well as no fatalities resulting from this interaction from periodic observation by scientific, management and enforcement officials. Representatives of KamchatNIRO and inspectors of the territorial administration of the PAR and environmental protection authorities regularly visit the fishing areas and processing plants throughout the season. Fisheries authorities have determined that the fishery has such a low impact that it does not require the collection of specific data on interactions with ETR species. SG100 is not met. Quantitative information is not available to estimate with a high degree of confidence the magnitude of the fishery-related impacts, deaths and injuries, and the effects on stock status of ETP species in the Units.				
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**	**No**	**No**

Rationale
SG60 is met. Information from scientists and observers of KamchatNIRO and other branches of VNIRO, environmental organizations (WWF Russia), regional inspectors of the FFA and environmental protection authorities about the absence of impacts is adequate to support measures to manage the impacts of ETP species. In the absence of some level of routine sampling, it is not clear that information can be considered adequate to measure trends and support a strategy to manage impacts on ETP specs – SG80 is not met.

References
• Red Book of Species of Russian Federation.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**60-79**
Information gap indicator	**Quantitative data on catches (or absence of catches) of ETP species over time would support scoring.**

Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**3**

PI 2.4.1 – Habitats outcome (all UoAs)

PI 2.4.1		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

Fishing is carried out with fixed seines, mainly in the sublittoral zone, in a narrow, gentle coastal strip at depths from 10 to 20 m, less often up to 50 m, along the migration routes of Pacific salmon. These areas are dominated by sandy sediments, which are subject to active wave (especially during storms) and tidal effects. In this regard, benthic communities, especially epifauna, are extremely poor, sessile vulnerable forms of megabenthos are practically absent, and the entire bottom biota, including epifauna, infauna, and the bottom ichthyocene, is well adapted to periodic severe hydrodynamic wave impact.

Trap nets are a highly selective passive static fishing gear that, even when compared to other passive fishing gear (bottom hook longlines, crab and shrimp traps), has minimal impact on marine ecosystems.

The impact on the bottom and its inhabitants is limited to anchoring at the beginning of the fishing season and their removal at the end of the fishing season. Taking into account the features of benthic fauna described above, this impact is extremely insignificant. It can be noted that even in areas with a rich and vulnerable megafauna, the impact of these anchors on the bottom fauna is also insignificant and has a narrow-local, or rather, point-like character. Natural perturbation by waves or current action during the winter season is invariably considerably my impacting.

Seine netting is an active fishing gear, but the technological features (absence of a rigid bottom line and very low towing speeds) and the requirement for its use only in areas of clean seabed also greatly limit the possibility of negative impact on coastal habitats.

Fixed and especially flowing nets are passive fishing gear and have minimal contact with river ecosystems, and their impact is considered minimal.

It is considered there is evidence that it is highly unlikely that fishing will reduce the structure and function of the coastal and in river biotopes in the fishing area to the point where serious or irreversible damage is caused – SG60, SG80 and SG100 are met.

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	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

			harm.	or irreversible harm.
	Met?	**N/A**	**N/A**	**N/A**

Rationale

In Russian waters at the Far East, there are extensive areas with restrictions or prohibition of bottom trawling, for general habitat and species conservation purposes. However, the concept of VMEs and potential VMEs (as defined by the FAO Guidelines; see GSA3.13.3.2) has not been accepted, defined or identified in the region by Russian authorities as the management authority/governance body (Spiridonov et al. 2018), and therefore VMEs are not scored (MSC interpretation 'Identification of VMEs'[2]). Should this situation change in future, the fishery would need to be scored against VMEs at that time.

c	**Minor habitat status**			
	Guide post			There is **evidence** that the Utah 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

As far as the Assessment Team knows, there are no minor habitats. However, from a precautionary perspective, this SI is considered not met at the SG100 level.

d	**Impacts due to enhancement activities within the UoA**			
	Guide post	The enhancement activities are **unlikely** to have adverse impacts on habitat.	The enhancement activities are **highly unlikely** to have adverse impacts on habitat.	There is a **high degree of certainty** that the enhancement activities do not have adverse impacts on habitat..
	Met?	Yes	Yes	No

Rationale

The Ozerki and Malkinsky hatcheries on the Bolshaya River cover a physically small area in both cases, and activities (including those that may impact water quality) are regulated tightly (https://sv.glavrybvod.ru/rybovodnye-zavody/). More information will be sought at the site visit, but at this stage is considered that enhancement activities are highly unlikely to have adverse impacts on habitat – SG60 and SG80 are considered met, but SG100 will require further information.

References

- Spiridonov *et al.*, 2018.

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**

[2] https://mscportal.force.com/interpret/s/article/identification-of-VMEs-SA3-13-3-1527262008557

Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 2.4.2 – Habitats management strategy (all UoAs)

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA 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, SG80 are met. The fishing strategy is to use trap nets and seine nets in marine areas as low impact gears, as well as fixed and drift nets in river areas. Fishing is constrained by season and location, and in all cases, the impact of these gears on habitats is extremely low, including in comparison with natural processes (storms in marine areas and rain floods in river areas). The SG 100 requirements are not met because, to the knowledge of the Assessment Team, there are no mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts to habitats (i.e., see MSC definition of 'strategy', Table SA8, MSC 2018).				
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				
The fishery is conducted with standard fishing gear in a conservative mode, no increase in fishing efforts is envisaged. The specific features of the impact of set and seine nets on bottom communities are quite obvious, simple and well predicted, the impact of networks on river habitats is even lower. This is considered sufficient to provide an objective basis for confidence that the partial strategy will work – SG60 and SG80 are met. SG 100 requirements are not met because it is possible for the nets to be carried away by currents or a heavy floating object (log) and cause disturbances in river or marine habitats. The Assessment Team is not aware of the presence of a network accounting system that includes a search and recovery programme for lost gear.				
c	**Management strategy implementation**			
	Guide post		There is some quantitative evidence that the measures/partial strategy is being implemented	There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and

			successfully.	is achieving its objective, as outlined in scoring issue (a).
	Met?		**Yes**	**No**
Rationale				
The unofficial data of KamchatNIRO observers and inspectors of the territorial administration of the FFA convincingly confirm that fishing is carried out within the boundaries of the Client's fishing areas using permitted fishing gear – trap nets, seines and nets, the impact of which on bottom and pelagic ecosystems is tiny. SG100 is not met. There is no quantitative evidence that the impact of fishing on benthic communities is extremely small and that the fishing strategy is being successfully implemented and achieving its objective. There is no strategy for accounting and control of lost and spent networks.				
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?	**N/A**	**N/A**	**N/A**
Rationale				
As there are no VMEs to consider this SI is N/A.				
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				
Condition number (if relevant)		**N/A**		

PI 2.4.3 – Habitats information (all UoAs)

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, SG80 are met. Fishing in the coastal region is carried out with trap nets and seines, mainly in the sublittoral zone, in a narrow, gentle coastal strip at depths from 10 to 20 m, less often up to 50, along the migration routes of Pacific salmon. Fixed and drift nets are employed in river areas. The sea areas are dominated by sandy soils, which are subject to active wave (especially during storms) and tidal effects. On the river – gravel-sandy, in places silty soils, subject to periodic powerful effects of rain and melts floods. In this regard, benthic communities are very poor, sessile vulnerable forms of megabenthos are practically absent, and the entire bottom biota, including the epifauna, infauna, and bottom ichthyocene, is well adapted to the periodic hydrodynamic impact of waves and currents. The assessment team is not aware of the mapping of biotopes in the fishing grounds, so the requirements at SG100 are not met.				
b	**Information adequacy for assessment of impacts**			
	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:	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	The physical impacts of the gear and enhancement activities on all habitats have been quantified fully.

		Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	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.	
	Met?	**Yes**	**Yes**	**No**
Rationale				
SG60, SG80 are met. The types of biotopes in the fishing area are known, there is reliable information about the time and place of setting fishing gear. The impact of trap nets and seine nets on coastal habitats, as well as of set and drift nets on riverine biotopes is known at an adequate level and is considered tiny in comparison to the effect of natural processes. Sufficient information is available to determine that fishing activities are not significantly affecting habitats. The fishing is licensed and controlled by the state. SG100 is not met. There is no complete and detailed information on the spatial distribution and condition of biotopes, and the impact of fishing gear on them. There is no plan or strategy for accounting and control of waste and search for lost nets.				
c	**Monitoring**			
	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				
SG80 is met. Habitat risks of fishing can be assessed based on the number and location of fishing grounds that are licensed and regulated by the government. The fishery is regularly visited by KamchatNIRO observers, as well as by the state inspection, which monitors the effort of the fishery in the fishery area. In case of violations, the company is fined. This is enough to detect any increase in threats to the habitat from fishing. SG100 is not met. Physical habitat assessment has not been carried out (due to lack of significant impacts), therefore SG100 is not being implemented.				
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	
Condition number (if relevant)	**N/A**

PI 2.5.1 – Ecosystem outcome (all UoAs)

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

Pacific salmon have a major role in the productivity of aquatic and associated terrestrial life in the freshwater ecosystems of Kamchatka, by transferring marine nutrients to freshwater for fertilizing and enhancing productivity. As such, the key ecosystem element for the FTP Comandor JSC Pacific Salmon fishery in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River is considered to be salmon as a key food and nutrient source for the Bolshaya River and the linked terrestrial and marine system.

SG60, SG80 are met. Potential ecosystem problems associated with fisheries may be related to the impact of changes in salmon abundance on trophic relationships and ecosystem structure. For example, a decline in salmon populations due to fishing would be beneficial for its prey species, but negatively affect salmon-eating predators, and vice versa. Sustainable management of the salmon fishery will reduce the amplitude of fluctuations in salmon populations and the resulting consequences for ecosystems, including extreme negative ones. However, the UoA is very localised in space and time, and the long-term (about 100 years) data from KamchatNIRO on the biology, distribution and fishing of salmon in eastern Kamchatka provide a reliable basis for the conclusion that fishing is highly unlikely to disrupt key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm. The complex biological cycle, the huge range of Pacific salmon, the multifactorial influence of the environment at different stages of the life cycle determine the exceptionally high variability and difficult predictability of ecosystem processes associated with the dynamics of salmon abundance and the impact of fishing on ecosystems and their structures. Therefore, despite many years of observations of fishery data, population dynamics, ecosystem structure, trophic relationships and other ecological aspects, it is considered precautionary to say that SG100 is not met.

b	**Impacts due to enhancement**			
	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**	**No**

Rationale

Hatchery production of chum salmon and sockeye salmon in the Ozerki and Malkinsky hatcheries is relatively small, and the average long-term occurrence of these species in mixed catches in the Bolshaya River, based on

the results of otolith marking, was 3% for chum and 10% for sockeye salmon (Bugaev *et al*., 2018). The Assessment Team therefore concludes that hatchery production is unlikely to measurably alter the food web in fresh water and marine habitats.

Overall, enhancement activities supplement the numbers of fish returning to enhanced systems, thereby making additional food and nutrients available within watersheds (e.g. Larkin & Slaney, 1997). This is sufficient to meet the SG80 level of performance that 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. However, SG100 requires 'evidence', and the Assessment Team is not aware of studies focused on this issue in Kamchatka, therefore SG60 and SG80 are met, but SG100 is not.

References

- Bugaev *et al*., 2018.
- Larkin & Slaney, 1997.

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	
Condition number (if relevant)	**N/A**

PI 2.5.2 – Ecosystem management (all UoAs)

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, SG80 are met. For many decades, KamchatNIRO has been developing measures and a strategy for managing this fishery, which should ensure its sustainability, which includes the preservation of commercial salmon populations and associated river and lake ecosystems, on which the well-being of reproduction of these populations depends. This strategy also includes monitoring and researching marine ecosystems on a global scale to study the role of salmon in these ecosystems, its structure, trophic relationships, and forecasting their stocks. In general, this strategy is aimed at reducing the amplitude of fluctuations in salmon abundance and, as a consequence, reducing risks for all ecosystems, especially freshwater ones. The strategy takes into account all archival information; tracks new data obtained as a result of annual comprehensive studies, and should ensure fishing restrictions in the event that dangerous trends are identified for the ecosystem and its structure. SG100 is not met. The spatial extent and extreme complexity of ecosystems does not suggest that this strategy includes a specific plan that addresses all major impacts of fishing on the North Pacific and riverine ecosystems, or that all functional relationships between fishing and ecosystem components and elements are good studied. In addition, starting in 2015, problems began with aerial photography, as a result of which the data on the dynamics of the number of manufacturers in recent years became incomplete.			
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/ 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, SG80 are met. Salmon populations have natural dynamics with a high interannual amplitude of fluctuations in abundance, which is influenced by numerous and diverse environmental factors, including long-term climatic cycles. However, practical experience in the management of salmon fisheries and information from other systems over the historical period confirms that fishing measures can mitigate the risks of serious or irreversible damage to				

ecosystem structure and functions.

SG100 is not met. Testing the impact of fisheries on the ecosystem is very problematic, and to the knowledge of the assessment team it has not been undertaken in this system.

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, SG100 are met. During the historical period, KamchatNIRO carries out annual research and monitoring. Qualitative information and observation of the state of ecosystems confirms that river and coastal ecosystems are in a natural state, biodiversity and productivity of local communities are preserved.

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**	**No**

Rationale

Hatchery permitting processes control all aspects of production, including limiting the number of releases from the hatcheries, and require that appropriate, regular monitoring is undertaken, including of water quality. Information is available on the relative scale of natural and hatchery production (e.g., Bugaev *et al*., 2018), and hatchery contributions to the run and escapement provide information on the effectiveness of the production strategy. Both the hatchery operations and long-term monitoring provide sufficient monitoring to support the tested/evaluated artificial production strategy to achieve the Ecosystem Outcome SG80 level. At this stage, the Assessment Team is not aware evidence that the strategy is comprehensive and fully evaluated, so SG60 and SG80 are met, but SG100 is not.

References

- Bugaev *et al*., 2018.

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	
Condition number (if relevant)	**N/A**

PI 2.5.3 – Ecosystem information (all UoAs)

PI 2.5.3		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, SG80 are met. Long-term biological and ecosystem studies of KamchatNIRO strongly suggest that the fishery is unlikely to disrupt key elements underlying ecosystem structure and function to the extent that serious or irreversible damage can be caused. These ecosystem studies of freshwater and marine aquatic ecosystems include structural elements and trophic relationships between them, as well as the functions of the main elements of ecosystems (food base, predators, competitors, etc.), species composition of communities, productivity patterns, and quantitative characteristics of biodiversity. Key elements of freshwater and marine ecosystems of Pacific salmon have been deeply studied by Russian fisheries science and the world scientific community, the results of these studies are regularly published and discussed at the regional, federal and international levels.				
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, but **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**	**Yes**
Rationale				
SG60, SG80 and SG100 have been met. The trophic relationships and the influence of salmon on freshwater ecosystems, communities at the interface between fresh water and land, the relationship between salmon and the dynamics of populations of their land-based predators, as well as on the productivity of coastal areas and the development of a food base for juvenile salmon at the first stages of the marine part of life are all well studied. Over the past decades, a large array of data has been accumulated on the structure, trophic relationships, and functions of marine ecosystems in the North Pacific and the Far Eastern seas and the role of feeding salmon in this structure. SG100 has probably been reached. There are certain problems in assessing the impact of a complex of climatic and oceanological conditions on the productivity of populations. It is also known that short-term and long-term variability in stock productivity is largely related to ocean productivity models. There is a periodic change in the ocean productivity regimes depending on the favourable conditions. And although it is still impossible to predict future changes in salmon stocks, there is no complete and accurate picture of the impact of salmon fishing on marine ecosystems, these patterns, their consequences and the main structural, trophic and functional				

relationships are generally clear, however.

Thus, it can be concluded that there is information on the main interactions between the Units of Assessment (UoAs) fishery and ecosystem elements, and these have been investigated in detail, and SG100 is met.

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 species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		**Yes**	**Yes**

Rationale

SG80 is met. Long-term serial research has been carried out in freshwater and marine ecosystems of Kamchatka, the North Pacific Ocean, the Bering and Okhotsk seas.

SG100 is also met. A significant body of multiyear data has been accumulated from ecosystem surveys, which provides adequate information on the impacts of fishery in the Unit of Assessment on the components and elements of freshwater and marine ecosystems, which allows to conclude about the possible main impacts on these ecosystems, and the functions of the components.

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**	**Yes**

Rationale

Landing information together with research information on ecosystem characteristics of western part of the Sea of Okhotsk, including Kamchatka-Kuril subzone and linked terrestrial elements, is considered adequate to evaluate the impacts that the different UoAs have on the ecosystem and the main consequences for its components. The requirements at SG80 and SG100 are met.

e	**Monitoring**			
	Guide post		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		**Yes**	**No**

Rationale

Data continues to be collected by the different research institutes. Specifically, there is annual research on fish biomass of most of the fish species in the Kamchatka-Kuril subzone. The requirements at SG80 are met. While there is a great overview of ecosystem impacts by the UoAs, there is room for uncertainty in relation to predation needs by ETP species present in the Kamchatka-Kuril subzone and Bolshaya River. And while direct impacts of the UoAs on these species are not expected, the team is not aware of any research to confirm this. The team considers that there is a good load of information on Kamchatka-Kuril subzone and Bolshaya River, however is uncertain on if this information is sufficient to develop strategies to fully manage ecosystem impacts. The requirements at SG100 are not met.
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	
Condition number (if relevant)	**N/A**

7.3.9 Principle 2 References

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7.4 Principle 3

(Note – all hyperlinks provided in the following sections were accessed successfully in November 2020).

7.4.1 Principle 3 background

7.4.1.1 Governance and Policy

The Russian Federation consists of various levels of autonomy with its centralized authority represented by the federal government in Moscow, where final decisions are made. In Russia, fisheries management has developed since the rupture of the former USSR. Similarly, the fisheries management system consists of different levels of authority for management and research, also with final decisions centralized in Moscow.

Russian fisheries management has a federal body and regional offices in Russia's eight fishery regions (basins): 1) the Far Eastern, 2) the Northern, 3) the Western, 4) the Black and the Azov Seas, and 5) the Baikal 6) the Volga-Caspian, 7) the East Siberian and 8) West Siberian (Source: http://fish.gov.ru/territorialnye-upravleniya).

The Federal Fisheries Agency (FFA or in Russian: Росрыболовство / Rosrybolovstvo) is by far the most important fisheries management body in Russia. By Presidential Decree No. 724 on 12 May 2008, the FFA replaced the pre-existing State Committee for Fisheries under the Ministry of Agriculture. The FFA has been directly submit to the Government, but due to some changes in the Russian Government structure (in May 2012), the FFA is now subordinating to the Ministry of Agriculture. In other words, the FFA is an implementing authority of the decisions that are made by the Ministry of Agriculture (Source: http://fish.gov.ru/). In addition, the Department of Regulation in the Field of Fisheries and Aquaculture (Fish Farming), under the Ministry of Agriculture of Russia, carries out the practical implementation of the functions assigned to the Ministry for the development of state policy and legal regulation (Source: https://mcx.gov.ru/ministry/departments/departament-regulirovaniya-v-sfere-rybnogo-khozyaystva-i-akvakultury-rybovodstva/).

The fishery is totally under the national jurisdiction and is performed only in the EEZ of the Russian Federation so it is managed at national level and therefore only the Russian's fisheries management system should be considered.

7.4.1.2 Legal and/or customary framework

In the Russian management system there is no explicit environmental policy that refers directly to fisheries. A series of inter-linked laws, decrees, orders, and rules consistent with local, national, and international mandates, are in place, instead of a specific policy, to protect the environment and fisheries resources.

The Federal Law "**On Fishery and Protection of Aquatic Biological Resources**" (2004) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/), (as amended by Federal Law of October 15, 2020 N 331-F3 "On Amendments to the Federal Law" https://rg.ru/2020/10/20/o-rybolostve-dok.html), is the overarching framework for fishery regulation in Russia. The main goals and objectives for the fishery sector are not clearly defined in the regulatory documents. This law defines Total Allowable Catch (TAC) levels for fishery stocks as "*scientifically justified annual catch of aquatic biological resources of particular species in a fishing area*" (**Article 1.12)**). It also states the protection and conservation of aquatic biological resources "*regulation of relationship in the field of fishery and conservation of aquatic biological resources is performed on the basis of perceiving them as a natural entity, protected as most important component of Nature, a natural resource, used by human being for human consumption and also a basis of performing economic and other activities, and, at the same time as a property right object*" (**Article 2.1**). The Law also argues "*priority of conservation and rational use of aquatic bio-resources over the use of bio-resources as property right objects*" (**Article 2.2**). Besides TAC setting for industrial fishery, all categories of fisheries are regulated by so-called Fishing Rules "Pravila rybolovstva / Правила рыболовства", which are set separately for several major areas or basins. These Fishing Rules sets management measures to regulate the condition of fishery in particular areas and specify fishing closures, gear regulation, minimum allowable size of commercially caught specimens of particular species, and allowable bycatch of non-target species (**Articles 16.2** and **16.3** of Fishing Rules). The Law also gives a definition of a fishing unit area "rybolovnyy uchastok / Рыболовный участок" and sets general principles of their use (**Articles 18** of Federal Law). Compiling lists of fishing unit areas is delegated to regional authorities. The fishing rules for the Far Eastern Fisheries Basin (as amended on July 20, 2020) (Source: http://docs.cntd.ru/document/554767016; http://xn--b1a3aee.xn--p1ai/pravila-rybolovstva.html).

Supporting pieces of primary legislation to the Federal Law (2004), include:

The Law of the Russian Federation "**Federal Law of the Russian Federation on Wildlife (No. 52-FZ of 1995)**" (Source: https://www.ecolex.org/details/legislation/federal-law-of-the-russian-federation-on-wildlife-no-52-fz-of-1995-lex-faoc022375) stipulates that animal organisms inhabiting the territorial seas, the internal marine waters, the continental shelf and the EEZ of the Russian Federation, those migrating between two or more administrative regions, and those subject to international agreements, are federal property. Therefore, it is a responsibility of the federal institutions to manage, monitor and enforce marine fisheries. It also sets the general requirements for TAC setting to harvest the kinds of the Animal World are defined in this law. Also the law declares a conservation priority in case the

fishery affects endangered species listed in the Red Book of the Russian Federation (Order of the Ministry of Natural Resources and Environment of the Russian Federation dated March 24, 2020 No. 162 "On approval of the List of wildlife objects included in the Red Book of the Russian Federation" - http://docs.cntd.ru/document/564578614; https://redbookrf.ru/).

The two Federal Laws "**On the Continental Shelf of the Russian Federation**" **(1995)** (Source: http://extwprlegs1.fao.org/docs/html/rus21902E.htm) and "**On the Exclusive Economic Zone of the Russian Federation**" EEZ **(1998)** (Source: https://www.ecolex.org/details/legislation/federal-law-no-191-fz-of-1998-on-the-exclusive-economic-zone-lex-faoc027457) set the principles of sovereign rights and jurisdiction of the Russian Federation over the aquatic biological resources found on the Continental Shelf and the EEZ of the Russian Federation, and provided general regulation for scientific research including the fishery research.

The Federal Law "**On Protection of the Environment**" **(2001)** (Source: https://rg.ru/2002/01/12/oxranasredy-dok.html) defines the legal basis for state policy in the field of environmental protection, ensuring a balanced solution of socio-economic tasks, maintaining a favourable environment, biological diversity and natural resources in order to meet the needs of present and future generations, strengthen the rule of law in the field of environmental protection and ecological safety. It has a number of articles related to fisheries impact on environment. The (**Article 5**) defines the procedure of state control and monitoring in the field of environmental protection on objects of economic activities (e.g. fishing), including cross-border environmental pollution that have a negative impact on the environment within the territory of the Russian Federation. The (**Article 15**) defines how the development of federal programs in the field of environmental protection of the Russian Federation should be based on the proposals of citizens and public organizations. Legal entities and individual entrepreneurs engaged in economic and other activities (e.g. fishing) that have a negative impact on the environment are required to plan, develop and implement measures for environmental protection in the manner prescribed by law.

The list of anadromous fish species that are managed based on recommended catch is approved by order of the FFA from February 26, 2009 No. 147 "**On approval of the list of anadromous species of fish that are caught (caught) in accordance with Article 29.1 of the Federal Law "On Fisheries conservation of aquatic biological resources**" (Source: http://docs.cntd.ru/document/902151646).

The Order of the Ministry of Agriculture of Russia dated 08.04.2013 N 170 (as amended on 02.26.2020) "**On approval of the Procedure for the Commission for Regulation of the Production (Catching) of Anadromous Fish Species**" approves procedures for the activities and roles of the commission for the regulation of the extraction (catch) of anadromous fish species in the inland waters of the Russian Federation and in the territorial sea of the Russian Federation (Source: http://docs.cntd.ru/document/499016590).

The Fishing Rules for the Far Eastern Fisheries Basin (as amended on July 20, 2020) are found at (Source: http://docs.cntd.ru/document/554767016; http://xn--b1a3aee.xn--p1ai/pravila-rybolovstva.html). Every year the regulations and legal framework of salmon fishing season are supplemented by the order of the FFA "On Organization of Salmon Fishing Season in the Far Eastern Fisheries Basin" and the decree of the Head of the FFA "On approval of the Action Plan for Organization and Conduct of salmon Fishing Season in the Far Eastern Fisheries Basin".

- Further Federal laws can be found at the website of North-Eastern Territorial Administration of Federal Fisheries Agency (hereinafter North-Eastern TA of FFA, or in Russian: Северо-ВосточноетерриториальноеуправлениеФедеральногоагенствапорыболовству – СВТУФАР) (Source: http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/normativnaya-pravovaya-baza.html).

7.4.1.3 Rights and dispute resolution

In Russia, in general terms, quota distribution for fish stocks that are shared with other countries, as well as for exclusively Russian stocks is a responsibility of Ministry of Agriculture and the FFA. Since 2019, fishing rights are allocated for 15 years, while previously they were given for 10 years. This extension was adapted to ensure stability for the fishing fleet and stimulate companies to invest in renewing ageing vessels.

In 2016, the Federal Law 2004 was amended (No. 349-FZ dated July 3, 2016) to introduce a new type of quota called – quota for investment objectives. The volume of quotas for investment objectives may be up to 20% from TAC approved for the current year. New quota types also were introduced to encourage fishing fleet renewal, development of at-sea and coastal resources processing and increase effectiveness of raw materials utilization. So, taking into account amendments to the Federal law 2004 the quota types are: 1) industrial (= commercial) quotas; 2) coastal quotas; 3) scientific quotas for scientific and research and monitoring purposes; 4) fishery quotas for educational and culturally educational purposes; 5) fishery quotas for aquaculture purposes; 6) amateur and sport (recreational) fishing quotas; 7) quotas for fishing in order to ensure the traditional life style and the implementation of traditional economic activities of the indigenous peoples of the North, Siberia and the Far East of the Russian Federation; 8) quotas in the areas of international treaties; 9) quotas in the Russian EEZ for foreign countries (intergovernmental agreements); 10) industrial (= commercial) quotas in domestic fresh water reservoirs; 11) quotas for investment objectives.

In Pacific salmon fisheries, recommended volume of catch are assigned by "the Commission of Anadromous fish species" for each group of fishing parcels leased by each company in one fishing area, where these companies have a separate fishing license for each fishing parcel (Kurilova, 2014). Since 2008, fishing parcel license are given for 20 years to encourage companies to develop long-term and sustainable fishing practices, to reduce the number of users in specific areas and to reduce incentives of misreporting harvest. The priority in the recommended volume of catch allocation is based on the proven catch capacity (track record) or credit history, i.e. those, with proven long-term commitment for sustainable fishing, have fulfilled former quota agreements successfully and provided employment to local people (Kurilova, 2014).

These preliminary volumes of recommended catch can be changed/adapted during the fishing season (in-season management) according to the strength of anadromous migration of one or another species of Pacific salmon (usually for Pink salmon), but always within the volume established by "the Commission of Anadromous fish species" for each specific fishing area. Within each of the fishing areas, a unique "Olympic system" is used. This leads to competition between companies in the same fishing area to get more catch within the total recommended catch allocated for that fishing area. When the full volume of the recommended catch is achieved, then the fishery is closed for all companies, or the volume of the catch can be increased, if necessary.

Moreover, the rights of fishing dependent communities are also explicitly stated in the Russian legislation. On October 1, 2020, the Ministry of Justice of the Russian Federation registered the Order of the Ministry of Agriculture of the Russian Federation of September 1, 2020 No. 522 "On approval of the Procedure for fishing in order to ensure the traditional way of life and the implementation of traditional economic activities of the indigenous peoples of the North, Siberia and the Far East of the Russian Federation." (Source: http://publication.pravo.gov.ru/Document/View/0001202010050066?index=0&rangeSize=1; https://rg.ru/2020/10/06/minselhoz-prikaz522-site-dok.html). The previous order of April 11, 2008 N 315 does not apply from 10/16/2020 on the basis of the order of the Federal Agency for Fishery of 09/01/2020 N 458. Other pieces of legislation that guarantee the rights of fishing for indigenous peoples include: Federal Law of April 30, 1999 No. 82-FZ "On Guarantees of the Rights of Indigenous Minorities of the Russian Federation" (Source: http://docs.cntd.ru/document/901732262), and Decree of the Government of the Russian Federation of March 24, 2000 No. 255 "On the Unified List of Indigenous Minorities of the Russian Federation" (Source: http://docs.cntd.ru/document/901757631). The Russian Association of Indigenous Peoples of the North (RAIPON) (Russian: Ассоциация коренных, малочисленных народов Севера, Сибири и Дальнего Востока Российской Федерации (АКМНССиДВ) is the Russian national umbrella organisation representing 41 indigenous small-numbered peoples of the North, Siberia and the Far East. Further information, including the catch reporting form, for indigenous people can be found at the website of North-Eastern TA of FFA (Source: http://xn--b1a3aee.xn--p1ai/informatsiya-dlya-kmns/vazhnoe.html; http://xn--b1a3aee.xn--p1ai/images/docs/Prikazi_2019/3110_forma.pdf).

Table 30: Report on the review of citizens' appeals to the North-Eastern TA of the FFA in 2019.

	1st quarter 2019	2nd quarter 2019	3rd quarter 2019	4th quarter 2019
Received letters	3	27	18	7
Accepted citizens' appeals	7	6	5	9
The effectiveness of the review of control letters in the office (structural unit) Including:	2	18	17	6
- decided positively	0	0	0	0
- measures taken	0	2	0	0
- explained	2	2	5	6
- denied	0	0	0	0
- left unanswered (anonymous)	0	0	0	0
- redirected by accessory	0	14	12	0

Disputes at national level are solved at the court system. In Russia, a transparent court system mechanism is provided to avoid and resolve disputes and issues arising between the fishing companies and inspectors. According to the Federal Law of May 2, 2006 No. ФЗ-59 "On the Procedure for Considering Appeals of Citizens of the Russian Federation" citizens have the right to apply in person, as well as to submit individual and collective appeals to state bodies, local self-government bodies, and officials (Source: http://base.garant.ru/12146661/). The procedures for the reception and consideration of citizen's proposals and the rules for submission of appeals are specified in the official website of the FFA (Source: http://fish.gov.ru/obrashcheniya-grazhdan/poryadok-priema-i-rassmotreniya-obrashchenij-grazhdan). For example, the North-Eastern TA of the FFA (see section 1.1.4.) provides the opportunity

for citizen proposals and the submission of appeals in the Kamchatka region (Source: http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/elektronnoe-obrashchenie.html). Similarly, the government of Kamchatka provides different ways for the submission of appeals (Source:https://www.kamgov.ru/obrashenia-grazdan). The results of the citizens' appeals to the North-Eastern TA in 2019 are shown in Table 30 (Source:http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/elektronnoe-obrashchenie-2.html).

The court considers cases that can be regarded as serious violations (for example, overfishing or unauthorized by-catch). The results of any disputes in the court system can be consulted at the website of the Federal Arbitration Courts of the Russian Federation (Федеральные арбитражные суды Российской Федерации) (http://www.arbitr.ru) as well as for the territorial level, for example, at the website of Arbitration Court of Kamchatka territory (Арбитражный суд Камчатского края) (https://kamchatka.arbitr.ru/). In practice, most of disputes are resolved through the management system, which includes extensive formal and informal opportunities for interaction between fishing companies and other stakeholders with the authorities (for example, to resolve disputes, disagreements and conflicts between users, as well as between users and authorities).

7.4.1.4 Roles and responsibilities

The roles and responsibilities of the Russian fisheries management organizations are presented below (Figure 65).

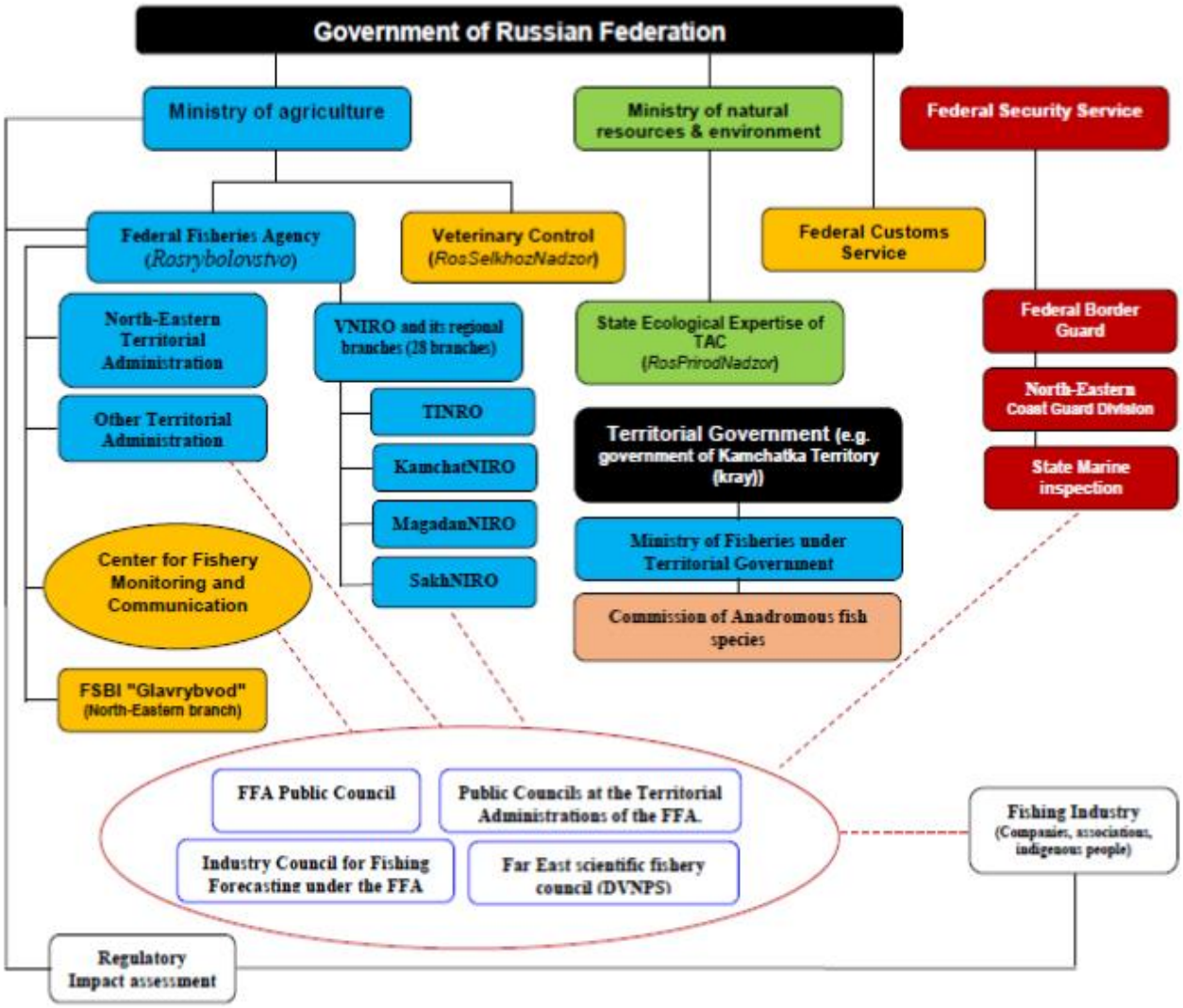

Figure 65: Structure of the fishery management system in Russia.

The Ministry of Agriculture of Russian Federation is responsible for developing policies on fisheries (Source: http://mcx.ru/), while the FFA act as its executive arm, in accordance with the Russian legislation, over the territory of Russia, the exclusive economic zone and continental shelf of Russia, as well as in those cases covered by Russia's international treaties, on the territory of foreign countries and international waters. The FFA has regional branches which implement fishery regulations in its own region. The FFA maintains a central administration to ensure

coordination of regional fishery management processes. Communication between regional branches and the FFA is an integrated process of continuous informal and formal procedures (Source: http://fish.gov.ru/).

By decrees and amendments, the main functions and roles of the FFA are:

- To develop laws, orders, and rules related to fishery management, all of which are issued by the Ministry of Agriculture of Russia;
- To manage the protection, rational use, study and reproduction of aquatic biological resources and their habitats;
- To perform fisheries control and enforcement functions;
- To promote scientific research and surveys of resources;
- To ensure that TACs (total allowable catches) and PCs (possible (recommended) catches) are set for aquatic biological resources in Russian EEZ and internal waters;
- To deliver public services in the area of fisheries, conservation, sustainable use, study, preservation and reproduction of aquatic biological resources and their habitat;
- To arrange adequate observation and monitoring activities and manages the Centre for Fishery Monitoring and Communication (CFMC);
- To distribute TACs among various types of quota;
- To allocate quotas among fishing companies;
- To issue catch permits for companies and fishing vessels;
- To provide for safety and rescue operations on fishing grounds; and
- To coordinate activities related to ports and vessel maintenance.

Operational management and FFA functions are delivered by Territorial Administrations of the FFA located in Primorye, Kamchatka, Sakhalin, Magadan, etc. (in total there are 18 TAs across Russia). Depending on where the fishing company is registered, its fishing activity is controlled and managed by a FFA Territorial Administration. For instance, if a company is registered in Kamchatka, it reports to the FFA Kamchatka department. But regardless the area of registration, a company can operate (harvest) in any fishing zone across the whole Far East Fishery Basin (having a valid fishing permit). For example, the North-Eastern Territorial Administration of the Federal Fisheries Agency (In Russian: Северо-Восточное территориальное управление / Severo-Vostochnoye territorial'noye upravleniye) (hereinafter North-Eastern TA of the FFA) is the government branch subordinate to the Federal Fisheries Agency (Source: http://xn--b1a3aee.xn--p1ai/). It exercises the FFA roles including fisheries management in Kamchatka Region including the fishery under assessment.

The Federal state budgetary institution "Centre for Fishery Monitoring and Communications" (In Russian: Центр системы мониторинга рыболовства и связи) (CFMC) provides state monitoring of aquatic biological resources, and monitoring the activities of fishing vessels (Source: http://cfmc.ru/). At the federal level, the head monitoring centre is located in Moscow and carries out processing, storage and analysis of data received by the Industry Monitoring System (IMS; a synonym for VMS) from the regional centres. There are two regional monitoring centres - Western and Eastern, and 7 representative offices, including the Kamchatka, Vladivostok, Sakhalin offices (Source: https://cfmc.ru/filialy-i-otdely/), which ensure the functioning of the IMS in the region and the collection of data.

The Federal Security Service of the Russian Federation (hereinafter FSB) (In Russian: Федеральная служба безопасности России) through its Border Guard Department of the FSB of Russia (In Russian: Пограничная служба ФСБ России) is a control and enforcement body responsible for, within the limits of its authority and among other functions, the protection and safeguard of the border territory, the exclusive economic zone and the continental shelf of the Russian Federation, as well as state control in the field of protection of marine biological resources regarding transboundary fish species and highly migratory fish species in the open sea, in accordance with the existing treaties of the Russian Federation (Source: http://www.fsb.ru/ and http://ps.fsb.ru/). Duties and responsibilities of Coast Guard Inspectors, among other things, include:

- enforce and control compliance of the fishing rules and regulations;
- check catches of marine biological resources taken by fishing companies (during fishing, during trans-shipments, unloading in ports) in order to prevent overfishing above the approved limits;
- check VMS (satellite control equipment);
- inspect vessels (fishing and transport), inspect holds, check cargoes and products;
- check fishing gears and equipment;
- check fishing and processing logbooks, fishing permits, Daily Vessel Reports (DVR), other documentations and reporting;
- identify, prevent or eliminate violations of fishery regulations and fishing rules, and, where applicable, international fishery agreements;
- bring offenders to prosecution in accordance with law;

- inform state authorities, and their regional bodies, on catches taken by fishing companies, violations identified, penalties imposed and fees paid.

Federal Customs Service (In Russian: Федеральная таможенная служба) is responsible for, within the limits of its authority and among other functions, inspecting fish products landed in Russia waters and destined for export. Since 2009, all fish and fish products caught in the Russian EEZ must be delivered into the Russian ports for clearance (Based on the Federal Law No. 333-FZ of 6 December 2007 “On Amendments to Federal Law “On Fisheries and Aquatic Biological Resource Conservation” and Some Legislative Acts of Russian Federation”). Before 2009, it was allowed to trans-ship fish caught in the Russian EEZ at sea without clearing customs inspections. Therefore, the Federal Customs Service plays an important role in increasing traceability and cooperates with the FFA and FSB in controlling international transfer and shipping of Pacific salmon and other Russian fishery products.

The Commission for the Regulation of the Production (Catching) of Anadromous Fish Species (Комиссия по регулированию вылова (добычи) анадромных видов рыб / Komissiya po regulirovaniu vylova (dobychi) anadromnykh vidov ryb) (hereinafter referred to as "the Commission of Anadromous fish species"), is a governmental commission subordinating to the Ministry of Fisheries under the territorial governments (e.g. Government of Kamchatka), that was established in 2008 (Source: http://docs.cntd.ru/document/499016590). It plays an important role in the allocation of “recommended catch volumes” for each pacific salmon species (also for Arctic char) by different type of quotas, before and during the fishing season.

FSBI "Glavrybvod" Federal State Budgetary Institution “Main Basin Administration for Fisheries and the Conservation of Aquatic Biological Resources” (In Russian: ФГБУ "Главрыбвод" Федеральное государственное бюджетное учреждение «Главное бассейновое управление по рыболовству и сохранению водных биологических ресурсов») is an institution for the conservation of aquatic biological resources and which subordinates to FFA (Source: https://glavrybvod.ru/). It has 29 branches all around the Russian Federation (Source: http://www.fish.gov.ru/podvedomstvennye-organizatsii/rybvody). The North-Eastern branch of FSBI "Glavrybvod" (In Russian: Северо-Восточного филиал ФГБУ "Главрыбвод") is the branch subordinate to the North-Eastern TA which includes the UoAs under its zone of activities (Source: http://xn--b1aa5bc.xn--p1ai/). The North-Eastern branch of FSBI "Glavrybvod" is currently engaged in the conservation and reproduction of fish stocks in the Far East basin - its area of responsibility includes regions of the Kamchatka Territory and the Chukotka Autonomous Okrug. The objectives and main activities of the branch are:

- The conservation of aquatic biological resources in accordance with the legislation of the Russian Federation through the implementation on the basis of scientific data of measures for the study, reproduction, rational use of aquatic biological resources and their habitats.
- Ensuring state accounting and state monitoring of aquatic biological resources.
- Implementation of measures to restore aquatic biological resources and their habitat disturbed as a result of natural disasters and for other reasons.
- Participation in the implementation of international treaties and agreements of the Russian Federation in the field of fishing and fisheries.
- Reproduction is one of the main areas of activity of the Northeast branch of the FSBI “Glavrybvod”.

Figure 66: Locations of the 5 governmental hatcheries and species composition of Pacific salmon, which are the objects of artificial reproduction in the Kamchatka Territory.

The activities of the North-Eastern branch of FSBI "Glavrybvod" in Kamchatka are carried out by 5 fish salmon hatcheries (see Figure 66), in which two hatcheries (Ozerki and Malkkinsky) found in the zone of the fishery under this assessment:

1. Ozerki salmon hatchery (In Russian: ЛРЗ "Озерки").
2. Malkinsky salmon hatchery (In Russian: ЛРЗ Малкинский).
3. Ketkino salmon hatchery (In Russian: ЛРЗ "Кеткино").
4. Paratunsky experimental production salmon hatchery (In Russian: ЭПЛРЗ Паратунский).
5. Vilyui salmon hatchery (In Russian: ЛРЗ "Вилюйский").

Federal Service for Veterinary and Phytosanitary Surveillance (In Russian: Россельхознадзор /Rosselkhoznadzor) submits to the Ministry of Agriculture of the Russian Federation (Source: http://www.fsvps.ru/). It is the federal organ of executive power, carrying out functions on control and supervision in the field of veterinary science. Although it is not engaged into direct management of fisheries, however, it conducts sanitary veterinary inspections of landed fish products before they move into to domestic or export markets.

The Federal Service for Supervision of Nature Management (In Russian: Rosprirodnadzor / Росприроднадзор) is a federal government body whose main responsibilities are to ensure rational, uninterrupted and environmentally safe use. It monitors and battles violations and illegal actions causing negative effect on environment (Source: http://rpn.gov.ru/).

Furthermore, the All-Russian Research Institute of Fisheries and Oceanography (In Russian: Всероссийский научно-исследовательский институт рыбного хозяйства и океанографии) (VNIRO/ВНИРО) is the leading research institute of the fisheries industry that coordinates implementation of fishery research plans and programs ensuring the efficient operation of all fishery research organization in the Russian Federation (Source: http://www.vniro.ru/ru/). The Kamchatka branch of the FGBNU "VNIRO" (KamchatNIRO) (In Russian: Камчатский филиал Федерального государственного бюджетного научного учреждения "Всероссийский научно-исследовательский институт рыбного хозяйства и океанографии" (КамчатНИРО)) was founded in 1932, first as a branch of the Pacific Research Institute of Fisheries and Oceanography, and since 1995 - as an independent state institution. The branch is the scientific institution responsible for fisheries research and management studies in the Kamchatka region including the northern part of the Pacific Ocean, the Sea of Okhotsk, the Bering Sea, inland waters of Kamchatka (Source: http://www.kamniro.ru/). With regard to pacific salmon species, KamchatNIRO is the key designer of the mathematical model for assessment and forecasting of stocks. Similarly, TINRO-Center in Vladivostok (ТИНРО) (Source: http://tinro.vniro.ru/en/), SakhNIRO (СахНИРО) in Sakhalin (Source: http://www.sakhniro.ru/), and MagadanNIRO (МагаданНИРО) in Magadan (Source: http://magadan.vniro.ru/).

In addition to the local management agencies, Russia is a member of the North Pacific Anadromous Fish Commission (NPAFC) which is an international inter-governmental organization established by the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. The Convention was signed on February 11, 1992, and took effect on February 16, 1993. The member countries are Canada, Japan, the Republic of Korea, the Russian Federation, and the United States of America (Source: https://npafc.org).

7.4.1.5 Consultation and participation mechanisms

Generally, all new federal regulations in Russia have to go through public consultations. The public are given 15–30 days to provide their comments on the draft proposal of any new regulation through the Federal portal for draft regulatory legal acts https://regulation.gov.ru, which is administered by the Ministry of Economic Development (In Russian: Министерство экономического развития Российской Федерации). Different governmental bodies, fishing sector, industry organizations and research institutions are involved in the management of Russian fisheries. The FFA supports the right for public participation in the fishery management process which is set out in the Federal Law on Fisheries “participation of citizens and public associations in resolving issues related to fishing and the preservation of aquatic biological resources, according to which citizens of the Russian Federation and public associations have the right to participate in the preparation of decisions, …” (Article 2.5) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/).

The main arena for the interaction between stakeholders is the advisory bodies, the so-called councils including: Public Council (In Russian: Общественный совет при Росрыболовстве), Fisheries Council (In Russian: Рыбохозяйственный совет) and Scientific-Fisheries Council (In Russian: Научно-промысловые советы). These councils provide three levels of participation in the fishery management process: the federal level, the basin level, and the regional level. Basin and regional level fishery councils have existed since Soviet times, while in 2004 the Federal Fisheries Act made their existence mandatory for all basins and regions located. In 2008, the rules and procedures for Basin Scientific and Fishery Councils in the Russian Federation were approved.

The Public Council under FFA (Общественный совет при Росрыболовстве) is a permanent advisory body of public control. Public Councils are formed in accordance with Federal Law of July 21, 2014 No. 212-FZ "On the Basics of Public Control in the Russian Federation". The purpose of the Public Council is to exercise public control over the activities of the government, including consideration of draft socially significant normative legal acts, participation in monitoring the quality of public services, implementation of control and oversight functions, the progress of anti-corruption and personnel work, evaluating the effectiveness of public procurement, reviewing annual plans activities and reports on their implementation, as well as other issues provided by applicable law (Source: http://fish.gov.ru//otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve). Meetings of the Public Council are held at least 1 time per month. For example, a meeting will be held at FFA on 5th of November, 2020. In this meeting, the members of the Public Council plan to discuss the national program for the socio-economic development of the Far East for the period up to 2024 and for the future until 2035, approved by the order of the Government of the Russian Federation (Source: http://www.fish.gov.ru/territorialnye-upravleniya/15-otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve). The meeting will also consider the situation related to the death of marine organisms in Kamchatka.

The Fisheries Council (Рыбохозяйственный совет) is a consultative and advisory body for local ministry / government, which pay attention and try to find solutions for small narrow problems and coordination on local level (Source: http://base.garant.ru/9891762/5ac206a89ea76855804609cd950fcaf7/). It depends on the development of fishing in a particular region.

The Scientific-Fisheries Council (Научно-промысловые советы) is an advisory interregional body found on a basin level, in order to prepare proposals for the conservation of aquatic biological resources, including proposals for the allocation of quotas resources between regions, different type of fisheries, problems with legislations etc. Also to ensure the interaction of the regional governments in solving problems related to fisheries, taking into account public opinion, informing people and get their recommendations. The Council is working under the order of the Ministry of Agriculture of the Russian Federation of March 20, 2017 No. 135 "On approval of the Procedure for the Activities of Basin Scientific and Commercial Councils" (Source: http://publication.pravo.gov.ru/Document/View/0001201705180008). The Council consists of representatives of federal and regional executive bodies, control authorities, scientific organizations, public organizations and enterprises (not only fisheries). A prerequisite is the presence of representatives of all stakeholders included in the fisheries basin. Meetings of the Council are held at least twice per year. The Far Eastern Basin Scientific and Fishery Council (DVNPS) is responsible for the discussion of management decisions taken in the Far East fisheries including fishing rules adjustment. The meetings minutes of the DVNPS can be found at http://fish.gov.ru/otraslevaya-deyatelnost/organizatsiya-rybolovstva/protokoly-komissij-i-nauchno-promyslovykh-sovetov.

For example, during the last meetings, the DVNPS approved the proposals on the Kamchatka Territory to expand the restrictions on the use of fixed nets in fishing areas on the western coast of Kamchatka. For commercial fishing of Pacific salmon, it will be prohibited to use nets in the Kamchatka-Kuril and West-Kamchatka subzones up to the

mouth of the Icha River (Source: https://www.kamgov.ru/minfish/news/po-iniciative-kamcatskogo-kraa-v-pravila-rybolovstva-vnesut-rad-izmenenij-34870). This step tries to reduce the fishing pressure on Pacific salmon stocks. It is expected that the same restrictions will be extended to sea areas in the Northern Kuril Islands, where the main migration routes of Pacific salmon to the shores of Western Kamchatka, Magadan Oblast and northern regions of the Khabarovsk Territory pass. Moreover, in September at a meeting of the Security Council of the Russian Federation, the governors of the Kamchatka Territory and the Sakhalin Region agreed to sign a new agreement that would allow regulating the fishing of transit salmon. In addition, for recreational fishing, the region's proposal to catch fish with only one gear during the Chinook salmon run from 20 May to 15 July was approved. The Council also supported the initiative of the region on the introduction of special documentation, catch records for the indigenous peoples. Now there is no obligatory procedure for maintaining such reporting, documentation is not recorded, and it is not possible to control the actual amount of catch.

Moreover, in the TAC and recommended catch setting process, the branches of the VNIRO (e.g. KamchatNIRO), within their area of responsibility, annually develop materials for the TAC or recommended catch for the next year based on their monitoring data (Figure 67). The process (including the pre-season and during-season) is a good example of the effective consultation as well as decision-making mechanism in the management system in the fishery. After KamchatNIRO's scientists calculate the forecast for potential catches the recommendations are sent to TINRO center to be subject to a comprehensive review by a specific council called Far East Salmon Council (FESC) that was established within the TINRO center to coordinate the research and forecasting of salmon in the Far Eastern basin. The results are sent then to VNIRO in Moscow, which examines and approves the scientific board's recommendations. After VNIRO’s examination, the forecasts and recommendations are sent to the FFA for approval and implementation. During this process, active participation is encouraged and discussions are held with wide range of stakeholders including representatives of fishing companies, local administrations and federal ministries. This process is, therefore, the basis for the management of fishing and catch recommendation in the region. The management decisions during the fishing season is delegated from the central to the territorial authority, therefore, it became easier and adaptable in time.

The minutes of the meetings of "the Commission of Anadromous fish species" in the Kamchatka Territory can be found at the website of the ministry of fisheries under the Government of Kamchatka (Source:https://www.kamgov.ru/minfish/2011/2020) also at the website of the North-Eastern TA (Source: http://xn--b1a3aee.xn--p1ai/organizatsiya-rybolovstva/komissiya-po-regulirovaniyu-dobychi-vylova-anadromnykh-vidov-ryb/protokoly-zasedaniya-komissii-po-kamchatskomu-krayu.html). For example, in the meeting (№ 27) held in Petropavlovsk-Kamchatsky on 17th of August 2020, the discussion considered issues including: 1) the end of fishing in the Korf Bay and the rivers flowing into it; 2) the completion of fishing on sea fishing parcels No. 189 – 209; 3) the establishment of additional volumes of catch; 4) the consideration of appeals of two companies (Source: http://xn--b1a3aee.xn--p1ai/images/docs/Prikaz_2020/0309_Protokol_27.pdf). At this meeting, the Commission decided to establish additional volumes catch of 15,000 tonnes of Pink salmon for the West-Kamchatka subzone; and another 10,000 tonnes of Pink salmon for the Kamchatka-Kuril subarea. Similarly, in the last meeting (№ 31) held in Petropavlovsk-Kamchatsky on 30th of September 2020, the discussion considered: 1) the management of the autumn-winter fishery for Asian smelt and char; 2) the extension of restrictions on amateur fishing for char in the lake Nachikinskoe; 3) the establishment of additional volumes of catch (Source: http://xn--b1a3aee.xn--p1ai/images/docs/Prikaz_2020/3009_Protokol_31.pdf). The Commission decided to establish additional volumes catch of 1.0 tonnes of coho salmon for each of the fishing parcels No. 849 (Kamchatka river), No. 689 (Vorovskaya river), No. 693 (Vorovskaya river) for "Andar" LLC fishing company.

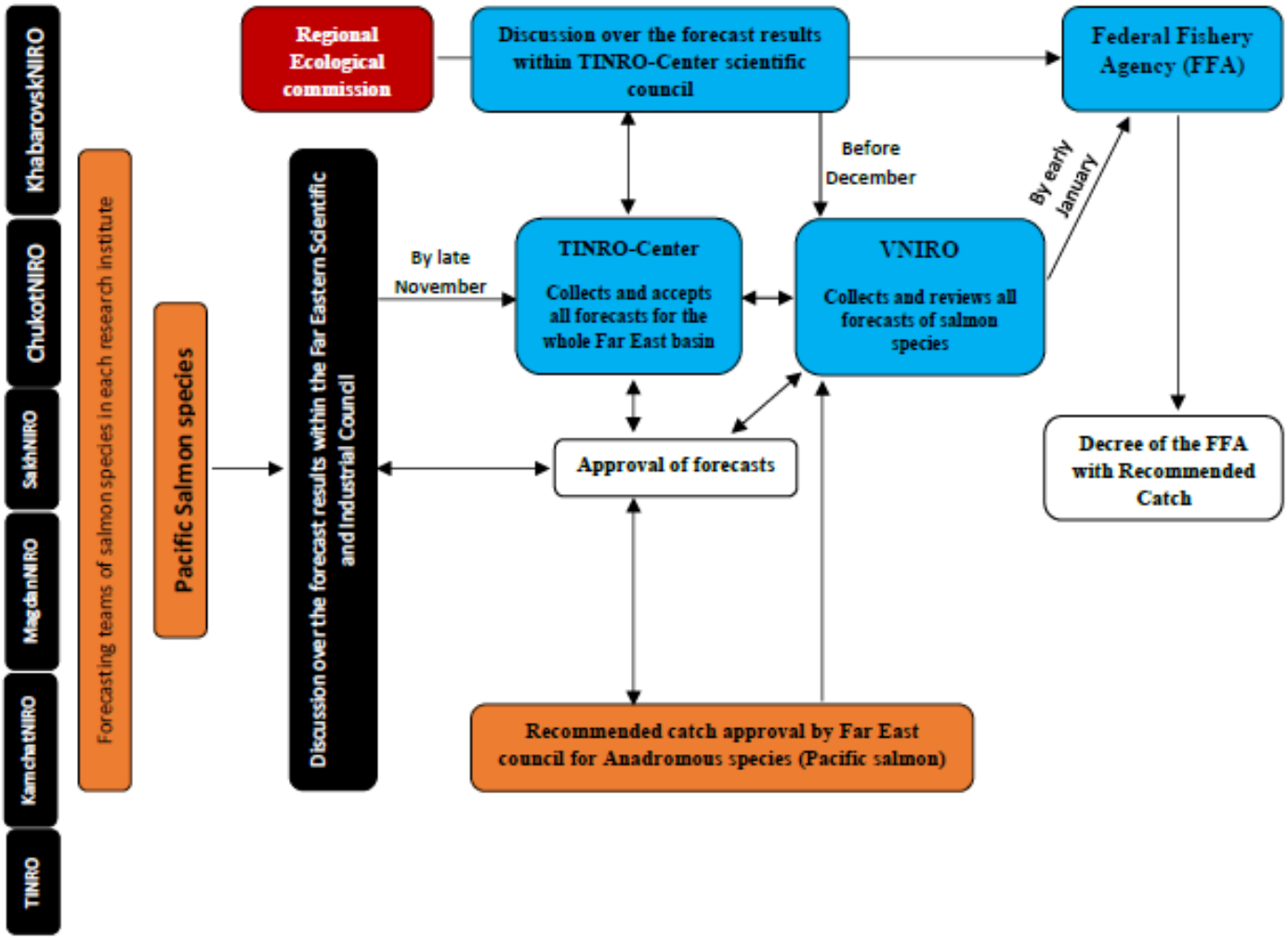

Figure 67: TAC decision-making process flow chart in salmon fisheries of the Russian Federation Far East (adapted from Rassadnikov, 2006).

Currently in the Bolshaya River basin, where the fishery of FTP Comandor JSC is concentrated, there are 4 licensed recreational fishing parcels of 4 companies, in addition to 28 tribal communities of the indigenous peoples carrying out traditional fishing. Consultations are also held with representatives of the indigenous people and these companies to obtain primary information on the number of Pacific salmon producers that have spawned in the Bolshaya River. In case of receiving negative data on filling of salmon spawning grounds in this water body, the information is immediately sent to the North-Eastern TA and the KamchatNIRO for a comprehensive analysis of the situation. Historically, specialists from KamchatNIRO have repeatedly received alarming signals about problems with the formation of spawning salmon stock in a particular tributary of the Bolshaya River. As a rule, a collective request is formed on the basis of the general information of several fishing companies, as well as representatives of the indigenous people and of recreational fishing companies. As soon as the relevant information had been received, the North-Eastern TA, the Ministry of Fisheries of the Kamchatka Territory and KamchatNIRO took the corresponding measures to solve a specific problem.

7.4.1.6 Long term objectives

In Russia, also the long-term objectives for the development of the fisheries complex are found at three levels:

- on the Federal (State or Government) level — for the all fishery complex within Russian Federation;
- on the regional level (e.g. Far East Federal region) — for the fishery complex of all territorial entities within one Federal region;
- on the territorial, municipal level (e.g. Kamchatka Territory (Krai)) — for only one territorial entities of Russian Federation.

The long-term objective of fisheries management system in Russia is stated in the **Federal law "On Fishery and Protection of Aquatic Biological Resources" (2004)** (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/) as: "Conservation and maintenance of aquatic biological resources or their recovery to the

levels at which maximum sustainable extraction (catch) of aquatic biological resources and their biological diversity can be ensured, through the implementation of measures on the basis of scientific data for the study, protection, reproduction, rational use of water biological resources and protection of their habitat" (**Article 1.7**). Moreover "The priority of conservation of aquatic biological resources and their rational use before their use as an object of ownership and other rights, according to which possession, use and disposal of aquatic biological resources are carried out by the owners freely, if this does not damage the environment and the state of aquatic biological resources" (**Article 2.2**). There is a similarity between the 'Protection and rational use' mentioned in these articles and the sustainability concept. It also put emphasis on the long-term and sustainable use of the biological resource, the priority of their conservation, based on scientific research and for socio-economic purposes. It is noteworthy that the priority of conservation of aquatic biological resources based on the scientific data and knowledge bears resemblance to the requirements of the precautionary despite that it is not mentioned explicitly in the Federal Fisheries Act. Moreover, the Russian federation has signed on a number of international agreements which adopt the precautionary approach, including the 1995 UN Straddling Stocks Agreement.

A new long-term strategy for the development of the Russian fisheries complex until 2030 (In Russian: Стратегия развития рыбохозяйственного комплекса Российской Федерации на период до 2030 года) was presented for the first time in September 2017 and approved in the 26th of November 2019 by the Decree No. 2798-r "On approval of the development strategy of the fishery complex of the Russian Federation for the period until 2030 and an action plan for its implementation". The strategy includes five large-scale integrated programs, the implementation of which will require over 600 billion rubles in investments (Source: http://fish.gov.ru/files/documents/files/proekt-strategiya-2030.pdf; http://fish.gov.ru/files/documents/press-centr/vystavki/mrf2017/p_6-1.pdf). The strategy defines priorities, objectives and targets aimed at ensuring the dynamic development of the fisheries sector, updating production assets, avoiding the export orientation of raw materials by stimulating the production of products with a high share of added value, creating favourable conditions for doing business and attracting investments in the industry.

The expected outcomes, according to the authors, of the strategy are: doubling the annual contribution of the fishery complex to Russia's gross domestic product (GDP), with an average annual growth rate of at least 5 percent, an increase in the production of aquatic biological resources from 4.7 million t to 5.5 million t, an increase in aquaculture production from 180,000 t to 700,000 t, an update of at least half the capacity of fishing fleet vessels, a gradual increase in the proportion of products with high added value in total production - up to 40 percent, the creation of 25,000 new jobs.

One of the main tools of the strategy, capable of giving the greatest economic effect in the industry, is the non-waste processing of fish, which today accounts for 30 percent of the total fish production. According to the new strategy, in order to obtain fishing quotas, companies should invest in the construction of fishing vessels and the development of deep processing, which allows them to export products with high added value, rather than cheap raw materials.

The strategy is planned to be implemented in two stages: the first - until 31st of December 2025, and the second - from 1st of January 2026 to 31st of December 2030.

The state program "Development of the fishery complex" (as amended on March 31, 2020) (In Russian: государственной программы Российской Федерации "Развитие рыбохозяйственного комплекса"), approved by the Decree of the Government of the Russian Federation dated April 15, 2014 No. 314 - has more widely strategic goals of development of the fishery complex in Russia (Source: http://docs.cntd.ru/document/499091766 ; https://mcx.gov.ru/activity/state-support/programs/fish-development/).

At regional level, the long-term goals of the Far East region are stated in the "National program of socio-economic development of the Far East of the Russian Federation for the period up to 2024 and for the future until 2035", approved by the order of the Government of the Russian Federation dated September 24, 2020 No. 2464-r - (Source: https://www.garant.ru/products/ipo/prime/doc/74587526/).

7.4.1.7 Fisheries-Specific Management

The main specific objective of the salmon fishery in Kamchatka is to ensure adequate spawning escapements to maintain a sustainable yields and steady return of salmon in future. The escapement benefit is evaluated by observing whether salmon is actually using all areas that are likely to be suitable for spawning. The fishery is generally managed by specific regional escape ranges from observed species that had generated significant returns in the past. Specific short-term (annual) objectives try to maintain the main target salmon species within sustainable levels and therefore are consistent with the MSC Principles 1. These objectives are based on and specified by the annual recommended catch and forecasting document. Quotas are reviewed annually based on surveys and during season by "the Commission of Anadromous fish species" which clearly show an adaptive management system to current stock levels (see section 1.1.5).

On the other hand, short-term objectives including management measures (e.g. gear's technical characteristics, seasonal and area closures etc.) are also consistent with the MSC Principles 2 and are explicitly specified in the fishing rules for the Far Eastern Fisheries Basin (as amended on July 20, 2020) (Source:

http://docs.cntd.ru/document/554767016). The fishing rules for the commercial (industrial) fisheries are specified in the second section (from articles 8 to article 47). Other sections provide fishing rules for other type of fishing (e.g. recreational). General requirements for the conservation of aquatic biological resources are outlined from article 8 to article 25. Areas prohibited for the fishing in internal sea waters, territorial seas, continental shelf and EEZ of the Russian Federation are specified from article 23 to article 25, while for inland water bodies in articles 26 and 27. Similarly, periods of fishing ban for internal sea waters, territorial seas, continental shelf and EEZ of the Russian Federation are specified in from articles 28 and 29, while for inland water bodies in article 30. Also, types of aquatic biological resources (species) prohibited for fishing (article 31). In addition, technical measures such as types of forbidden fishing gears and methods (articles 32 and 33), mesh size and design of fishing gears (from article 34 to 39). Finally, rules regarding the by-catch of certain species (from article 40 to 47).

For example, in regards to the salmon fishery under assessment, Article (22.14.) prohibits for commercial fisheries to install fishing gears with overlapping more than 2/3 of the width of the river bed, stream or strait, channel, passage connecting a lagoon-type bay or lake with the sea, and the deepest part of the channel must remain free (with some exceptions including the installation of fish hatches and fish counting barriers, as well as commercial fisheries of Pacific salmon in order to prevent mortality in water bodies in which juveniles of Pacific salmon are released by fish hatcheries). Also, Article (22.15.) prohibits for commercial fisheries to catch Pacific salmon on rivers (with the exception of the Sakhalin Region and Kamchatka Territory, as well as cases where a single user has the right to catch Pacific salmon) at a distance in fishing areas located on the same water body less than 1 km: a) between the places of setting fixed and (or) overhanging seines; b) between the places of setting fixed and (or) overhanging seines and river mouths.

Article 28 prohibits the catch of certain species in certain periods using certain fishing gears, in which (28.23.) prohibits fishing of Pacific salmon in order to ensure optimal conditions for natural reproduction during the days (periods) of the brood-stock's admission to spawning grounds, which are established by the decision of "the Commission of Anadromous fish species". The following (28.24.) prohibits fishing of Pacific salmon in the exclusive economic zone of the Russian Federation: in the Kamchatka-Kuril subzone, the West Bering Sea zone, the Karaginskaya subzone, the Petropavlovsko-Komandorskaya subzone and the North Kuril zone - from October 1 to May 31; in the North Okhotsk subarea - from September 16 to June 30; in the South Kuril zone from October 1 to June 30.

In regards to prohibited types of fishing gears for salmon fisheries, it is prohibited to use fixed seines (trap nets) outside the boundaries of fishing areas located in the territorial sea of the Russian Federation adjacent to the territory of the Kamchatka Territory and in the internal sea waters of the Russian Federation in the zones of the West Bering Sea, East Kamchatka, subzones of West-Kamchatka, Kamchatka-Kuril (Article 32.1.). Also to catch with all fishing gear on the spawning grounds of Pacific salmon in the period between the start date and the period of the prohibition of commercial fishing for Pacific salmon, as well as during the periods for the release of producers of Pacific salmon, determined by "the Commission of Anadromous fish species" (Article 32.2.). Similarly, to catch Pacific salmon with fixed nets in fishing areas in the territorial sea of the Russian Federation adjacent to the territory of the Kamchatka Territory and in the internal sea waters of the Russian Federation: in the Petropavlovsko-Komandorskaya subzone (except for the water area of Avacha Bay, Avacha Bay and Kronotsky Bay), in the Karaginskaya subzone, the West Bering Sea zone, the Kamchatka-Kuril subzone (Article 32.24.). And by (Article 32.25.) to catch Pacific salmon with fixed nets in fishing areas in the territorial sea of the Russian Federation adjacent to the territory of the Kamchatka Territory and in the internal sea waters of the Russian Federation:

a) Simultaneously with the use of other types of fishing gears in the same fishing area;

b) Nets with a length of more than 120 m and a height of more than 9 m;

c) Without gaps between nets less than 120 m when installed in one line (order of nets);

d) With a distance between networks or orders of networks less than 120 m;

e) Installing more than 20 nets at one fishing (fishing) site;

f) Installing networks in a checkerboard pattern;

In the commercial fishery for Pacific salmon using fixed nets in the territorial sea of the Russian Federation (with the exception of areas adjacent to the Magadan region), the mesh spacing must be at least 40 mm (Article 34.3.). Similarly, Article 35 and Table 1 (of the fishing rules) specify the minimum mesh size for fishing gears used in the inland sea waters and in freshwater bodies of the Russian Federation, in which set at 40 mm for fixed nets used for fishing Pacific salmon.

7.4.1.8 Monitoring, Control and Surveillance

Monitoring, Control and Surveillance (MCS) Implementation

The state Monitoring, Control and Surveillance (MCS) functions are divided into five main elements; 1) maintenance of ongoing analytical monitoring of fishery; 2) visual monitoring of fishing vessels activities; 3) obligatory trans-shipment control; 4) offshore inspections with boarding a fishing vessel; 5) port control. These elements interconnect various management and control authorities, in which FFA and its territorial offices cooperate with the Federal Security Service (FSB), the Center of Fishery Monitoring and Communications (CFMC), and Costumes Services.

In this role, the FFA maintains a MCS system and supports the CFMC that collects, stores, processes, and distributes all fishery data. It includes daily statistics about the volumes of biological resources harvested, processed, trans-shipped, and transported by individual vessels. It provides real-time vessel position and allows authorities to spot distortions suggesting illegal activities. While the FSB conducts enforcement and inspections at-sea and in-port in cooperates with FFA to share data through the CFMC. The FFA also register and review the amount of fish that each vessel and company (in Russia: quotas are allocated to companies, not to vessels) caught at any time, based on daily reports (logbooks) and reports accumulated every 15 days of all fishing vessels.

An important component of control over the activities of the fishery is the Daily Vessel catch Report (DVR). On daily basis, each company submits information on the catch volumes and species composition to North-Eastern TA, which is then summarized for reporting to the "the Commission of Anadromous fish species". The DVR includes: the date of the report; coordinates of the parcel; name and register code of the parcel; the name and personal code of the parcel-owner; the license number; composition and quantity of caught species; residue on board of raw material; quantity and range of products shipped for transportation and so on. This information must completely coincides with the reporting documentation, which is conducted in paper form. In case of discrepancy between the data in the DVR and logbook, proceedings are conducted and the parcel-owner is administratively charged. The introduction of an electronic logbook system for the fisheries within the Far East by the beginning of 2019 has facilitated the process of reporting the catch. After the sum of catches of all companies that fishing in the management unit reaches the total recommended catch, the fishery will be closed if "the Commission of Anadromous fish species" does not decide to increase the quota.

The Coast Guard Inspection carries out analytical monitoring of fishing and trans-shipment activities. In addition to its internal resources (e.g. aircraft, patrol vessels, and radar surveillance), the FSB/Coast Guard has access to both VMS position system and DVR databases held by the CFMC and also to fishing permit database held by the North-Eastern TA. The plans for inspections of the activities of Legal entities and individual fishing companies can be found at the website of the North-Eastern TA (Source: http://xn--b1a3aee.xn--p1ai/rybookhrana/plan-provedeniya-proverok-yuridicheskikh-lits-i-ip/yuridicheskikh-lits-i-ip.html).

Also, quality / health inspections of landed fishery products before transferring them to domestic or export markets are responsibility of the Ministry of Agriculture which coordinates the work of the Federal Service for Sanitary and Veterinary Inspection (RosSelkhozNadzor).

In addition, taking into account the limited number of inspectors, it is impossible to ensure control over all water bodies of the Kamchatka Krai using only their forces. Therefore, a volunteering system has been recently developed in the Kamchatka Krai to attract the largest fishing companies to participate in voluntary environmental protection measures. This refers to the largest enterprises, which rent several fishing parcels within one or more water bodies. The voluntary activities are organised with the North-Eastern TA. These measures are intended to deter the IUU fishing at water bodies where the voluntary company directly carries out its fishing. In this regard, the voluntary assistance of fishing companies plays a significant role to ensure the conservation of regional salmon stocks. Besides providing information on the volumes of catch to the North-Eastern TA, FTP Comandor JSC also participates in voluntary environmental protection measures by helping in the installation of observation posts system in the Bolshaya River basin. FTP Comandor JSC also renders comprehensive assistance, providing inspectors and volunteer combatants with technical survival facilities, tools, and means of transport and communication.

7.4.1.9 Sanctions

Both the "Code of the Russian Federation on Administrative Offenses" 30.12.2001 No. 195-FZ and the "The Criminal Code of the Russian Federation" 13.06.1996 No. 63-FZ define the sanctions for violating the rules regulating fishing in Russian Federation. Table 31 shows the sanctions corresponding to each type of violation according to fishing regulations or rules.

Table 31: The sanctions corresponding to each type of violation according to fishing regulations or rules.

Type of violation/offences	Corresponding sanction/fine
"Code of the Russian Federation on Administrative Offenses" 30.12.2001 No. 195-FZ	
Article 8.16 (2). Failure to comply with the rules for maintaining ship	Administrative penalty - from 5 to 10 thousand rubles.

documents	
Article 8.17 (2). Violation of regulatory requirements or conditions of activity in inland sea waters, in the territorial sea, on the continental shelf, in the exclusive economic zone of the Russian Federation or in the open sea	Administrative penalty: - for citizens from ½ to 1 of the costs of biological resources, with or without confiscation of a vessel and fishing gear; - for executives from 1 to 1.5 of the costs of biological resources, with or without confiscation of a vessel and fishing gear; - for enterprises from 2 to 3 of the costs of biological resources, with or without confiscation of a vessel and fishing gear;
Article 8.37 (2). Violation of hunting rules, rules governing fishing and other uses of wildlife	Administrative penalty: - for citizens from 1 to 5 thousands rubles, with or without confiscation of a vessel and fishing gear; - for executives from 20 to 30 thousands rubles, with or without confiscation of a vessel and fishing gear; - for enterprises from 100 to 200 thousands rubles, with or without confiscation of a vessel and fishing gear.
Article 8.38. Violation of the rules for the protection of aquatic biological resources	Administrative penalty: - for citizens from 2 to 3 thousands rubles; - for executives from 10 to 15 thousands rubles; - for entrepreneurs from 10 to 15 thousands rubles or ban for activity up to 90 days; - for enterprises from 100 to 200 thousands rubles or ban for activity up to 90 days;
Article 8.39. Violation of the rules for the protection and use of natural resources in specially protected natural territories	Administrative penalty: - for citizens from 3 to 4 thousands rubles, with or without confiscation of a vessel and fishing gear and illegal productions; - for executives from 15 to 20 thousands rubles, with or without confiscation of a vessel and fishing gear and illegal productions; - for enterprises from 300 to 500 thousands rubles, with or without confiscation of a vessel and fishing gear and illegal productions.
"The Criminal Code of the Russian Federation" 13.06.1996 No. 63-FZ	
Article 256. Illegal fishery (catch) of aquatic biological resources	(1) Penalty for illegal fishery from 300 to 500 thousands rubles, or salary (income) for 2-3 years, or obligatory work up to 480 hours, or correctional work up to 2 years, or prison up to 2 years.
	(3) If illegal fishery committed by a person using his official position or by a group of persons in a preliminary conspiracy or by an organized group or persons who have caused particularly serious damage are punishable by penalty from 500 to 1000 thousands rubles, or salary (income) for 3-5 years, or prison 2-5 years with the deprivation of the right to occupy certain positions or engage in certain activities for a period of up to 3 years or without it.
Article 257. Violation of the rules for the protection of aquatic biological resources	Penalty up to 200 thousands rubles, or salary (income) 18 moths, or deprivation of the right to occupy certain positions or engage in certain activities for a period of up to 3 years, or obligatory work up to 480 hours, or correctional work up to 2 years.

7.4.1.10 Compliance

According to the pre-assessment of this fishery, Mr. Tatarinov highlighted that the IUU fishing activities have 3 different components including: the historical misreporting catch by fishing companies, the poachers and indigenous people (Samy-Kamal, 2019). The magnitude of the misreporting catch by fishing companies has decreased since the introduction of the recommended catch and Olympic system in 2008 and lately the electronic logbooks in 2019. Currently, companies do not have any reason to hide or misreport their catch, he explained. Also added that the illegal fishing by indigenous people also has decreased as they have their own quotas by law. However, this keeps poaching as the only source of IUU. Historically poaching was emerged due to the lake of income and working opportunities after the collapse of the Soviet Union. This led to the development of a parallel commercial poaching. During the last two decades, the magnitude of commercial poaching has decreased significantly since the reform of the management

system in 2008, also due to the reducing market for IUU catch. Currently, poaching for the personal consumption still ongoing mostly in remote areas. The voluntary initiatives of monitoring collaboration by fishing companies, fishing associations and citizens with the North-Eastern TA, also help to deter poaching.

According to the provided data, by consulted scientists of Kamchatka branch of VNIRO, for the period 2014–2018, the number of the recorded violations of the regulation in the Kamchatka-Kuril subzone amounted 1270 cases. Annual distribution of violations and illegally caught fish (tonnes) was as follows: 2014 - 411 / 32,095; 2015 - 234 / 3,524; 2016 - 142 / 4,542; 2017 - 190 / 14,919; 2018 - 293 / 12,962 (Figure 68). It should be noted that from 2014 to 2018 there was a decreasing trend in the total number of violations and the actual withdrawal of illegally caught fish. However, in 2017 and 2018, these indicators increased slightly. The scientists also highlighted that the total volumes of illegal catches during the period under review remained at a very low level, taking into consideration the whole volumes of Pacific salmon harvested in Kamchatka-Kuril subzone. In this sense, the scientists believe that such level of IUU fishing cannot cause significant harm to salmon stocks, both at the regional level as a whole and the Bolshaya River itself. Also it should be borne in mind that the data presented here only accounted for the capture of poachers, so the real damage to salmon stocks of the Bolshaya River is hard to determine. The situation tends to become more complicated due to transport accessibility and the scale of the water distribution system of the basin the Bolshaya River. The scientists consider that the actual magnitude of IUU fishing in this water body is much higher.

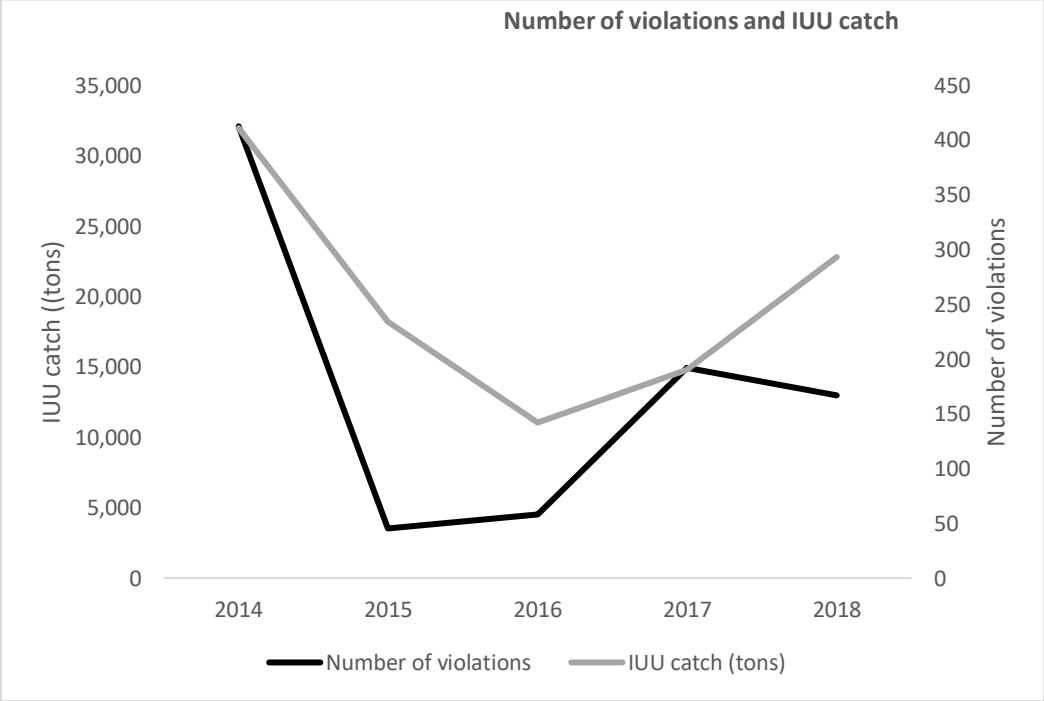

Figure 68: Number of the recorded violations of the regulation and IUU catch (based on the provided data by scientists) in the Kamchatka-Kuril subzone.

The scientists also emphasized that statistics on violations committed in the sea area of 12-mile zone of territorial waters of the Russian Federation are not given here. This is due to the confidentiality of these data, since the control of the marine area is carried out by the Coast Guard of the FSB of Russia (see section 1.1.8.1). They also added that according to unofficial information obtained during the working groups and headquarters of salmon fishing seasons, there are no significant violations that could adversely affect regional stocks of Pacific salmon in the Kamchatka-Kuril subzone.

7.4.1.11 Monitoring and Evaluation

The fishery has mechanisms to internally evaluate and review key parts of the management system on a regular basis. In Russia the management authorities (e.g. the FFA) receive feedback from the interested stakeholders including NGOs through the different councils found at federal, basin and regional levels (see section 8.1.5). Moreover, the FFA reviews the performance of its regional offices regularly. In this matter, the recommendations of Regional Fisheries Council are taken into account in the FFA regional office's feedback to the federal office. In the TAC-setting process, the scientific advice from local institutes (e.g. KamchatNIRO) and "the Commission of

Anadromous fish species" is peer reviewed by the VNIRO, and then forwarded to FFA and the federal natural resources monitoring agency Rosprirodnadzor for comments.

The fishery-specific management system is also subject external review. The State Ecological Expertise in Russia, which is under the Federal Service, in contrast to the FFA which is under the Ministry of Agriculture, is responsible for the Supervision of Natural Resources, and review of the Russian management system. Also, at Federal level, Melnychuk, etc., (2016) analysed characteristics of fisheries management systems of 28 major fishing nations. A Fisheries Management Index was calculated, integrating; research, management, enforcement, and socioeconomic attributes. Out of these 28 fishing nations, the Russian fisheries management system has been ranked #4 after the US, Iceland, and Norway, which highlights its effectiveness.

7.4.2 Principle 3 Performance Indicator scores and rationales: All UoAs

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**	**Yes**

Rationale

The fishery is totally under the jurisdiction of the Russian Federation and managed at national level and therefore only the Russian's fisheries management system should be considered.

The fisheries management system in Russia has well-developed legal system which has all the necessary tiers for effective management based on binding procedures dictated in administrative legislation, ordinances and decrees. The main legal framework governing fisheries in Russia is the Federal Law "On Fishery and Protection of Aquatic Biological Resources" which signed in 2004, continuously revised and updated (last amendments to be entered into force on 14th of June 2020). Russia also signed up to international fisheries laws and conventions, such as the 1982 Convention on the Law of the Sea and the 1995 Agreement on Straddling Stocks.

The list of anadromous fish species that are managed based on recommended catch is approved by order of the FFA from February 26, 2009 No. 147 "On approval of the list of anadromous species of fish that are caught (caught) in accordance with Article 29.1 of the Federal Law "On Fisheries conservation of aquatic biological resources". The Order of the Ministry of Agriculture of Russia dated 08.04.2013 N 170 (as amended on 02.26.2020) "On approval of the Procedure for the Commission for Regulation of the Production (Catching) of Anadromous Fish Species" approves procedures for the activities and roles of the commission for the regulation of the extraction (catch) of anadromous fish species in the inland waters of the Russian Federation and in the territorial sea of the Russian Federation. The Fishing Rules for the Far Eastern Fisheries Basin (as amended on July 20, 2020) provide regulations for all fisheries resources in the Far Eastern Fisheries Basin including the Pacific salmon fisheries. Every year the regulations and legal framework of salmon fishing season are supplemented by the order of the FFA "On Organization of Salmon Fishing Season in the Far Eastern Fisheries Basin" and the decree of the Head of the FFA "On approval of the Action Plan for Organization and Conduct of salmon Fishing Season in the Far Eastern Fisheries Basin".

Taking into account that outputs of the Russian legal framework, and the other international agreements are binding to deliver management outcomes consistent with MSC Principles 1 and 2, therefore this scoring issue is performing at SG100.

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 effective** in dealing with most issues and that is appropriate to the context of the UoA.	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 of the fishery and has been **tested and proven to be effective**.
	Met?	**Yes**	**Yes**	**No**

Rationale

In Russia, a transparent court system mechanism is provided to avoid and resolve disputes and issues arising between the fishing companies and inspectors. According to the Federal Law of May 2, 2006 No. ФЗ-59 “On the Procedure for Considering Appeals of Citizens of the Russian Federation,” citizens have the right to apply in person, as well as to submit individual and collective appeals to state bodies, local self-government bodies, and officials (Source: http://base.garant.ru/12146661/). The procedure for the reception and consideration of citizen’s proposals and the rules for submission of appeals are specified in the official website of the FFA (Source: http://fish.gov.ru/obrashcheniya-grazhdan/poryadok-priema-i-rassmotreniya-obrashchenij-grazhdan). Also at territorial level, for example, the North-eastern TA (see section 7.4.1.4) provides the opportunity for citizen proposals and the submission of appeals in the Kamchatka region (Source: http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/elektronnoe-obrashchenie.html). Table 31 shows the review of citizens' appeals to the North-eastern TA of FFA in 2019.

The court considers cases that can be regarded as serious violations (for example, overfishing or unauthorized by-catch). The results of any disputes in the court system can be consulted at the website of the Federal Arbitration Courts of the Russian Federation (Федеральные арбитражные суды Российской Федерации) (http://www.arbitr.ru) as well as for the territorial level, for example, at the website of Arbitration Court of Kamchatka territory (Арбитражный суд Камчатского края) (https://kamchatka.arbitr.ru/). In practice, most of disputes are resolved through the management system, which includes extensive formal and informal opportunities for interaction between fishing companies and other stakeholders with the authorities, (for example, to resolve disputes, disagreements and conflicts between users, as well as between users and authorities).

However, it remains unclear whether the mechanism is proven to be effective under a full spectrum of tests. Therefore, SG80 is likely to be met, but not SG100. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

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

The rights of fishing dependent communities are explicitly stated in the Federal Fisheries law 2004 "*taking into account the interests of the people living in coastal areas, including the indigenous peoples of the North, Siberia and the Far East of the Russian Federation, according to which they must be given access to aquatic biological*

resources to guarantee the vital activity of the population" (**Article 2.1**). More in details, (**Article 25**) ensures the traditional way of life and the implementation of traditional economic activities, including fishing, of the indigenous peoples of the North, Siberia and the Far East of the Russian Federation. Other pieces of legislation that guarantee the rights of fishing for indigenous peoples include: Federal Law of April 30, 1999 N 82-FZ "On Guarantees of the Rights of Indigenous Minorities of the Russian Federation" and Decree of the Government of the Russian Federation of March 24, 2000 N 255 "On the Unified List of Indigenous Minorities of the Russian Federation". The Russian Association of Indigenous Peoples of the North (RAIPON) (In Russian: Ассоциация коренных, малочисленных народов Севера, Сибири и Дальнего Востока Российской Федерации (АКМНССиДВ) is the Russian national umbrella organisation representing 41 indigenous small-numbered peoples of the North, Siberia and the Far East. In practice, in the Bolshaya River basin, where the fishery of Comandor JSC is concentrated, there are 28 tribal communities of the indigenous peoples carrying out traditional fishing.

Therefore, this scoring issue is performing at SG100 which likely to be met.

References

- Federal Law of the Russian Federation of December 20, 2004 N 166-ФЗ “On Fishery and Protection of Aquatic Biological Resources” (In Russian: Федеральный закон Российской Федерации от 20 декабря 2004 г. No. 166-ФЗ О рыболовстве и сохранении водных биологических ресурсов) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/).
- List of anadromous fish species that are managed based on recommended catch is approved by order of the FFA from February 26, 2009 No. 147 “On approval of the list of anadromous species of fish that are caught (caught) in accordance with Article 29.1 of the Federal Law “On Fisheries conservation of aquatic biological resources” (Source: http://docs.cntd.ru/document/902151646).
- Order of the Ministry of Agriculture of Russia dated 08.04.2013 N 170 (as amended on 02.26.2020) "On approval of the Procedure for the Commission for Regulation of the Production (Catching) of Anadromous Fish Species" (Source: http://docs.cntd.ru/document/499016590).
- The website of the Federal Arbitration Courts of the Russian Federation (Федеральные арбитражные суды Российской Федерации) (http://www.arbitr.ru).
- The website of Arbitration Court of Kamchatka territory (Арбитражный суд Камчатского края) (https://kamchatka.arbitr.ru/).
- Federal Law of May 2, 2006 N 59-ФЗ "On the Procedure for Considering Appeals of Citizens of the Russian Federation" (In Russian: Федеральный закон от 2 мая 2006 г. No. 59-ФЗ "О порядке рассмотрения обращений граждан Российской Федерации").
- Procedure for the reception and consideration of citizens (In Russian: Порядок приема и рассмотрения обращений граждан) (Source: http://fish.gov.ru/obrashcheniya-grazhdan/poryadok-priema-i-rassmotreniya-obrashchenij-grazhdan).
- The submission of appeals in the Kamchatka region (Source: http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/elektronnoe-obrashchenie.html).
- Federal Law of 30.04.1999 No.82-FZ. “On guarantees of the rights of the indigenous peoples of the Russian Federation (as amended on February 6, 2020) (In Russian: О гарантиях прав коренных малочисленных народов Российской Федерации (с изменениями на 6 февраля 2020 года)) (Source: http://docs.cntd.ru/document/901732262).
- Decree of the Government of the Russian Federation of March 24, 2000 N 255 "On the Unified List of Indigenous Minorities of the Russian Federation" (as amended on May 26, 2020) (In Russian: О Едином перечне коренных малочисленных народов Российской Федерации (с изменениями на 26 мая 2020 года)) (Source: http://docs.cntd.ru/document/901757631).
- Russian Association of Indigenous Peoples of the North (RAIPON) (In Russian: Ассоциация коренных, малочисленных народов Севера, Сибири и Дальнего Востока Российской Федерации (АКМНССиДВ) (Source: http://www.raipon.info).

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	
Condition number (if relevant)	**N/A**

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				
The Russian management system clearly defines the main organizations and stakeholders involved in the management process. The functions, roles and responsibilities specific to each organization are well defined in their own websites. The fisheries management system is organized and coordinated through the Federal Fisheries Agency (FFA or Rosrybolovstvo), which reports to the Ministry of Agriculture as the fisheries enforcement agency. The rest of functions, roles and responsibilities of organisations involved in the management are described in (section 7.4.1.4). Bearing in mind that the functions, roles and responsibilities of the main management organisations are explicitly defined and integrated into the national institutional framework, and it seems to be well-understood, this scoring issue is performing at SG80 which likely to be met. However it is difficult to guarantee that they are explicitly defined and well understood for "all" areas, so SG100 is likely not to be met for a precautionary scoring purpose. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.			
b	**Consultation processes**			
	Guide post	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	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**.
	Met?	**Yes**	**Yes**	**No**
Rationale				
Generally, all new federal regulations in Russia have to go through public consultations. The public are given 15–30 days to provide their comments on the draft proposal of any new regulation through the website				

(https://regulation.gov.ru) which is administered by the Ministry of Economic Development. Different governmental bodies, fishing sector, industry organizations and research institutions are involved in the management of Russian fisheries. The FFA supports the right for public participation in the fishery management process which is set out in the Federal Law on Fisheries "participation of citizens and public associations in resolving issues related to fishing and the preservation of aquatic biological resources, according to which citizens of the Russian Federation and public associations have the right to participate in the preparation of decisions, …" (Article 2.5).

The main arena for the interaction between stakeholders is the advisory bodies, the so-called councils including: Public Council (In Russian: Общественный совет), Fisheries Council (In Russian: Рыбохозяйственный Совет) and Scientific-Fisheries Council (In Russian: Научно-промысловые советы). There are three levels of participation in the fishery management process: the federal level, the basin level, and the regional level. Basin and regional level fishery councils have existed since Soviet times, while in 2004 the Federal Fisheries Act made their existence mandatory for all basins and regions located on their territory. In 2008, the rules and procedures for Basin Scientific and Fishery Councils in the Russian Federation were approved. Meetings of the Public Council are held at least 1 time per month. For example, a meeting will be held at FFA on 5th of November, 2020. In this meeting, the members of the Public Council plan to discuss the national program for the socio-economic development of the Far East for the period up to 2024 and for the future until 2035, approved by the order of the Government of the Russian Federation (Source: http://www.fish.gov.ru/territorialnye-upravleniya/15-otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve). The meeting will also consider the situation related to the death of marine organisms in Kamchatka.

The Far Eastern Basin Scientific and Fishery Council (DVNPS) is of main relevance for the Pacific salmon fishery. This Council is responsible for the discussion of management decisions taken in the Far East fisheries including fishing rules adjustment. For example, during the last meetings, the DVNPS approved the proposals on the Kamchatka Territory to expand the restrictions on the use of fixed nets in fishing areas on the western coast of Kamchatka. For commercial fishing of Pacific salmon, it will be prohibited to use nets in the Kamchatka-Kuril and West-Kamchatka subzones up to the mouth of the Icha River (Source: https://www.kamgov.ru/minfish/news/po-iniciative-kamcatskogo-kraa-v-pravila-rybolovstva-vnesut-rad-izmenenij-34870). This step tries to reduce the fishing pressure on Pacific salmon stocks. It is expected that the same restrictions will be extended to sea areas in the Northern Kuril Islands, where the main migration routes of Pacific salmon to the shores of Western Kamchatka, Magadan Oblast and northern regions of the Khabarovsk Territory pass. Moreover, in September at a meeting of the Security Council of the Russian Federation, the governors of the Kamchatka Territory and the Sakhalin Region agreed to sign a new agreement that would allow regulating the fishing of transit salmon. In addition, for recreational fishing, the region's proposal to catch fish with only one gear during the Chinook salmon run from 20 May to 15 July was approved. The Council also supported the initiative of the region on the introduction of special documentation, catch records for the indigenous peoples. Now there is no obligatory procedure for maintaining such reporting, documentation is not recorded, and it is not possible to control the actual amount of catch.

Moreover, the TAC and recommended catch setting process is a good example for the consultation in the Russian management system (see section 7.4.1.5 and Figure 67).

In the Bolshaya River basin, where the fishery of FTP Comandor JSC is concentrated, there are 4 licensed recreational fishing parcels of 4 companies, in addition to 28 tribal communities of the indigenous peoples carrying out traditional fishing. Consultations are also held with representatives of the indigenous people and these companies to obtain primary information on the number of Pacific salmon producers that have spawned in the Bolshaya River. In case of receiving negative data on filling of salmon spawning grounds in this water body, the information is immediately sent to the North-Eastern TA and the KamchatNIRO for a comprehensive analysis of the situation. Historically, specialists from KamchatNIRO have repeatedly received alarming signals about problems with the formation of spawning salmon stock in a particular tributary of the Bolshaya River. As a rule, a collective request is formed on the basis of the general information of several fishing companies, as well as representatives of the indigenous people and of recreational fishing companies. As soon as the relevant information had been received, the North-Eastern TA, the Ministry of Fisheries of the Kamchatka Territory and KamchatNIRO took the corresponding measures to solve a specific problem.

The management system takes into account the information obtained by continuously adapting policies according to the stakeholders and the opinion of the user groups, and therefore the SG80 is met. However, there is no written evidence that the management system has consistently explained how it uses / did not use the information gathered through its consultation processes, and therefore SG100 is not met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

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

As previously explained, Russian management system gives the opportunity and encourages all stakeholders to participate in the management process. The team was able to verify that stakeholders are provided opportunities to participate in the management process through the protocols of the meetings of the Public Council of the FFA, the Far Eastern Basin Scientific and Fishery Council (DVNPS) and "the Commission of Anadromous fish species". Therefore SG80 is met.

Although the system offers the opportunity to participate, it cannot be demonstrated with certainty that all interested and concerned parties have been involved, and it cannot be demonstrated conclusively that this process facilitated their effective participation. As such, SG100 cannot be fully justified and is likely not to be met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

References

- Federal Law of the Russian Federation of December 20, 2004 N 166-ФЗ “On Fishery and Protection of Aquatic Biological Resources” (In Russian: Федеральный закон Российской Федерации от 20 декабря 2004 г. No. 166-ФЗ О рыболовстве и сохранении водных биологических ресурсов) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/).
- Meeting will be held at FFA on 5th of November, 2020 (Source: http://www.fish.gov.ru/territorialnye-upravleniya/15-otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve).
- Proposals on the Kamchatka Territory approved by DVNPS during the last meetings (Source: https://www.kamgov.ru/minfish/news/po-iniciative-kamcatskogo-kraa-v-pravila-rybolovstva-vnesut-rad-izmenenij-34870).

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	
Condition number (if relevant)	**N/A**

PI 3.1.3 – Long term objectives

PI 3.1.3		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

The long-term objective of fisheries management system in Russia is stated in the **Federal law "On Fishery and Protection of Aquatic Biological Resources" (2004)** as: "Conservation and maintenance of aquatic biological resources or their recovery to the levels at which maximum sustainable extraction (catch) of aquatic biological resources and their biological diversity can be ensured, through the implementation of measures on the basis of scientific data for the study, protection, reproduction, rational use of water biological resources and protection of their habitat" (**Article 1.7**). Moreover "The priority of conservation of aquatic biological resources and their rational use before their use as an object of ownership and other rights, according to which possession, use and disposal of aquatic biological resources are carried out by the owners freely, if this does not damage the environment and the state of aquatic biological resources" (**Article 2.2**).

There is a similarity between the 'Protection and rational use' mentioned in these articles and the sustainability concept. It also put emphasis on the long-term and sustainable use of the biological resource, the priority of their conservation, based on scientific research and for socio-economic purposes. It is noteworthy that the priority of conservation of aquatic biological resources based on the scientific data and knowledge bears resemblance to the requirements of the precautionary despite that it is not mentioned explicitly in the Federal Fisheries Act. Moreover, the Russian federation has signed on a number of international agreements which adopt the precautionary approach, including the 1995 UN Straddling Stocks Agreement.

The long-term strategy for the development of the Russian fisheries complex until 2030 (In Russian: Стратегия развития рыбохозяйственного комплекса до 2030 года) defines priorities, objectives and targets aimed at ensuring the dynamic development of the fisheries sector, updating production assets, avoiding the export orientation of raw materials by stimulating the production of products with a high share of added value, creating favourable conditions for doing business and attracting investments in the industry.

The state program "Development of the fishery complex" (as amended on March 31, 2020) (In Russian: государственной программы Российской Федерации "Развитие рыбохозяйственного комплекса"), approved by the Decree of the Government of the Russian Federation dated April 15, 2014 No. 314 - has more widely strategic goals of development of the fishery complex in Russia (Source: http://docs.cntd.ru/document/499091766 ; https://mcx.gov.ru/activity/state-support/programs/fish-development/).

At regional level, the long-term goals of the Far East region are stated in the "National program of socio-economic development of the Far East of the Russian Federation for the period up to 2024 and for the future until 2035", approved by the order of the Government of the Russian Federation dated September 24, 2020 No. 2464-r - (Source: https://www.garant.ru/products/ipo/prime/doc/74587526/).

Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy of Russia, and therefore the SG80 is met. However, such objectives are not required by management policy and hence SG 100 is not met. It is all subject to

receiving further information (or not) and has to be confirmed later, after the site visit.

References

- Federal Law of the Russian Federation of December 20, 2004 N 166-ФЗ “On Fishery and Protection of Aquatic Biological Resources” (In Russian: Федеральный закон Российской Федерации от 20 декабря 2004 г. No. 166-ФЗ О рыболовстве и сохранении водных биологических ресурсов) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/).
- Long-term strategy for the development of the Russian fisheries complex until 2030 (In Russian: Стратегия развития рыбохозяйственного комплекса до 2030 года) (Source: http://fish.gov.ru/files/documents/files/proekt-strategiya-2030.pdf).
- State program "Development of the fishery complex" (as amended on March 31, 2020) (In Russian: государственной программы Российской Федерации "Развитие рыбохозяйственного комплекса"), approved by the Decree of the Government of the Russian Federation dated April 15, 2014 No. 314 (Source: http://docs.cntd.ru/document/499091766 ; https://mcx.gov.ru/activity/state-support/programs/fish-development/).
- "National program of socio-economic development of the Far East of the Russian Federation for the period up to 2024 and for the future until 2035", approved by the order of the Government of the Russian Federation dated September 24, 2020 No. 2464-r - (Source: https://www.garant.ru/products/ipo/prime/doc/74587526/).

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	
Condition number (if relevant)	**N/A**

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		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**	**Partial**

Rationale

The main specific objective of the salmon fishery in Kamchatka is to ensure adequate spawning escapements to maintain a sustainable yields and steady return of salmon in future. The escapement benefit is evaluated by observing whether salmon is actually using all areas that are likely to be suitable for spawning. The fishery is generally managed by specific regional escape ranges from observed species that had generated significant returns in the past. Specific short-term (annual) objectives try to maintain the main target salmon species within sustainable levels and therefore are consistent with the MSC Principles 1. These objectives are based on and specified by the annual recommended catch and forecasting document. Quotas are reviewed annually based on surveys and during season by "the Commission of Anadromous fish species" which clearly show an adaptive management system to current stock levels (see section 7.4.1.5).

On the other hand, short-term objectives including management measures (e.g. gear's technical characteristics, seasonal and area closures etc.) are also consistent with the MSC Principles 2 and are explicitly specified in the fishing rules for the Far Eastern Fisheries Basin (as amended on July 20, 2020) (Source: http://docs.cntd.ru/document/554767016). For example, in regards to the salmon fishery under assessment, Article (22.14.) prohibits for commercial fisheries to install fishing gears with overlapping more than 2/3 of the width of the river bed, stream or strait, channel, passage connecting a lagoon-type bay or lake with the sea, and the deepest part of the channel must remain free (with some exceptions including the installation of fish hatches and fish counting barriers, as well as commercial fisheries of Pacific salmon in order to prevent mortality in water bodies in which juveniles of Pacific salmon are released by fish hatcheries). Also, Article (22.15.) prohibits for commercial fisheries to catch Pacific salmon on rivers (with the exception of the Sakhalin Region and Kamchatka Territory, as well as cases where a single user has the right to catch Pacific salmon) at a distance in fishing areas located on the same water body less than 1 km: a) between the places of setting fixed and (or) overhanging seines; b) between the places of setting fixed and (or) overhanging seines and river mouths.

Article 28 prohibits the catch of certain species in certain periods using certain fishing gears, in which (28.23.) prohibits fishing of Pacific salmon in order to ensure optimal conditions for natural reproduction during the days (periods) of the brood-stock's admission to spawning grounds, which are established by the decision of "the Commission of Anadromous fish species". The following (28.24.) prohibits fishing of Pacific salmon in the exclusive economic zone of the Russian Federation: in the Kamchatka-Kuril subzone, the West Bering Sea zone, the Karaginskaya subzone, the Petropavlovsko-Komandorskaya subzone and the North Kuril zone - from October 1 to May 31; in the North Okhotsk subarea - from September 16 to June 30; in the South Kuril zone from October 1 to June 30.

In regards to prohibited types of fishing gears for salmon fisheries, it is prohibited to use fixed seines (trap nets) outside the boundaries of fishing areas located in the territorial sea of the Russian Federation adjacent to the

territory of the Kamchatka Territory and in the internal sea waters of the Russian Federation in the zones of the West Bering Sea, East Kamchatka, subzones of West-Kamchatka, Kamchatka-Kuril (Article 32.1.). Also to catch with all fishing gear on the spawning grounds of Pacific salmon in the period between the start date and the period of the prohibition of commercial fishing for Pacific salmon, as well as during the periods for the release of producers of Pacific salmon, determined by "the Commission of Anadromous fish species" (Article 32.2.). Similarly, to catch Pacific salmon with fixed nets in fishing areas in the territorial sea of the Russian Federation adjacent to the territory of the Kamchatka Territory and in the internal sea waters of the Russian Federation: in the Petropavlovsko-Komandorskaya subzone (except for the water area of Avacha Bay, Avacha Bay and Kronotsky Bay), in the Karaginskaya subzone, the West Bering Sea zone, the Kamchatka-Kuril subzone (Article 32.24.). And by (Article 32.25.) to catch Pacific salmon with fixed nets in fishing areas in the territorial sea of the Russian Federation adjacent to the territory of the Kamchatka Territory and in the internal sea waters of the Russian Federation:

a) Simultaneously with the use of other types of fishing gears in the same fishing area;

b) Nets with a length of more than 120 m and a height of more than 9 m;

c) Without gaps between nets less than 120 m when installed in one line (order of nets);

d) With a distance between networks or orders of networks less than 120 m;

e) Installing more than 20 nets at one fishing (fishing) site;

f) Installing networks in a checkerboard pattern;

In the commercial fishery for Pacific salmon using fixed nets in the territorial sea of the Russian Federation (with the exception of areas adjacent to the Magadan region), the mesh spacing must be at least 40 mm (Article 34.3.). Similarly, Article 35 and Table 1 (of the fishing rules) specify the minimum mesh size for fishing gears used in the inland sea waters and in freshwater bodies of the Russian Federation, in which set at 40 mm for fixed nets used for fishing Pacific salmon.

Overall, information indicates that the SG80 is met. However, while the short-term objectives are considered explicit, well defined and measurable (e.g. status of stock through stock assessments), the long-term objectives are not; therefore, SG100 is only partially likely to be met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

References

- On approval of the fishing rules for the Far Eastern fishery basin (as amended on July 20, 2020) (In Russian: Об утверждении правил рыболовства для Дальневосточного рыбохозяйственного бассейна (с изменениями на 20 июля 2020 года) (Source: http://docs.cntd.ru/document/554767016).

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	
Condition number (if relevant)	**N/A**

PI 3.2.2 – Decision-making processes

PI 3.2.2		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				
The decision-making process of the fisheries management system is clear and based on scientific data as well as on comprehensive consultation at regional and national levels as explained in the previous sections. This process results in measures and strategies to achieve the fishery-specific objectives. For example, at regional and Federal levels, the Recommended catch-setting process includes all available information to be evaluated and reviewed by regional scientific institutes (e.g. KamchatNIRO), "the Commission of Anadromous fish species" and at Federal level VNIRO, followed by the State Ecological Expertise in Moscow and FFA (see section 7.4.1.5 and Figure 67). Overall, information indicates that the SG80 is met.				
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				
The decision-making process is based on updated scientific data (e.g. catch statistics, monitoring and survey results) and stakeholder's consultation at least on an annual basis. The decision-making process responds to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner. For example the organised meetings of fisheries councils provide up to date recommendations for the management authorities which later are reflected in the TAC and Recommended catch as well as the new fishing rules. Also, in the Bolshaya River basin, where the fishery of FTP Comandor JSC is concentrated, there are 4 licensed recreational fishing parcels of 4 companies, in addition to 28 tribal communities of the indigenous peoples				

carrying out traditional fishing. Consultations are also held with representatives of the indigenous people and these companies to obtain primary information on the number of Pacific salmon producers that have spawned in the Bolshaya River. In case of receiving negative data on filling of salmon spawning grounds in this water body, the information is immediately sent to the North-Eastern TA and the KamchatNIRO for a comprehensive analysis of the situation. Historically, specialists from KamchatNIRO have repeatedly received alarming signals about problems with the formation of spawning salmon stock in a particular tributary of the Bolshaya River. As a rule, a collective request is formed on the basis of the general information of several fishing companies, as well as representatives of the indigenous people and of recreational fishing companies. As soon as the relevant information had been received, the North-Eastern TA, the Ministry of Fisheries of the Kamchatka Territory and KamchatNIRO took the corresponding measures to solve a specific problem. The minutes of the meetings of "the Commission of Anadromous fish species" in the Kamchatka Territory reflect the in-season adjustments of recommended catch volumes based on the information provided by scientific institutions during the season. For example, in the meeting (№ 27) held in Petropavlovsk-Kamchatsky on 17th of August 2020, the Commission decided to establish additional volumes catch of 15,000 tonnes of Pink salmon for the West-Kamchatka subzone; and another 10,000 tonnes of Pink salmon for the Kamchatka-Kuril subzone.

Taking into account that the decision-making processes respond to serious and other important issues, therefore SG80 is met. However, it cannot be considered that it responds to "all" issues in timely and adaptive manner as is required for SG100. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

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

Rationale

As previously stated, the decision making such as the recommended catch in-season adjustment is based on the most updated scientific data and available information. For example, catches are checked daily in addition to the scientific surveys conducted by regional scientific institutes in the Far East (e.g. KamchatNIRO) and therefore provide the best information available on fishing mortality for "the Commission of Anadromous fish species" to take the most suitable decision. Also measures specified in the fishing rules such as closed areas and seasonal fishing ban are based on the latest scientific information and tries to avoid any harmful impact on target, primary, secondary and ETP species, and associated habitats. The process can be considered, implicitly precautionary but not explicitly.

Overall, information indicates that the SG80 is met.

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**	**Partial**	**No**

Rationale

Some information regarding the performance of the fishery and its management is available for interested stakeholders. The websites of the FFA and North-eastern TA provide some information on the fishery's performance and management action (e.g. some protocols of the meetings of some of the Fisheries Councils). Further information on fishery management performance (including compliance) and management action is generally available upon the request of interested parties. This has been clear as the client and consulted scientists responded by providing the majority of information requested by the Assessment Team for this report. However, some important information (e.g. compliance and enforcement data) are requested by the Assessment Team and the client from agencies involved in fisheries management, and not received because its confidentiality. Thus, the SG80 partially met.

In addition, no formal reporting to all interested stakeholders takes place as required by SG 100. Also it is not clear whether the reporting is comprehensive in 'describing' how the management system responded to findings and relevant recommendations (e.g. the information provided to the Assessment Team for this report was not that comprehensive); as such, SG 100 is not met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

e	**Approach to disputes**			
	Guide post	Although the management authority or fishery may be subject to continuing 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.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	**Yes**	**Yes**	**Yes**

Rationale

Both the management system and the fishing sector try to resolve disputes and issues arises regarding the compliance to avoid judicial trials. Thanks to the well-established consultation system, most of cases are solved either directly between user groups and the government or by consultation with user groups through fisheries councils (see section 7.4.1.4). Internal fisheries offenses are processed by the enforcement agencies, while fishermen and ship-owners have the opportunity to take their case to court system instead of accepting a fine. The fishery inspectorate have the power to issue administrative penalties for minor infringements. Only the most serious cases go to prosecution by the fishery inspectorate and may transfer to the judicial system. When occasionally the dispute is taken to court by fishing companies, the management authority complies with the judicial decision in a timely manner.

Since the management system acts proactively to avoid legal disputes and rapidly implements judicial decisions, information indicates that the fishery meets SG60, SG80 and SG100.

References

- On approval of the fishing rules for the Far Eastern fishery basin (as amended on July 20, 2020) (In Russian: Об утверждении правил рыболовства для Дальневосточного рыбохозяйственного бассейна (с изменениями на 20 июля 2020 года) (Source: http://docs.cntd.ru/document/554767016).
- Meeting held at FFA on 5th of November, 2020 (Source: http://www.fish.gov.ru/territorialnye-upravleniya/15-otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve).
- Minutes of the last meeting (held at Vladivostok in 9th of July 2020) Far Eastern Basin Scientific and Fishery Council (DVNPS) (Source: http://fish.gov.ru/files/documents/otraslevaya_deyatelnost/organizaciya_rybolovstva/protokoly_komissij_sovetov/protokol_dvnps_090620.pdf).
- Procedure for the reception and consideration of citizens (In Russian: Порядок приема и рассмотрения обращений граждан) (Source: http://fish.gov.ru/obrashcheniya-grazhdan/poryadok-priema-i-rassmotreniya-obrashchenij-grazhdan).
- Minutes of the meeting (№ 27) of "the Commission of Anadromous fish species" (Source: http://xn--

b1a3aee.xn--p1ai/images/docs/Prikaz_2020/0309_Protokol_27.pdf).

- Minutes of the meeting (№ 31) of "the Commission of Anadromous fish species" (Source: http://xn--b1a3aee.xn--p1ai/images/docs/Prikaz_2020/3009_Protokol_31.pdf).

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**More information sought to score PI**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	**MCS implementation**			
	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**	**Yes**	**No**

Rationale

The state Monitoring, Control and Surveillance (MCS) functions are divided into five main elements; 1) maintenance of ongoing analytical monitoring of fishery; 2) visual monitoring of fishing vessels activities; 3) obligatory trans-shipment control; 4) offshore inspections with boarding a fishing vessel; 5) port control. These elements interconnect various management and control authorities, in which FFA and its territorial offices cooperate with the Federal Security Service (FSB), the Center of Fishery Monitoring and Communications (CFMC), and Costumes Services.

In this role, the FFA maintains a MCS system and supports the CFMC that collects, stores, processes, and distributes all fishery data. It includes daily statistics about the volumes of biological resources harvested, processed, trans-shipped, and transported by individual vessels. It provides real-time vessel position and allows authorities to spot distortions suggesting illegal activities. While the FSB conducts enforcement and inspections at-sea and in-port in cooperates with FFA to share data through the CFMC. The FFA also register and review the amount of fish that each vessel and company (in Russia: quotas are allocated to companies, not to vessels) caught at any time, based on daily reports (logbooks) and reports accumulated every 15 days of all fishing vessels.

An important component of control over the activities of the fishery is the Daily Vessel catch Report (DVR). On daily basis, each company submits information on the catch volumes and species composition to North-Eastern TA, which is then summarized for reporting to the "the Commission of Anadromous fish species". The DVR includes: the date of the report; coordinates of the parcel; name and register code of the parcel; the name and personal code of the parcel-owner; the license number; composition and quantity of caught species; residue on board of raw material; quantity and range of products shipped for transportation and so on. This information must completely coincides with the reporting documentation, which is conducted in paper form. In case of discrepancy between the data in the DVR and logbook, proceedings are conducted and the parcel-owner is administratively charged. The introduction of an electronic logbook system for the fisheries within the Far East by the beginning of 2019 has facilitated the process of reporting the catch. After the sum of catches of all companies that fishing in the management unit reaches the total recommended catch, the fishery will be closed if "the Commission of Anadromous fish species" does not decide to increase the quota.

The Coast Guard Inspection carries out analytical monitoring of fishing and trans-shipment activities. In addition to its internal resources (e.g. aircraft, patrol vessels, and radar surveillance), the FSB/Coast Guard has access to both VMS position system and DVR databases held by the CFMC and also to fishing permit database held by the North-Eastern TA. The plans for inspections of the activities of Legal entities and individual fishing companies can be found at the website of the North-Eastern TA (Source: http://xn--b1a3aee.xn--p1ai/rybookhrana/plan-provedeniya-proverok-yuridicheskikh-lits-i-ip/yuridicheskikh-lits-i-ip.html).

Also, quality / health inspections of landed fishery products before transferring them to domestic or export markets are responsibility of the Ministry of Agriculture which coordinates the work of the Federal Service for Sanitary and Veterinary Inspection (RosSelkhozNadzor).

In addition, taking into account the limited number of inspectors, it is impossible to ensure control over all water bodies of the Kamchatka Krai using only their forces. Therefore, a volunteering system has been recently developed in the Kamchatka Krai to attract the largest fishing companies to participate in voluntary environmental protection measures. This refers to the largest enterprises, which rent several fishing parcels within one or more water bodies. The voluntary activities are organised with the North-Eastern TA. These measures are intended to deter the IUU fishing at water bodies where the voluntary company directly carries out its fishing. In this regard, the voluntary assistance of fishing companies plays a significant role to ensure the conservation of regional salmon stocks. Besides providing information on the volumes of catch to the North-Eastern TA, FTP Comandor JSC also participates in voluntary environmental protection measures by helping in the installation of observation posts system in the Bolshaya River basin. FTP Comandor JSC also renders comprehensive assistance, providing inspectors and volunteer combatants with technical survival facilities, tools, and means of transport and communication.

A monitoring, control and surveillance system has been implemented in the fishery and shows an ability to enforce relevant management measures, strategies and/or rules, which is reflected in the cases of violations detected by the inspectors (see section 7.4.1.8.3 and Figure 68), therefore SG80 is met. However, taking into account that the statistics on violations committed in the sea area of 12-mile zone of territorial waters of the Russian Federation are not provided due its confidentiality, also that no independent information on inspections and infringements (e.g. scientific paper) or information about the magnitude of the IUU in previous years have been provided to the assessment team, therefore SG100 is met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

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

Sanctions are provided to address non-compliance within the fisheries management system in Russia. In the fishery, the authority draws extensively on administrative fines and sends only unsolved cases to the judicial system. Both the "code of the Russian Federation on Administrative Offenses" 30.12.2001 N 195-FZ and the "The Criminal Code of the Russian Federation" 13.06.1996 N 63-FZ define the sanctions for violating the rules regulating fishing in Russian Federation (see Table 31).

According to the compliance statistics provided by the consulted scientists, there are evidences that sanctions to deal with non-compliance exist, and are consistently applied; therefore SG80 is met.

However, taking into account that the statistics on violations committed in the sea area of 12-mile zone of territorial waters of the Russian Federation are not provided due its confidentiality, also that no independent information on inspections and infringements (e.g. scientific paper) or information about the magnitude of the IUU in previous years have been provided to the assessment team, it cannot be concluded that sanctions provide effective deterrence, therefore SG100 is not met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

c	**Compliance**			
	Guide post	Fishers are **generally thought** to comply with the management system for the fishery and associated enhancement activities under assessment, including, when	**Some evidence exists** to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing	There is a **high degree of confidence** that fishers and hatchery operators comply with the management system under assessment, including, providing information of

		required, providing information of importance to the effective management of the fishery.	information of importance to the effective management of the fishery and associated enhancement activities..	importance to the effective management of the fishery and associated enhancement activities.
	Met?	**Yes**	**No**	**No**

Rationale

According to the pre-assessment of this fishery, Mr. Tatarinov highlighted that the IUU fishing activities have 3 different components including: the historical misreporting catch by fishing companies, the poachers and indigenous people (Samy-Kamal, 2019). The magnitude of the misreporting catch by fishing companies has decreased since the introduction of the recommended catch and Olympic system in 2008 and lately the electronic logbooks in 2019. Currently, companies do not have any reason to hide or misreport their catch, he explained. Also added that the illegal fishing by indigenous people also has decreased as they have their own quotas by law. However, this keeps poaching as the only source of IUU. Historically poaching was emerged due to the lake of income and working opportunities after the collapse of the Soviet Union. This led to the development of a parallel commercial poaching. During the last two decades, the magnitude of commercial poaching has decreased significantly since the reform of the management system in 2008, also due to the reducing market for IUU catch. Currently, poaching for the personal consumption still ongoing mostly in remote areas. The voluntary initiatives of monitoring collaboration by fishing companies, fishing associations and citizens with the North-Eastern TA, also help to deter poaching.

According to the provided data, by consulted scientists of Kamchatka branch of VNIRO, for the period 2014–2018, the number of the recorded violations of the regulation in the Kamchatka-Kuril subzone amounted 1270 cases. Annual distribution of violations and illegally caught fish (tonnes) was as follows: 2014 - 411 / 32,095; 2015 - 234 / 3,524; 2016 - 142 / 4,542; 2017 - 190 / 14,919; 2018 - 293 / 12,962 (Figure 68). It should be noted that from 2014 to 2018 there was a decreasing trend in the total number of violations and the actual withdrawal of illegally caught fish. However, in 2017 and 2018, these indicators increased slightly. The scientists also highlighted that the total volumes of illegal catches during the period under review remained at a very low level, taking into consideration the whole volumes of Pacific salmon harvested in Kamchatka-Kuril subzone. In this sense, the scientists believe that such level of IUU fishing cannot cause significant harm to salmon stocks, both at the regional level as a whole and the Bolshaya River itself. Also it should be borne in mind that the data presented here only accounted for the capture of poachers, so the real damage to salmon stocks of the Bolshaya River is hard to determine. The situation tends to become more complicated due to transport accessibility and the scale of the water distribution system of the basin the Bolshaya River. The scientists consider that the actual magnitude of IUU fishing in this water body is much higher.

The scientists also emphasized that statistics on violations committed in the sea area of 12-mile zone of territorial waters of the Russian Federation are not given here. This is due to the confidentiality of these data, since the control of the marine area is carried out by the Coast Guard of the FSB of Russia (see section 7.4.1.8.1). They also added that according to unofficial information obtained during the working groups and headquarters of salmon fishing seasons, there are no significant violations that could adversely affect regional stocks of Pacific salmon in the Kamchatka-Kuril subzone.

Taking into account the information provided about MCS system (see PI 3.2.3 SIa) and sanction schemes (see PI 3.2.3 SIb) in the fishery, as well as the statistics on the violations detected between 2014 and 2018, it is generally thought that fishers comply with the management regulations. However, the statistics on violations committed in the sea area of 12-mile zone of territorial waters of the Russian Federation are not provided due its confidentiality. Also, no independent information on inspections and infringements (e.g. scientific paper) or information about the magnitude of the IUU in previous years have been provided to the assessment team. Therefore, the provided information is not considered enough evidence to demonstrate that fishers comply with the management system and therefore the SG80 is not met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

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

Rationale
A compliance summary was requested by the assessment team and the consulted scientist provided the available data between 2014 and 2018 (see section 7.4.1.8.3 and Figure 68). There is no evidence of systematic non-compliance in the fishery. The assessment team did not find any information indicating that this is not the case. Therefore, information indicates that the fishery is performing at SG80 which likely to be met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.
References
• "Code of the Russian Federation on Administrative Offenses" dated 30.12.2001 No. 195-FZ (as amended on 31.07.2020) (as amended and supplemented, entered into force on 11.08.2020) (In Russian: "Кодекс Российской Федерации об административных правонарушениях" от 30.12.2001 No. 195-ФЗ (ред. от 31.07.2020) (с изм. и доп., вступ. в силу с 11.08.2020)) (Source: http://www.consultant.ru/document/cons_doc_LAW_34661/). • "The Criminal Code of the Russian Federation" dated 13.06.1996 No. 63-FZ (as amended on 31.07.2020) (In Russian: "Уголовный кодекс Российской Федерации" от 13.06.1996 No. 63-ФЗ (ред. от 31.07.2020)) (Source: http://www.consultant.ru/document/cons_doc_LAW_10699/ ; https://www.wipo.int/edocs/lexdocs/laws/en/ru/ru080en.pdf).

Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**60-79**
Information gap indicator	**More information sought to score PI**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**4**

PI 3.2.4 – Monitoring and management performance evaluation

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**	**Yes**
Rationale				

The fishery has mechanisms to internally evaluate and review key parts of the management system on a regular basis. The management authorities (e.g. the FFA) receive feedback from the interested stakeholders including NGOs through the different councils found at federal, basin and regional levels (see section 7.4.1.5). Moreover, the FFA reviews the performance of its regional offices regularly. In this matter, the recommendations of Regional Fisheries Council are taken into account in the FFA regional office's feedback to the federal office. In the Recommended catch-setting process, the scientific advice from regional scientific institutions in the Far East (e.g. KamchatNIRO) is peer reviewed by "the Commission of Anadromous fish species", the VNIRO, and then forwarded to FFA and the federal natural resources monitoring agency Rosprirodnadzor for comments (see section 7.4.1.5).

The fishery-specific management system is also subject to external review. The State Ecological Expertise in Russia, which is under the Federal Service, in contrast to the FFA which is under the Ministry of Agriculture, is responsible for the Supervision of Natural Resources, and review of the Russian management system. Also, at Federal level, Melnychuk, etc., (2017) analysed characteristics of fisheries management systems of 28 major fishing nations including Russia. A Fisheries Management Index was calculated, integrating; research, management, enforcement, and socioeconomic attributes. Out of these 28 fishing nations, the Russian fisheries management system has been ranked #4 after the US, Iceland, and Norway, which highlights its effectiveness.

This SI tries to assess the extent of the review and evaluation mechanisms and its coverage to the parts of the fishery-specific management system. Information indicates that the SG100 is met as "most" parts of the fishery-specific management system are reviewed by these mechanisms.

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				

The fishery has mechanisms to evaluate and review key parts of the management system on a regular basis as explained above in PI 3.2.4 SIa. Internal reviews include the received feedback from the interested stakeholders such as NGOs through the different councils found at federal, basin and regional levels as well as the FFA reviews over the performance of its regional offices. Also the Recommended catch-setting process includes the scientific reviews by regional scientific institutions in the Far East (e.g. KamchatNIRO), "the Commission of Anadromous fish species", VNIRO, FFA and the federal natural resources monitoring agency Rosprirodnadzor. In addition to the reviews by the scientific paper cited above, the reviews by the State Ecological Expertise in Russia are totally external to the management system.

This SI tries to assess the frequency and regularity of the internal and external evaluation mechanisms of the parts of the fishery-specific management system. Information indicates that the SG80. Although the reviews by the State Ecological Expertise is regular (annually), it reviews only one element of the management system such as TAC allocation. Meanwhile, the external review by scientific researchers is occasional. Therefore the fishery-specific management system as a whole is not subject to regular external review, thus SG100 is not met. It is all subject to receiving further information (or not) and has to be confirmed later, after the site visit.

References

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report	
Draft scoring range	**≥80**
Information gap indicator	**More information sought to score PI**
Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	
Condition number (if relevant)	**N/A**

7.4.3 Principle 3 References

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Procedure for the reception and consideration of citizen's proposals and the rules for submission of appeals are specified in the official website of the FFA (Source: http://fish.gov.ru/obrashcheniya-grazhdan/poryadok-priema-i-rassmotreniya-obrashchenij-grazhdan).

Protocols of the meetings of the Public Council at FFA (Source: http://www.fish.gov.ru/territorialnye-upravleniya/15-otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve).

Public Council at the Federal Fisheries Agency (In Russian: Общественный совет при Федеральном агентстве по рыболовству) (Source: http://fish.gov.ru//otkrytoe-agentstvo/obshchestvennyj-sovet-pri-rosrybolovstve).

Results of the citizens' appeals to the North-Eastern TA of the FFA in 2019 (Source:http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/elektronnoe-obrashchenie-2.html).

Samy-Kamal, M., 2019.Pre-Assessment report for Kolkhoz Udarnik Salmon Fishery in Karaginsky Gulf, Karaga Bay and Litke Strait.71 pp.

State program "Development of the fishery complex" (as amended on March 31, 2020) (In Russian: государственной программы Российской Федерации "Развитие рыбохозяйственного комплекса"), approved by the Decree of the Government of the Russian Federation dated April 15, 2014 No. 314 - has more widely strategic goals of development of the fishery complex in Russia (Source: http://docs.cntd.ru/document/499091766 ; https://mcx.gov.ru/activity/state-support/programs/fish-development/).

Submission of citizens' appeals to the government of Kamchatka (Source:https://www.kamgov.ru/obrashenia-grazdan).

8 Appendices

8.1 Assessment information

8.1.1 Small-scale fisheries

FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River is a small-scale fishery (**Error! Reference source not found.**).

Table 32: Small-scale fisheries.

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
All UoAs for Pink *Oncorhynchus gorbusha*, chum *O. keta*, sockeye *O. nerka* salmon caught by FTP Comandor JSC on the own fishing gears in the own 11 fishing parcels at the coastal area in Kamchatka-Kuril subzone of the Sea of Okhotsk and in the Bolshaya River.	100 %	100

8.2 Evaluation processes and techniques

8.2.1 Site visits

The CAB shall include in the report:

- An itinerary of site visit activities with dates.
- A description of site visit activities, including any locations that were inspected.
- Names of individuals contacted.

Reference(s): FCP v2.2 Section 7.16

8.2.2 Stakeholder participation

The CAB shall include in the report:

- Details of people interviewed: local residents, representatives of stakeholder organisations including contacts with any regional MSC representatives.
- A description of stakeholder engagement strategy and opportunities available.

Reference(s): FCP v2.2 Section 7.16

8.2.3 Evaluation techniques

At Announcement Comment Draft report stage, if the use of the RBF is triggered for this assessment, the CAB shall include in the report:

- The plan for RBF activities that the team will undertake at the site visit.
- The justification for using the RBF, which can be copied from previous RBF announcements, and stakeholder comments on its use.
- The RBF stakeholder consultation strategy to ensure effective participation from a range of stakeholders including any participatory tools used.
- The full list of activities and components to be discussed or evaluated in the assessment.

At Client Draft Report stage, if the RBF was used for this assessment, the CAB shall include in the report:

- A summary of the information obtained from the stakeholder meetings including the range of opinions.
- The full list of activities and components that have been discussed or evaluated in the assessment, regardless of the final risk-based outcome.

The stakeholder input should be reported in the stakeholder input appendix and incorporated in the rationales directly in the scoring tables.

Reference(s): FCP v2.2 Section 7.16, FCP v2.2 Annex PF Section PF2.1

8.3 Peer Review reports

To be drafted at Public Comment Draft Report stage

The CAB shall include in the report unattributed reports of the Peer Reviewers in full using the relevant templates. The CAB shall include in the report explicit responses of the team that include:

- Identification of specifically what (if any) changes to scoring, rationales, or conditions have been made; and,
- A substantiated justification for not making changes where Peer Reviewers suggest changes, but the team disagrees.

Reference(s): FCP v2.2 Section 7.14

8.4 Stakeholder input

To be drafted at Client and Peer Review Draft Report stage

The CAB shall use the 'MSC Template for Stakeholder Input into Fishery Assessments' to include all written stakeholder input during the stakeholder input opportunities (Announcement Comment Draft Report, site visit and Public Comment Draft Report). Using the 'MSC Template for Stakeholder Input into Fishery Assessments', the team shall respond to all written stakeholder input identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a 'CAB response code'.

The 'MSC Template for Stakeholder Input into Fishery Assessments' shall also be used to provide a summary of verbal submissions received during the site visit likely to cause a material difference to the outcome of the assessment. Using the 'MSC Template for Stakeholder Input into Fishery Assessments' the team shall respond to the summary of verbal submissions identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a 'CAB response code'.

Reference(s): FCP v2.2 Sections 7.15, 7.20.5 and 7.22.3

8.5 Conditions – delete if not applicable

8.5.1 Summary of conditions closed under previous certificate

The CAB shall include a summary of conditions that were closed during the previous certificate.

This is the first assessment of the FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River. As such, there is no previous certificate.

8.5.2 Open Conditions at reassessment announcement – delete if not applicable

The CAB shall complete this section if:

1. The assessment is a reassessment, and
2. There are open conditions when the reassessment is announced.

The CAB shall identify conditions that are open at the time of the reassessment announcement, conditions that will be closed during the reassessment including an outline of how and when the condition will be closed, and conditions that are being carried over into the next certificate.

The CAB shall confirm the status of progress for each open condition. For the ACDR the CAB shall base this on the most recent surveillance audit. For the PCDR the CAB shall base this on the site visit.

The CAB shall include details regarding the closing of conditions during the reassessment following Section 5.3.2 from the MSC Surveillance Reporting Template.

The CAB shall only include information on conditions that are being carried over in the ACDR. In the Client and Peer Review Draft Report and subsequent reports the CAB shall incorporate all conditions that are being carried over into Section 8.5.2.

Reference(s): FCP v2.2 Section 7.30.5.

Table 33 **– Open Condition X (***use existing numbering)*

Performance Indicator	
Score	*State score for Performance Indicator.*
Justification	*Cross reference to page number containing scoring template table or copy justification text here.*
Condition	*State condition.*
Condition start	*State when the condition was set.*
Condition deadline	*State deadline for the condition.*
Milestones	*State milestones and resulting scores where applicable.*
Progress on Condition	*State a summary of the progress made by the fishery client to address the condition.* *Identify if milestones have been revised as part of remedial action at previous Surveillance Audits.*
Progress status	*Identify whether this condition is 'on target', 'ahead of target', 'behind target', or progress is inadequate, and provide justification as per FCP v2.2 7.28.16.1 and 7.28.16.2.*

Carrying over condition ☐	*Check the box if the condition is being carried into the next certificate and include a justification for carrying over the condition (FCP v2.2 7.30.5.1.a).*
Closing the condition during the reassessment	*Outline how and when the condition will be closed during the reassessment.*

8.5.3 Conditions – delete if not applicable

To be drafted at Client and Peer Review Draft Report stage

The CAB shall document in the report all conditions in separate tables.

Reference(s): FCP v2.2 Section 7.18, 7.30.5 and 7.30.6

Table 34 **– Condition 1**

Performance Indicator	
Score	*State score for Performance Indicator.*
Justification	*Cross reference to page number containing scoring template table or copy justification text here.*
Condition	*State condition.*
Condition deadline	*State deadline for the condition.*
Exceptional circumstances ☐	*Check the box if exceptional circumstances apply and condition deadline is longer than the period of certification (FCP v2.2 7.18.1.6). Provide a justification.*
Milestones	*State milestones and resulting scores where applicable.*
Verification with other entities	*Include details of any verification required to meet requirements in FCP v2.2 7.19.8.*
Complete the following rows for reassessments.	
Carried over condition ☐	*Check the box if the condition is being carried over from a previous certificate and include a justification for carrying over the condition (FCP v2.2 7.30.5.1.a).* *Include a justification that progress against the condition and milestones is adequate (FCP v2.2 7.30.5.2). The CAB shall base its justification on information from the reassessment site visit.*
Related condition ☐	*Check the box if the condition relates to a previous condition that was closed during a previous certification period but where a new condition on the same Performance Indicator or Scoring Issue is set.* *Include a justification – why is a related condition being raised? (FCP v2.2 7.30.6 & G7.30.6).*
Condition rewritten ☐	*Check the box if the condition has been rewritten. Include a justification (FCP v2.2 7.30.5.3).*

8.6 Client Action Plan

To be drafted at Public Comment Draft Report stage

The CAB shall include in the report the Client Action Plan from the fishery client to address conditions.

Reference(s): FCP v2.2 Section 7.19

8.7 Surveillance

To be drafted at Client and Peer Review Draft Report stage

The CAB shall include in the report the program for surveillance, timing of surveillance audits and a supporting justification.

Reference(s): FCP v2.2 Section 7.28

Table 35 – Fishery surveillance program

Surveillance level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit & re-certification site visit

Table 36 – Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
e.g. 1	e.g. May 2018	e.g. July 2018	e.g. Scientific advice to be released in June 2018, proposal to postpone audit to include findings of scientific advice

Table 37 – Surveillance level justification

Year	Surveillance activity	Number of auditors	Rationale
e.g.3	e.g. On-site audit	e.g. 1 auditor on-site with remote support from 1 auditor	e.g. From client action plan it can be deduced that information needed to verify progress towards conditions 1.2.1, 2.2.3 and 3.2.3 can be provided remotely in year 3. Considering that milestones indicate that most conditions will be closed out in year 3, the CAB proposes to have an on-site audit with 1 auditor on-site with remote support – this is to ensure that all information is collected and because the information can be provided remotely.

8.8 Risk-Based Framework outputs – delete if not applicable

To be drafted at Client and Peer Review Draft Report stage

8.8.1 Consequence Analysis (CA)

The CAB shall complete the Consequence Analysis (CA) table below for each data-deficient species under PI 1.1.1, including rationales for scoring each of the CA attributes.

Reference(s): FCP v2.2 Annex PF Section PF3

Table 38 **– CA scoring template**

	Scoring element	Consequence subcomponents	Consequence score
Principle 1: Stock status outcome		Population size	
		Reproductive capacity	
		Age/size/sex structure	
		Geographic range	
Rationale for most vulnerable subcomponent			
Rationale for consequence score			

8.8.2 Productivity Susceptibility Analysis (PSA)

The CAB shall include in the report an MSC Productivity Susceptibility Analysis (PSA) worksheet for each Performance Indicator where the PSA is used and one PSA rationale table for each data-deficient species identified, subject to FCP v2.2 Section PF4. If species are grouped together, the CAB shall list all species and group them indicating which are most at-risk.

Reference(s): FCP v2.2 Annex PF Section PF4

Table 39 **– PSA productivity and susceptibility attributes and scores**		
Performance Indicator		
Productivity		
Scoring element (species)		
Attribute	Rationale	Score
Average age at maturity		**1 / 2 / 3**
Average maximum age		**1 / 2 / 3**
Fecundity		**1 / 2 / 3**
Average maximum size Not scored for invertebrates		**1 / 2 / 3**
Average size at maturity Not scored for invertebrates		**1 / 2 / 3**
Reproductive strategy		**1 / 2 / 3**
Trophic level		**1 / 2 / 3**
Density dependence Invertebrates only		**1 / 2 / 3**
Susceptibility		
Fishery Only where the scoring element is scored cumulatively	*Insert list of fisheries impacting the given scoring element (FCP v2.2 Annex PF 7.4.10)*	
Attribute	Rationale	Score
Areal Overlap	*Insert attribute rationale. Note specific requirements in FCP v2.2 Annex PF4.4.6.b, where the impacts of fisheries other than the UoA are taken into account*	**1 / 2 / 3**
Encounterability	*Insert attribute rationale. Note specific requirements in FCP v2.2 Annex PF4.4.6.b, where the impacts of fisheries other than the UoA are taken into account*	**1 / 2 / 3**

Selectivity of gear type		**1 / 2 / 3**
Post capture mortality		**1 / 2 / 3**
Catch (weight) Only where the scoring element is scored cumulatively	*Insert weights or proportions of fisheries impacting the given scoring element (FCP v2.2 Annex PF4.4.4)*	**1 / 2 / 3**

Table 40 **– Species grouped by similar taxonomies (if FCP v2.2 Annex PF4.1.5 is used)**

Species scientific name	Species common name (if known)	Taxonomic grouping	Most at-risk in group?
e.g. Genus species subspecies		Indicate the group that this species belongs to, e.g. *Scombridae, Soleidae, Serranidae, Merluccius spp.*	Yes / No

8.8.3 Consequence Spatial Analysis (CSA)

The CAB shall complete the Consequence Spatial Analysis (CSA) table below for PI 2.4.1, if used, including rationales for scoring each of the CSA attributes.

Reference(s): FCP v2.2 Annex PF Section PF7

Table 41 **– CSA rationale table for PI 2.4.1 Habitats**

Consequence	Rationale	Score
Regeneration of biota		**1 / 2 / 3**
Natural disturbance		**1 / 2 / 3**
Removability of biota		**1 / 2 / 3**
Removability of substratum		**1 / 2 / 3**
Substratum hardness		**1 / 2 / 3**
Substratum ruggedness		**1 / 2 / 3**
Seabed slope		**1 / 2 / 3**
Spatial	Rationale	Score
Gear footprint		**1 / 2 / 3**
Spatial overlap		**1 / 2 / 3**
Encounterability		**1 / 2 / 3**

8.8.4 Scale Intensity Consequence Analysis (SICA)

The CAB shall complete the Scale Intensity Consequence Analysis (SICA) table below for PI 2.5.1, if used, including rationales for scoring each of the SICA attributes.

Reference(s): FCP v2.2 Annex PF Section PF8

Table 42 **– SICA scoring template for PI 2.5.1 Ecosystem**

	Spatial scale of fishing activity	Temporal scale of fishing activity	Intensity of fishing activity	Relevant subcomponents	Consequence Score
Performance Indicator PI 2.5.1 Ecosystem outcome				Species composition	
				Functional group composition	
				Distribution of the community	
				Trophic size/structure	
Rationale for spatial scale of fishing activity					
Rationale for temporal scale of fishing activity					
Rationale for intensity of fishing activity					
Rationale for consequence score					

8.9 Harmonised fishery assessments – delete if not applicable

Harmonisation is required in cases where assessments overlap, or new assessments overlap with pre-existing fisheries.

If relevant, in accordance with FCP v2.2 Annex PB requirements, the CAB shall describe in the report the processes, activities and specific outcomes of efforts to harmonise fishery assessments. The report shall identify the fisheries and Performance Indicators subject to harmonisation.

Reference(s): FCP v2.2 Annex PB

The MSC provides guidance with respect to overlapping fisheries and the need or otherwise for harmonisation (Annex PB, MSC, 2020a); with respect to overlapping UoAs, it states "*Teams shall ensure that conclusions are consistent between the 2 (or more) fishery assessments, with respect to evaluation, scoring and conditions*".

In considering nearby fisheries for harmonization, the team reviewed MSC guidance including:

PB1.3.1 *Teams assessing overlapping UoAs shall ensure consistency of outcomes so as not to undermine the integrity of MSC fishery assessments*.

PB1.3.2 *Teams shall prepare for harmonisation with overlapping UoAs no later than the site visit*.

PB1.3.3.2 *Teams shall ensure that conclusions are consistent between the 2 (or more) fishery assessments, with respect to evaluation, scoring and conditions*.

GPB1.1. The MSC-MSCI Vocabulary defines overlapping fisheries as, "2 or more fisheries which require assessment of some, or all, of the same aspects of MSC Principles 1, 2 and/or 3 within their respective units of certification". This definition is also relevant for the Unit of Assessment (UoA). Harmonisation is not necessary in assessments of fisheries that use similar gears or management approaches but operate in clearly different geographic areas.

Based on this MSC guidance, the Assessment team identifies three MSC certified fisheries in the coastal area of Kamchatka-Kuril subzone(including Bolshaya River) and one certified fishery in the West-Kamchatka subzone - Zarya-Kolpakovsky Sobolevo Salmon Fisheries to consider for harmonization in the Eastern part of the Sea of Okhotsk off Western Kamchatka:

- Narody Severa Bolsheretsk salmon;
- Zarya-Kolpakovsky Sobolevo Salmon Fisheries;
- VA-Delta Kamchatka salmon fisheries;
- Ozernovsky RKZ No 55 West Kamchatka salmon fishery.

There are identified all other certified fisheries of Pacific salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River as for spatial overlap. These all fisheries target the joint stocks with similar gear and types of fishing. According the MSC guidance, these similar overlapping salmon fisheries need to be considered for harmonization. The team is considered harmonization for certain PIs in Principles 1-3. See (Table 43).

Table 43: List of overlapping fisheries with FTP Comandor JSC Pacific Salmon in Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River.

Fishery name	Certification status and date	Performance Indicators to harmonise
Narody-Severa-Bolsheretsk-salmon https://fisheries.msc.org/en/fisheries/narody-severa-bolsheretsk-salmon/@@view	Certified, May 2018	P1: Yes. Assume joint stocks of target species (Pink, Chum and Sockeye salmon) in the coastal area of Kamchatka-Kuril subzone. P2: Yes. Conditions of the fishing of by-catch species are similar on the coastal salmon fisheries by the coastal trap

		nets, beach seines, fixed and drifting gillnets in the coastal area of Kamchatka-Kuril subzone, Bolshaya River and the impact on the ETP-species, habitats and ecosystem too.- PIs 2.1 – 2.5. P3: PIs 3.1.1 – 3.1.3
Zarya-Kolpakovsky Sobolevo-Salmon-Fisheries https://fisheries.msc.org/en/fisheries/zarya-kolpakovsky-sobolevo-salmon-fisheries/@@view	Certified, July 2020	The same.
VA-Delta Kamchatka salmon fisheries https://fisheries.msc.org/en/fisheries/va-delta-kamchatka-salmon-fisheries/@@view	Certified with component(s) in assessment, Sept 2016	The same.
Ozernovsky RKZ No55 West Kamchatka salmon fishery https://fisheries.msc.org/en/fisheries/ozernovsky-rkz-no-55-west-kamchatka-salmon-fishery/@@view	Certified, July 2020	The same.

Table 44: Evaluating overlapping fisheries (to be determined).

Supporting information	
Describe any background or supporting information relevant to the harmonisation activities, processes and outcomes.	
Was either FCP v2.2 Annex PB1.3.3.4 or PB1.3.4.5applied when harmonising?	Yes / No
Date of harmonisation meeting	DD / MM / YY
If applicable, describe the meeting outcome	
e.g. Agreement found among teams or lowest score adopted.	

Table 45: Scoring differences (to be determined).

Performance Indicators (PIs)	Fishery name	Fishery name	Fishery name	Fishery name
PI	Score	Score	Score	Score
PI	Score	Score	Score	Score
PI	Score	Score	Score	Score

Table 46: Rationale for scoring differences.

If applicable, explain and justify any difference in scoring and rationale for the relevant Performance Indicators (FCP v2.2 Annex PB1.3.6)

If exceptional circumstances apply, outline the situation and whether there is agreement between or among teams on this determination

8.10 Objection Procedure – delete if not applicable

To be added at Public Certification Report stage

The CAB shall include in the report all written decisions arising from the Objection Procedure.

Reference(s): MSC Disputes Process v1.0, FCP v2.2 Annex PD Objection Procedure

8.11 UoA company and vessel's list (correct at time of ACDR production)

Table 47: Vessel's list of own FTP Comandor JSC and freigthers of other companies in the Kamchatka-Kuril subzone of the Sea of Okhotsk and Bolshaya River.

Support vessels for fishing operations on coastal trap nets and transfer raw salmon from trap nets to the slot		
FTP Comandor JSC and Freighted vessels	Boat	Zh (Ж)-165-326
	Boat	Zh (Ж)-22-1057
	Boat	KZh (КЖ)-312
	Small Fishing Seiner (MPC)	MRS (MPC) 150-276
	Small Fishing Seiner (MPC)	MRS (MPC) 150-318
	Small Fishing Seiner (MPC)	MRS (MPC) 150-325
	Small Fishing Seiner (MPC)	MRS (MPC) 150-359
	Small Fishing Seiner (MPC)	MRS (MPC) 150-086
	Small Fishing Seiner (MPC)	MRS (MPC) 150-351
	Small Fishing Seiner (MPC)	MRS (MPC) 225-350
Accepting of raw fish and processing vessels		
Fishing collective farm named after V.I. Lenin	FV	Victor Gavrilov
	FV	Planeta
	FV	Mysovoy
	FV	Ikhtiolog
	LRFT	Seroglazka
	LRFT	Sergey Novosyolov
Transportation vessels (for delivering of raw fish to on-shore processing facility "Fish Processing Factory" of the Fishing collective farm named after V.I. Lenin)		
Fishing collective farm named after V.I. Lenin	FV	Gromoboy
	FV	Leninets
	FV	Komandor
	FV	Vasily Kapluk

9 Corporate branding

This template may be formatted to comply with the Conformity Assessment Body (CAB) corporate identity. The CAB shall ensure that content and structure follow the template.

Examples of appropriate amendments are:

a. A title page with the company logo;
b. A company header and footer used throughout the report;
c. Replacement of font styles;
d. Inclusion of contact details for the assessment team members in relation to consultation
e. Deletion of any sections that are not applicable, though CABs should leave any sections that will be populated later in the assessment; and,
f. Deletion of introductory text or instructions.

10 Template information and copyright

This document was drafted using the 'MSC Reporting Template v1.2'.

Template version control

Version	Date of publication	Description of amendment
1.0	17 December 2018	Date of first release
1.1	29 March 2019	Minor document changes for usability
1.2	25 March 2020	Release alongside Fisheries Certification Process v2.2

A controlled document list of MSC program documents is available on the MSC website (msc.org).

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