Marine Stewardship Council fisheries assessments

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East Kamchatka Alaska (Walleye) pollock mid-water trawl

Photo from website: https://skurilsk.ru/news/skurilsk/153621/ (© Sakhalin.Info, 2018)

Announcement Comment Draft Report

Conformity Assessment Body (CAB)	UCSL United Certification Systems Limited
Assessment team	Steven Nelson, Dr. Giuseppe Scarcella, Dr. Mohamed Samy-Kamal
Fishery client	PCA – Pollock Catchers Association (Russian Federation)
Assessment type	Initial Assessment
Date	December 2020

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Glossary

CABs	Conformity Assessment Bodies
CFMC	Center of System for Monitoring of Fisheries and Communication, FGBU (Federal State Budgetary Institution)
CITES	Convention on International Trade in Endangered Species
CPUE	Catches Per Unit Effort
DVR	Daily Vessel (catch) Report
EEZ	Exclusive Economic Zone
ETP	Endangered, Threatened and Protected species
EU	European Union
FAO	Food and Agriculture Organization
FCR v2.1	Fishery Certification Requirements Version 2.1
FFA	Federal Fisheries Agency (or in Russian – Rosrybolovstvo)
FGIS Mercury	Mercury, Federal State Infomational System
FPZ	Fishery Protection Zone
FSB	Federal Security Service of Russian Federation
GLM	Generalised Linear Model
HCR	Harvest Control Rule
ICES	International Council for the Exploration of the Sea
IUCN	International Union for Conservation of Nature
KamchatNIRO	Kamchatka branch of VNIRO (former – Kamchatka Research Institute of Fisheries and Oceanography)
kt	Thousand tons
MCS	Monitoring Control and Surveillance
MLS	Minimum Landing Sizes
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
NGOs	Non-Governmental Organizations
PA	Precautionary approach
PIs	Performance Indicators
PRI	Point of Recruitment Impairment
RBF	Risk-Based Framework
RC	Recommended (or possible) Catch
RF	Russian Federation
SGs	Scoring Guideposts
SNBR	State Nature Biosphere Reserve
SNR	State Nature Reserve
SPNAs	Specially protected natural areas

TAC	Total Allowable Catch
TBD	To be determinated
UCSL	United Certification Systems Limited, CAB
UoA	Unit of Assessment
UoC	Unit of Certification
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System
VNIRO	All-Russian Federal Research Institute of Fisheries &Oceanography, FGBNU (Federal State Budgetary Research Institution)

List of symbols and reference points

B_{lim}	Minimum biomass below which recruitment is expected to be impaired or the stock dynamics are unknown.
B_{MSY}	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 spawning stock biomass (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.
F	Instantaneous rate of fishing mortality.
F_{lim}	Fishing mortality rate that is expected to be associated with stock ‘collapse’ if maintained over a longer time (precautionary reference point).
F_{MSY}	F giving maximum sustainable yield (biological reference point).
F_{pa}	Precautionary buffer to avoid that true fishing mortality is at F_{lim} when the perceived fishing mortality is at F_{pa}.
K	Carrying Capacity
MSY	Maximum Sustainable Yield

1 Executive summary

This report is the Announcement Comment Draft Report (ACDR) which provides details of the MSC assessment process for East Kamchatka Alaska (Walleye) pollock mid-water trawl. The ACDR was published in December 2020.

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 Steven Nelson (Team Leader and Principle 2 specialist), Dr. Giuseppe Scarcella (Principle 1 specialist) and Dr. Mohamed Samy-Kamal (Principle 3 specialist).

Client fishery strengths

Principle 1:

- The long time-series of data available on pollock, in the area.
- Good science in support of management
- Adequate administrative and scientific management system that is responsive of the state of the stock.

Principle 2:

- Good long-term data to identify trends in fish communities, habitats, and ecosystems.
- Low by-catch levels. No by-catch species exceeds 3% of the catch
- Healthy stocks. Primary minor stocks maintain high abundance levels significantly above target levels.
- Strong fishery management. TACs and reference points for 15 primary species and Recommended Catch (RC) designations for other secondary species.
- Minimum impact to ETP species. Insignificant impacts to Steller sea lions and Short-tailed albatross.
- Minimum habitat impacts. Trawl fisheries rarely interact with the benthic environment and have little impact.
- Minimum ecosystem impacts. No significant disruption of predator-prey relationships or trophic structure and function. Good long-term data at all trophic levels documents ecosystem changes; mostly resulting from climatic and oceanic conditions rather than fishing.

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.
- Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood.
- There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.

[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

Client fishery weaknesses

Principle 1:

- Potential lack of confidence in the knowledge about the impact on juvenile pollock.
- Lack in the revision of alternative measures to decrease unwanted cathces of target species.

Principle 2:

- Inadequate data for all by-catch species. With over 50 species recorded as by-catch, there is not sufficient data to establish points of recruitment impairment (PRI) for all of them.
- Broad-scale fishery management. By combining North Kuril zone and Petropavlovsk-Commander subzone into a single UoA, fishery management.
- Statistics describe broad-scale impacts that may overlook significant local regions and seasonal impacts.
- Seabird interactions. No information about non-ETP seabird interactions to determine their possible status as secondary main species. Trawlers may interact with Lysan Albatross, Common Murre, Northern Fulmar and Pelagic Commorant.
- VME characteristics. Although scientists have identified VME indicator species; there are no maps of VME areas based on bathymetry. Also, no record of VME-indicator species in by-catch.
- Ecosystem models. There is not a good ecosystem model to integrate and connect food webs across all trophic levels.

Principle 3:

- There is no enough evidence to demonstrate that fishers comply with the management system.

It is noted that information 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:

- More information is sought about the model outputs to define the status of the target species.
- More information about unwanted catches of target species is needed as well as about the review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality.
- Potential information gaps related to the Information and Monitoring (especially evidence of catches from other fisheries) of pollock in East Kamchatka will be further investigated.

Principle 2:

- Lists of all species with TACs and PCs by sepately for both North Kuril zone and Petropavlovsk-Commander subzone.
- Define any ETP species listed under a “limit” defined by national law or international treaty. Is there a limit? Or only “protection”? ETP status of Steller sea lion?
- Observer reports and catch data showing interactions with seabirds.
- UoC list of vessels with names of Company, Vessel (English and Russian), IMO numbers, call signs, and registration numbers.
- Any ETP or protected area violations.
- Maps of VMEs and protected areas. Any VME maps based on bathymetry?
- Any ecological, food web model that covers all trophic levels?

Principle 3:

- Further information demonstrating that roles and responsibilities are understood for all areas.
- A clear demonstration of how information is or is not used in decision-making.
- Information on how the consultation process facilitates the effective engagement of all parties.
- Clarification on the extent to which the long-term objectives are explicit and required by management policy.

- Clarification on the extent to which the long-term objectives are well-defined and measurable.
- Clarification on the extent to which the evaluations cover all parts of the fishery-specific management system.
- Clarification on the external review processes and regularity.

Determination

On completion of the initial review of information and scoring, the assessment team conclude 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.

2 Report details

2.1 Authorship and peer review details

The assessment of the East Kamchatka Alaska (walleye) pollock mid-water trawl fishery was conducted by the following Team from UCSL United Certification Systems Limited:

Principle 1 Lead: Dr. Giuseppe Scarcella

Dr. Giuseppe Scarcella is an experienced fishery scientist and population analyst and modeller, with wide knowledge and experience in the assessment of demersal stocks. He holds a first degree in Marine Biology and Oceanography (110/110) from the Unversità Politecnica delle Marche, and a Ph.D. in marine Ecology and Biology from the same university, based on a thesis "Age and growth of two rockfish in the Adriatic Sea". After his degree he was offered a job as project scientist in several research programs about the structure and composition of fish assemblage in artificial reefs, off-shore platform and other artificial habitats in the Italian Research Council – Institute of Marine Science of Ancona (CNR-ISMAR, now CNR-IRBIM). During the years of employment at CNR-ISMAR he has gained experience in benthic ecology, statistical analyses of fish assemblage evolution in artificial habitats, fisheries ecology and impacts of fishing activities, stock assessment, otolith analysis, population dynamic and fisheries management.

During the same years he attended courses of uni- multivariate statistics and stock assessment. He is also actively participating in the scientific advice process of FAO GFCM in the Mediterranean Sea. At the moment he is member of the Scientific, Technical and Economic Committee for Fisheries for the European Commission (STECF). He is author and co-author of more than 50 scientific paper peer reviewed journals and more than 150 national and international technical reports, most of them focused on the evolution of fish assemblages in artificial habitats and stock assessment of demersal species. For some years now, Dr Scarcella has been working in fisheries certification applying the MSC standard for sustainable fisheries, currently concentrating on Principle 1 of the Standard. Furthermore, Dr Scarcella holds the credential as Fishery team leader (MSC v2.0) and he completed the MSC procedure training 2.1. He also holds the credential as certifier of Responsible Fisheries Management (RFM).

UCSL confirms that Dr. Guiseppe Scarcella meets the competency criteria for team members as specified in FCP v.2.2:

- He holds a PhD in in marine Ecology and Biology and more than 3 years research experience in fisheries;

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

- He has more than 3 years experience of applying relevant stock assessment techniques; more than 3 years experience working with the biology and population dynamics different marine species;

- He has passed the Traceability and RBF training modules;

It is also confirmed that Dr. Guiseppe Scarcella has no conflicts of interest in relation to the fishery under assessment. A full C.V. is available on request.

Team Leader and Principle 2 Lead: Steven Nelson

Steven Nelson has over 25 years of experience in coastal, watershed and fishery management. During this time he worked in management, scientific, and communication roles for US and international programs sponsored by federal, state, and local governments, academic institutions, NGOs, and private companies. As a seasoned program manager, he has experience setting program goals and objectives, managing budgets and work plans, supervising staff and contractors, administering grants and contracts, and negotiating with diverse stakeholders. He has technical expertise in fishery management, watershed management, biodiversity conservation, policy and governance and resource economics. He has experience working in seafood and aquaculture sectors with expertise in sustainability certification and product traceability. Steven is also a skilled writer with a record of publications and has implemented marketing, communications and knowledge management projects in public and private sectors.

UCSL confirms that Steven Nelson meets the competency criteria for team members as specified in FCP v.2.2:

- He holds a BA in economics and an MS in environmental biology (estuarine ecology);

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

- He has 3 years' experience in management and research in fisheries; more than 3 years' experience working with the biology and population dynamics; more than 3 years' experience in research into/policy analysis/management of fisheries impacts on aquatic ecosystems;

- He speaks Russian and has more than 2 years' fishery work experience in Russia;

- He has passed the Traceability and RBF training modules.

It is also confirmed that Steven Nelson has no conflicts of interest in relation to the fishery under assessment. A full C.V. is available on request.

Principle 3 Lead: Dr. Mohamed Samy-Kamal

Dr. Mohamed Samy-Kamal is a fisheries scientist from University of Alicante. Dr. Samy-Kamal holds a BSc in Marine Biology from Al Azhar University, Egypt, an MSc in Economics and Management of Fisheries from University of Barcelona, Spain, and a PhD in Marine Science and Applied Biology from University of Alicante, Spain. He was a scholarship holder of the research institution (IAMZ-CIHEAM) of Zaragoza and of the Spanish Agency for International Development and Cooperation (MAECAECID) of Madrid. Dr. Samy-Kamal has authored a number of scientific articles, regularly participates in international fisheries conferences (e.g. Iberian Symposium of Marine Biology Studies) and has taken numerous technical courses, including on MSC evaluation tools. He teaches the International master programme of Sustainable fisheries management organized by University of Alicante and IAMZ-CIHEAM.

UCSL 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.

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. is available on request.

Use of the Risk-Based Framework (RBF):

Steven Nelson and Dr. Mohamed 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:

2.2Version details

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**

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

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

3.1.1 Unit(s) of Assessment

A single Unit of Assessment (UoA) is described and assessed for East Kamchatka Alaska (Walleye) pollock mid-water trawl, as presented in Table 2, below.

Table 2. Unit(s) of Assessment (UoA)

UoA 1	Description
Species	Alaska (Walleye) pollock *(Gadus (Theragra) chalcogrammus)*
Stock	In FAO Code Subareas: 61.02 – Eastern Kamchatka (61.02.2 – Petropavlovsk-Commander subzone) and 61.03 – North Kuril zone
Fishing gear type(s) and, if relevant, vessel type(s)	Mid-water (pelagic) trawl
Client group	The client group is represented by the Pollock Catchers Association (PCA). The companies and their vessels that are operated by the East Kamchatka Alaska (Walleye) pollock mid-water trawl client group (correct at the time of drafting the ACDR) are detailed in Section 10.10 of this report. If required, an up-to-date list will be available from UCSL United Certification Systems Limited upon request.
Other eligible fishers	Potential Russian fishing enterprises which are not members of the PCA and have legal quotas for harvesting Alaska (walleye) pollock in the North Kuril zone and the Petropavlovsk-Commander subzone and catch its on their own or contracted vessels with using mid-water trawl.
Geographical area	Northwest Pacific (within FAO Major Fishing Area - 61): Petropavlovsk-Commander subzone (61.02.2) and North-Kuril zone (61.03)

UCSL United Certification Systems Limited as the Conformity Assessment Body confirms that East Kamchatka Alaska (Walleye) pollock mid-water trawl 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).

3.1.2 Unit(s) of Certification

It is anticipated that the Unit of Certification (UoC) with description in Table 3 will be the same as the UoA, as detailed in Table 2 above. This will be confirmed in the Public Certification Report.

Table 3. Unit of Certification (UoC)

UoC 1	Description
Species	Alaska (Walleye) pollock *(Gadus (Theragra) chalcogrammus)*
Stock	In FAO Code Subareas: 61.02 – Eastern Kamchatka (61.02.2 – Petropavlovsk-Commander subzone) and 61.03 – North Kuril zone
Fishing gear type(s) and, if relevant, vessel type(s)	Mid-water (pelagic) trawl
Client group	The client group is represented by the Pollock Catchers Association (PCA). The companies and their vessels that are operated by the East Kamchatka Alaska (Walleye) pollock mid-water trawl client group (correct at the time of drafting the ACDR) are detailed in Section 10.10 of this report. If required, an up-to-date list will be available from UCSL United Certification Systems Limited upon request.
Geographical area	Northwest Pacific (within FAO Major Fishing Area 61): Petropavlovsk-Commander subzone (61.02.2) and North-Kuril zone (61.03)

3.1.3 Scope of assessment in relation to enhanced or introduced fisheries

East Kamchatka Alaska (Walleye) pollock mid-water trawl is not enhanced nor is it an introduced species-based fishery (ISBF). Therefore, enhanced and ISBF fishery assessment considerations do not apply.

3.2 Assessment results overview

3.2.1 Determination, formal conclusion and agreement

To be drafted at Public Comment Draft Report stage

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

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

Reference(s): FCP v2.2, 7.20.3.h and Section 7.21

3.2.2 Principle level scores

To be drafted at Client and Peer Review Draft Report stage

The CAB shall include in the report the scores for each of the three MSC principles in the table 4 below.

Reference(s): FCP v2.2 Section 7.17

Table 4. Principle level scores

Principle	UoA 1	UoA 2	UoA 3	UoA 4
Principle 1 – Target species				
Principle 2 – Ecosystem impacts				
Principle 3 – Management system				

3.2.3 Summary of conditions

To be drafted at Client and Peer Review Draft Report stage

Table 5. Summary of conditions

Condi-tion num-ber	Condition	Performance Indicator (PI)	Deadline	Excep-tional circum-stances?	Carried over from previous certificate?	Related to previous condition?
1	Meet SG 80 score: *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.*	**PI 1.2.1** Harvest strategy **SI(f)** Review of alternative measures	**To be determined** **TBD**	**No**	**No**	**No**
2	Meet SG 80 score: *There is a partial strategy in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.*	**PI 2.2.2** Secondary species management strategy **SI(a)** Management strategy in place	**TBD**	**No**	**No**	**No**
3	Meet SG 80 score: *Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status.*	**PI 2.2.3** Secondary species information **SI(a)** Information adequacy for assessment of impacts on main secondary species	**TBD**	**No**	**No**	**No**
4	Meet SG 80 score: *Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.*	**PI 3.2.3** Compliance and enforcement **SI(a)** MCS implementation	**TBD**	**No**	**No**	**No**

3.2.4 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.

4 Traceability and eligibility

4.1 Eligibility date

It is anticipated that the eligibility date would be set as the publication date of the Public Comment Draft Report (PCDR) version of the assessment report. This would be confirmed at the publication of the PCDR, if desired by the client and if product harvested after the eligibility date and sold or stored as under-assessment fish can be handled in conformity with the MSC requirements as detailed in 7.8 (MSC 2020a).

4.2 Traceability within the fishery

As pollock fisheries are managed with TAC tool, only fishing companies which have quotas are allowed to harvest pollock. Companies are provided with a fixed quota share for a long term period (15 years). Pollock TAC is annually set for each fishing zone, based on a quota share in TAC, each company is allocated a quota annually according to the Federal Fisheries Agency order.

Based on allocated quota, fishing company applies for a fishing permit. Fishing permit is issued for a vessel, it contains catch limit, fishing area, time period, gear type.

Pollock catch is processed mainly by trawler-processors at-sea, as well as on motherships or delivered to onshore factories. Trawler-processors produce some products: frozen pollock HG (headed and gutted), WR (whole and round), fillets (PBO/PBI/Shatter pack blocks), mince, roe, liver, mint, fishmeal.

Products are frozen and packed on board into boxes or bags by 20 or 22 kg (depending on a product type). Each box/bag is individually labeled. According to the state regulation, label must have full information about producer, vessel name, production date, product type, area of catch, gear type, etc.

All information about vessel’s activities is recorded into fishing and production logbooks. The captain must keep both logs, and they are always checked during the inspection by Coastguard. At the moment, the electronic fishing logbook is used in a testing mode. Mandatory use of EFL is expected in 2021.

According to the regulations, daily pollock catch is calculated from produced products with convention factors (or yield factors). The factors are developed and tested by the state institutes, they reflect what amount of raw fish is used to produce certain amount of particular product. Yield factors take into account type of processing equipment, way of freezing, as well as fishing area and season.

Besides recording of catching and processing operations into logbooks, all vessels must submit daily vessel reports (DVR) to the Fishery Monitoring System. DVR contains the results of the vessel’s production activity over the last day and it is drawn up on the basis of the log book, fishing log and technology log of the vessel. DVR contains information on:

- vessel location and recent movement;
- catch information and fish products output;
- fishing and non-fishing operations at sea (transshipment, bunkering);
- product stocks onboard the vessel;
- residual stock of fish products onboard.

Each fishing and transport vessels are mandatory equipped with a satellite equipment for monitoring that allows to monitor and control vessel location and movement by the Coastguard and Federal Fisheries Agency. The VMS system operates through Russian satellite system Gonets and Inmarsat. Vessels usually have equipment for two systems to avoid missing of position transferring.

Trawler-processors make transshipment of products to refer vessels at-sea. Only Russian-flagged refers are allowed to operate. All transshipment must be controlled by Coast Guard inspector to conduct functions of the state control and enforcement. During transshipment, inspector checks and verifies transshipped products, counts them, checks production information, all documentations, fishing permits, etc. Each product batch receives verified act required for further documentation and clearance.

All refer vessels must call a Russian port for cargo clearance. Upon arrival to the port, the refer vessel is inspected by the Coast Guard, Customs, and Veterinary Service which issues corresponding documentations for the products. Only after all documents are obtained, a vessel can leave and deliver the products for export. Veterinary Service now runs a electronic system called FGIS Mercury that has all veterinary certificates (health and 5i) for fish products and is considered an effective tool.

All fish product export comes with EU catch certificates issued by the local office of the Federal Fisheries Agencies. Fish export to China comes with obligatory catch certificates according to the Russia-China intergovernmental agreement on fisheries cooperation and IUU prevention.

All PCA member companies that harvest, process and trade pollock have MSC CoC certificates since 2013. According to the MSC CoC rules, companies go through rigor audits and inspections regularly. State system of fish products traceability applied to the at-sea harvesting and processing guarantees absence of raw fish mixing or mislabeling as well as other risks of non-conformance.

The traceability of the pollock fishery in the UoC is summarised in Table 6.

Table 6. 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.	*Low risk. Client group includes only mid-water trawlers. No Danish-seiner won't be included into client group list. It is no way to use Danish seiner from a trawler, and visa versa. Gear type must be indicated in the fishing permits. Type of gear is also put on a label on the products. Companies use colored sewings for packing.* *There is a remote possibility that gear other than midwater trawl will be carried on pollock-directed vessels. Operators may also have a TAC or RC catch allocations for cod, Atka mackerel and halibut and possibly a few other managed species. This is not expected to be a common occurrence. Vessels are required to notify authorities on a daily basis when they switch gear and target other species. These species are separated from any pollock catch and non-pollock gear stowed when not in use.*
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.	*Low risk. All harvest operations are monitored by VMS. Catch and production is reported according to the fishing zones, so it is clearly stated where the fish is caught and processed. It is closely controlled by the Coastguard.* *Vessels may fish in other zones, but locatons are known, recorded and monitored. Therefore there is low risk of UoC vessels fishing in another area.*
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.	*Low risk. UoC vessels target and process only pollock on their vessels. All pollock catch is recorded and processing often takes place on catcher vessels where fish are headed and gutted, frozen and boxed for transhipment. Any pollock-related products (such as roe) are packed separately. Juvenile pollock proportions can vary seasonally, but proportions are monitored by inspectors at sea and boats must move on when juvenile proportions are >20%. Dumping is not permitted and all pollock are processed as MSC-certified.* *MSC-certified pollock follows a simple chain of traceability – basically from trawl, mostly headed and gutted, frozen at sea and labelled and transshipped to mother vessels for transport to land. Coastguard and FSB monitor all transhipments and fish must be landed in Russia. Once landed, a different traceability chain is followed for product sold in the domestic market or sent to reprocessing facilities in Russia or China in some cases. The movement of products, the recording of catches, transhipments and quantities landed are monitored by the FSB or Coastguard and rigorously controlled to ensure that catches are maintained within permitted allocations and securely transferred to Russian ports. Under this system,.the risk of product mixing is very low.*

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.	*Yes. All transhipments must be monitored and checked by the Coast Guard of FSB RF. No transhipment is allowed without Coast Guard observers. All transport vessels are also equipped with VMS. All products must be delivered to Russian ports for clearance. At port landings all products are checked again by Customs and Veterinary services. All information about the products go through one system – FGIS Mercury.*
Are there any other risks of mixing or substitution between certified and non-certified fish? If Yes, please describe how any risks are mitigated.	*Risk is low. Other pollock fishers operate in the Sea of Okhotsk, West Bering Sea and South Kuril fishing zones. Most of these fisheries will be MSC certified.* *Moreover, all products are labeled with catch date, fishing zone ID code, product name, etc. So there is little risk of product substitution or mixing.*

4.3 Eligibility to enter further chains of custody

To be drafted at Client and Peer Review Draft Report stage

The fishery assessment covers all products from Alaska (Walleye) pollock (*Gadus (Theragra) chalcogrammus*) landed from PCA vessels operating in the UoA until the point of landing. Therefore, the scope of certification ends at the point of landing. Downstream certification of the product requires the appropriate chain of custody certification.

The fishery certificate is applicable to all PCA vessels that are legally licenced to fish for Alaska (Walleye) pollock in the Petropavlovsk-Commander subzone (61.02.2) and North-Kuril zone (61.03) (including only the Russian EEZ). Any Alaska (Walleye) pollock landed by PCA vessels operating within the UoA is considered to be within scope.

The PCA vessels that are operated by the East Kamchatka Alaska (Walleye) pollock mid-water trawl client group (correct at the time of drafting the ACDR) are detailed in Section 10.10 of this report. If required, an up-to-date list will be available from UCSL United Certification Systems Limited upon request.

Beyond the point of landing, any company taking ownership of East Kamchatka Alaska (Walleye) pollock product originating from the fishery and wishing to identify it as MSC certified will need to hold a valid chain of custody certificate.

In order for subsequent links in the distribution chain to be able to use the MSC logo, companies and/or individuals must enter into a separate chain of custody certification, and be able to track product to the client group companies and member companies.

4.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to enter further chains of custody

There are not considered to be any IPI stocks in this fishery – East Kamchatka Alaska (Walleye) pollock mid-water trawl.

5 Scoring

5.1 Summary of Performance Indicator level scores

The following draft performance indicator scores are provided (Table 7). 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 7. Draft Performance Indicator scores (at ACDR).

Principle	Component	Performance Indicator (PI)		Score
1	Outcome	1.1.1	Stock status	≥80
		1.1.2	Stock rebuilding	N/A
	Management	1.2.1	Harvest strategy	60-79
		1.2.2	Harvest control rules & tools	≥80
		1.2.3	Information & monitoring	≥80
		1.2.4	Assessment of stock status	≥80
2	Primary species	2.1.1	Outcome	≥80
		2.1.2	Management	≥80
		2.1.3	Information	≥80
	Secondary species	2.2.1	Outcome	≥80
		2.2.2	Management	60-79
		2.2.3	Information	60-79
	ETP species	2.3.1	Outcome	≥80
		2.3.2	Management	≥80
		2.3.3	Information	≥80
	Habitats	2.4.1	Outcome	≥80
		2.4.2	Management	≥80
		2.4.3	Information	≥80
	Ecosystem	2.5.1	Outcome	≥80
		2.5.2	Management	≥80
		2.5.3	Information	≥80
3	Governance and policy	3.1.1	Legal & customary framework	≥80
		3.1.2	Consultation, roles & responsibilities	≥80
		3.1.3	Long term objectives	≥80
	Fishery specific management system	3.2.1	Fishery specific objectives	≥80
		3.2.2	Decision making processes	≥80
		3.2.3	Compliance & enforcement	60-79
		3.2.4	Monitoring & management performance evaluation	≥80

6 Principle 1

6.1 Principle 1 background

The following information is mainly based on a stock assessment report produced by Kamchatka branch of VINRO (KamchatNIRO, 2020a; b) and Pollock Catchers Association website (http://pollock.ru/en/pollock-sustainability). The present report focuses on the fishery of 61.02.2 – Petropavlovsk-Commander (In Russian: Petropavlovsk-Komandorskaya or Петропавловск-Командорская) subzone and 61.03 – North Kuril zone (In Russian: Severo-Kurilskaya or Северо-Курильская) (including subzone 61.03.1 – the Pacific side of the Northern Kurils Islands (of North Kuril zone) and 61.03.2 – the Okhotsk side of these Islands (of North Kuril zone).

6.1.1 Spatial distribution and stock unit

Alaska pollock or walleye pollock *Gadus chalcogrammus* (former Latin name – *Theragra chalcogramma*) is the most abundant and widely distributed representative of cod-like (Gadid) fish in the Pacific Ocean. It inhabits the North Pacific coastal waters. The northern border of its distribution is in the Chukchi Sea to the north, and it extends south along the coast of North America to the Gulf of Monterey, and along the Asian coast to the northern part of the Korea Strait (PCA, 2011). On that side of the Pacific, large and abundant Northern Sea of Okhotsk and East Bering Sea populations live and are exploited commercially.

The largest populations of pollock are found around West Alaska, Olyutorsky-Karaginsky Bays, and East Kamchatka and Eastern Korea. There are also many small populations, which include pollock in Peter the Great Bay, four groups around Hokkaido Island, Tatar Strait, Commander Islands, East Alaska and Vancouver, and possibly others (see Figure 1).

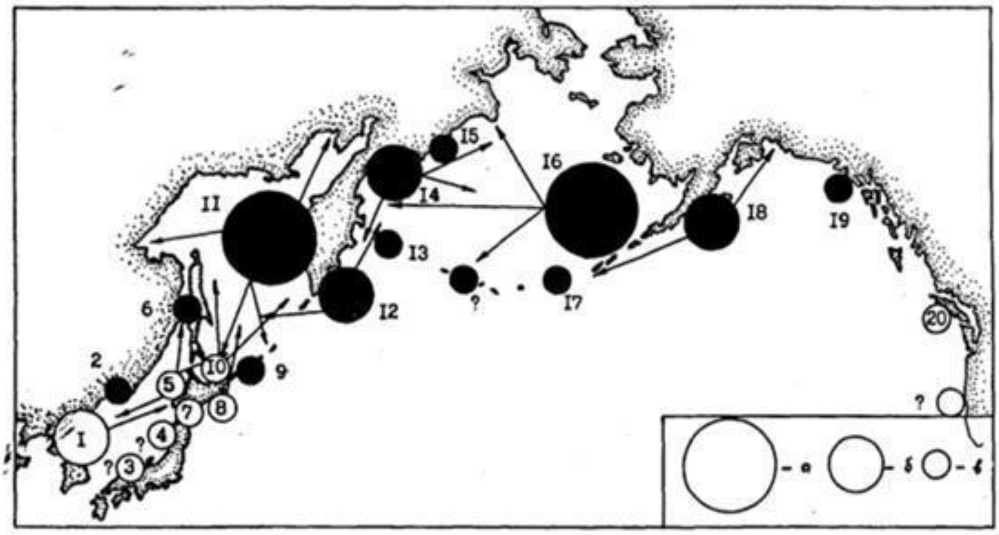

Figure 1. General diagram of pollock population structure (after Shuntov et al., 1993). [Large circle (a) from a few million tons to >10 million tons, Medium-sized circle (b) from several hundred thousand to several million tons, Small circle (c) from tens of thousands to several hundred thousand tons. The arrows show the pollock movementand the open circles are autumn or winter spawners and the black ones the spring spawners. Populations: East Korean (1), Peter the Great Bay (2), Shimana (3), Toyama (4), West Hоккaido (5), Tatar Strait (6), South Hоккaido (7), East Hоккaido (8), South Kuril (9), North Hоккaido or Raus (10), North Okhotsk Sea superpopulation (11), East Kamchatka (12), Commander (13), Olyutorsky-Karaginsky (14), Koryak (15), East Bering Sea superpopulation (16), East Aleutian (17), West Alaska (18), East Alaska (19), Vancouver (20)].

Pollock of the northern populations are characterized by notable migration activity, while migration paths of southern groups are relatively shorter. Pollock of the northern populations spawn mainly in spring, whereas southern populations do so in autumn (Korean waters), or more often in winter. The southern, especially the southwestern part of the area, has many population groups, which is likely a consequence of their adaptation to the complex oceanography in the area which is located at the junction of moderate and subtropical waters.

In Russian legislation, the management areas in the pollock fisheries are shown in Figure 2 (referred to as subzones). Management measures and different regulations and controls are typically set for each subzone. This includes the partitioning of the pollock Total Allowable Catch (TAC) which is broadly divided among Petropavlovsk-Commander subzone (61.02.2) and North-Kuril zone (61.03).

Note however, that TAC allocation between zones may vary from year to year and even within a season primarily to adapt to the inter-annual and seasonal variability in the availability of the pollock resources.

Spawning takes place over the shelf and shallow areas at depths ranging from 50 to 200-250 m, with the largest concentration of spawners on the West Kamchatka shelf, in the shallow north-central region and in Shelikhov Bay. There are smaller spawning concentrations in waters northwest and southwest of Iona Island and near the east coast of Sakhalin.

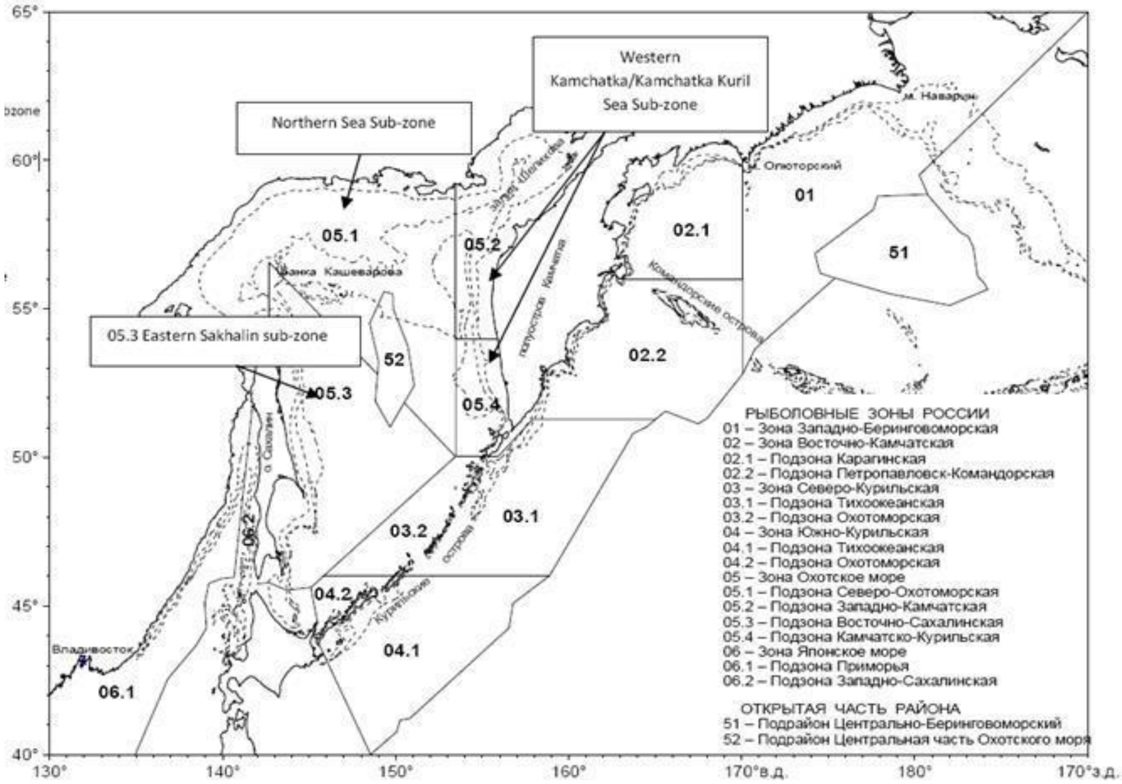

Figure 2. Far Eastern fishing basin management subzones. (Source: PCA, 2011).

According to the information provided by VINRO scientists relatively recently it became known that the spring (in the ending of April - early May) spawning of pollock near southwestern Kamchatka and in the Okhotsk Sea waters adjacent of the Northern Kuril Islands is associated with migrations of pollock from the Eastern Kamchatka population to this area (Buslov, Varkentin, 2008; Buslov, 2009). Therefore, the Alaska (walleye) pollock in North Kuril zone (61.03) and Petropavlovsk-Commander subzone (61.02.2) is considered as single population.

The geographic range of the East Kamchatka pollock population stretches from the Kronotsky Bay to oceanic waters off Kharimkotan Island and coincides with the Petropavlovsk-Commander and North Kuril Pacific subzones. Pollock of this population is not involved in any significant migrations to the high seas. Its distribution and migrations are subject to seasonal variations. In the feeding period, pollock is distributed at large depths and migrates from the waters off the southeastern coast of Kamchatka northeastward to Avacha Bay and Kronotsky Bay and southwestward to the waters of North-Kuril. Also, its migrations via the Kamchatka Strait to the Bering Sea were observed (Antonov, 1991; Shuntov et al., 1993). Its breeding center is the Avacha Bay and Southeast Kamchatka waters (Zolotov, Antonov, 1986; Antonov, 1991). In years when its stock level is high, pollock spawning grounds and, consequently, mature fish aggregations are found all across the shelf zone: from the waters of Onekotan Island to the Avacha Bay and Kronotsky Bay. Part of spawners migrates to the Sea of Okhotsk waters of North Kurils and Southwest Kamchatka (Buslov, 2009; Buslov, Varkentin, 2009). In years when the pollock stock biomass is low, the greater portion of spawning activities takes place in deep-water canyons of the Avacha Bay and Kronotsky Bay (Buslov, Tepnin, 2002). East Kamchatka pollock is rather large grouping of this species, with its biomass reaching up to 2 million tons in high abundance years (Zolotov et al., 1997) and 2.5 million tons according to other sources (Ilyin et al., 2014). Researchers for the whole population generally perform proceeding from the assumptions regarding the same population status of pollock in the Pacific waters of Kamchatka and North Kurils, this grouping's stock assessment and TAC forecasting and then estimated TAC is distributed between the Petropavlovsk-Commander subzone and North Kuril zone depending on predicted stock distribution and fishery specifics.

Pollock is characterized by seasonal migrations associated with particular phases of its life cycle. Pollock's yearly cycle includes the following periods: winter period (November – February), spawning period (March – May) and feeding period (June – October) (Antonov, 1990; Buslov, Velikanov, 2013). Figure 3 shows East Kamchatka pollock migrations and locations of its key breeding areas and juvenile habitats.

In November, after completion of the feeding period, aggregated pollock masses move southwestward to Shumshu and Paramushir islands to the upper part of the continental slope and margin of the continental shelf to depth contours of 150– 300 m. It is in this area (along the shelf of the southeastern tip of Kamchatka and North Kurils) that pollock fisheries actively operate (Buslov, Velikanov, 2013). In this time, catches of BMRT (large freezer fishing trawler) type vessels near North Kurils reach 60–70 tons/ship-day and about 30 tons/haul. Catches near Southeast Kamchatka are somewhat smaller – 50–60 tons and 20–30 tons respectively. The greater portion of catches is mature individuals with their gonads at initial maturity stages.

In December, pollock keeps at water depths of 150–550 m. In January – February, its major concentrations are distributed above depths of 400–450 m in the layer of 290–350 m (Antonov, 1990). In this time, mature individuals concentrate near spawning grounds. The densest aggregations are concentrated in vicinity of the deep-water canyons of the Avacha Bay and Kronotsky Bay near the southern tip of Kamchatka.

Figure 4 shows fishing fleet (using trawls and Danish seines) locations in winter which are indicative of the distribution of pollock concentrations. Some explanations are needed here. In their vessel's daily reports (VDR), vessels indicate not coordinates of performed fishing operations but vessel's position at 12:00 UTM. It is due to this reason that vessel positions on distribution maps are sometimes outside the boundaries of areas under consideration.

In 2019, largest pollock aggregations were observed in the Kronotsky Bay and Avacha Bay, near Southeast Kamchatka, on the Pacific side of Paramushir and Onekotan islands.

Mean BMRT-type vessel catches were 80–100 tons/day and about 30 tons per haul. Near North Kurils, vessels of this class harvest an average of 58 tons per day and 24 tons per haul. In late February – March, pre-spawning individuals start migrating to smaller depths toward the margin of the continental shelf (Zolotov, Antonov, 1986; Buslov, 2001). The highest aggregations keep at depths of 260–320 m.

In the breeding period, pollock individuals concentrate in canyon spurs at depths of 300–500 m, in the expanded continental shelf segment near the southeastern tip of the peninsula and on the oceanic side of North Kurils, where spawning takes place (Figure 5).

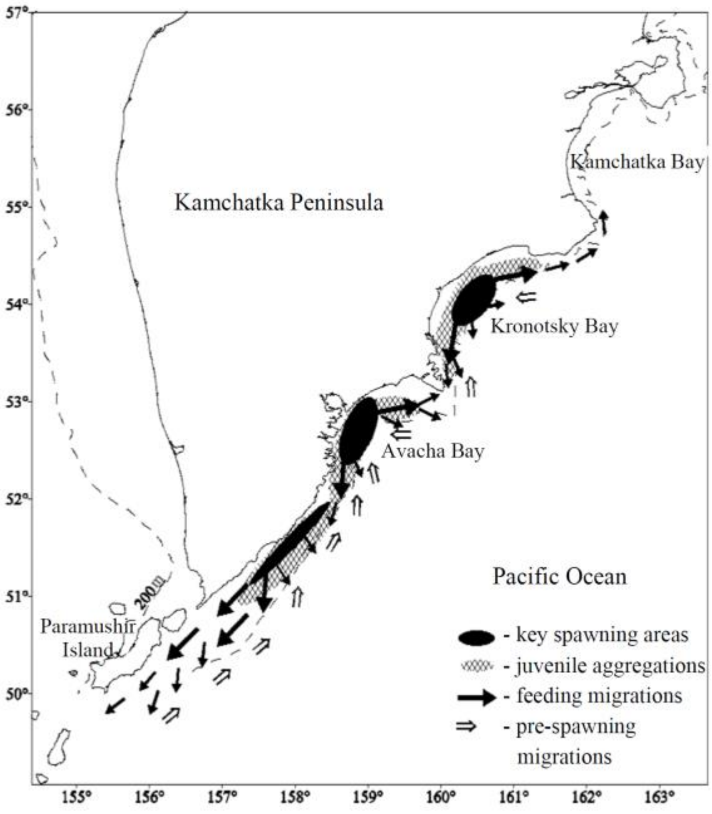

Figure 3. Functional structure of East Kamchatka pollock geographic range (Buslov, 2008).

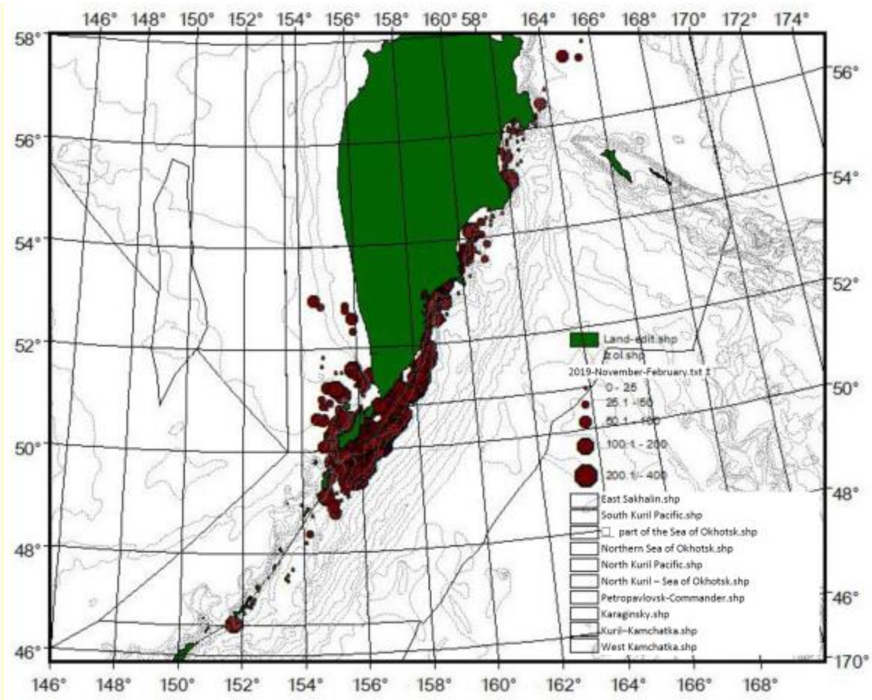

Figure 4. East Kamchatka pollock fishing areas in winter period of 2019 (Source: KamchatNIRO, 2020a).

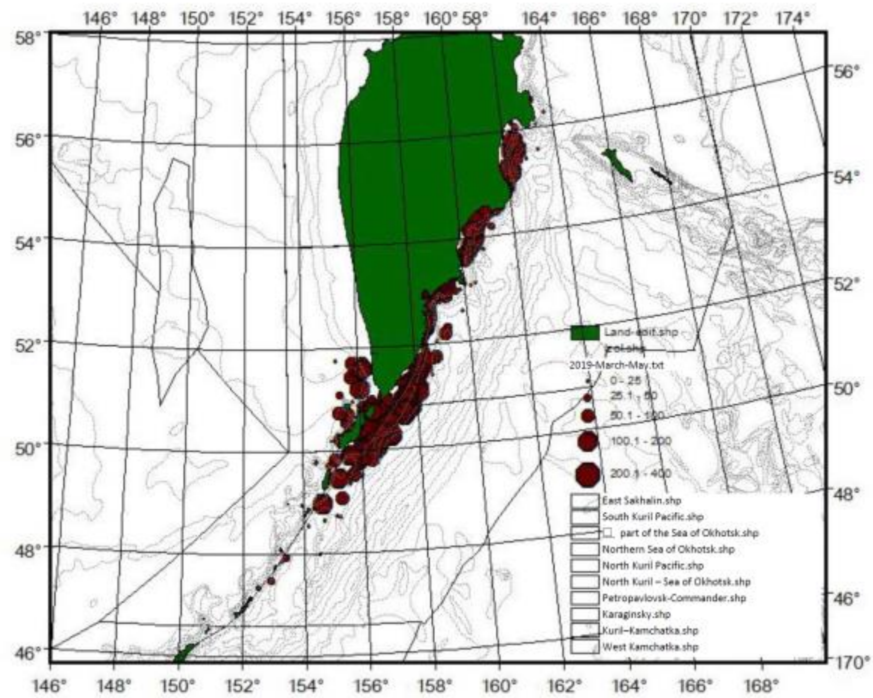

Figure 5. East Kamchatka pollock fishing areas in the spawning period of 2019. (Source: KamchatNIRO, 2020a).

After spawning, spawners are rather discontinuously distributed along the whole shelf and drop-off zone. A considerable flow of individuals migrating for feeding is traced in southern direction toward the North Kurils. Mean catches off Southeast Kamchatka are 48 tons per ship-day and 19 tons per haul. Data for the North Kurils are higher: 56 and 26 tons respectively.

During the feeding period, pollock individuals actively feed in the outer shelf and in the upper part of the continental slope and undertake no significant migrations to the high seas moving along the drop-off area southward and northward. Pollock intensively feeds till September – October, with individuals rather uniformly distributed between areas and forming no dense concentrations (Figure 6).

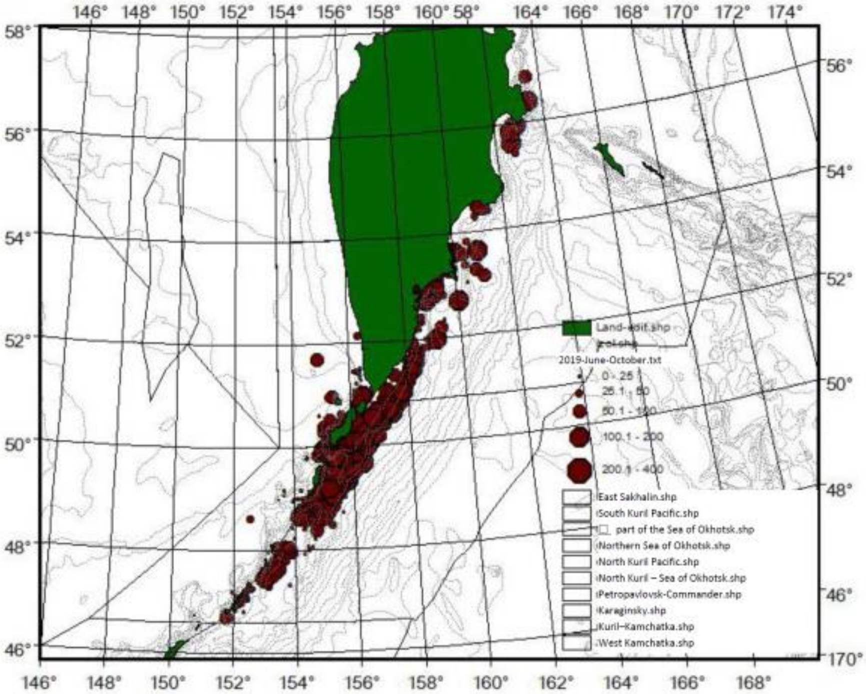

Figure 6. East Kamchatka pollock fishing areas in the feeding period of 2019. (Source: KamchatNIRO, 2020a).

According to multi-year data, virtually no small-sized individuals are observed in this period at the southern periphery of the geographic range. At the same time, juveniles are regularly present in catches north of Onekotan Island (Buslov, Velikanov, 2013).

In November – December, juveniles appear in the upper part of the continental slope and outer shelf and, depending on their abundance, may account for a significant portion of catches. In some years, 2- or 3-year-olds became dominant age cohorts. This is evidence in favor of the hypothesis that immature pollock from the geographic range's southern part concentrates in vicinity of the Fourth Kuril Strait (Buslov, 2001). According to our observations, the percentage of juveniles in catches off Southeast Kamchatka also grows in this period. Possibly, immature individuals stay in the midwater in the spring and during feeding period and occupy near-bottom layers in November – December becoming more accessible for fishing.

In terms of vertical distribution in the water column, pollock occupies an intermediate position between bottom and pelagic fishes (Fadeev, 1986). In daylight hours, it stays mostly in near-bottom layers and ascends to higher levels in the night. The character of its vertical migrations largely depends on daily migrations of its food objects. In the spawning period, when pollock virtually does not feed, the course of its daily vertical migrations becomes disrupted.

The intensity and extent of pollock migrations are known to be depending on its stock size (Shuntov et al., 2003). Thus, at a relatively high stock level of East Kamchatka pollock in 1993, its main aggregations in the spawning period were found near Paramushir Island and north of it. In June – December, pollock concentrations in its geographic range's southern part grew which is explained by redistribution of spawners. In the following years, when stock size was declining, catch increments noticeably decreased south of Paramushir Island and no migrations to this area were observed in some years of a low stock level. Thus, as studies carried out by A.V. Buslov (2001) showed, in high population abundance periods significant pollock aggregations reach 48º N when migrating south during feeding activities. In low stock level periods, migrations from key breeding areas located father north become less intensive and pollock individuals distribute only to the region somewhat south of the Fourth Kuril Strait. In periods of an extremely low stock biomass, any considerable pollock migrations across its geographic range discontinue. Only juvenile migrations to south, where they concentrate in vicinity of the Fourth Kuril Strait, are observed in the winter period.

6.1.2 Life history traits of the target stock

Pollock linear growth is most intensive in its first year of life. The length of pollock at the first year of life may vary from 13.0 to 15.5 cm averaging at 15.2 cm. The mean length of 2-year-olds is 26.4 cm. The sizes of individuals at the age of 5, 6 and 7 years — key age cohorts of the stock — are 42.8, 46.3 and 49.5 cm respectively. Pollock is characterized by significant variance of its age-size parameters. The range of fluctuations between maximum and minimum length values increases from a few centimeters for yearlings to 20 cm by the age of 6–8 years. Thus, the length of 2-year-olds varies from 18.0 to 32.0 cm, length fluctuation range for 5-year-olds is 31.5–51.0 cm, and the length of 13-year-old individuals varies from 48.0 to 73.5 cm (Buslov, 2005).

The growth rate slows down in the course of pollock's life cycle. The largest yearly increments are observed during the first 4 years and they are much smaller in senior age groups. In addition, the pollock body weight grows rather intensively during its life cycle. According to mean multi-year data, having a weight of about 30 g at the age of one year, pollock reaches a weight of 1 kg in seven years and its weight doubles in the next 10 years.

Sex-specific weight differences are observed for same-age East Kamchatka pollock individuals. These deviations are minor in junior age groups. Such differences are credibly observed beginning from the age of 6 years (Buslov, 2005) when the weight of same-age different-sex individuals differs by 100 g and more, with females showing bigger sizes.

When carrying out estimates relating to determination of a minimum commercial size of pollock, provision should be made for the year-class biomass dynamic with account for natural mortality of various age classes. This aspect characterizes productivity of year classes.

Using natural mortality values and mean weight values at different ages, Ilyin et al. (2014) calculated a theoretical generation abundance and biomass at different ages (Figure 7). The largest biomass of East Kamchatka pollock is observed at the age of 5 years, and it reduces 9 times by the age of 14 years.

Pollock is mostly planktivorous although juvenile fish are also considered an essential part of their diet (as well as pollock juveniles i.e. carnivorous). Of benthic the benthic fauna, shrimps is the most important in their diet. Pollock are important food items for many predatory fish such as halibut, cod, coal fish and grenadiers. Pollock trophic level is estimated as 3.6 ± 0.1 (se) (based on diet studies; https://www.fishbase.se/summary/318).

Generally, pollock diet is considered adaptable to environmental conditions and they compete with many other species for food. These characteristics have resulted in the species being dominant in their trophic niche and they are therefore considered to play a major role within the ecosystems of the Far Eastern seas and a major contributor to commercial fisheries globally. The stock is not considered to be an LTL species.

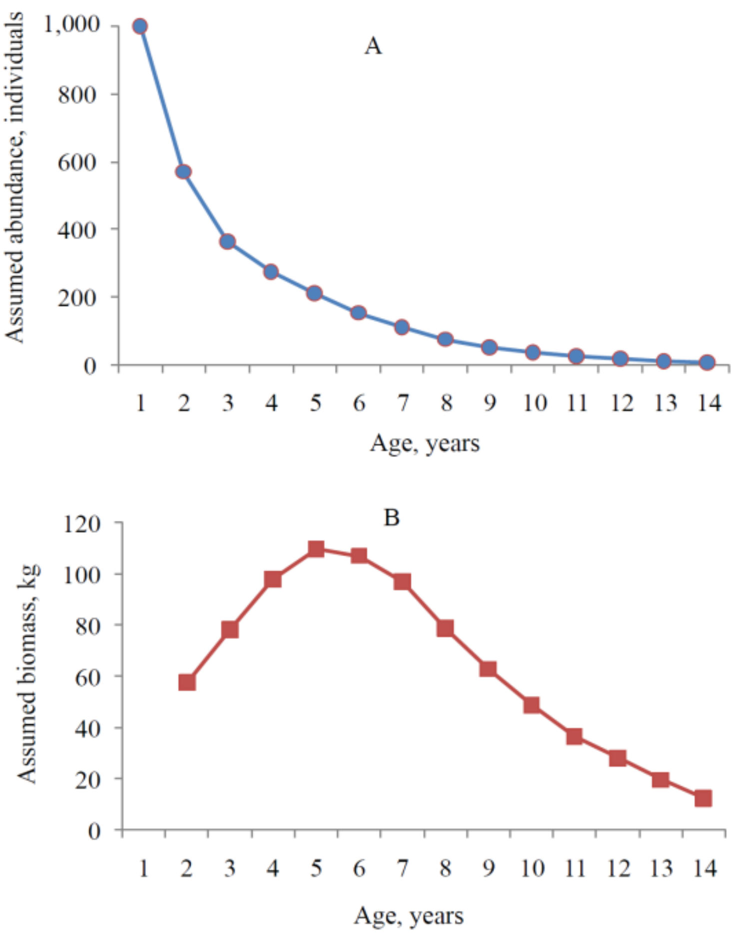

Figure 7. Dynamic of assumed abundance (A) and biomass (B) of East Kamchatka pollock year classes. (Source: KamchatNIRO, 2020a).

Antonov (1991) investigated the rate of East Kamchatka pollock maturation on the basis of data acquired in 1973–1989. It was found that some pollock individuals of this population become mature at the length of 30–31 cm. Massive maturation was observed upon reaching the length of 38–40 cm and age of 5 years. The ratio of mature males in this age group varied from 65% to 75% and that of mature females was about 50%. The moment of 50% maturation occurs at the age of 4.4 years for males and 4.8 years for females (Antonov, Zolotov, 1987).

It should be kept in mind that these results are based on pollock age assessments using data on its scales. In 2016–2019, the smallest length of a mature male was 32 cm and that of a female was 31 cm. The percentage of mature individuals among 37–38-cm-long males was 43.8%. The percentage of mature females in this size group was 13.2%.

The difference in percentages of mature individuals belonging to different sex disappears upon reaching the length of 46 cm (Figure 8).

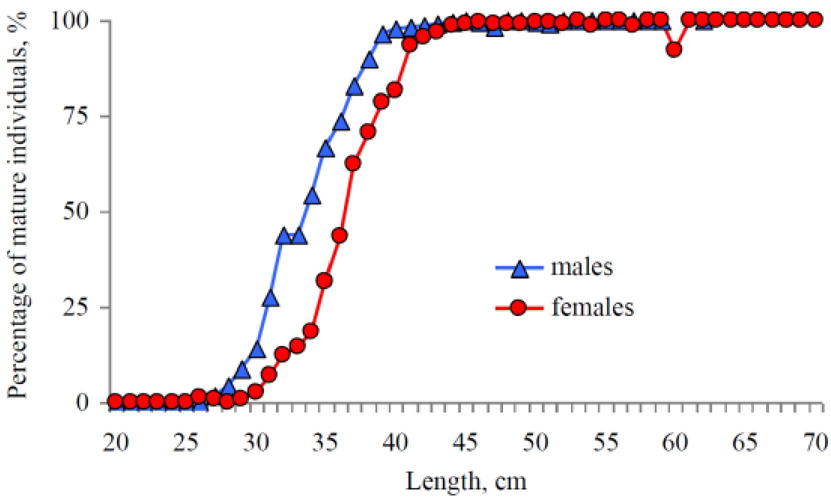

Figure 8. Percentage of mature East Kamchatka pollock individuals by length in 2016-2019. (Source: KamchatNIRO, 2020a).

The length at which half pollock individuals reach a maturity status is currently 38.6 cm for males and 41.4 cm for females. Earlier, the length of massive maturation was specified as 38–40 cm (Antonov, Zolotov, 1987).

At the age of 3 years, mature males account for 3.8% of investigated individuals and females account for 1.0% of that number. The age of 50% maturation is 4.3 full years for males and 5.2 years for females. The most intensive maturation is observed for males at the 4th–5th year of life and for females at the 5th–6th year of life. Under the age of 9 years, the percentage of mature individuals among males is higher than among females and this difference is insignificant for older individuals. The presence of immature (more correctly, “post-mature”) individuals in senior age groups is associated with discontinuation of the breeding function or with an omitted spawning cycle.

Junior age groups in catches are dominated by males. Thus, males account for 60% of 4–5-year-olds. A roughly equal male/female proportion is observed at the age of 9 years. Then the percentage of males gradually goes down and is less than 20% for individuals older than 14 years. 19-year-old and older individuals are represented by females. Such age-specific dynamic of male/female ratio is explained by earlier maturation and increased natural mortality of males compared with females.

In term of seasonal maturation, it is known that in January – March, individuals with gonads at maturity stage IV dominate: 77.2%, 84.0% and 71.8% respectively. The percentage of spawners in the spawning condition (stage V) grows from January (2.3%) to April (43.6%). Postspawning individuals are in the majority in May and June – 64.5% and 79.3% respectively. Subsequently, their percentage decreases while the relative abundance of individuals at the initial gonad development stage (II–III) increases. In September, gonads of nearly all mature individuals have signs of initial generative growth and development of glands. In December, already 34.3% of individuals have gonads at maturity stage IV.

First information about East Kamchatka pollock fecundity was based on data for 1978–1984 (Antonov, 1987). Those data were supplemented by additional data obtained in 2008–2016.

The individual absolute fertility (IAF) of East Kamchatka pollock varies within a broad range: from 28.9 thousand of eggs in female 41.2 cm long to 1,878.8 thousand eggs in female 72.7 cm long. IAF variation depending on body length and age is described by power function equations. The IAF relationship to body weight corresponds to a linear function equation. Of special importance for spawner abundance estimation is the value of “population” fertility which reflects fertility of a female having a mean length in a particular year and is calculated in accordance with the size structure of mature females. Thus, it was 219.5 thousand eggs on average in 2008-2010.

Taking int account earlier studies on East Kamchatka pollock breeding, 2 types of its spawning behavior were identified which differ in the ecology, timing and areas of spawning — deep-water and shelf types (Buslov, Tepnin, 2002; Buslov et al., 2004). Accordingly, its geographic area's spawning part is represented by deepwater spawning grounds located in the canyons of Avacha Bay and Kronotsky Bay and shelf spawning grounds near Southeast Kamchatka (south of Cape Povorotnyi) and North Kurils (up to the southern extremity of Paramushir Island) (Figure 9). In Avacha Bay and Kronotsky Bay, pollock also spawns in the shelf but the extent of these activities is small in comparison with deep-water spawning.

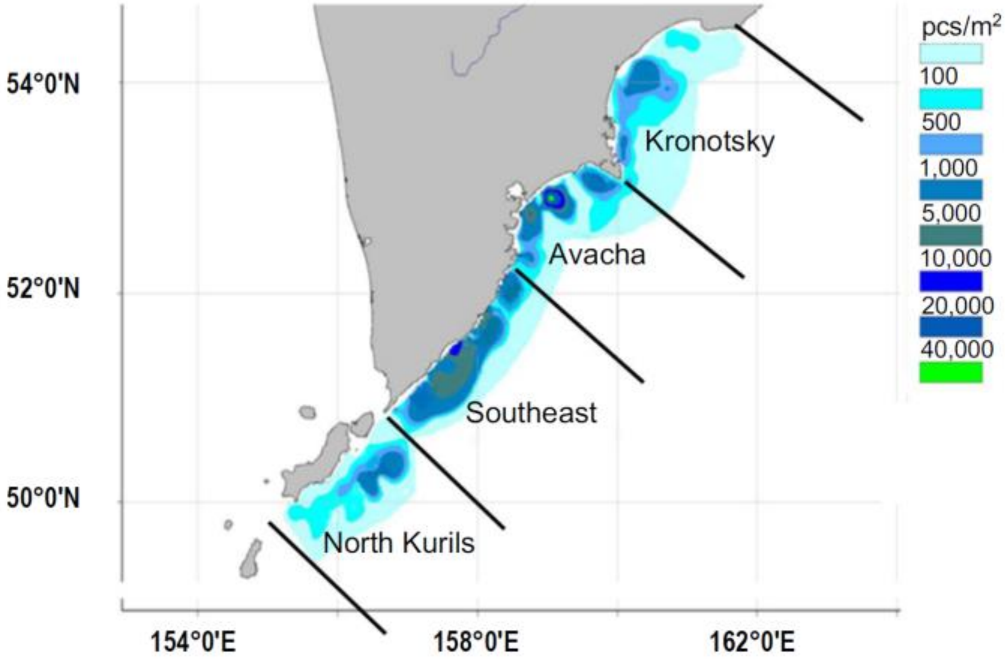

Figure 9. Generalized map of East Kamchatka pollock roe distribution in 2006–2011 and experimental fishing grounds locations. (Source: KamchatNIRO, 2020a).

Spawner aggregations start appearing in deep-water canyons by far earlier than massive spawning activities – roughly in February, and in March – April they are distributed lower than the "warm" intermediate layer. Breeding takes place at depths more than 300 m where water temperature is above-zero and virtually constant; that's why the timing of spawning activities in canyons varies insignificantly from year to year. A small portion of spawners spawns in February. Spawning activities become noticeably more intensive in mid-March, when about half spawners are involved in breeding activities, then the intensity of roe casting out declines and comes to an end in mid-May.

The studies of deep-water pollock spawning processes showed that breeding in canyons is this species' adaptation to a set of quasi-stationary hydrological conditions in vicinity of these canyons (Buslov et al., 2004). The highest spawning intensity is observed in deep-water canyons. One of breeding features is existence of spawning "epicenters" where roe casting-out is the most intensive. Due to this, cast eggs are not driven from deeps and their development proceeds within the canyons.

In the shelf spawning ground south of Cape Povorotnyi, pre-spawning migrations of pollock spawners to the shelf margin start later than in bays – in late February, with the densest aggregations observed at depths of 260–320 m and mature fish percentages growing as the depth increases. During March, pollock continues moving to shallow waters and by that month's end its aggregations are found in the depth range of 100–400 m with the largest concentrations observed above depth contours of 200–300 m. In the period of massive spawning activities – in April – the densest concentrations are distributed in the shelf at depths of 50– 170 m (Antonov, 1990).

According to results of multi-year studies on pollock spawning intensity in its shelf spawning ground near Southeast Kamchatka, occasional spawning individuals are caught in February – March between Cape Povorotnyi and Vestnik Inlet. Spawning activities intensify by mid-April, and rather isolated roe casting-out "foci" appear south of this area – between Vestnik Inlet and Cape Lopatka. In the massive breeding period (latter half of April – early May), roe casting-out activities encompass the whole Southeast Kamchatka shelf. As the parent stock abundance grows, the breeding area moves southward. In these years and in the initial period of its abundance reduction, main breeding activities take place in the southern part of the spawning ground – between Kamchatka and North Kurils. At a medium level of spawner abundance, this spawning area shrinks again and moves northward (Buslov, Velikanov, 2013).

The timeframe of the pollock breeding process is relatively stable on a year to- year basis and the spawning "peak" occurs in the third 10-day period of April (Antonov, Zolotov, 1987). The roe casting-out intensity noticeably declines in the latter half of May and residual spawning activities are observed in the shallow shelf waters in June (Buslov, Velikanov, 2013).

In case of deep-water spawning, embryo development takes place within canyons. Eggs are cast out mostly at depths of more than 400 m (Buslov, Tepnin, 2002), and in the course of their development embryos rise to upper layers. In case of shelf spawning, eggs are cast out in the near-bottom layer and, while developing, also rise to upper layers due to their positive buoyancy. The duration of embryo development depends on water temperature. Thus, at temperatures of 2.0–2.5 ºC, which are typical of canyons, embryos hatch out in 23– 26 days, and at shelf water temperatures of 0.5–1.0 ºC larvae appear in 37–42 days. As experimental works on pollock embryogenesis showed, below-zero water temperatures may be one of initial predictors in a sequence of factors adversely affecting the formation of a year-class strength (Buslov, Sergeeva, 2013).

In term of age-size composition of fishable stock it was observed that in 2010–2019, individuals 17–75 cm long occurred in commercial catches harvested by pelagic trawls. The bulk of catches was generally composed of individuals 40–50 cm long, percentage of which varied from 48.0% (2018) to 71.4% (2013) averaging at 61.3%. The percentage of undersized individuals [commercial size is 37 cm TL (Pravdin, 1966)] varied from 0.4% (2013) to 16.7% (2018) and averaged at 8.2%. An appreciable portion of catches was individuals 37–39 cm long. These are largely immature individuals representing the nearest recruitment of the population's spawning part. The percentage of individuals 51–60 cm long was similar in year mean's terms – 15.7% and varied from 3.9% (2018) to 21.8% (2013). Larger individuals were captured by trawls in insignificant quantities, their percentage being within 2.0% (2011) and averaging 0.6%.

The size composition of pollock in Danish seine's catches is somewhat different. Thus, the percentage of undersized pollock was 6.6% on average and varied from 0.8% (2019) to 13.2% (2014). The percentage of pollock 37–39 cm long was at its maximum in 2015 (23.0%) and at its minimum in 2012 (6.0%) averaging at 12.5%. The dominant size group of 40–50 cm accounted for 43.9% (2014) to 72.0% (2019) and averaged at 57.8%. The percentage of individuals 51–60 cm long was larger than in trawl catches and averaged at 21.7% varying from 10.4% (2017) to 33.6% (2011). An average occurrence rate of larger individuals was 1.4%.

Mean pollock length in trawl catches in two fishing areas in 2010–2015 varied from 44.0 to 46.9 cm averaging at 45.4 cm. The modal size group was normally individuals 44–46 cm long. In the next 2 years, mean length was 43.2 and 44.3 cm. In 2018, it decreased to 41.0 cm and the size curve, unlike in previous years, had a double-peaked pattern, modal groups being 36–38 and 44–46 cm. The percentage of undersized individuals in 2010–2015 varied in the range of 0.4% to 13.5% and averaged at 5.6%. In 2016–2017, undersized pollock by-catch increased to 11.7–14.5% and grew to 16.7% in 2018.

Therefore, the by-catch of undersized individuals in the past decade was not exceeding the value of 20% set in the Fishing Rules for the Far Eastern Fisheries Basin approved by the RF Ministry of Agriculture's Order No. 267 dd. May 23, 2019 (hereinafter – Fishing Rules) (Clause 38.1). Individuals 15–83 cm long occurred in Danish seine's catches. Individuals 41– 52 cm long dominated in all years. Their total percentage varied from 53.2% (2014) to 79.6% (2019) averaging at 65.5%. The undersized fish by-catch varied from 0.8% (2018) to 13.2% (2014) averaging at 6.7%. The age composition of pollock catches includes individuals at 1–22 years of age. On average, 4–7-year-olds dominated in catches in 2010–2019 and accounted for 68.3%. The input of individuals at the age of 1 and 1+ years was 0.03%. The percentage of individuals at the age of 2, 2+, 3 and 3+ years was 8.4%. The total percentage of individuals at the age of 14, 14+ years and older was 1.3%.

In last 10 years, the age composition of East Kamchatka pollock in commercial catches was varying rather significantly. In 2010, catches were dominated by individuals born in 2004 (25.2%). The percentage of the 2003 year class was also significant (21.4%). The latter year class was apparently strong but its members were already leaving the stock. There was no pollock younger than 3 years in catches (Figure 10).

The individuals of the 2004 year class at the age of 7 years composed the bulk of commercial catches in 2011 as well. Their percentage was 22.0%. That of the 2005 year class was slightly lower (20.1%). The percentage of 2-year-olds was 1.1% which corresponds to its multi-year mean. In 2012, individuals at the age of 4–7 years prevailed in commercial catches (67.2%) and the modal age group was 6-year-olds (17.9%). The percentage of the 2009 year class individuals at the age of 3 years was significant (9.0%) in catches and that of 2-year-olds exceeded its multi-year mean (1.7%). In 2013, the bulk of catches was composed of 5–7-year-old individuals (56.6%), the modal age group being 7-year-olds (20.3%). The percentage of the 2009 year class, significant a year before, was only 9.2% in that year. The percentage of 2-year-olds was 1.8% (Figure 10).

In 2014, individuals at the age of 4–7 years accounted for roughly equal percentages of commercial catches (65.4%). The percentage of the 2011 year class individuals was 7.6% which is significantly higher than average for the period under consideration which is equal to 4.1%. 4-year-old individuals represented a noticeable portion in catches (15.3%), this cohort's multi-year mean being 12.3% (Figure 10).

In 2015, 52.6% of individuals reached the age of 5–7 years. In terms of abundance, catches were dominated by the 2010 year class individuals (22.7%). The suggestion about the strength of the 2011 year class was supported then by a significant percentage of individuals belonging to that year class in Danish seine catches in the Petropavlovsk-Commander subzone which was 24.4% versus the multi-year mean of 13.7% for 4-year-old individuals.

In 2016, the 2011 year class dominated in both fishing areas in abundance terms: 21.8% and 23.7% in the Petropavlovsk-Commander subzone and North Kuril Pacific zone respectively. In general, this age cohort of East Kamchatka pollock accounted for 22.9%, the multi-year mean for 5-year-olds being 18.8%. The second largest group in occurrence rate terms was the 2010 year class accounting for 16.3% (Figure 10). In 2017, 69% of individuals reached the age of 4–7 years. In terms of abundance, catches were dominated by the 2012 year class individuals (25.4%). The earlier prediction regarding the strength of the 2011 year class was not verified – although this year class dominated in catches in abundance terms in 2016, its input only slightly exceeded the multi-year mean value (18.8%). Its percentage in catches in 2017 (17.0%) was also within its multi-year mean (20.2%) (Figure 10).

The estimates of the pollock age composition in 2018 showed that 3–7-yearold individuals dominated in catches accounting for 85.7%. The largest percentages were composed of individuals belonging to three age cohorts: the year classes of 2013 (23.1%), 2012 (16.2%) and 2014 (19.8%). The latter percentage exceeded its multi-year mean, although that age cohort had not been characterized by an increased abundance before. In 2019, a considerable portion of East Kamchatka pollock catch was represented by individuals at the age of 5–7 years. The dominant age cohort was the 2014 year class accounting for 21.4% which is close to its multi-year mean over the period under consideration. The percentages of age cohorts of 4, 6 and 7 years were also close to their multi-year mean values (Figure 10).

The year-to-year variation of the age composition shows that, beginning from 2015, the dominant age cohort in commercial catches was 5-year-old individuals, unlike in the previous 6-year period when such group was composed of 6–7-yearold individuals. In summary, after two consecutive strong year classes of East Kamchatka pollock born in 2000–2001 and its strong year class of 2003 which drove its stock growth after 2005, only medium-strength (2011) or low-abundance generations appeared. As a result, this grouping's stock biomass had been declining after 2011. As for the generations constituting the pollock stock in last 10 years, the year classes of 2000, 2001 and 2003 can be assessed as strong, year classes of 2011 and 2014 can be assessed as medium-strength, and the abundance of rest year classes was below its mean level (Figure 10).

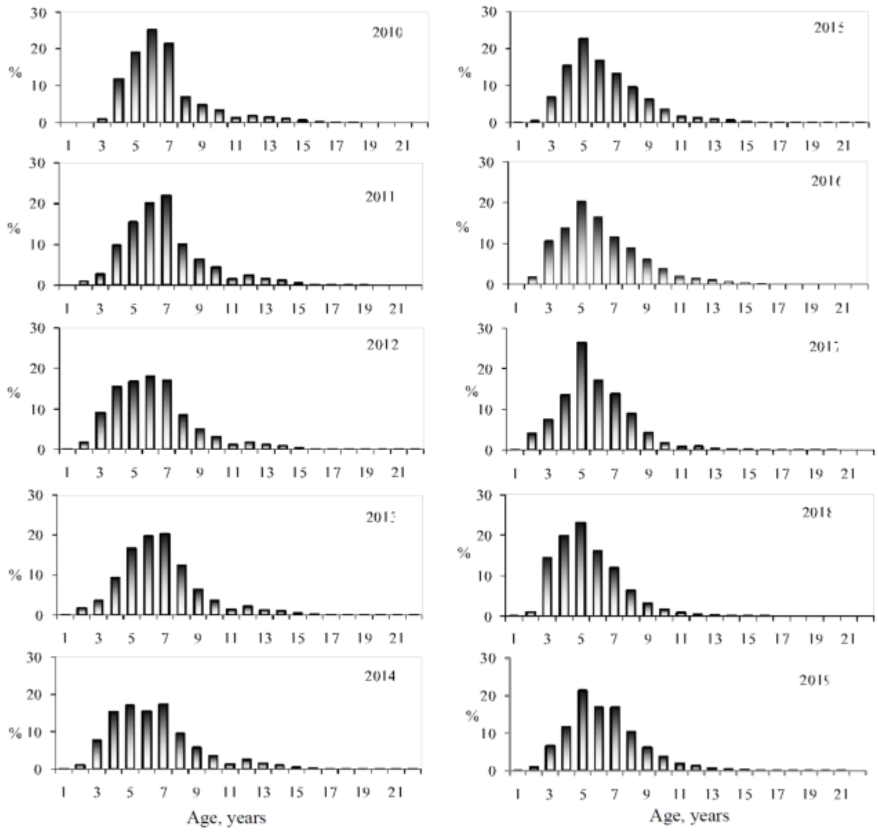

Figure 10. Year-to-year dynamic of East Kamchatka pollock age composition in commercial catches in 2010–2019. (Source: KamchatNIRO, 2020a).

6.1.3 History of the fishery and management

The East Kamchatka pollock domestic fishery has a long history. Back in 1940s, Kamchatka fishermen started a cod trawl fishery and in 1949–1951 they harvested together with cod, primarily in summer months, 350 to 790 tons of pollock in the Avacha Bay and Kronotsky Bay (Varkentin, Sergeeva, 2017).

The target pollock fishery was launched by Soviet fishermen in 1967 when they harvested 8.0 kt near Southeast Kamchatka (see Figure 11).

Pollock yield significantly grew in 1975 both due to an increased number of vessels of different types and extension of fishery duration. In 1976–1979, pollock yield off Southeast Kamchatka was reaching 181–229 kt. There were virtually no domestic target pollock fisheries in the North Kuril waters in the first half of 1970s. Pollock was largely harvested as by-catch. Subsequently, yield started growing and reached 108 kt in 1975. The maximum East Kamchatka pollock yield harvested by USSR fleets was registered in 1979 and amounted to 357 kt. In general, maximum yields of this population's pollock were observed in 1970–1979 when it was intensively harvested by Japanese and Soviet fishermen, with total catch averaging 462 kt and nearing 550 kt in some years.

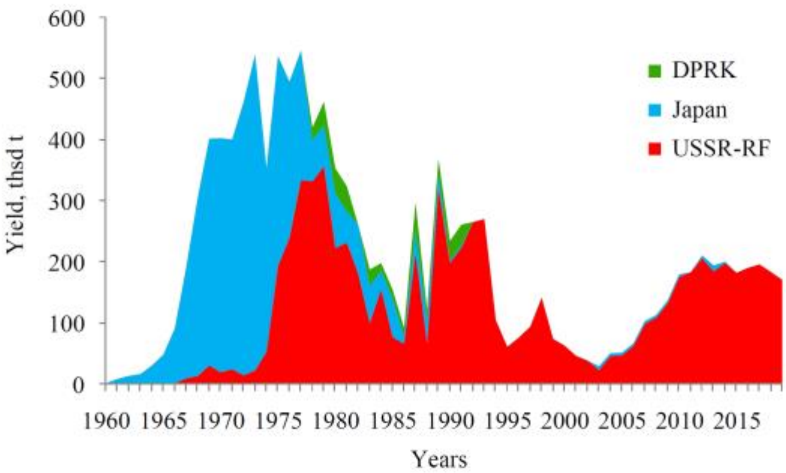

Figure 11. East Kamchatka pollock yield data by country. (Source: KamchatNIRO, 2020b).

In 1980–1986, total pollock catches in the Petropavlovsk-Commander subzone and North Kuril zone declined from 354 to 86 kt. After that, yield was gradually growing during seven years and reached 265–270 kt in 1992–1993 (Figure 12). Then a lengthy period (1994–2006) of small catches followed: 27 to 141 kt with an average of 68 kt. Beginning from 2007, as the East Kamchatka pollock stock was growing, catches increased again and amounted to 179–210 kt in 2012–2017 with an average of 192 kt. In 2018–2019, yield reduced and amounted to 183 and 170 kt respectively.

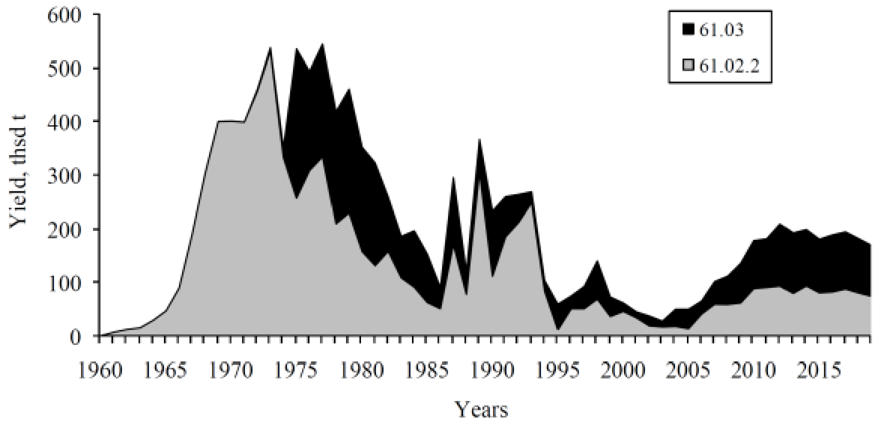

Figure 12. Year-to-year dynamic of East Kamchatka pollock yield in 1960–2019. 61.03 – North Kuril zone, 61.02.2 – Petropavlovsk-Commander subzone. (Source: KamchatNIRO, 2020b).

After 2002, the rate of pollock removal was within allowable limits and the rate of TAC use varied from 83.6% (2004) to 97.5% (2015) averaging at 93.2%. In 2010–2018, the rate of TAC use in subzone 61.02.2 and zone 61.03 was 93.7% on average (Table 8). In 2019, the rate of TAC use remained at its previous level and was 94.0% in the Petropavlovsk-Commander subzone and 97.6% in the North Kuril zone.

The target East Kamchatka pollock fishery uses pelagic trawls and Danish seines. Pollock also occurs in bottom trawl catches in the squid fishery, Atka mackerel fishery, and in the cod long-line fishery. The key areas of the target trawl fishery are: East Kamchatka – vicinity of the Asacha Inlet and canyons of the Avacha Bay; North Kurils – oceanic waters of Onekotan and Paramushir islands, vicinity of the Fourth Kuril Strait. The Danish seine fishery operating area encompasses the whole shelf of Southeast Kamchatka and North Kurils. The locations of vessels using trawls and Danish seines in the pollock fishery in 2019 are shown in Figure 13. The key fishing areas remain virtually unchanged from year to year. In 2010–2019, catch by pelagic trawls in the Petropavlovsk-Commander subzone was 24.8–37.3 kt averaging 30.2 kt. Catch by Danish seines varied from 48.0 to 65.5 kt and averaged at 55.0 kt. Pollock yield as by-catch in bottom trawl catches was within 111 tons (2017) and averaged at 69 tons per year. By-catches are even less significant in the cod long-line fishery and did not exceed 36 tons in this period.

In the North Kuril zone, 78.2–95.2 kt was harvested by pelagic trawls in last 10 years (87.7 kt on average). Danish seine yield varied from 10.6 to 21.0 kt (15.1 kt on average). Pollock by-catch in bottom trawl catches was up to 0.5 kt and averaged at 0.3 kt in the period under consideration. Pollock by-catch in the long-line fishery was within 35 tons.

The structure of the East Kamchatka pollock fishery is different depending on its area. In the Petropavlovsk-Commander subzone, main catch volumes are generally harvested by vessels equipped with Danish seines and operating in an inshore fishery mode (catches are transferred to shore for processing). An average of 32.7% of yearly catches in 2014–2018 was harvested by pelagic trawls and in 2019 this figure was 35.3%. Another important factor is that the Fishing Rules set less “tight” fishing timelines for Danish seine fisheries than for trawl fisheries.

In the North Kuril zone, main pollock volumes in the trawl fishery are harvested by medium- and large-tonnage trawlers operating in a commercial fishery mode (an average of 85.3% of total yearly yield in 2010–2019), while in the Danish seine fishery they are much lower (14.3% on average). It should be emphasized that virtually all pollock yield originates on the oceanic side of the North Kurils, i.e. in subzone 61.03.1.

Pollock is harvested by various vessel types varying from supertrawlers to small-size seiners. The number of vessels engaged in the East Kamchatka pollock pelagic trawl fishery in different years was 53–67 vessels in subzone 61.02.2 and 64–83 vessels in zone 61.03. The largest group of catchers is medium-tonnage trawlers (SRMS, SRTM, STR) and large freezer trawlers (BMRT, RTM). During the period under consideration, the number of medium-tonnage vessels in different years varied from 24 to 33 in subzone 61.02.2 and from 34 to 43 in zone 61.03. The number of “large class” vessels was 19–35 in the former area and 28–40 in the latter area. Mean percentages of medium- and large-tonnage vessels in last 10 years were 49% and 45% respectively.

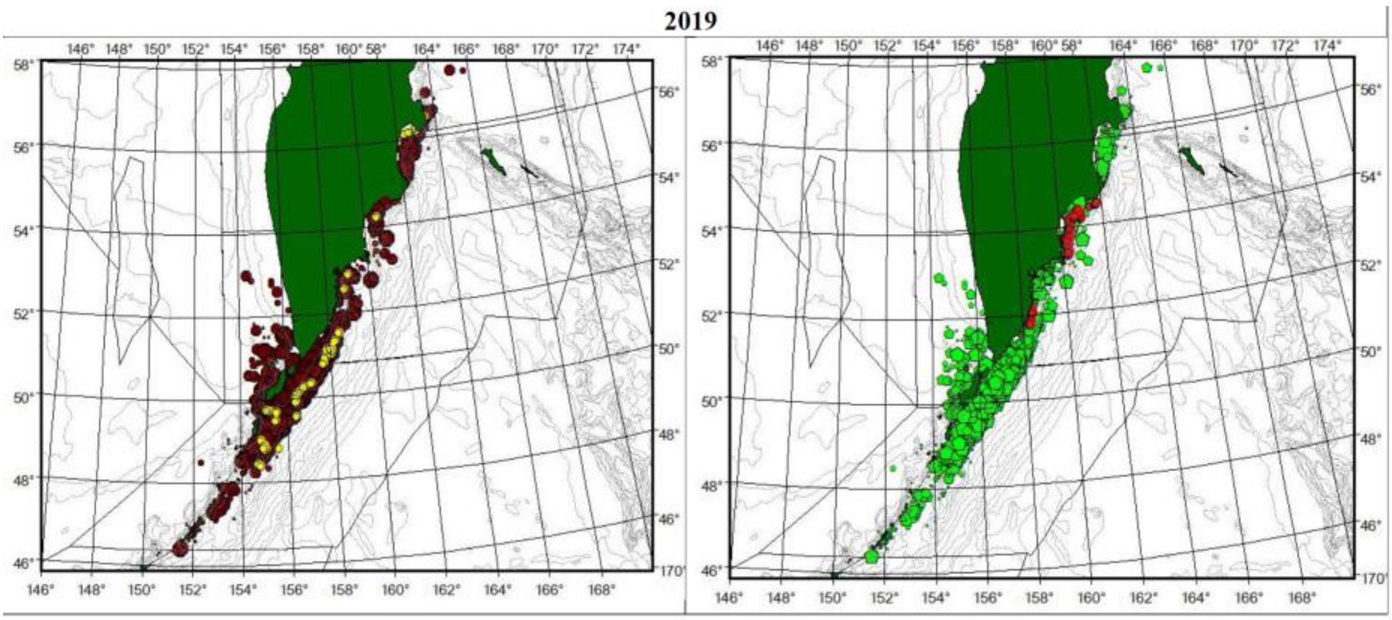

Figure 13. Fleet locations in East Kamchatka pollock trawl (burgundy color circles) (left) and Danish seine (green rhombs) (right) fisheries in 2019. (Source: KamchatNIRO, 2020b).

Table 8. Year-to-year dynamic of East Kamchatka pollock TAC, yield and rate of TAC use in 2010–2019. (Source: KamchatNIRO, 2020b).

Year	TAC, thsd t	Yield, thsd t	Rate of TAC use, %
Petropavlovsk-Commander subzone			
2010	96.0	88.719	92.4
2011	95.0	90.795	95.6
2012	101.0	93.540	92.6
2013	90.8	79.846	87.9
2014	96.0	93.823	97.7
2015	83.1	80.823	97.3
2016	88.6	82.384	93.0
2017	95.7	87.961	91.9
2018	87.2	80.697	92.5
2019	79.1	74.387	94.0
North Kuril zone			
2010	95.6	90.350	94.5
2011	99.0	91.782	92.7
2012	129.6	116.488	89.9
2013	119.2	113.763	95.4
2014	119.5	106.060	88.8
2015	103.2	100.888	97.8
2016	109.5	107.369	98.1
2017	118.4	107.492	90.8
2018	107.8	102.184	94.8
2019	97.9	95.566	97.6
Petropavlovsk-Commander subzone and North Kuril zone			
2010	191.6	179.069	93.5
2011	194.0	182.577	94.1
2012	230.6	210.028	91.1
2013	210.0	193.609	92.2
2014	215.5	199.883	92.8
2015	186.3	181.711	97.5
2016	198.1	189.753	95.8
2017	214.1	195.453	91.3
2018	195.0	182.881	93.8
2019	177.0	169.953	96.0

On a year-to-year basis, the number of in-fishery ship-days spent in the Petropavlovsk-Commander subzone by medium-tonnage vessels varied from 224 to 555 (357 on average) and from 1,050 to 1,401 in the North Kuril zone (1,228 on average) or, in relative terms, was 61.9% and 72.1% respectively. Large freezer trawlers were in a fishing status during 143 to 223 days in subzone 61.02.2 and 310 to 517 days in zone 61.03. An average percentage of in-fishery days for these vessels was 30.6% in the former area and 23.9% in the latter area.

The most important parameters of a fishery exploiting aquatic organism populations are catch per unit effort (CPUE) and number of efforts (E) of vessels producing the bulk of yield. These data are frequently used for tuning-up in mathematical models.

Significant yield volumes in the pollock pelagic trawl fishery in the Pacific waters of Kamchatka and North Kurils are currently produced by BMRT type vessels of various designs and medium-tonnage trawlers (primarily SRTM (medium freezer fishing trawler) of “Mys Korsakov” type); in the Danish seine fishery – RS-300 (fishing seiner) Project 388 and Project 388M vessels. The percentage of yield produced by large-tonnage vessels in last 5 years significantly reduced, while yield volumes produced by medium-tonnage trawlers noticeably grew.

As for the Danish seine fishery in the Petropavlovsk-Commander subzone, a trend to an increasing yield percentage produced by RS-300 and RS-300M vessels is observed in the period under consideration. In the North Kuril zone, the percentage of yield harvested by vessels of the above mentioned designs remains sufficiently high at relatively small volumes of yearly catches by Danish seines.

In 2019, mean catch per ship-day and per haul in the Petropavlovsk-Commander subzone for BMRT class vessels reduced and was at its minimum over the 10-year period. Catches per effort noticeably grew in 2018–2019 for medium-tonnage vessels compared with the previous period. Catches per shipday and per seine cast started growing after 2016 for RS-300 type vessels and grew particularly noticeably in 2019. Even larger catches per effort were registered in 2018–2019 for vessels equipped with Danish type purse seines.

In 2014–2019, rather stable CPUE data were observed for vessels engaged in the trawl fishery near the North Kurils. Mean yearly catch per ship-day varied from 66.7 to 75.9 tons for BMRT type vessels and from 43.7 to 56.6 tons for medium-tonnage vessels. In the Danish seine fishery, catches per ship-day in 2019 grew compared with 2017, particularly for RS-300 type vessels equipped with Danish type purse seines

It is known that catch per effort characterizes stock level. GLM-standardized catches per effort are used in model-based stock estimates. Standardized catch per effort in April for large-tonnage vessels using pelagic trawls shows growth of catches, which amounted to 78.9 tons/ship-day in 2019 (Figure 14).

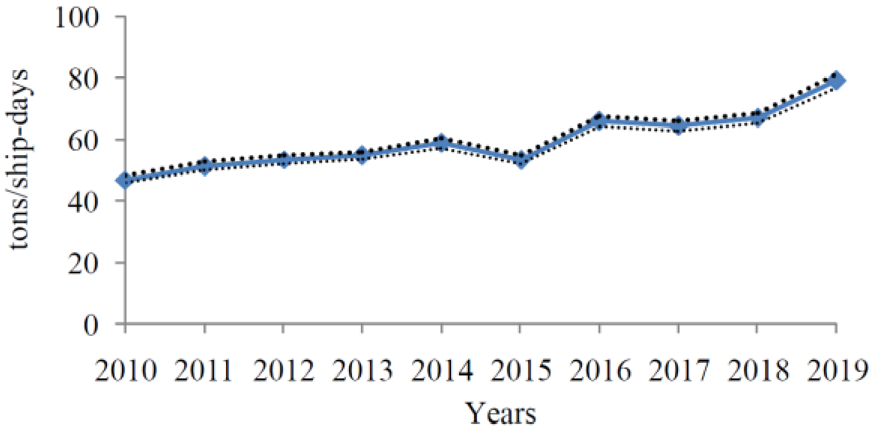

Figure 14. East Kamchatka pollock standardized catches per unit effort. (Source: KamchatNIRO, 2020b).

The Fishing Rules for the Far Eastern Fisheries Basin (RF Ministry of Agriculture Order No. 267 dd. May 23, 2019) contain a set of measures on pollock fishery control.

Clause 22.10 prohibits output of raw pollock roe in excess of 4.5% of the weight of raw fish supplied for processing.

Clause 24 prescribes no-entry zones for target pollock fisheries using pelagic trawls: in the East Kamchatka zone south of 52°00' N latitude – at water depths of 100 m and less, and in the area between 52°00' N and 56°00' N latitudes – at water depths of 300 m and less within thePetropavlovsk-Commander subzone; on the Sea of Okhotsk and Pacific sides of Atlasov, Shumshu, Paramushir and Onekotan islands – at water depths of 100 m and less.

Clause 28.1 prescribes no-fishing periods for the target pollock fishery: c) in the Petropavlovsk-Commander subzone (except the Kamchatka Bay) – from the start of massive spawning activities but not later than from February 15 till May 1.

Clause 32.4 prohibits use of the following fishing gear for pollock fishing in all areas where pollock is harvested (caught): bottom trawls; pelagic trawls with two-layer bags and devices that may block the mesh or reduce its size; pelagic trawls without a selective insert with squarely positioned meshes installed between the bag and cod-end. The inner size of net panel meshes of a pelagic trawl, trawl bag and selective insert shall be at least 100 mm when fabricated from kapron (nylon) and at least 110 mm when fabricated from other materials and monofilaments. A selective insert shall be of a cylindrical form, fabricated from one net panel layer, at least 10 m long for vessels with main engine capacity of 2,000 hp and more; at least 7 m for vessels with main engine capacity of less than 2,000 hp. The cylindrical insert perimeter will be selected depending on the trawl bag perimeter provided that its rate of hanging is 0.5. Mesh interval shall be 30 mm in the net part and bag and 45 mm in wings. A minimum commercial size for East Kamchatka pollock is set at 35 cm.

Clause 38 regulates juvenile pollock by-catch, the allowable limit for which is set at 20% by count per one haul. All captured juveniles (except prohibited species of aquatic living resources) are subject to processing on board with relevant entries to be made in the fishing and/or processing log. In case of exceeding the 20% limit, the vessel must change its fishing location by at least 5 miles, make relevant entries to the fishing log and report to the Federal Fisheries Agency.

6.1.4 Data collection of target stock

Pollock roe survey is one of main methods for breeding studies and for abundance estimates of the breeding part of pollock populations. This method's focus is on the count of embryos developing in the water and further estimation of the spawning stock biomass (Kachina, Sergeeva, 1978; Zolotov et al., 1987; Lisovenko, 2000; Balykin et al., 2002; Balykin, Varkentin, 2006). Regular ichthyoplankton surveys in the waters of Southeast Kamchatka and North Kurils have been performed since 1974. Subsequently, based on data on the rate of roe occurrence at survey stations, a standard grid of stations was established and is currently in use. During the whole period of observations, the IKS-80 net was used for ichthyoplankton capture which makes the available materials comparable.

The key objective of these works is an assessment of the East Kamchatka pollock spawning stock. Concurrently, these surveys address ambient environmental conditions (temperature, salinity, oxygen content in the water and chemical composition of the water). Also, relevant materials are collected to investigate zooplankton distribution features, including organisms which are food objects for pollock larvae.

At the first stage of such survey – from March 1 to April 15 – overall and layer-by-layer capture of ichthyoplankton in the canyons of the Avacha Bay is performed at intervals of 3–5 days. In 2000–2018, capture was performed in three canyons ("northern", "central" and "southern") and, beginning from 2019, in the "northern" canyon only. By data of D.Ya. Saushkina and O.I. Ulyin (2020, in press), it is exactly the "northern" canyon that is the "spawning epicenter" of East Kamchatka pollock in the Avacha Bay. The value of total roe production in the "northern" canyon is used as the spawning stock index in model based calculations.

The key objective of this stage is to determine the time of the beginning of massive pollock spawning activities and, if required, to change the start date of the count survey in the whole study area. A mandatory condition is to perform capture at specified coordinates with as small deviations as possible because it is necessary to perform capture above the depth contour of 550 m. At the second stage – roughly from mid-April till early May – an ichthyoplankton count survey is undertaken across the whole study area: first in the Avacha Bay, then near Southeast Kamchatka and then in the Kronotsky Bay. In these areas, surveys are performed by vessels of MRTK (small stern trawling fishing trawler) type belonging to KamchatNIRO. Near North Kurils, surveys are performed by other vessels. An approximate number of stations is 92 in the Petropavlovsk-Commander subzone and 35 in the North Kuril zone.

The ichthyoplankton surveys carried out in past years indicated the growth of this grouping's spawning stock till 2010. Evidence of that was the number of developing eggs registered during standard ichthyoplankton surveys in the Pacific waters of Kamchatka. However, results of works carried out in 2011–2012 showed a significant reduction of quantitative parameters, with 58.3×10^{12} and 59.7×10^{12} eggs registered respectively. This reduction continued in 2013, with 45.7×10^{12} eggs registered in the Avacha Bay and oceanic waters of Kamchatka. In April 2016, 15.1×10^{12} eggs were registered in the oceanic waters of Southeast Kamchatka and the Avacha Bay – the lowest value since 2000. In 2017, the count survey of ichthyoplankton stages covered the period before the spawning peak, and the number of registered pollock eggs in the experimental fishing grounds of the Avacha Bay and Southeast Kamchatka was 5.1×10^{12} eggs. In 2019, the survey was carried out within an optimal timeframe, with 28.5 trillion embryos registered in the above experimental fishing grounds of the Avacha Bay, Kronotsky Bay and off Southeast Kamchatka. In the Pacific waters of Kamchatka, bottom trawl and Danish seine count surveys were carried out.

Pollock was registered during these surveys but, as they were focused, above all, on stock assessment of bottom fishes (flatfish, Pacific cod, Saffron cod, etc.) and commercial invertebrates (crabs), results of these assessments are not used for forecasting studies. Of much more interest is the age-size composition of pollock in count trawl runs (Danish seine casts), expressed in relative values, because it allows for a conclusion on the strength of the short-term and long-term predicted recruitment. Robust bottom trawl surveys were carried out in 1984, 1999 and 2002. In 2010–2014, as an alternative to bottom trawl surveys, Danish seine surveys were carried out in shelf locations of this area. Due to difficulties of determining the square area covered by a Danish seine and, more important, uncertainty in its catchability indices, results of Danish seine surveys have never been used in practice. In 2016–2019, KamchatNIRO resumed bottom trawl count surveys using its own research vessels (NIS (research vessel) type). For these purposes, special count trawls suitable for use by MRTK type vessels were designed and a procedure was developed for contactless transfer of the trawl with catch from one vessel to another. The results of bottom trawl surveys carried out in 2002 and 2016–2019 were standardized by experimental fishing grounds. Details on the standardization algorithm are provided in the article published by A.I. Varkentin et al. (2019).

A topical task is obtaining of stock indices (in terms of abundance and biomass) in standard experimental fishing grounds, which are surveyed annually and, in a varying degree, characterize a general stock condition of exploited populations, rather than obtaining of absolute values of the stock size. These data can be directly used as stock condition indices and, if data on the age composition of aquatic organisms in catches harvested by a count trawl are available, as an abundance (biomass) index by age groups for model tuning up.

In 1999 and 2002, surveys were carried out by vessels having a longer endurance at sea and, due to this circumstance, surveys covered the Kamchatka Bay as well. In 2016–2019, bottom surveys were carried out by the institute's own NIS type vessels in the Kronotsky Bay, Avacha Bay and off Southeast Kamchatka. The pattern of control station locations was roughly same in all years.

In 2016, the trawl survey was carried out concurrently by the institute's both NIS type vessels. Trawling was performed by MRTK-316. The scientific team was every day transferred from the MRTK Engineer Martynov to the MRTK-316 and carried out necessary surveys. In 2017, a method of contactless catch transfer was practiced in the Avacha Bay experimental fishing ground and, beginning from that year, surveys were performed as follows: the MRTK-316 performed a trawl run and then transferred the bag of the count trawl to the MRTK Engineer Martynov, where the scientific team was based, and scientists sorted out the catch and made necessary biological tests.

In all years, such surveys were performed using standard methods. The methods for catch size determination, species composition determination and biological analysis are standard and generally accepted in ichthyologic surveys and in the practice of bottom trawl surveys.

5 experimental fishing grounds, located at a significant distance from each other, were singled out in the survey area:

Experimental Fishing Ground 1 — Kamchatka Bay;

Experimental Fishing Ground 2 — Kronotsky Bay;

Experimental Fishing Ground 3 — northern part of the Avacha Bay;

Experimental Fishing Ground 4 — area in vicinity of Cape Povorotnyi;

Experimental Fishing Ground 5 — Southeast Kamchatka.

Fish density and stock size were assessed separately for each experimental fishing ground by method of zonally averaged values (Aksyutina, 1968), with experimental fishing grounds preliminarily divided into Thiessen polygons. Only accident-free trawl runs or trawl runs with insignificant malfunctions were accepted for calculations. When calculating the trawling coverage area, vertical trawl opening height was assumed equal to 1. When assessing stock sizes, catchability index for all fish species was assumed equal to 1.

In the northern part of the Avacha Bay, experimental fishing grounds with a standard square area in all years and in Southeast Kamchatka – only in 2002, 2018 and 2019 were carried out. Data for 2017 are missing for the Kronotsky Bay. Small areas were surveyed in vicinity of Cape Povorotnyi, and they differed from year to year. Surveys in the Kamchatka Bay were carried out only in 1999 and 2002; that's why these data were not standardized.

Pollock size distribution was obtained separately for each standard experimental fishing ground through catch per 1 trawling hour in quantitative terms. The age composition of above species was determined by converting their size composition through size-age keys compiled using fish age determination in summer by otoliths. Such size-age key for pollock includes 1,368 age definitions.

Although being a typical pelagic species, pollock was traditionally registered during bottom trawl surveys. Juveniles normally live in the pelagic zone while medium- and large-size individuals gravitate toward near-bottom water layers; therefore, any estimates based on bottom surveys only characterize only a certain portion of the stock (Shuntov et al., 1993). Virtually in all years, the largest catches per unit effort and pollock aggregation densities were observed in the experimental fishing ground in Southeast Kamchatka. A maximum density was registered in 2002 in abundance terms (176.272 individuals/km^2) and in 2017 in biomass terms (21.220 tons/km^2). Respective values averaged over the whole survey period were 62.162 ind./km^2 and 12.717 tons/km^2. The Kronotsky Bay ranked second both in maximum and average values. Mean density was 39.145 ind./km^2 in abundance units and 5.381 tons/km2 in weight units. It is obvious that the above experimental fishing grounds are of key importance for pollock. Rather high density of pollock aggregations was registered in the Kamchatka Bay in 1999.

No clear pattern in the year-to-year pollock density dynamic in the Southeast Kamchatka experimental fishing ground has been identified so far, as only twice in 5 years of surveys works were carried out on a standard experimental fishing ground. Compared with 2016, fish density in 2019 grew in the Kronotsky Bay, in the experimental fishing ground in the northern part of the Avacha Bay and off Southeast Kamchatka. Primarily due to its larger square area, highest pollock stock values virtually in all years were registered in the Kronotsky Bay (52.7% on average in abundance terms and 47.1% in biomass terms).

The Southeast Kamchatka experimental fishing ground ranked second with a maximum mean density of pollock aggregations registered in this location. The pollock stock size is small in the Kamchatka Bay. Therefore, benchmark site for this species are experimental fishing grounds in the Kronotsky Bay and off Southeast Kamchatka. The latter experimental fishing ground needs to be surveyed every year and in full volume. In addition, pollock abundance and biomass data obtained in the experimental fishing ground in the northern part of the Avacha Bay can be used, because this experimental fishing ground is surveyed every year and in full volume. In total, 241.856 million individuals or 109.006 kt of pollock was registered in the whole surveyed area in 2019. Compared with 2016, this species' abundance has grown after a maximum in 2017 and its biomass has doubled.

In summary, the experimental fishing grounds in the Kronotsky Bay and off Southeast Kamchatka are priorities for pollock in the Petropavlovsk-Commander subzone from the viewpoint of stock assessment. Data on fish abundance and biomass obtained in the experimental fishing ground in the northern part of the Avacha Bay can be used additionally. It is expected that stock assessments for key commercial fish species in benchmark experimental fishing grounds will be used in the future as stock condition indices in model-based calculations. For the purpose of optimization of this survey type, KamchatNIRO carries out bottom trawl surveys only in 3 experimental fishing grounds beginning from 2019: Kronotsky Bay, northern part of the Avacha Bay and Southeast Kamchatka.

Individuals at the age of 1+ to 21+ years were present in survey catches. In 2016, individuals at the age of 3+ (21.3%) dominated in standard experimental fishing grounds and three-year-olds born in 2014 were the second largest group (16.2%). In 2018, the dominant age cohort was four-year-olds born in 2015 (25.9%). The second-largest group in abundance terms was individuals born in 2016 (20.5%). In 2019, the total percentage of these age cohorts reduced to 25.5% compared with 37.6% in 2016 and 46.4% in 2018. The dominant group was six-year-olds of the 2014 year class (17.9%). As the period of observations is too short, the strength of generations cannot be assessed by results of bottom trawl surveys as yet.

In order to obtain credible data on the age composition of the fishable stock, which constitute a basis for stock assessment by mathematical modelling methods, annual surveys are carried out in both areas onboard fishing vessels in periods of intensive fishing operations in trawl and Danish seine fisheries.

To collect biostatistical information about pollock catches, observers are deployed on onshore processing factories receiving catches produced by the Danish seine fishery. Also, observers are based on trawling vessels processing their catches themselves.

Almost every year, observers gather data on pollock in other fishery types as well, such as cod and halibut long-line fisheries, greenling and squid bottom trawl fisheries, but these data are not used in prognostic estimates.

Data are collected on fishing vessels and fish processing factories under standard methods adopted in fishing industry practices and including some additions.

After each operation, the species composition of catches is analyzed, with yield estimated in abundance and weight units. Weight measurements (WM) (with or without dissection) and full biological analysis (FBA) are performed for all key commercial species.

To determine a species composition of fishes and invertebrates, random sampling (100–200 kg) is performed for each catch. If one species prevails in the catch, 200–300 individuals of this species are selected including the whole by-catch.

Then, the species composition of aquatic organisms in the sampling base is determined (fishes are determined to species or genus), with individuals of each species counted and weighed.

Mandatory data for inclusion in the registration card are species composition of the catch, fish length and mean weight range, total catch and catch per effort (1 trawling hour).

WM are made every day on 300–600 individuals. Smitt length – AC (from the snout tip to the end of middle rays of the caudal fin, measurement interval being 1 cm (0.5 cm for young-of-the year)) is measured. Then fish is dissected, with its sex and gonad maturity stage determined.

FBA is performed on all commercial fishes (30–50 individuals every day) and all rare by-caught species. In addition to WM, FBA includes measurements of liver weight (for gadid species only) and gonad weight (with accuracy of 1 g), determination of sex and gonad maturity stage for males and females, visual assessment of stomach fullness in points (5-point scale from 0 to 4) and of food composition. Otoliths are collected to determine fish age.

All collected information, including date, coordinates, number and depth of respective trawl run, is entered into the MS Access database.

6.1.5 Stock assessment and TAC determination of the target stock

In accordance with the Order of Federal Fisheries Agency No. 104 dd. February 6, 2015, available informational support to East Kamchatka pollock studies allows for a comprehensive analytical assessment of its stock condition and TAC determination using structured exploited stock models (cohort models).

The “Synthesis” (“Sintez”) model (Ilyin et al., 2014) has been used for these purposes since 2008. It belongs to rather simple statistical cohort models with separable representation of fishing mortalities, takes into account specific features of fishing statistics and allows for obtaining of a detailed description of the age structure dynamic of the stock being assessed. It has significant similarities with such generally known models as CAGEAN (Deriso et al, 1985), ICA (Patterson, 1994) and others (Quinn and Deriso, 1999). This model’s algorithm was implemented in a software program with the same name developed in KamchatNIRO.

This model has been continuously improved and in 2016 it successfully passed testing procedures organized by the Working Group on Mathematical Modelling Methods (WGM) set up under the Federal Fisheries Agency and consisting of leading Russian specialists in this discipline.

The input data set prepared for testing of models addressing age structure was in line with the approach adopted in ICES. Upon reviewing test results, it was found that the model has successfully coped with the task to assess the biomass and abundance dynamics of stocks included as “true” ones when generating test data sets. It demonstrated its reliability according to test results and, along with such models as XSA, TISVPA and others already tested and proven during many years by ICES and other fishery research organizations, was included in the list of models of this type for use in stock and TAC assessment procedures (Babayan et al., 2018).

The following parameters were selected as East Kamchatka pollock stock condition indices in model-based computations:

- East Kamchatka pollock spawning stock biomass estimates in 2003–2011, 2013 and 2018;
- estimated total quantities of pollock eggs in experimental fishing grounds of the Avacha Bay and Southeast Kamchatka in 2000–2019;
- estimated East Kamchatka pollock roe production in the spawning epicenter — “northern” canyon in 2003–2018 (Ilyin, Sergeeva, 2014);
- GLM-standardized index of catch per ship-day.

Thus, there is a full assemblage of information about stock structure, its productivity, fleet distribution, population density, environmental data, etc.

Proceeding in line with mid-term forecasting methods as part of the precautionary approach to commercial fish stock management (Babayan, 2000), the Harvest Control Rule (HCR) for East Kamchatka pollock is defined as in Figure 15, the key target of which is stock recovery to a high productivity level and its further exploitation at this level. The recommended TAC value is determined in line with HCR and depends on the position of spawning stock biomass and fishing mortality relative to management reference points.

Therefore, fishery strategy is sensitive to stock condition and has been developed to reach stock management targets reflected via target and limit reference points.

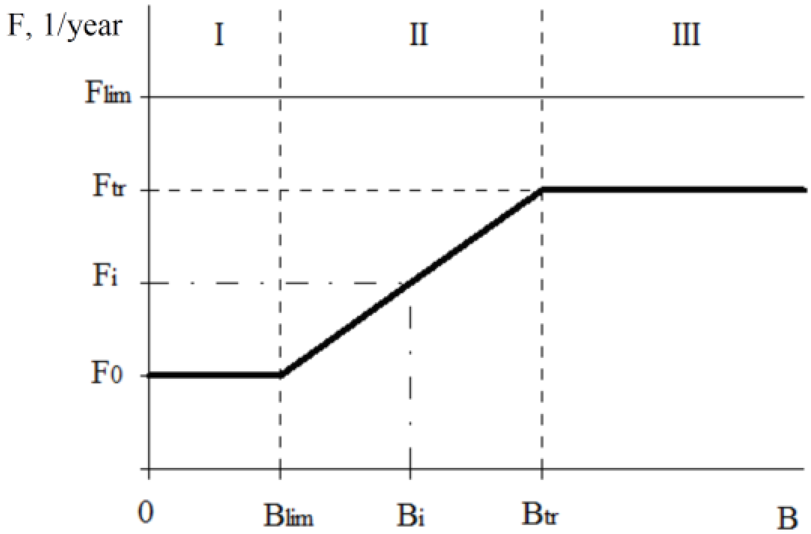

Figure 15. Harvest Control Rule diagram. (Source: KamchatNIRO, 2020b).

The analytical form of HCR looks as follows:

I – $Frec_i = F_0$, at $B_i < B_{lim}$

II — $Frec_i = (F_{tr}-F_0)(B_i-B_{lim})/(B_{tr}-B_{lim})+F_0$, at $B_{lim}<B_i< B_{tr}$

III — $Frec_i = F_{tr}$=const, at $B_i > B_{tr}$.

A clearly formulated HCR is in place, which is in line with fishery strategy and guarantees that the level of exploitation will reduce in case of stock reduction to a limit reference point for spawning stock biomass.

The reference point F0 enables scientific fishing when the fishery is closed. Target reference points for spawning stock biomass (B_{tr}) and fishing mortality (F_{tr}) as well as the limit reference point for fishing mortality (F_{lim}) and fishable stock biomass (B_{lim}) were determined by model-based estimates obtained in 2012.

Some of reference points were obtained using the “Synthesis” software by equilibrium catch and equilibrium biomass curves (Thompson, Bell, 1934; Sissenwine, Shepherd, 1987) (Figure 16). Their estimated values and variation rates are presented in Table 9.

The smallest value was taken as fishing mortality target reference point F_{tr} — FMED: Ftr=FMED=0.305 1/year.

F_{lim} according to Caddy empirical dependence (Caddy, 1998) was taken as a fishing mortality limit reference point — Flim=0.386 1/year. F0 was adopted equal to 0.1 × Ftr = 0.03 1/year, and later F0 was adoped equal to 0. These management reference points are well consistent with existing practices (Quinn and Deriso, 1999).

The spawning stock biomass value corresponding to F_{tr} value on the equilibrium biomass curve was taken as the biomass target reference point: SSB(Ftr) = 922 kt. Control values were based on maximum sustainable yield (MSY) and are adequate.

The spawning stock biomass target reference point B_{tr} has been set such that to maintain the stock at a level corresponding to B_{MSY}.

The spawning stock biomass limit reference point in 2012 was determined at the level of B_{loss} with account for uncertainty: Blim=Bloss×EXP(ts90%×SE)=622 kt.

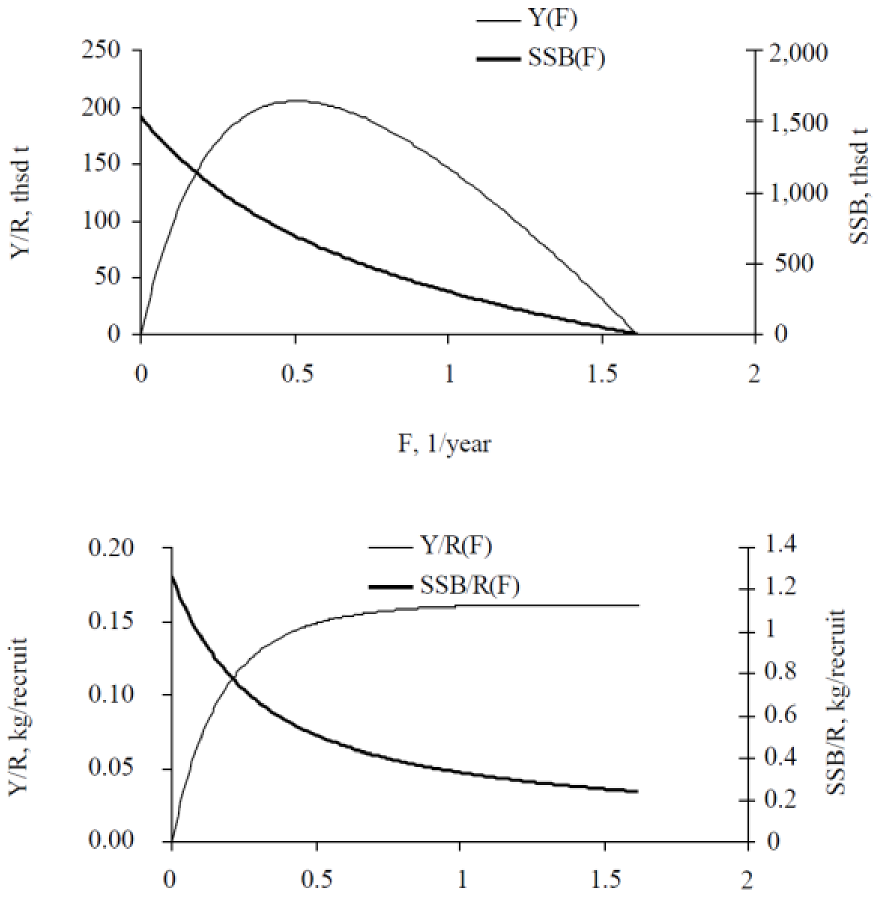

Figure 16. Equilibrium biomass and equilibrium catch curves (upper graph). Curves of equilibrium biomass and equilibrium catch per recruit (lower graph). (Source: KamchatNIRO, 2020b).

Table 9. Estimated biological reference points. (Source: KamchatNIRO, 2020b).

Reference point	f_{lim}, 1/year	f_{med}, 1/year	f_{max}, 1/year	f_{msy}, 1/year	$f_{40\%}$, 1/year	f_{01}, 1/year	B_{loss}, thsd t
Estimated value	0.386	0.305	1.308	0.515	0.519	0.411	574.8
CV	0.045	0.134	0.079	0.234	0.081	0.034	0.09

However, this value was rather close to its target reference point which led to a high sensitivity of TAC value to small fluctuations of spawning stock biomass around the target reference point and, as a consequence, to TAC underestimation. In 2019, the spawning stock biomass limit reference point was re-established at Blim=B25%Bvir=540 kt, which is equal to 25% of the SSB of virgin stock. According to VINRO scientists, the use of B25%Bvir as a limit reference point is quite justifiable. The spawning stock biomass limit reference point B_{lim} has been set above the level at which a significant risk of damage to the breeding part of the stock exists.

The Harvest Control Rule should be periodically reviewed and improved as necessary. Management reference points should also be reviewed once in 5 years. However, given that the East Kamchatka pollock stock is currently at a high productivity level, the session of the Working Group on TAC Assessment for Priority Fishery Objects held in early March 2020 decided to leave them at the previous level (except B_{lim}). The HCR and reference points will be reviewed concurrently with justification of TAC for 2022.

The following input data were used to assess the current stock condition in 2019 using the “Synthesis” model:

- East Kamchatka pollock yield (millions of individuals) by age (2-14 years) and year (1975–2019). Its age composition was determined by size-age keys compiled using age determination by otoliths separately for each year. These sizeage keys were used separately for the first and second half-year according to data for 1998–2019.
- Mean multi-year weight of individuals by age groups.
- Mean multi-year percentage of mature individuals by age groups, calculated by results of weight measurements with dissection performed in January – March.
- Mean multi-year instantaneous rates of natural mortality (IRNM) by age, calculated using the Gunderson and Dygert method (Gunderson and Dygert, 1988) for the most widely represented age groups – 5–14 years. These calculations were based on the gonado-somatic index (GSI) of females with gonads at maturity stage IV in 1996–2010. GSI data were obtained by weighing nonfixed fishes and ovaries in the laboratory. Natural mortality rates for 2–4-year old individuals were calculated by a simple relationship to length: $M = (L_r/L)\ M_r$ (Lorenzen, 1996), where: r — junior “benchmark” age (5 years) for which an IRNM value is known, L is fish length.

The approximate boundaries of 95% confidence intervals for recruitment, selectivity and fishing mortality rates for selectively fully-removed age groups as well as for total and spawning stock biomass were plotted using the Monte Carlo method.

Two “blocks” of selectivity rates were established for East Kamchatka pollock: for the period till 2001 inclusive and after 2001, when a ban was imposed on use of pelagic trawls without a selective insert with square meshes incorporated between the trawl bag and cod-end in all areas of the target pollock fishery. Due to this novelty, selective properties of trawls changed which resulted in smaller percentages of junior age groups in pollock catches. An exponential logistic form was chosen for selectivity functions.

According to model-based estimates, intensive exploitation of East Kamchatka pollock (including spawning pollock in deep water canyons of the Avacha Bay and Kronotsky Bay) in early 1990s resulted in a significant reduction of its recruitment and, subsequently, of its total and spawning stock biomass (Figure 17).

As recruitment abundance, according to model-based estimates, was at a low level during the first half of 1990s – mid-2000s (Figure 17), it can be firmly stated that it is due to timely measures of fishery control that the spawning stock biomass had gradually recovered to its target reference point Btr by mid-2000s.

Briefly characterizing the stock dynamic of East Kamchatka pollock by results of model-based estimates, it is possible to note a rapid growth of biomass, both for total and spawning stock, observed in this century’s beginning followed by a decline after 2011. The stock is currently observed to be stabilizing at the level of its biomass target reference point with minor fluctuations. According to model-based estimates, 2014 and 2015 year classes are stronger than the 2011 year class. By data available as of 2019, 2016 and 2017 year classes are assessed as low-abundant.

According to model-based results, the estimated total stock biomass of pollock at the age of 2 years and older was 1,512.1 kt as of early 2019 and that of its spawning stock was 917.0 kt. The latter value is somewhat lower than the current value of B_{tr}=922 kt, i.e. the level at which a high stock productivity is maintained.

According to calculations by the Monte Carlo method, the probability that the spawning stock biomass as of early 2019 exceeds its target reference point is 0.562 (P(SSB2019>Btr)=0.562). The probability that the spawning stock biomass as of early 2019 exceeds its limit reference point is 0.999 (P(SSB2019>Blim)=0.999).

The year-to year dynamic of model-based instantaneous fishing mortality rates shows that the East Kamchatka pollock fishery was generally effective in the 21st century (Figure 17). However, according to model-based estimates, the current value of the fishing mortality limit reference point is observed to be exceeded in recent years which may be related to stock reassessment in recent years. A possible cause is use of new-design pelagic trawls with a better selectivity in the pollock fishery in recent years.

The retrospective analysis results presented in Figure 18 are indicative of the absence of a marked retrospective drift of model-based spawning biomass estimates, i.e. computation results can be recognized satisfactory as well as other diagnostics available in the stock assessment report.

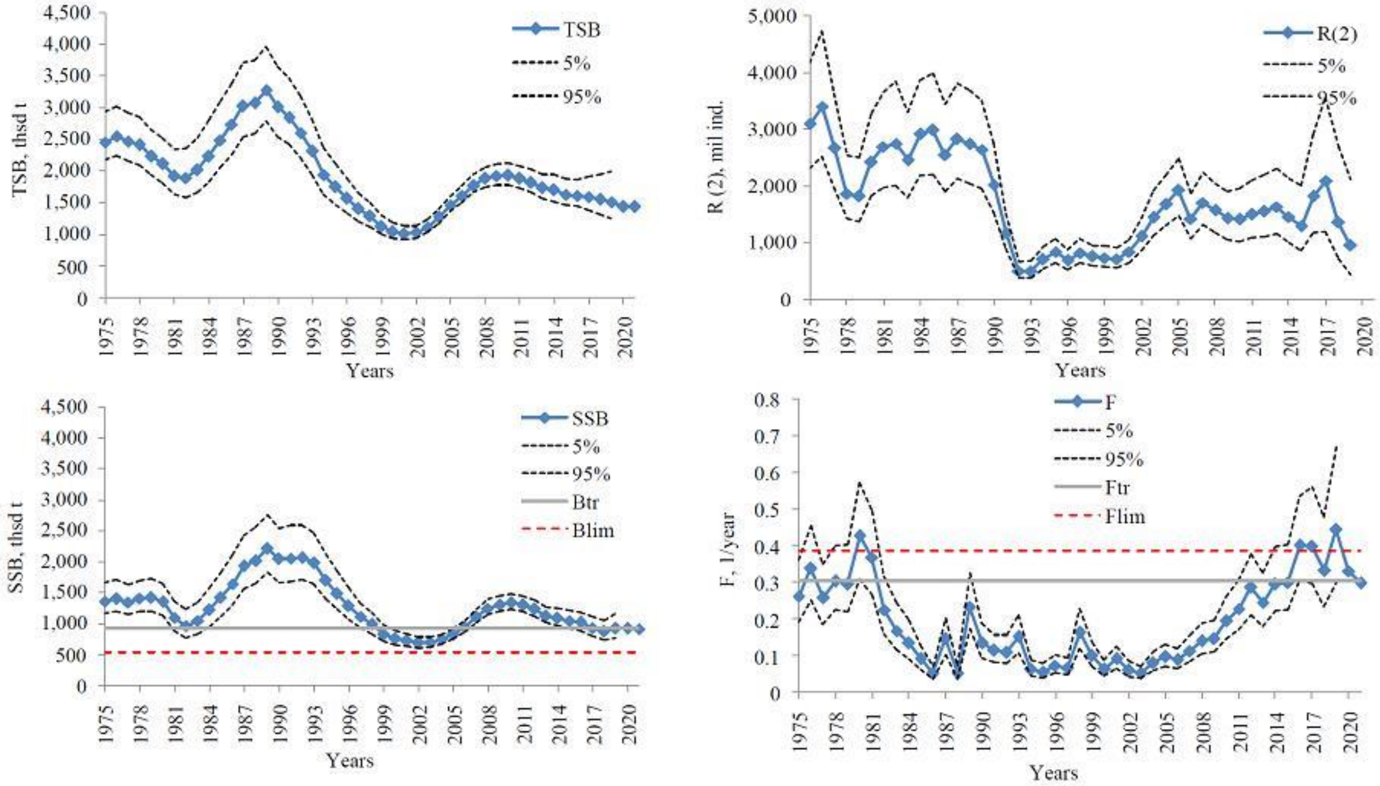

Figure 17. Stock assessment outputs. (Source: KamchatNIRO, 2020b).

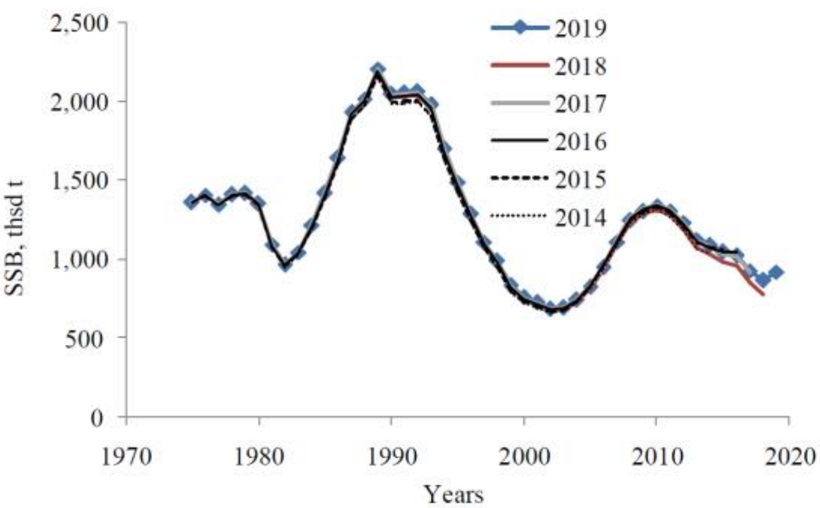

Figure 18. Retrospective analysis results for East Kamchatka pollock spawning stock biomass estimates. (Source: KamchatNIRO, 2020b).

The model-based approach, which has long since become the key tool for quantitative analysis of the majority of international fishery objects, is applied to stock assessments and, especially, to East Kamchatka pollock TAC forecasting. As a matter of fact, this is also required by the effective Order of Federal Fisheries Agency No. 104 dd. February 6, 2015. According to this order, a comprehensive analytical assessment of the stock condition and TAC using exploited stock structured models is mandatory for stocks with Level I (the highest) of informational support.

However, even the most perfect models of fisheries theory can be of little effect, unless provision is made for influence of numerous uncertainty sources. Uncertainty is understood as incompleteness or known non-credibility of knowledge about the study object. The ICES Working Group on the Precautionary Approach to Fisheries Management (ICES, 1998) suggested the following classification of uncertainties:

1) uncertainty caused by measurement errors relating to non-representative character of sampled data;

2) uncertainty of the model-based approximation of fishery dynamics;

3) uncertainty of the natural variability of fishable stock parameters.

These three uncertainty types eventually lead to uncertainties in stock condition and forecasted TAC assessments. The above uncertainty types are not equivalent, both from the viewpoint of their influence on credibility of harvest control recommendations and from the viewpoint of handling them. For instance, special measures can significantly reduce sampling and model-based uncertainty, while natural variability of population parameters can only be characterized at the best case.

The stochastic cohort model “Synthesis” is used for East Kamchatka pollock stock assessments the model makes provision for the fact that observed catches differ from model-based ones due to measurement errors and that uncertainty in the relationship between recruitment abundance and parent stock size is induced by lognormal noise. It is also supposed that the observed data on stock indices and fishing efforts differ from theoretical data by a random value with a lognormal distribution. Model parameters optimize the target function — either minimize the weighted sum of squared deviations of observed values from theoretical ones or maximize the log-likelihood function. In other words, model parameters should be chosen such that to minimize uncertainty of type 2.

There are weighted coefficients λi, governing the degree of confidence to available observation data. These coefficients depend on data accuracy and are inversely proportional to error dispersion. Standard deviations of observation errors σC, σE, σa, σR and σII in the expression for the log-likelihood function are parameters to be estimated. In this way, uncertainties of type 1 are incorporated in the model.

Both above-mentioned uncertainty types are taken into account when evaluating uncertainties in estimation of model parameters, stock condition and management reference points under the bootstrap method.

The uncertainties of type 3 as well as uncertainties of model parameter estimates are taken into account when evaluating efficiency of the harvest control scheme as part of imitation modelling. As part of the Monte Carlo method, a large number of random errors is generated for values of terminal abundance of year classes, weight and percentage of mature individuals, selectivity rates and recruitment values in projected years. Dispersions of the above-said errors are evaluated by bootstrap method or Monte Carlo method in the “Synthesis” model.

A measure of uncertainty is probability of a certain predetermined event. Uncertainty presentation in the form of estimated probabilities of possible changes in the stock condition is important in analysis of the efficiency of various harvest control schemes in relation to a given stock. The probabilistic interpretation of uncertainty plays one of key roles in justification of scientific recommendations on harvest control making results much more vivid and convincing. When making provision for uncertainty in this way, probability is most frequently presented in the form of a risk. In fishery management, “risk” is interpreted as “probability that something bad will happen” (Francis, 1991). With this definition in view, risk analysis may, in particular, focus on calculation of a probability that in certain conditions the spawning stock will be below its limit reference point or maximum allowable fishing mortality rate will be exceeded.

A serious problem to be faced when assessing a stock and forecasting its TAC is lack of information necessary for full statistical analysis of tasks to be solved. The only way out from such situation is application of imitation modelling methods which enable to find acceptable in practice solutions of the problem of uncertainty evaluation in those conditions in which traditional mathematical statistics methods turn out to be of little effect. In the interpretation of Western researchers, risk analysis is confined to statistical processing of results of multiple realizations by the Monte Carlo method (100 and more) of the probabilistic model of stock dynamic for the “decision-making period” (1–2 years) and/or the whole “management period” (10–50 years). In the first case, the purpose of analysis is an evaluation of the probability of forecasted TAC accuracy based on the stock dynamic history, and particular harvest control measures directly depend on the terminal state of the stock. In the latter case, the focus is on the probability of undesirable consequences for the stock and/or fishery in the course of implementation of the fisheries strategy being tested, i.e. management strategy efficiency is assessed which in a much lesser degree depends on the pre-forecast stock condition.

A conclusion on the efficiency of the strategy being tested is made through comparing of the risk assessed on the basis of available information and the maximum allowable risk level pre-set for the event under consideration or risks obtained for other harvest control options.

When performing TAC justification studies, the efficiency of the chosen harvest control scheme is analyzed using risk analysis procedures. In doing so, the probability of undesirable consequences for the stock resulting from this fishery strategy is determined. In accordance with the Monte Carlo method, a given large (>100) number of generations of random errors is generated for starting values of year-class abundance, weight and percentage of mature individuals, selectivity rates and recruitment values in projected years. Used as starting values are year-class abundances in the terminal year contaminated by noise through introduction of a lognormal error with a standard deviation estimated by the bootstrap method in the “Synthesis” model. Recruitment values in projected years are “contaminated by noise” with account for the lognormal distribution of the error. The abundance of year classes is further extrapolated to the next year by the following formula:

$$N_{i,j} = N_{i-1,j-1} * \exp(-F_{i-1,j-1} - M_{j-1}),$$

where fishing mortality rates F correspond to the fishery strategy being tested. Selectivity rates are “contaminated by noise” through introduction of a lognormal error with a standard deviation estimated by the bootstrap or Monte Carlo method in the “Synthesis” model. The estimated spawning stock biomass is further calculated by summing up year-class abundances multiplied by respective values of the weight and percentage of mature individuals. Then statistical processing of the obtained sample base is performed.

An important step in management strategy testing is evaluation of the probability that, in the long-term prospect (10 years ahead), the spawning stock biomass of East Kamchatka pollock will not descend below the biomass limit reference point Blim at a given permanent exploitation rate. This probability is evaluated as part of statistical imitation modelling by the Monte Carlo method. If the fishery intensity rate remains at the level of the target reference point Ftr during 10 years, the risk of overfishing in recruitment terms does not exceed the recommended (Babayan, 2000) level of α=0.1–0.2; therefore, there are no grounds for rejection of this management strategy. These calculations also confirm the adequacy of chosen reference points for fishing mortality.

Another argument in favor of the currently used fishery strategy may be stock dynamic modelling results for a long period of time (10 years) at the intensity of removal recommended according to HCR and adopted suggestion regarding the recruitment size. As seen from results presented in Figure 19, if HCR is observed, there is 95% probability that the East Kamchatka pollock stock will not reach beyond its biologically safe limits and stay near its target reference point Btr. Based on imitation modelling results, it can be stated that the currently used management strategy is acceptable in the long-term run.

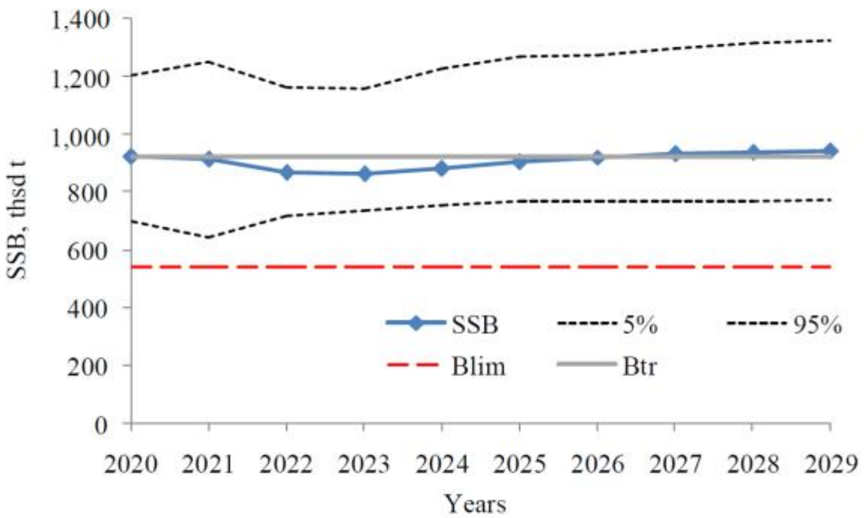

Figure 19. Model-based dynamic of the East Kamchatka pollock spawning stock biomass at the removal intensity recommended according to HCR. (Source: KamchatNIRO, 2020b).

As TAC is forecasted for a period of 2 years ahead, the probability of undesirable consequences of the adopted stock management strategy should be evaluated for 2 years ahead, i.e. risk analysis should be performed. For this purpose, an evaluation with the Monte Carlo method was employed for a risk analysis. This showed that the risks of overfishing in terms of recruitment and overfishing in terms of growth at the recommended TAC size for East Kamchatka pollock of 186.1 kt do not exceed the recommended level of α=0.1–0.2 (Babayan, 2000).

The final form of HCR with the specified stock trajectory, covering the period of time from 2010 to 2019 and the nearest prospect (till 2024), is presented in Figure 20.

Modelling results show that the East Kamchatka pollock HCR introduced in 2012 ensures stock supporting at a high productivity level. If HCR is observed, risks of the occurrence of unfavorable consequences for the stock do not exceed the recommended level of 10%.

In accordance with the Order of Federal Fisheries Agency No. 104 dd. February 6, 2015, pollock together with such target species as Pacific herring, Pacific cod, Greenland and Pacific halibut, Pacific salmons, sturgeons, red king crab, blue king crab, snow crab and Bairdi crab, squids and true whelks (Gastropod mollusks – Gastropoda: Buccinidae) is classified as priority species of Russian fisheries. The materials justifying TACs of these species should be developed 2 years in advance.

Before February 1 of the year proceeding to year of fishery, all materials justifying TACs of priority species should be examined at sessions of the Scientific Councils of each branch institute, researchers of which were involved in forecasting studies (regarding East Kamchatka pollock – Scientific Councils of KamchatNIRO and SakhNIRO).

After that, materials with predicted data are submitted to the Central Office of FGBNU VNIRO and its specialists should before February 20 give their comments and suggestions for incorporation and resubmission to the parent scientific institution before February 25.

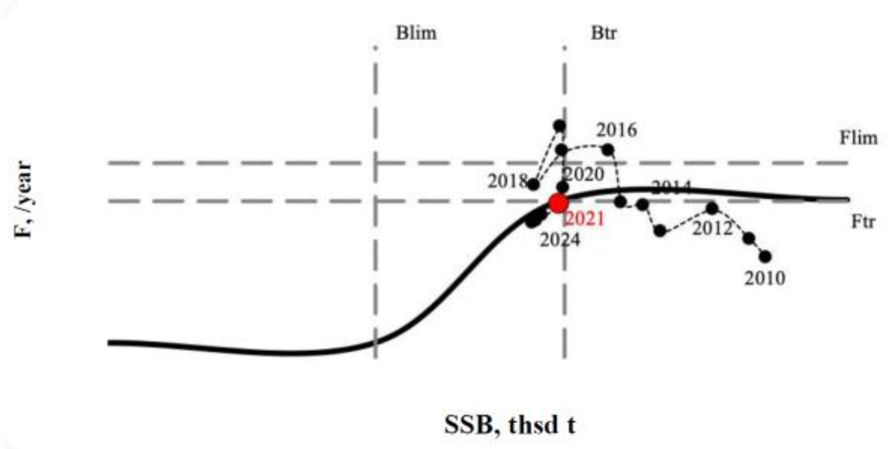

Figure 20. Realization of East Kamchatka pollock HCR in 2010–2024. (Source: KamchatNIRO, 2020b).

To work out an agreed position, FGBNU VNIRO sets up working groups for assessment of TACs for priority species of Russian fisheries, which should prepare their conclusions on justification of these TACs before February 25. The working groups hold their in-person sessions on FGBNU VNIRO's premises. They include the most skilled specialists in TAC forecasting from various industry research institutions.

The next step is examination of the TAC justification consolidated materials at an extended session of the Scientific Council of FGBNU VNIRO to be held before March 5.

Roughly in mid-March, final TAC data are approved by the Industry Council on Fisheries Forecasting of Federal Fisheries Agency chaired by P.S. Savchuk, deputy head of the Federal Agency for Fishery.

After that, roughly in mid-April, the materials justifying TACs for the next year are examined and approved at a session of the Council of Fishery Research Institution Directors under the Deputy Minister of Agriculture of Russian Federation – head of the Federal Fisheries Agency I.V. Shestakov. Roughly in mid-May, TAC materials pass a mandatory procedure of public hearings the purpose of which is to assess an environmental impact of planned business activities – fisheries in this case.

At the concluding stage, before the Federal Fisheries Agency issues an order approving TACs for the coming year, all TAC justification materials pass an independent Governmental Environmental Expert Review.

At the session of the Working Group on Assessment of Stocks and TACs of Priority Species of Russian Fisheries held in early March of 2015, SakhNIRO researchers presented an alternative TAC forecast for East Kamchatka pollock.

To estimate the pollock fishable stock biomass for 2016, the KAFKA ("Cohort Analysis Using Kalman Filter") model (Mikheev, 2016) allowing for use of various tuning indices was used. In particular, this forecast used data of ichthyoplankton and trawl surveys in addition to fishing efforts. The final tuning up is performed inside the model using the Kalman filter. In order to apply the Kalman filter, the cohort model is converted to a production model in KAFKA.

When performing their calculations, SakhNIRO researchers assumed that yield in 2015 would be equal to TAC. As estimated recruitment values for latest years of fishery are not reliable due to properties of cohort models, median values for 1975–2006 were used for estimation of recruitment at the age of 3 years to make a forecast for 2016. This value was 550 million individuals.

The estimated dynamic of the East Kamchatka pollock fishable stock biomass is presented in Figure 21. It is supposed that after some reduction in 2013 the fishable stock biomass will stabilize at a level close to its multi-year mean. Its estimated value for 2016 was 985.3 kt.

The biomass limit reference point was set at the level of its historical minimum of 400 kt, biomass target reference point was set at the level of Bmsy – 941 kt, and target rate of removal was set at MSY level – 21%.

As the estimated pollock fishable stock biomass for 2016 is higher than its target management reference point, the recommended rate of removal for the projected year is equal to its target value and amounts to 21%. Thus, the allowable yield for 2016 might be 985 kt × 0.21=207 kt.

It should be noted that the KAFKA model version (Mikheev, 2016) presented in 2015 contained errors and its algorithm was subsequently reworked. Nonetheless, the estimated East Kamchatka pollock stock biomass and TAC values for 2014–2016 obtained by SakhNIRO researchers in 2015 turned out to be close to "Synthesis" model-based estimates.

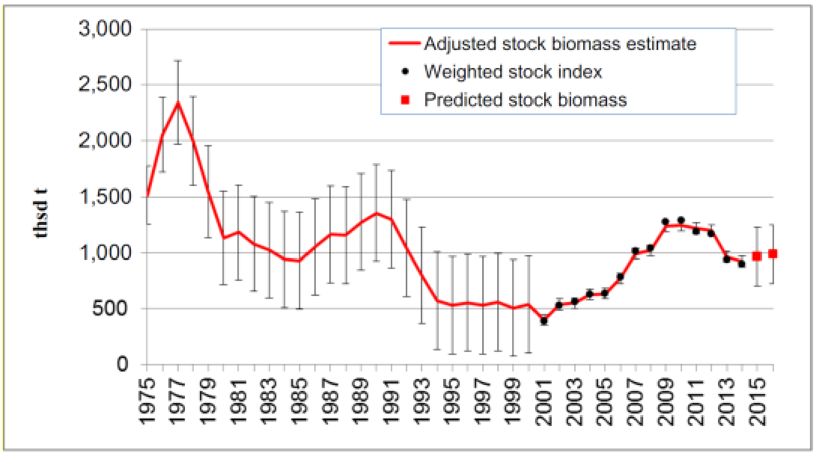

Figure 21. Dynamic of East Kamchatka pollock fishable stock biomass during observation period according to KAFKA model-based results; 95% confidence intervals are shown. (Source: KamchatNIRO, 2020b).

By a decision of the director of the parent institute FGBNU VNIRO in 2013 and then in 2016, an inter-institutional working group on methodology for assessment of raw material sources for fisheries (WGM) was set up and included the industry's best specialists in methodological and mathematical support to stock assessment.

Full details about WGM are available on FGBNU VNIRO website: http://www.vniro.ru/ru/interinstitutional-working-group.

The WGM's responsibilities include testing of new models recommended for TAC justification. This group approved the Procedure for Approval Testing of Mathematical Methods and Models Intended for the Assessment of Stock Condition and TAC Size (attached hereto) developed on the basis of similar procedures used in ICES working groups and other international fisheries organizations (such provisions are adopted by working groups themselves without involving any official bodies).

The "Synthesis" model was repeatedly presented at WGM sessions and industry-level methodological seminars on study of state-of-the-art methods for assessment and effective use of aquatic living resources. In 2016, WGM performed a diagnostic of the "Synthesis" model and by results of this exercise recommended it for use in TAC assessments of target species for Russian fisheries.

Testing was performed on three test data sets which, according to FGBNU VNIRO researchers, had been used for similar purposes in ICES. In each of the examples, "true" catches by age groups as well as "true" fishable and spawning stock biomass indices were contaminated by noise through introduction of the lognormal error with σ=0.3. Then "data gaps" were artificially incorporated in the obtained data series. Using the resulting data set and "Synthesis" model, "true" values of abundance by age groups, fishing mortality and selectivity rates as well as instantaneous natural mortality rates were reconstructed. The "Synthesis" model has demonstrated satisfactory results.

At "true" IRNM equal to 0.15, "Synthesis"-based estimate M was 0.1509 in test example No. 1 and 0.1504 in test example No. 3. The above mentioned WGM decision is available at FGBNU VNIRO website: http://www.vniro.ru/files/odu/RGM/Rekomendatsii_RGM_2016.pdf. In 2017, the "Synthesis" model was included into:

a) List of domestic and foreign models recommended by WGM for stock assessment and TAC justification for target species of Russian fisheries;

b) Methodological Recommendations on Stock Assessment of Priority Species of Aquatic Living Resources (Babayan et al., 2018).

The "Synthesis" program and relevant manual are in the public domain and posted at KamchatNIRO website: http://www.kamniro.ru/270120136.

6.1.6 Catch profiles

The catch profile is available in Figure 11

6.1.7 Total Allowable Catch (TAC) and catch data

Total Allowable Catch (TAC) and catch data are available in Table 10 and Figure 11.

Table 10. Total Allowable Catch (TAC) and catch data

TAC	Year	**2019**	177	**Thousand tons**
UoA share of TAC	Year	**2019**	170	**Thousand tons**
UoA share of total TAC	Year	**2019**	96	**Percent**
Total green weight catch by UoC	Year (most recent)	**2019**	67.8	**Thousand tons**
Total green weight catch by UoC	Year (second most recent)	**2018**	77.3	**Thousand tons**

6.2 Principle 1 Performance Indicator scores and rationales

PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guide post	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

According to the assessment produced by VINRO (KamchatNIRO, 2020b; see Section 6.1.5) stock biomass of pollock in North Kuril zone – 61.03, Okhotsk subzone of the North Kuril zone – 61.03.2 (hereafter defined as East Kamchatka pollock) is above the PRI assumed as B_{lim} (estimated as Blim=Bloss×EXP(ts90%×SE)=622 kt). In accordance with the model-based results (Figure 17), the stock biomass of pollock at the age of 2 years and older was 1,512.1 kt in 2019 and that of its spawning stock was 917.0 kt, with a lower bound of the 95th percentile above the PRI. Therefore, there is a high degree of certainty that stock biomass is above PRI (the point below which recruitment would be impaired), so SIa meets **SG 60, SG 80 and SG 100**.

b	Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is **a high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		**Yes**	**No**
Rationale				

The target biomass (Btarget) is set as SSB(Ftr) equal to 922 kt. Ftr is set below the estimated F_{MSY} (0.515 see Table 9), therefore it is reasonable that the Btarget is set at a level consistent with MSY. According to the assessment produced by VINRO (KamchatNIRO, 2020b) stock biomass of East Kamchatka pollock is above the Btarget (Figure 17) and is fluctuating around such level since 1999, thus more than one generation time (TGEN = 10 years, see https://www.fishbase.se/summary/318). Therefore**, SG 80 is met**.

However, taking into account that the lowest 95% confidence interval boundaries observed in the model in the last years is below Btarget, it is not possible to conclude that there is a high degree of certainty that stock has been above its target reference point over recent years, so **SG 100 is not met**.

Potential information gaps related to the stock status of pollock in will be further discussed during the site visit.

References

- KamchatNIRO, 2020b.

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 stock relative to PRI (SIa)	Blim	*622*	*1.47*
Reference point used in scoring stock relative to MSY (SIb)	Btarget = SSB(Ftr)	*922*	*0.99*

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought** *More information is sought about the model outputs.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock 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 stock 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 the stock.
	Met?	**NA**		**NA**
Rationale				

The stock is not depleted.

b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.
	Met?	**NA**	**NA**	**NA**
Rationale				

The stock is not depleted.

References

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

Draft scoring range	**NA**
Information gap indicator	**-**

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

Overall Performance Indicator score	
Condition number (if relevant)	

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 stock management objectives reflected in PI 1.1.1 SG 80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG 80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG 80.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The harvest strategy for pollock in Eastern Kamchatka is comprised of the following elements:

- Data collection of both fishery dependent and independent information;
- Stock assessment carried out by a scientific body;
- TAC and Harvest Control Rules based on MSY reference points.

Therefore, the HS is responsive to the state of the stock through projections that evaluate the achievement of objectives under assessed uncertainties. **SG 60 and SG 80 are met.**

Further, the HS is designed to achieve these objectives as reflected in target and limit reference points. There is good evidence that TACs are based on the scientific advice and that catch is maintained within the TACs. **Therefore, SG 100 is 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 stocks at target levels.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The harvest strategy has been used to provide TAC since 2010 (Table 8). Evidence that the harvest strategy is achieving its objectives is provided by the stable trend of the fishable biomass around the target. The testing of the harvest strategy and associated HCR consists of two elements, both of which indicate robust performance under the assessed starting stock conditions and uncertainties. According to Figure 20, the modelling of the HCR with the specified stock trajectory, covering the period of time from 2010 to 2019 and the nearest prospect (till 2024), shows that the East Kamchatka pollock HCR introduced in 2012 ensures stock supporting at a high productivity level. If HCR is observed, risks of the occurrence of unfavorable consequences for the stock do not exceed the recommended level of 10%.

The projections indicate that as long as the HCR is followed, there is 90% probability that SSB will be maintained above both B_{LIM} and B_{TR}. Although the harvest strategy of pollock fishery in East Kamchatka has not been fully tested (e.g. through MSE or a similar robust exercise), the testing that is being conducted and the evidence from the stock assessments indicates that it is achieving its objectives. Therefore, **SG 60 and 80 are met but not 100.**

c	Harvest strategy monitoring			
	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	**Yes**		
Rationale				

Monitoring is in place (i.e. annual stock assessment and associated monitoring programmes) to provide biomass indicators to inform the strategy's HCR and to allow determination of whether or not the strategy is working. Therefore, **SG 60 is met.**

d	Harvest strategy review			
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			**Yes**
Rationale				

According to the assessment produced by VINRO (KamchatNIRO, 2020b) reference points and the HCRs are reviewed once every 5 years. The HCR and reference points will be reviewed concurrently with justification of TAC for 2022. Therefore there is evidence that the HS is reviewed and **SG 100 is met**.

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?	**NA**	**NA**	**NA**
Rationale				

The stock is not a shark.

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?	**Yes**	**No**	**No**
Rationale				

Data about the amount of the unwanted catches of the target stock from the UoA are not available.

However, a minimum commercial size for East Kamchatka pollock is set at 35 cm and Clause 38 of Fishing Rules for the Far Eastern Fisheries Basin (RF Ministry of Agriculture Order No. 267 dd. May 23, 2019) regulates juvenile pollock by-catch, the allowable limit for which is set at 20% by count per one haul. All captured juveniles (except prohibited species of aquatic living resources) are subject to processing on board with relevant entries to be made in the fishing and/or processing log.

In case of exceeding the 20% limit, the vessel must change its fishing location by at least 5 miles, make relevant entries to the fishing log and report to the Federal Fisheries Agency.

This can be considered a sort of review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock. Therefore, **SG 60 is met.**

However, there is no evidence that this review is regularly carried out. Therefore, **SG 80 is not met**.

More information about unwanted catches will be requested during the site visit.

References

- KamchatNIRO, 2020a; b

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

Draft scoring range	**60-79**
Information gap indicator	**More information sought** *More information about unwanted catches will be requested during the site visit.*

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

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

PI 1.2.2 – 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** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **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?	**Yes**	**Yes**	**Yes**
Rationale				

The harvest control rule (HCR) consists of determination of a TAC based on the status of fishing mortality and spawning biomass in relation to limit and target reference points (B_{LIM}, B_{target}, F_{LIM} and F_{TR}) as well as to F_0, a value set to allow scientific fishing went the stock goes below B_{LIM}. When stock biomass is above B_{target}, fishing mortality is set at F_{TR}. Fishing mortality is reduced as stock levels decrease between B_{LIM} and B_{target} whereas below B_{LIM}, it is set at F_0. The latter allows for scientific fishing while the commercial fishery is closed. The HCR works in concert with the results of the annual stock assessment as part of a two-year projection process in which the current stock biomass along with the upcoming year's TAC is used to project the following year's TAC. **SG 60 is met.**

The upcoming year's TAC was established by the previous decision process, using the HCR; updates to that TAC are possible based on new survey and fishery observations. The HCR is used to set fishing mortality and hence to establish the TAC for the second year of the projection. This approach ensures that biomass does not fall below B_{LIM}. There is therefore a well-defined HCR in place that is a key part of the harvest strategy and which is designed to ensure that fishing mortality is reduced as B_{LIM} is approached and would maintain the biomass at MSY levels. **SG 80 is met.**

Moreover, taking into account the stable trend of the biomass and the simulation available in Figure 20 it is possible to conclude that HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY. **SG 100 is 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 stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		**Yes**	**No**
Rationale				

The HCR design is based on a probabilistic stock assessment outputs (Synthesis model), so the HCR takes the main uncertainties into account. It allows for the F_{TR} only when biomass is at or above B_{target} and reduces fishing mortality to near zero when biomass declines from B_{target} to B_{LIM}. This allows for a precautionary reduction in fishing mortality attributable to the amplified risk of crossing the unknown "true" value of B_{LIM} as a consequence of uncertainty in understanding pollock stock dynamics. As and when the uncertainty in the assessment inputs change, the updated estimates of uncertainty are incorporated into the HCR and hence the TAC advice. Therefore, **SG 80 is met.**

The current formulation of the HCR is focused on the management of pollock and does not consider the wider implications and uncertainties of fishing mortality on the ecosystem as well as changes in stock productivity. Therefore, **SG 100 is not met.**

c	HCRs evaluation			
	Guide post	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	**Yes**	**Yes**	**No**
Rationale				

There is a suite of regulatory tools used to implement the TAC produced by the HCR and to regulate the fishery (see clauses reported). This includes catch quotas allocated to fleet sectors, gear and mesh regulations, and time/area closures. All these tools are considered to be appropriate and effective at controlling fishing mortality. **SG 60 is met.**

Also, the favourable comparison of approved TAC with reported catch is evidence that the tools are effective at controlling fishing mortality. Further, the favourable comparison of science advice and approved TACs indicates that science advice is followed closely by fishery decision-makers. **SG 80 is met.**

However, the increasing patter of fishing mortality in some cases above Ftr is showing that the tools in use are not completely effective in controlling the exploitation under the required level of the HCRs. Therefore, **SG 100 is not met.**

References

- KamchatNIRO, 2020a; b.

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

Draft scoring range	**≥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)	

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 stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

A wide range of data is available on different features of stock productivity of pollock in East Kamchatka, including information on age and growth processes, on maturity and fecundity. These data have been and are still routinely collected on surveys and observed fishing trips, and summaries of the data are produced each year as part of the annual stock assessment process. There is general understanding that environment and specifically large zooplankton influence pollock recruitment. Matrix of catch (thousands of individuals) by age and by year is available, as well as mean multi-year values of weight, percentage of mature individuals and percentage of commercial-size individuals by age, calculated using full biological analysis (FBA) and instantaneous rates of natural mortality by age, with age determination based on otoliths. **SG 60 is met.**

Several indices of stock abundance are available for pollock in East Kamchatka, ichthyoplankton, trawl, acoustic and commercial catch rate. There are a number of sources of information on the composition of the fishing fleets. These include the FFA vessel licensing system, logbooks and FSB reporting requirements of at-sea activities, scientific observers and fishery inspectors. Further, VMS provides accurate information on fishing location, which supplements that found in the logbooks. Fishery removals are monitored by FSB inspectors aboard catch and catcher-processor vessels. The age/size composition of the catch is monitored by at-sea observers and scientific fishing. **SG 80 is met.**

In summary, there is a comprehensive range of information on pollock stock structure, productivity and abundance. Fleet composition and fishery removals data are available to support the harvest strategy. Ecosystem monitoring of the East Kamchatka through the VINRO survey programmes provide a wide range of environmental and other data not directly related to the current harvest strategy but are used in studies of pollock stock productivity. Therefore, **SG 100 is met.**

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

Rationale

The surveys at sea provide the annual assessment with indices of spawning biomass. Since 1998, the VINRO ichthyoplankton survey has been accompanied by trawl sampling. **SG 60 is met.**

Since 1998, the VINRO survey has also been accompanied by acoustic monitoring. Considerable effort has been spent on standardising the design and protocol of that survey, which now provides an acoustic index to the stock assessment. Monitoring of fishery removals is conducted by the FSB's coastguard aboard catcher and catcher-processor vessels. Landings from the fishery are verified by those inspectors, who are mandated by Russian Law to be aboard the transhipment vessels. Also, when a vessel enters and leaves a subzone, there is mandatory inspection.

In summary, fishery removals and stock abundance are monitored with sufficient frequency to support the harvest control rule. The stock assessment can consider observation uncertainty in each input dataset. This uncertainty is taken into account in projections of the harvest control rule. Therefore, **SG 80 is met.**

All information required by the HCR is monitored with high frequency and there is good understanding of inherent uncertainties in the information and growing awareness of the robustness of assessment and management to this uncertainty. Although sampling is sufficient to meet the needs of the harvest control rule, it cannot be said to be at a high degree of certainty, so **SG 100 is not met.**

c	Comprehensiveness of information			
	Guide post		There is good information on all other fishery removals from the stock.	
	Met?		**Yes**	
Rationale				

According to the information available there is no other removals of pollock in East Kamchatka. **SG 80 is met.**

Potential information gaps related to the Information and Monitoring of pollock in East Kamchatka will be further discussed during the site visit.

References

- KamchatNIRO, 2020a; b.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought** *Potential information gaps related to the Information and Monitoring (especially evidence of catches from other fisheries) of pollock in East* Kamchatka *will be further discussed during the site visit.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.2.4 – Assessment of stock status

PI 1.2.4	There is an adequate assessment of the stock status		
Scoring Issue	SG 60	SG 80	SG 100
a	**Appropriateness of assessment to stock under consideration**		
Guide post		The assessment is appropriate for the stock 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?		**Yes**	**Yes**
Rationale			

The assessment of the status of the stock is carried out using two models (Synthesis and KAFKA models). Both are considering the major features of the stock in term of maturity and growth. Also, the models are considering abundance indexes and catch at age matrix from the fishery (Figure 17). Therefore, **SG 80 and 100 are met.**

b	**Assessment approach**		
Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
Met?	**Yes**	**Yes**	
Rationale			

The stock assessment provides stock status estimates relative to reference points derived from Y/R model based on the target stock data (see Table 8). Therefore, **SG 60 and SG 80 are met**.

c	**Uncertainty in the assessment**		
Guide post	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
Met?	**Yes**	**Yes**	**No**
Rationale			

Estimation of the uncertainty in historical estimates of fishable stock biomass is available from the model. **SG 60 is met.**

The assessment characterises the major sources of uncertainty, such as uncertainty caused by measurement errors in input data and uncertainty in the model approximation of population dynamics. Therefore, **SG 80 is met.**

However, the assessment outputs are not provided in a full probabilistic way. Therefore, **SG 100 is not met.**

d	**Evaluation of assessment**		
Guide post			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

	Met?			**Yes**

Rationale

The assessment has been carried out using two different modelling approaches (Synthesis and KAFKA models). Both models are providing similar outputs in term of biomass relative to reference points. **Therefore, SG 100 is met.**

e	Peer review of assessment			
	Guide post		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		**Yes**	**No**

Rationale

The annual scientific peer review process involves preparation of the assessment by VINRO, review by the Far East Pollock Council, which consists of experts from each regional institute who discuss the draft assessments and TAC advice, review by VNIRO's central Scientific Council, and review by ecological experts such as non-FFA contracted scientists, academics and nature conservation organizations under the auspices of the Ministry of Natural Resources, which is independent of the FFA. The entire review is conducted over a series of meetings within the year before that of the TAC being considered. The initial Far East Pollock Council stage of the Russian peer review involves the scientists of the institutes most immediately engaged in the SOO pollock stock assessment (TINRO, KamchatNIRO, MagadanNIRO and SakhNIRO). It is an internal (to Russia) review although cross-institute expertise is involved. Therefore, **SG 80 is met.**

There is no evidence that the assessment has been externally peer reviewed. Therefore, **SG 100 is not met.**

References

- KamchatNIRO, 2020b.

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

Draft scoring range	**≥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)	

7 Principle 2

7.1 Principle 2 background

Table 11. Scoring elements

Component	Scoring elements	Designation	Data-deficient
e.g. P1, Primary, Secondary, ETP, Habitats, Ecosystems	e.g. species or stock (SA 3.1.1.1)	Main or Minor	
Primary	Atka mackerel	Minor	No
Primary	Pacific cod	Minor	No
Primary	Pacific halibut	Minor	No
Primary	Northern rock sole	Minor	No
Primary	Pacific Ocean perch	Minor	No
Secondary	Commander squid	Minor	No
Secondary	Skates (rays), sculpins, sablefish and > 50 species with insignificant catches.	Minor	Probably
ETP	Steller sea lion	NA	No
ETP	Short-tailed albatross	NA	No
Habitat	Midwater pelagic	Commonly encountered	No
Habitat	VME indicator species	VMEs	Possibly
Ecosystem	Eastern Kamchatka and North Kurils	Only	No

7.1.1 Primary species

Primary main species.

Following guidance SA3 1.3.3, the team designates Primary species as those "*where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points.* In Eastern Kamchatka, Primary species refers to fish harvested under TACs. Preliminary information identified 14 species operating under a TAC. Secondary species have no TACs or reference points and many operate under a Recommended (or Possible) Catch (RC) designation.

In accordance with guidance SA3.4.2.1, the team defines main species as those representing more than 5% of the catch. Preliminary data showed no main by-catch species. Scientists at KamchatNIRO tabulated pollock mid-water trawl by-catch for Petropavlovsk-Commander subzone and North Kuril zone over a ten-year period. By aggregating data for both zones, by-catch data are available for the whole UoA. These by-catch data list 63 species for species of fish and invertebrates caught as by-catch in the UoA. Of these, about 15 species (Table 12) operate under a TAC and none of them exceeded 5% of the catch. Therefore, there are no Primary main species.

Table 12. Top 15 by-catch species of combined zones 63.0 Petropavlovsk-Commander subzone (61.02.2) and North-Kuril zone (61.03). Average values from 2011-2020. (KamchatNIRO, 2020).

By-catch species	% of catch	Component
Pacific cod	2,49	Primary minor
Atka mackerel	2.27	Primary minor
Commander squid	1.19	Secondary minor
Great sculpin	0.92	Secondary minor
White blotched skate	0.89	Secondary minor
Aleutian skate	0.54	Secondary minor
Armorhead sculpin	0.43	Secondary minor
Okhotsk skate	0.43	Secondary minor
Kamchatka flounder	0.40	Primary minor
Northern rock sole	0.37	Primary minor
Flathead sole	0.35	Primary minor
Pacific halibut	0.34	Primary minor
Yellow Irish lord	0.32	Secondary minor
Rock greenling	0.30	Secondary minor
Pacific Ocean perch	0.29	Primary minor

Primary minor spesies.

Available information listed 63 by-catch species that included 14 species with TACs in the UoA. They represent Primary minor species with catches less than 5% of the UoA catch. Primary minor species with significant percentages of the catch include:

- Pacific cod *(Gadus macrocephalus*). 2.49 %;
- Atka mackerel (*Pleurogrammus monopterygius*). 2.27 %;
- Kamchatka flounder *(Atheresthes evermanni)*. 0.40 %;
- Northern rock sole (*Lepidopsetta polyxystra).* 0.37 %;
- Flathead sole (*Hippoglossoides elassodon)*. 0.35 %;
- Pacific halibut (*Hippoglossus stenolepis)*. 0.34 %;
- Pacific Ocean perch (*Sebastes alutus)*. 0.29 %.

Of these, the team evaluated the status of five species as elements to score the fishery. They include Pacific cod, Atka mackerel, Pacific halibut, Northern rock sole, and Pacific Ocean perch. Three of these species exceed target reference points and two of them exceed limit reference points.

Pacific cod (*Gadus macrocephalus*)**.**

Cod stocks in the Petropavlovsk-Commander subzone have been stable with biomass fluctuating around the target reference point. In the North Kuril zone, spawning biomass is higher than the target reference point (Figures 22 and 23).

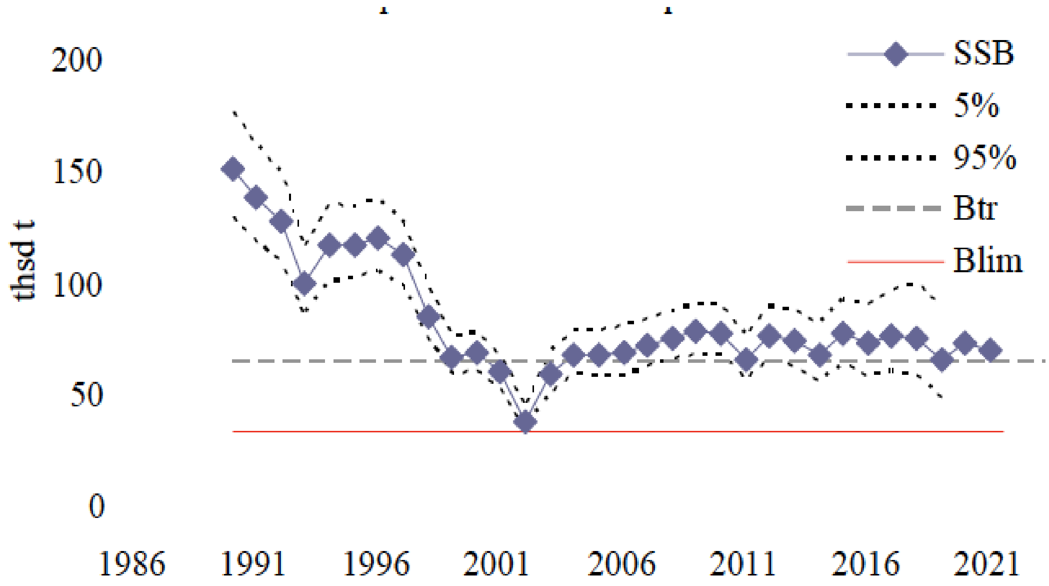

Figure 22. Recent spawning stock biomass (SSB) of Pacific cod relative to reference points. (Sources: KamchatNIRO, 2020; Ilyin et al., 2014, 2016).

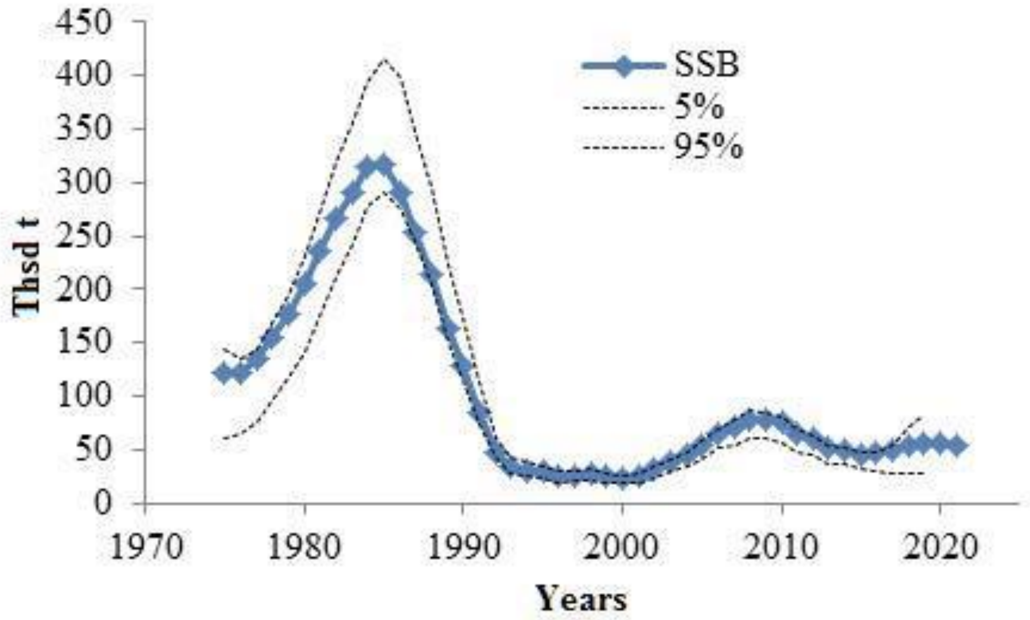

Figure 23. Historical trends in spawning stock biomass (SSB) of Pacific cod. (Sources: KamchatNIRO, 2020; Ilyin et al., 2014, 2016).

Atka mackerel (*Pleurogrammus monopterygius*).

Scientists consider Atka mackerel of the Eastern Kamchatka and Kuril Islands as a single population (Zolotov et al., 2015). KamchatNIRO conducts Atka mackerel stock assessments using the Synthesis model. It assesses stocks for the whole North Kuril-East Kamchatka population and managers use results to assign TACs to four fishing areas: Karaginskiy and Petropavlovsk-Commander subzones and North Kuril and South Kuril zones. The Synthesis model has been used since 2017. It provides limit and target reference points for spawning stock biomass (SSB) and fishing mortality (F). According to 2019 model estimates, the total Atka mackerel population between 3–13 years amounted to 208.4 thousand tons and spawning stock stood at 146.8 thousand tons. These amounts are lower than the target reference point but significantly higher than the limit one (Figures 24 and 25).

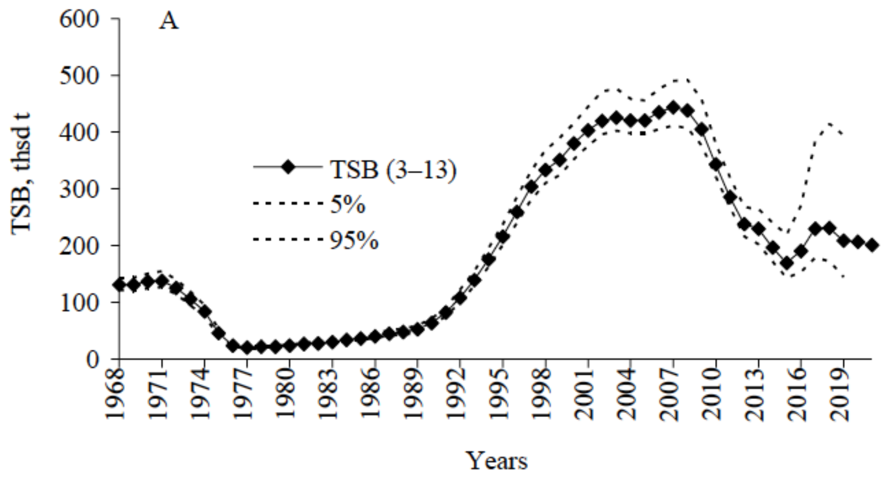

Figure 24. Total Atka mackerel biomass of the North Kuril-East Kamchatka population. (Sources: KamchatNIRO, 2020; Synthesis model; Babayan, 2000).

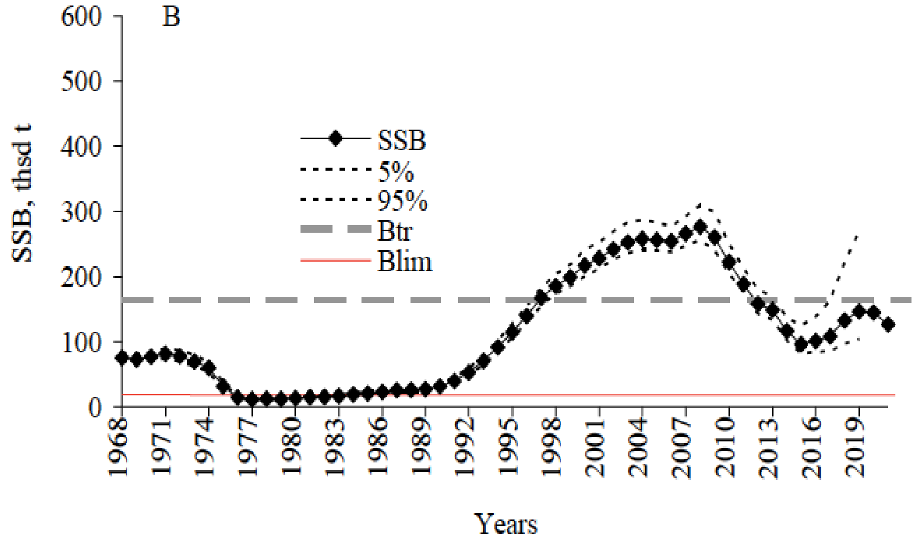

Figure 25. Spawning Atka mackerel biomass of the North Kuril-East Kamchatka population. (Sources: KamchatNIRO, 2020; Synthesis model; Babayan, 2000).

Northern rock sole (*Lepidopsetta polyxystra*).

Scientists estimate sole resources in the UoA as two separate stocks (Zolotov et al., 2012). In Petropavlovsk-Commander subzone, KamchatNIRO scientists use the Synthesis model to estimate 2021 sole stocks at around 68.1 thousand tons and spawning stock at about 45.9 tons (Figure 26). In the North Kurils, SakhNIRO researchers use VPA models to estimate 2021 fishable stock biomass at about 28.3 thousand tons and spawning stock biomass at 21.1 thousand tons (Figure 27). The latter value is slightly lower than the target reference point but significantly higher than the limit one.

Pacific halibut (*Hippoglossus stenolepis*).

In the Petropavlovsk-Commander subzone, managers conduct Pacific halibut stock assessments using production models combined with Data Limited Methods (DLM) to set TACs. According to the results of bottom trawl surveys of standard fishing grounds in 2019, the main aggregations of Pacific halibut occur in Kronotsky Gulf. The total abundance of biomass in three reference fishing grounds was lower relative to 2018, but higher than in all other years. These analyses indicate a stable stock with no expected changes in the next two years. In the North Kuril zone scientists conduct stock assessment based on Schaefer production models using data collected from Japanese trawlers, bottom trawl surveys and catch data from DVRs. The harvest control rule is based on target and limit reference points for biomass and target reference point for fishing mortality. Current Pacific halibut biomass currently exceeds the target reference point and is expected to remain at the same level over the next two years (KamchatNIRO, 2020; Babayan et al., 2018).

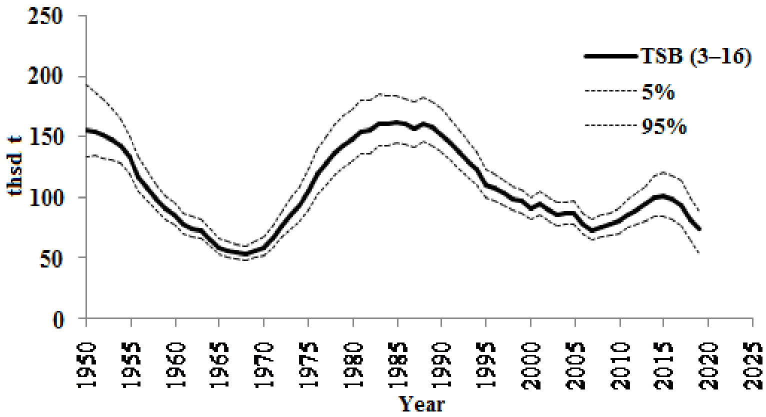

Figure 26. Total Northern rock sole biomass in Petropavlovsk-Commander zone. (Sources: KamchatNIRO, 2020; Synthesis model).

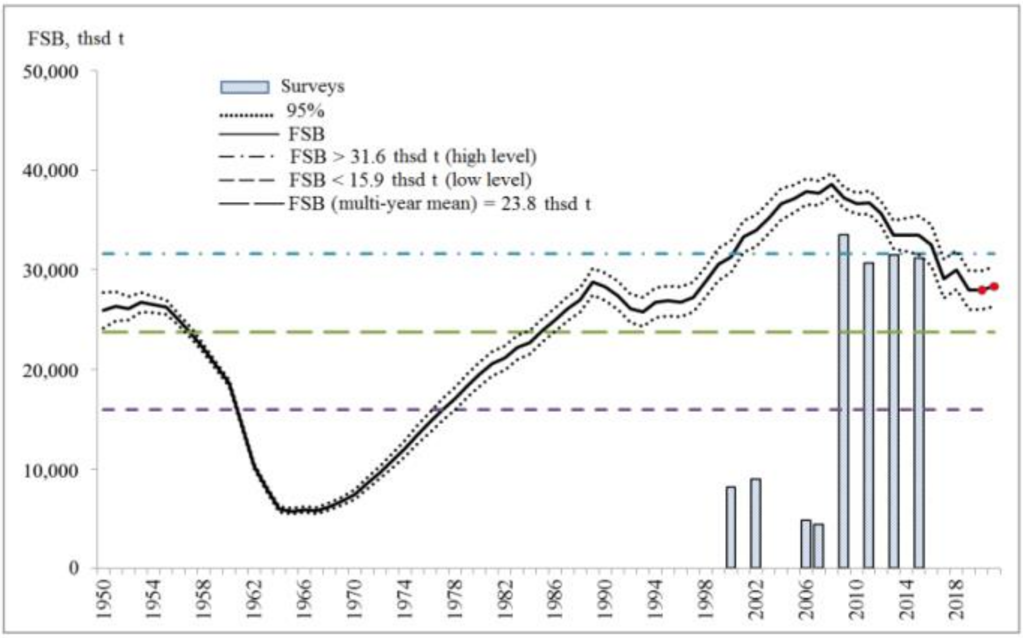

Figure 27. Multi-year dynamics of fishable stock biomass for Northern rock sole of the northern Kurils and southeast of Kamchatka by the VPA results. (Sources: KamchatNIRO, 2020; VPA model; Darby, Flatman, 1994).

Pacific Ocean perch (*Sebastes alutus*).

Scientists assess ocean perch stocks separately in each zone of the UoA and assume them to be independent stock units in the Eastern Kamchatka trawl fishery. In Petropavlovsk-Commander subzone scientists use the DLM-tool to estimate ocean perch biomass. But there is inadequate information on the current status of ocean perch stocks and managers have not set biological reference points. By the early 2021 scientists assume the total ocean perch biomass to be similar to the levels of 2008 and 2010, i.e. no more than 3.9 thousand tons. The harvest control rule is based on target and limit reference points for biomass and a target reference point for fishing mortality. Scientists currently estimate North Kuril biomass at levels higher than the target reference point; at about 11.4 thousand tons. They expect no significant changes in the stock sizes in the next two years. Since the fishery sets reference points in one zone, the team designates them as primary species (KamchatNIRO, 2020; Pella, Tomlinson, 1969).

7.1.2 Secondary species

In the first half of the year pollock trawlers in the Petropavlovsk-Commander subzone caught and recorded 40 fish species and 4 species of invertebrates. In the North Kurils, pollock trawlers caught 42 fish species and 1 invertebrate species – Commander squid (KamchatNIRO, 2020; Babayan et al., 2018, 2000; Terentyev, et al., 2019; Varkentin et al., 2019). Many of these species represent secondary minor species; those without TACs or reference points making up less than 5% of the catch. They include various rays, sculpins, greenlings, soles, crabs and Commander squid. Only a few exceed 0.3 % of the average catch:

- Commander squid (*Berryteuthis magister)* – 1.19%;
- Great sculpin *(Myoxocephalus polyacanthocephalus)* – 0.92%;
- White blotched skate *(Bathyraja maculata)* – 0.89 %;
- Aleutian skate (*Bathyraja aleutica)* – 0.54%;
- Armorhead sculpin (*Gymnocanthus galeatus)* – 0,43%;
- Okhotsk skate (*Bathyraja violacea)* – 0,43%;
- Yellow Irish lord (*Hemilepidotus jordani)* – 0.32%;
- Rock greenling (*Hexagrammos lagocephalus*) – 0.30%.

As secondary species, they do not have rigorous stock assessments, TACs, or reference points. Rather, they are managed under a Recommended (Possible) Catch (RC) designation. In some cases, scientists estimate stock size for RC managed species. For example, TINRO researchers estimate North Kuril Commander squid stocks at 209.9 thousand tons on average from 2001-2017 and Petropavlovsk-Commander Commander squid stocks were between 20-30 for the same period. And they expect no significant changes in the next two years.

Secondary main species would also include non-ETP seabirds interacting with the fishery. These include Lysan Albatross, Common Murre, Northern Fulmar and Pelagic Commorant recorded in the West Bering Sea ACDR. According to research findings and observer data the trawl fishery has a small impact on non-ETP seabirds such as ducks, loons, cormorants, larids, guillemots, gulls and kittiwakes. A seabird study in the Sea of Okhotsk recorded no seabird mortalities during the 2020 study period compared to higher mortalities in 2015 The study describes seabird mortalities resulting from interactions with trawling gear cables often at night when birds cannot see warp and depth finder cables off the stern. It notes that direct lethal contacts of birds with fishing gear in winter pollock fisheries are rare, sporadic in time and greatly depend on location of fishing areas. It concludes that low mortality levels cannot have any significant adverse impact on fulmar stock condition (Artyukin, 2020).

7.1.3 ETP species

ETP species listed in the Pacific waters of Kamchatka and northern Kuril Islands include 19 bird species and 15 marine mammal species. ETP listings include those from the IUCN Red List, Red Book of the Russian Federation, Red Book of Kamchatka and Sakhalin regions, Appendix I of CITES and the Appendices of bilateral agreements concluded by Russia with the USA and Japan on protection of migrating birds. According observations of marine bird and mammal by-catch performed in 2018–2020 KamchatNIRO staff, there were no cases of ETP species by catch by pollock trawlers in the Pacific waters of Kamchatka and northern Kuril Islands. However, the trawl fishery overlaps with populations and habitats of short-tailed albatross and Steller sea lions and may have impacts to these species (KamchatNIRO, 2020).

Sea birds.

Short-tailed albatross (*Phoebastria albatrus*) is a rare bird species found around coastal waters of Western Kamchatka, the Commander Islands and Japanese island of Tori-shima (Izu), and Senkaku and Bonin (Ogasawara) islands in the East China Sea. It is listed as “Endangered with extinction” and “vulnerable” among authorities that include the IUCN Red List, Red Book of the Russian Federation, Red Book of Kamchatka and Sakhalin regions, Appendix I of CITES and the Appendices of bilateral agreements concluded by Russia with the USA and Japan on protection of migrating birds.

Prior to 1900, short-tailed albatross were common along the shores of western Kamchatka and Commander Islands plus several Japanese islands. But in the early 20th century Japanese feather collectors almost exterminated the albatross. Bird numbers have increased since about 2000 and scientists currently estimate the current abundance of short-tailed albatross as 4,200 individuals, of which 3,540 nest on Tori-shima Island. Kamchatka albatross are usually observed alone, but groups of up to 8–11 individuals may gather near fishery vessels. According to satellite data, Kamchatka albatross spend most of their time in the Kamchatka current zone. Measures to protect albatross include buffer zones around critical habitats including the 30-mile buffer zone of the SNBR “Komandorskiy”. Other measures have been implemented to reduce bird by-catch in bottom longline fisheries. According to results of observations on marine birds and mammals’ by-catch performed in 2018–2020 by employees of KamchatNIRO in the Pacific waters of Kamchatka and northern Kuril Islands during pollock trawling and Danish seine fishery, no cases of ETP species by-catch were registered (Artyukhin, 2011, 2013, 2018, 2019a, 2019b).

Marine mammals.

Northern Steller sea lions (*Eumetopias jubatus*) represent a Category 2 subspecies with decreasing abundance (Figure 28). It is listed in the IUCN Red List and the Red Books of the Russian Federation, Kamchatka and Sakhalin regions and protected under Russian law. On the Kamchatka coast, populations dropped from 8–10 thousand individuals in the late 1970s to about 700 animals in 2002. Of the three reproductive rookeries operating around 2000, only one now remains on rocks at the Cape Kozlov. According to data collected in 2006–2007, Steller sea lion abundance at Kamchatka rookeries amounted to 678 individuals, including 101 pups and in the Commander Islands 931 individuals, including 220 pups. Many other rookeries within the Sakhalin region are within SPNAs and buffer zones. Among causes for declining abundance, scientists suggest death in fishing gear, ocean pollution, prey depletion, killer whale predation, and climate change. But clear causes are not known. To protect marine mammals, Fishing Rules (Regulations) forbid fishing in less than 30 nautical miles from the Commander Islands and define 12, 6, 3 and 2 mile no fishing zones around various Kuril Islands.

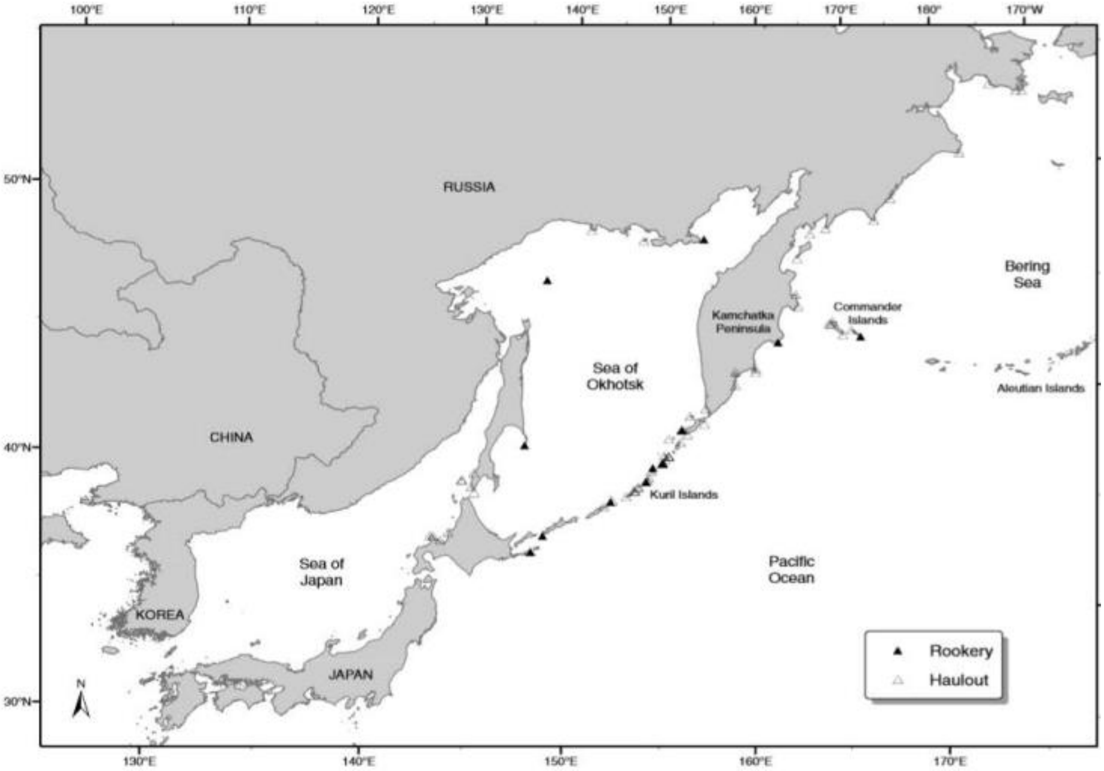

Figure 28. Permanent Steller sea lion rookeries and haulout sites along the Asian coast in 2000s. (Source: Burkanov and Loughlin, 2005).

Sea otter (*Enhydra lutris*) is a Category 3 ETP species. Over the past 10 years, there has been more than a twofold decline in the total abundance of the species in the Russian waters. Included into the IUCN Red List and the Red Books of the Russian Federation, Kamchatka and Sakhalin regions, Appendix II CITES. Protected under the law of the Russian Federation. Within Sakhalin region, sea otter is protected in the SNR “Kurilsky” and in wildlife reserves. Marine areas around some of the Kuril Islands were given the status of protected 2–12-mile zones, within limits of which any economic activities are forbidden or significantly limited. During studies the Commander Islands and Kamchatka, scientists observed a sharp range of abundance; from one hundred to several thousand individuals. In 2000s, there were about 7.5 thousand sea otters in Eastern Kamchatka. Over the past 10 years, abundance dropped to about 500 individuals in Kamchatka and 3 thousand individuals in the Commander Islands. The species' abundance is limited by the fodder base, parasitic invasions, poaching, shipping traffic intensification, water pollution, etc. However, due to their near-shore habitat, sea others are not likely to have significant interaction with the pollock trawl fishery.

According to results of observations on marine birds and mammals’ by-catch performed in 2018–2020 by employees of KamchatNIRO in the Pacific waters of Kamchatka and northern Kuril Islands during pollock trawling and Danish seine fishery, no cases of ETP species by-catch were registered (Blokhin, 2019; Burkanov et al., 2016; Kuznetsov and Mamaev, 2016; Laskina and Burkanov, 2016).

7.1.4 Habitat

Midwater trawls commonly encounter the midwater pelagic habitat. Operating with a 100 mm mesh net, trawl fishing catches larger fish, and squid but it does not affect the structure and function of the pelagic habitat; including communities of phytoplankton, zooplankton, and small pelagic fish. When operated properly, the trawl should not touch the bottom or impact the benthic environment or Vulnerable Marine Ecosystems (VMEs). Moreover, bottom trawling is not allowed and managers assume that midwater trawls do not touch the bottom. There is no available information about bottom interactions but catch records may identify VME indicator species in the trawl gear.

The Convention for the Conservation and Management of High Seas Fisheries in the North Pacific Ocean (February 24, 2012; Federal Law 45, 2014) defines VME species and groups to include the soft corals (*Alcyonacea*), antipatharians (*Antipatharia*), gorgonians (*Gorgonacea*) and some other groups of cold-water corals. Other VME indicator species include sponges (*Porifera*), sea squirts (*Ascidiacea*), moss animals (*Bryozoa*), sea pens (*Pennatulacea*), sea lilies (*Crinoidea*) and large brittle stars (*Ophiuroidea*). Of potential indicators for VME, the following taxa are found in trawl and dredge catches on the shelf of eastern Kamchatka and the northern Kuril Islands: sponges (approximately 6–7 species), large sea squirts (about 4 species, including colonial forms), sea pens (one species), approximately 8 species of actiniae and 3 relatively large species of brittle stars. Trawl surveys in 2018 and 2019 characterized VME species composition and estimated biomass in the Petropavlovsk-Commander subzone and earlier research characterized benthic species in the North Kuril zone (Kuznetsov, 1963; Koblikov and Nadtochiy, 1992; Korostelev et al., 2006; Parker, Bowden, 2010; Nadtochiy et al., 2017).

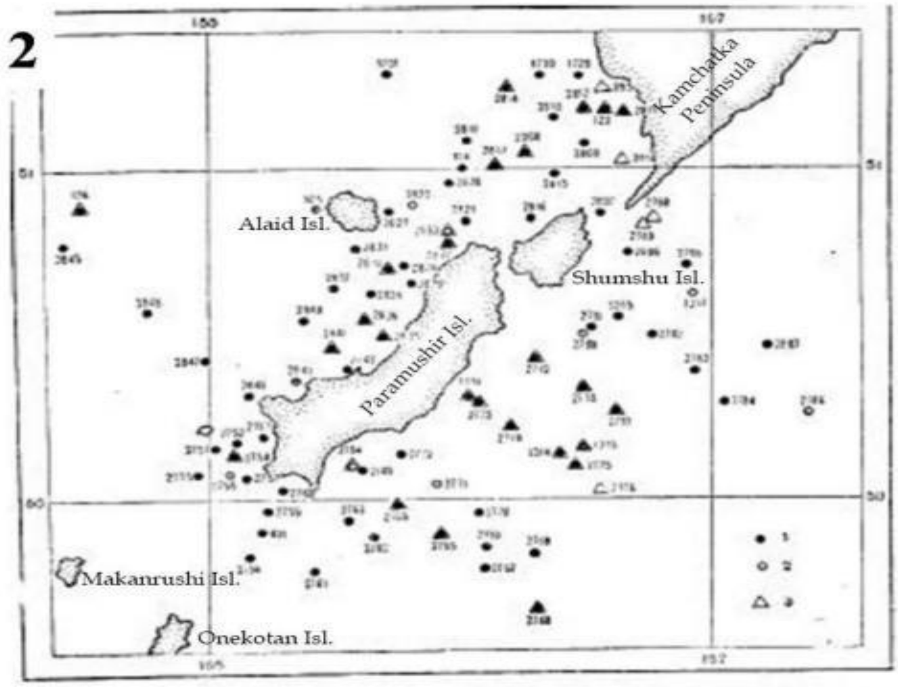

Figure 29. Map of benthic sampling stations of the research vessel Vityaz; 1950 –1955. (Source: Kuznetsov, 1963).

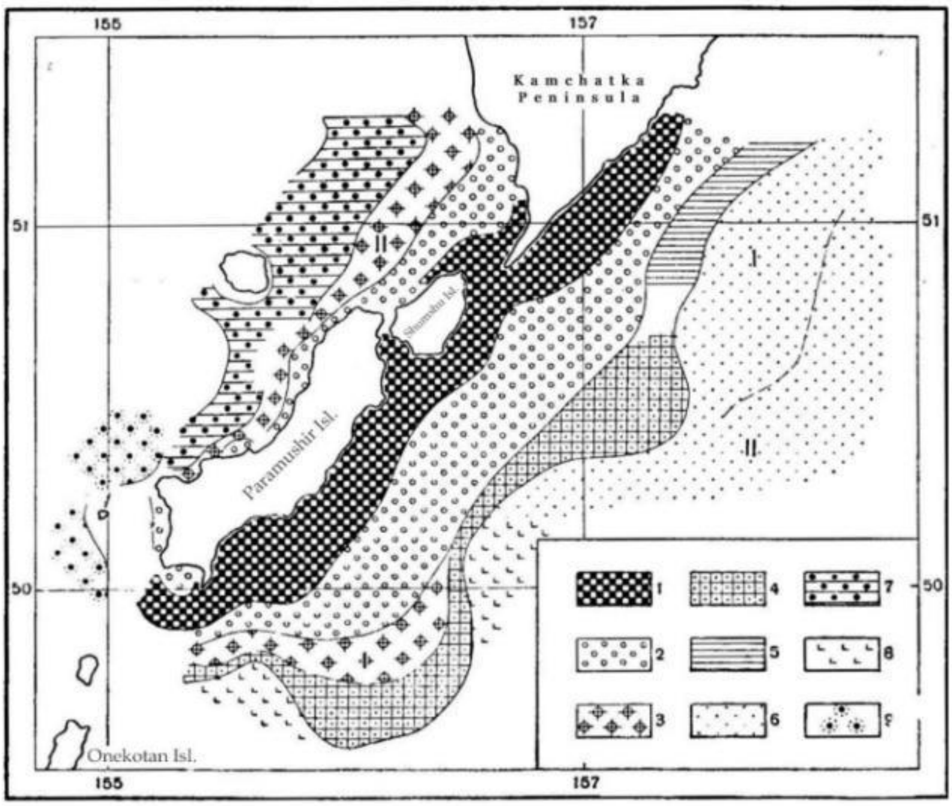

Figure 30. Map of macrobenthos communities including VME indicator species in North Kurils. (Source: Kuznetsov, 1963).

Macrobenthos and potential VME species in Figure 30 for the North Kurils include:

1 – *Modiolus modiolus* + *Mytilus edulis* + Spongia + Hydroidea; 2 – *Echinarachnius parma*; 3 – *Ophiura sarsi* (I – grouping of *Ophiura sarsi* + *Ampelisca macrocephala*, II – grouping of *Ophiura sarsi* + *Chiridota pellucida*); 4 – *Ophiopholis aculeata* + Spongia; 5 – *Cardium ciliatum*; 6 – *Ampelisca macrocephala* (I – grouping of *Ampelisca macrocephala* + *Nicomache lumbricalis*, II – grouping of *Ampelisca macrocephala* + *Byblis gaimardi*); 7 – *Brisaster latifrons*; 8 – *Pavonaria sp.* + *Asteronyx loveni*; 9 – *Artacama proboscidea* + *Ammotrypane aulogaster*.

7.1.5 Ecosystem

The Kamchatka Current dominates the Eastern Kamchatka marine ecosystem. It is cold, nutrient rich current that originates in the Bering Sea, passes through the Kamchatka Strait and moves along the coast of Kamchatka until it meets the Kurile Current (Oyashio) (Figure 31).

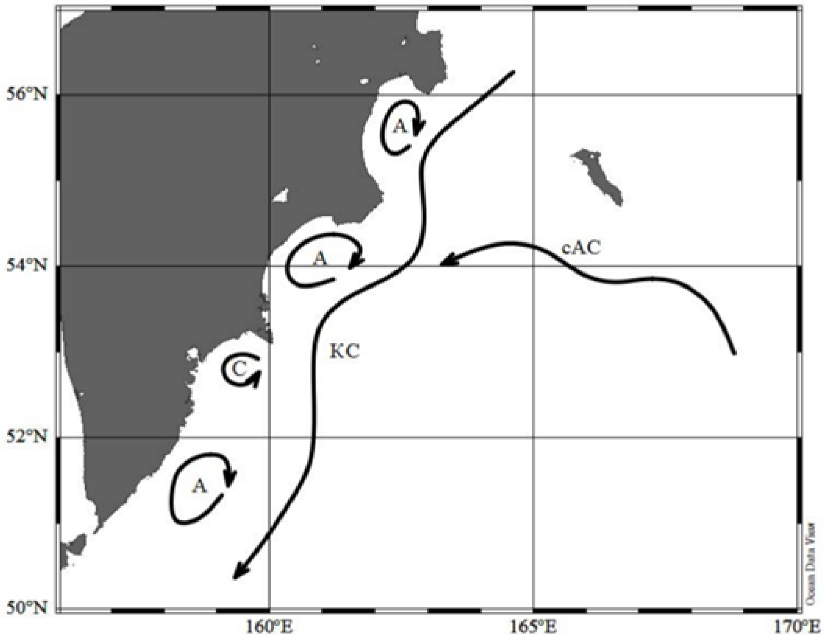

Figure 31. Generalized scheme of currents near the southeastern coast of Kamchatka: KC – the Kamchatka Current; cAC – continuation of the Alaska Current; A – anticyclonic eddies; C – cyclonic eddy (data of KamchatNIRO). (Source: KamchatNIRO, 2020).

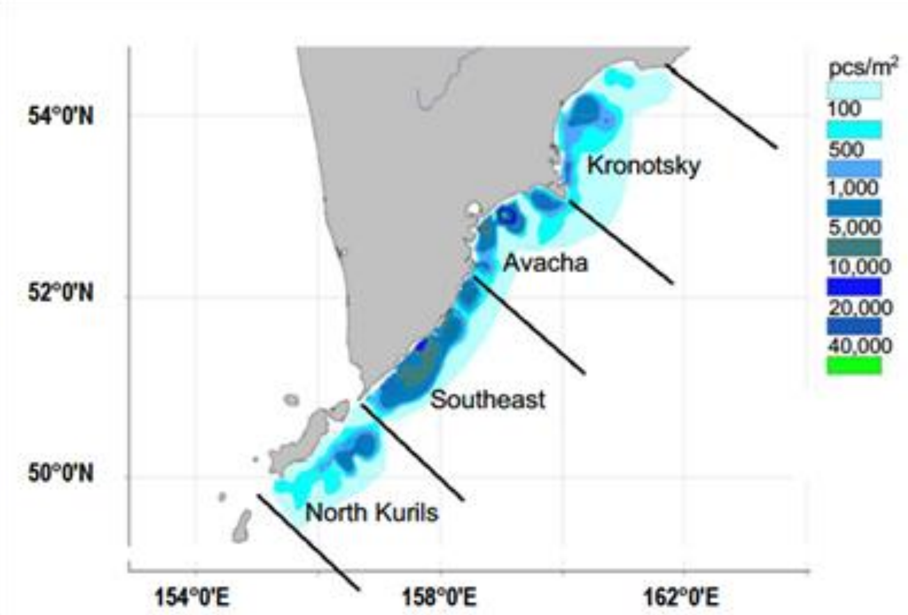

Figure 32. Pollock spawning grounds. (Source: KamchatNIRO, 2020).

Climate and ocean scale processes affect the swift, south-westward flowing Kamchatka Current. These include the Pacific Decadal Oscillation, and Arctic Oscillation, that led to regime shifts in 1976/1977 and 1988/1989. According to scientists (Ivanov, Sukhanov, 2013; Ivanov, 2016), the Pacific waters of Kamchatka and the Kuril Islands host the greatest species richness of nekton (361 species) and taxonomic diversity compared with other Far Eastern seas (Ivanov, Sukhanov, 2008, 2010, 2012, 2013). Russian scientists have studied elements of the Eastern Kamchatka ecosystem since the 1950s, well before the expansive growth of the pollock fishery. These data provide a baseline to understand ecosystem processes and measure ecosystem changes.

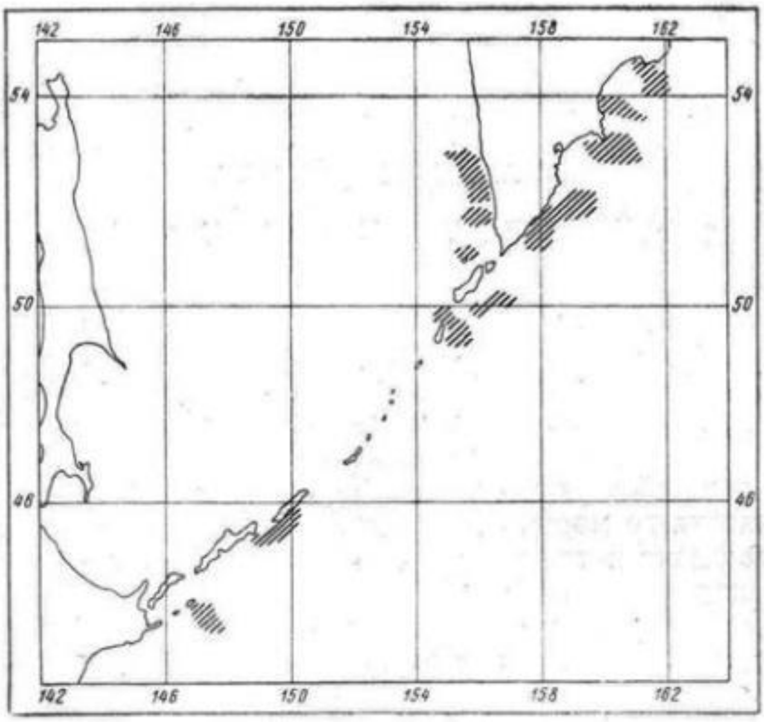

Figure 33. Distribution of phytoplankton bloom spots off eastern Kamchatka and in the near-Kuril region of the Pacific Ocean in April 1951. (Source: Ponomareva, 1956).

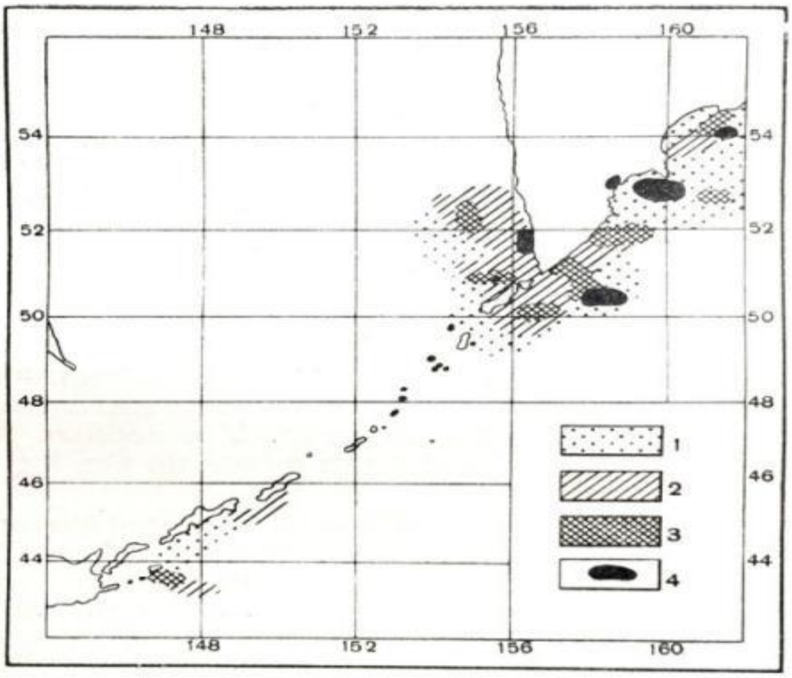

Figure 34. Mass distribution of seston (with dominance of zooplankton) in the layer of 0–100 m in April 1951: 1 – less than 0.1 g/m^3; 2 – 0.1–0.5 g/m^3; 3 – 0.5–1 g/m^3; 4 – more than 1 g/m^3. (Source: Ponomareva, 1956).

Based on long historical data, Russian scientists have also developed models to link ecosystem elements and define ecosystem processes. For example, KamchatNIRO experts measured amounts of juvenile pollock prey, or fodder, in various feeding grounds since the 1950s. Fodder includes young mollusks and polychaetes, echinoderm larvae, nauplii, two first copepodid stages of *Pseudocalanus minutus*, nauplii and three first copepodid stages of *Oithona similis* and *Microcalanus pigmaeus* (Maksimenkov, 2007, 2018a). These data provide long-term ecological indicators from several trophic levels.

Macrobenthos.

TINRO scientists have conducted macrobenthos surveys in Eastern Kamchatka and the Kurils since the 1950s. Resulting data provide a baseline of species abundance and distribution and allows scientists to track changes in the benthic environment. The mean biomass in the benthos has been stable over the last 50 years (Kuznetsov, 1963; Koblikov and Nadtochiy, 1992; Korostelev et al., 2006; Nadtochiy et al., 2017).

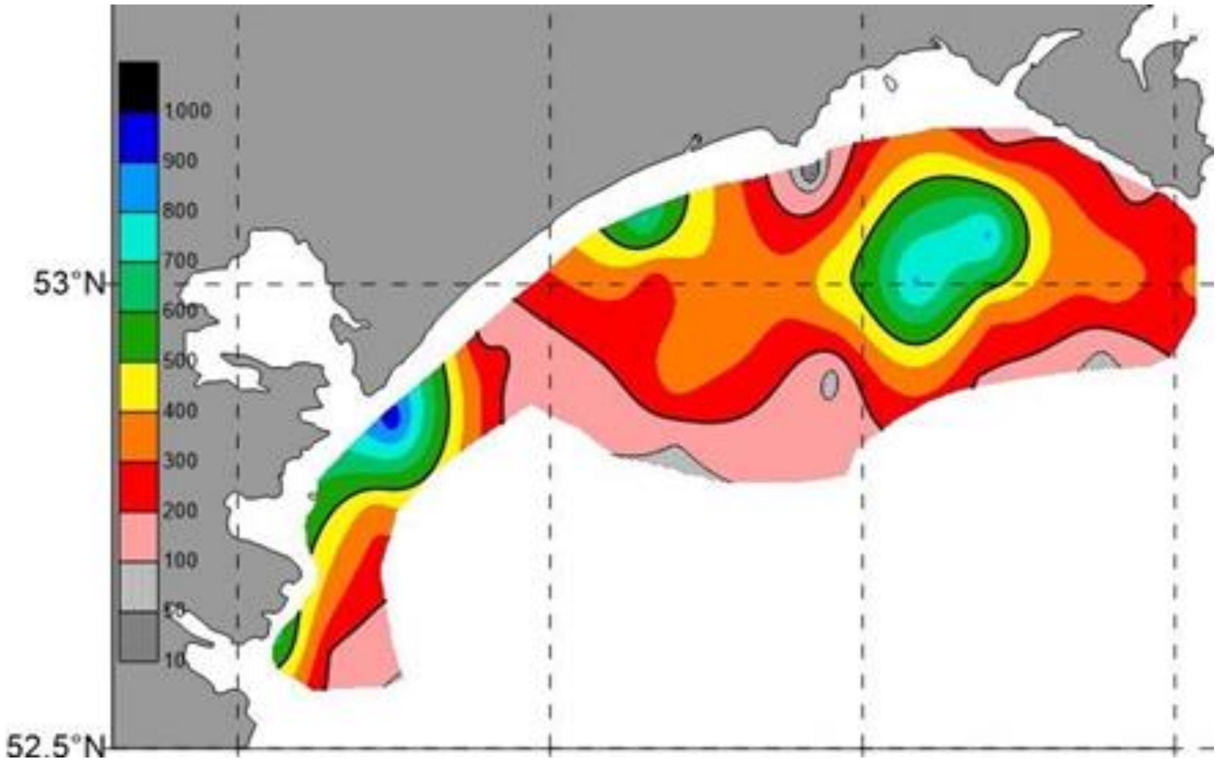

Figure 35. Distribution of the total biomass (g/m^2) of dredged macrozoobenthos from Avacha Gulf in 2009. (Source: KamchatNIRO, 2020).

Fish and nekton.

TINRO scientists have identified 361 species of marine nekton belonging to four classes that include: cephalopods (*Cephalopoda*), lampreys (*Petromyzontida*), cartilaginous and bony fishes (*Chondrichthyes* and *Actinopterygii*) (Ivanov, Sukhanov, 2013). These data come from 120 integrated TINRO expeditions conducted from 1980–2009. KamchatNIRO has performed annual ichthyoplankton spring surveys off the coast of southeastern Kamchatka to study pollock spawning patterns since 1974. These data provide historical baselines and allow researchers to measure changes in fish communities. Scientists recognize fish community changes associated with long-term climatic and oceanographic conditions (Table 13), especially Pacific and Arctic ocean oscillations rather than impacts from pollock fishing (Radchenko, 1994; Vasilenko et al., 1997; Belyaev, 2003; Shuntov, Temnykh, 2011a; Ivanov, Sukhanov, 2012, 2013; Ivanov, 2016).

Pollock represent a midlevel predator at a trophic level of about 3.3 – 3.5; slightly lower than top level IV predators such Pacific cod (*G. macrocephalus*), arrowtooth flounder (*Atheresthes stomias)* and Pacific halibut (*Hippoglossus stenolepis*). Juvenile pollock eat zooplankton and small fish while older pollock feed on other fish, including juvenile pollock. Many other species — including Steller sea lions and other marine mammals, fish, and seabirds — feed on pollock and rely on them for survival. In this trophic context, pollock transfer energy from lower trophic orders into higher ones and potentially serve as a wasp-waist species. But there is no evidence that fishing depletes pollock as predators to cause trophic cascades through lower trophic levels.

Table 13. Climatic and oceanographic changes affect fish communities and the trophic structure. (Source: Ivanov, 2016).

Region	Period	Biomass (t / km2)	Species and its percentage in the total biomass
Russian Pacific Ocean	1980–1990	31.6	Alaska pollock – 53.0% Japanese pilchard (*Sardinops sagax melanosticta)* – 36.4% Pacific chub mackerel (*Scomber japonicus)* – 8.7%
	1991–1995	1.9	Alaska pollock – 37.0% California headlightfish (*Diaphus theta)* – 9.7% Pink salmon *(Oncorhynchus gorbuscha*) – 8.4%
	1996–2009	7.5	Alaska pollock – 52.1% Pacific saury (*Cololabis saira)* – 12.5% Japanese anchovy (*Engraulis japonicus*) – 11.1%

In Eastern Bering Sea, USA scientists have developed food web modelling programs such as Ecopath with Ecosim (EwE), to examine the sensitivity and recovery time of higher trophic level groups in the eastern Chukchi Sea, eastern Bering Sea, and Gulf of Alaska. However, there is no evidence of comparable trophic models for the Eastern Kamchatka ecosystem.

7.2 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are **likely** to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI. OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	**NA**	**NA**	**No Primary main species.** **Score = 100**
Rationale				

SA3.4.2.1 Defines a main species as "*The catch of a species by the UoA comprises 5% or more by weight of the total catch of all species by the UoA.*" Based on this guidance and harmonization with other regional pollock fisheries, the team designates no Primary main 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 elements: Yes**
Rationale				

The fishery catches about 15 primary minor species. The team selected five species as elements to score the fishery:

- Pacific cod (*Gadus macrocephalus*). 2.49 %.
  Stocks exceed target reference point.
- Atka mackerel (*Pleurogrammus monopterygius*). 2.27 %.
  Lower than target reference point, but significantly higher than limit reference point.
- Pacific halibut (*Hippoglossus stenolepis*). 0.34 %.
  North Kuril stocks exceed target reference points.
- Northern rock sole (*Lepidopsetta polyxystra*). 0.37 %.
  Stocks lower than the target reference point but higher than the limit one.
- Pacific Ocean perch (*Sebastes alutus*). 0.29 %.
  North Kuril stocks exceed target reference point.

The fishery catches insignificant amounts of other Primary minor species. The status of these five elements provides evidence that Primary minor species are highly likely to be above the point of recruitment impairment (PRI) and the fishery scores SG 100.

References

- Babayan, 2000.
- Babayan et al., 2018.
- Belyaev, 2003
- Ilyin et al., 2014, 2016.
- Ivanov, 2016
- Ivanov, Sukhanov, 2012, 2013.
- KamchatNIRO, 2020.
- Radchenko, 1994.
- Shuntov, Temnykh, 2011a.
- Terentyev et al., 2019.
- Varkentin et al., 2019.
- Vasilenko et al., 1997.
- Zolotov et al., 2012, 2015.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** Information OK.

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	**Yes**	**Yes**	**No**
Rationale				

There are no primary main species so SG 80 is met. Management for minor primary species includes Fishing Rules that define gears, closed seasons, restricted areas, reporting requirements, stock assessments, reference points and TACs. As measures in a strategy, TACs and reference points can change in response to stock assessments and it is highly likely that the strategy will keep primary minor above PRI. However, there is no explicit strategy to manage pollock trawl fishery impacts on minor species. So SG 100 is not met.

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

There are no primary main species, due to low levels of by-catch. Primary minor species evaluated as P2 elements describe stable stocks significantly above target reference points. Based on this evidence SG 80 is met. There is no testing of alternative management scenarios, so SG 100 is not met.

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

Rationale

Good data, regular stock assessments, strong Fishing Rules, effective enforcement and healthy stocks provide some evidence that a partial strategy is implemented successfully. SG 80 is met. However, the team did not find clear evidence of successful management implementation due to lack of stock status data for all primary minor species. Moreover, there are some uncertainties results from data aggregation as fishing impacts and catch composition vary across zones and seasons. Oceanic and climate changes also add uncertainty to successful strategy implementation. Therefore, SG 100 is not met.

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 is no recognized shark catch in the pollock trawl fishery.

e	Review of alternative measures			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	**NA**	**NA**	**NA**
Rationale				

Scoring Issue not scored because here are no unwanted catches primary species.

References

- Fishing Rules. – 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).
- KamchatNIRO, 2020. Stock assessment and catch composition data.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need a list of primary species with a TAC and secondary species with RC designation.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.1.3 – Primary species information

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

There are no primary main species so SG 100 is met.

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?			**All elements: Yes**
Rationale				

Information describing the status of minor primary species comes from fishery independent trawls, icthyplankton surveys, scientific observers and catch reporting data. This quantitative information data provides some quantitative to assess the impact of the trawl fishery on minor primary species. So 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**	**All elements: No**

Rationale

There are no primary main species so SG 80 is met. Management measures representing a partial strategy for all primary species include Fishing Rules and TACs. Information to support these measures comes from fishery independent trawls, icthyoplankton surveys, scientific observers and catch reporting data. These quantitative data are adequate to assess the impact of the trawl fishery on primary minor species and keep them above limit reference points as defined in a partial strategy. So SG 80 is met. However, due to significant impacts of oceanic and climatic conditions on stock status, there is not a high degree of certainty that TACs achieve their objectives. Some primary species stock assessments are conducted for the entire Eastern Kamchatka ecoregion and related TACs are distributed among the two fishing zones. This TAC allocation process presents a possible mismatch between local and regional scales and introduces uncertainty about local impacts. Therefore, there is not a high degree of certainty that the strategy meets objectives for all primary stocks. SG 100 is not met.

References

- Babayan, 2000.
- Babayan et al., 2018.
- Belyaev, 2003.
- Ilyin et al., 2014, 2016.
- Ivanov, 2016.
- Ivanov, Sukhanov, 2012, 2013.
- KamchatNIRO, 2020.
- Radchenko, 1994.
- Shuntov, Temnykh, 2011a.
- Terentyev et al., 2019.
- Varkentin et al., 2019.
- Vasilenko et al., 1997.
- Zolotov et al., 2012, 2015.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need a list of all Eastern Kamchatka species with TACs and PCs.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide post	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are **considerable**, there is either **evidence of recovery** or a, **demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.
	Met?	**Yes**	**Yes**	**No**
Rationale				

There are no main secondary species among fish. However, non-ETP seabirds may be a main secondary species. SA3.7.1.2 provides guidance: “For species that are defined as ‘out of scope’ (amphibians, reptiles, birds, mammals) that are not classified as ETP, all species impacted by the UoA shall be considered ‘main.” Research studies and observer data from West Bering Sea pollock fisheries describe seabird interactions with Lysan Albatross, Common Murre, Northern Fulmar and Pelagic Commorant recorded in the West Bering Sea ACDR. The ACDR concludes that all four species are highly likely to be above biologically base limits. Based on this harmonized evidence SG 80 is met. However without seabird interaction from the Eastern Kamchatka UoA, there is not a high degree of certainty regarding seabird population status, SG 100 is not met. Need observer data listing seabird interactions and moralities related to pollock trawl fishing.

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 UoA does not hinder the recovery and rebuilding of secondary species
	Met?			**All elements: No**

Rationale

KamchatNIRO scientists listed 63 by-catch species in the mid-water pollock trawl fishery for combined fishing areas Petropavlovsk-Commander subzone (61.02.2) and North-Kuril zone (61.03). Pollock trawlers in the Petropavlovsk-Commander subzone registered 40 fish species and 4 species of invertebrates in first season catches. In the North Kurils, pollock trawlers caught as by-catch 42 fish species and 1 species of invertebrate (Commander squid). Many of these species represent Secondary minor species; those without TACs or reference points, making up less than 5% of the catch. They include various rays, squid, sculpins, greenlings, flatfish or soles, and crabs.

Only a few exceed 0.3% of the time-averaged catch:

- Commander squid (*Berryteuthis magister)*. 1.19%;
- Great sculpin *(Myoxocephalus polyacanthocephalus).* 0.92%;
- White blotched skate *(Bathyraja maculata)*. 0.89 %;
- Aleutian skate (*Bathyraja aleutica)*. 0.54%;
- Armorhead sculpin (*Gymnocanthus galeatus).* 0,43%;
- Okhotsk skate (*Bathyraja violacea)*. 0,43%;
- Yellow Irish lord (*Hemilepidotus jordani)*. 0.32%;
- Rock greenling (*Hexagrammos lagocephalus*). 0.30%.

Designated as secondary species, they do not have rigorous stock assessments, TACs, or reference points. Rather, most are managed under a Recommended (Possible) Catch (RC) designation. In some cases, scientists estimate stock size. For example, TINRO researchers estimated that North Kuril Commander squid stocks averaged 209.9 thousand tons from 2001-2017 and Petropavlovsk-Commander stocks – between 20-30 thousand tons for the same period. Scientists expect no significant changes in the next two years. But without reference points, there is not enough information to determine stock status as highly likely to be above biologically based limits. There is a similar lack of information for most secondary minor species. SG 100 is not met.

References

- Artyukhin, 2020.
- Babayan, 2000.
- Babayan et al., 2018.
- Belyaev, 2003.
- Ilyin et al., 2014, 2016.
- Ivanov, 2016.
- Ivanov, Sukhanov, 2012, 2013.
- KamchatNIRO, 2020.
- Radchenko, 1994.
- Shuntov, Temnykh, 2011a.
- Terentyev et al., 2019.
- Varkentin et al., 2019.
- Vasilenko et al., 1997.
- Zolotov et al., 2012, 2015.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information**

	sufficient to score PI *Need more complete observer data; especially about non-ETP seabird interactions / mortalities.* *Need more information about secondary minor species: stock status, monitoring and clarification about RC catch rules.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	**Fish: Yes** **Seabirds: Yes**	**Fish: Yes** **Seabirds: No**	**Fish: No** **Seabirds: No**
Rationale				

There are no main secondary fish species. The fishery likely interacts with non-ETP seabirds, but the team collected no data about the magnitude and scale of seabird interactions with the UoA. Scientists (Artyukhin, 2020) recommended measures to reduce seabird interactions and Fishing Rules require DVRs to record such interactions. So SG 60 is met. However there is no partial strategy to maintain seabird populations. So SG 80 is not met.

Management agencies designate Recommended Catch (RC) status for most minor secondary fish species and estimate biomass for a few. But these measures do not represent a comprehensive strategy for managing minor secondary species and there is not enough information to determine stock status relative to biologically based limits. Moreover, the measures do not account for by-catch species that are discarded. Therefore, SG 100 is not met for fish.

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				

Secondary by-catch species are managed under a partial strategy that includes Fishing Rules which designate closed fishing zones and seasons, restrict bottom fishing, set by-catch limits, establish move on rules and require daily vessel reports to record catch. Most stocks fluctuate with climactic and oceanic conditions and it is difficult to distinguish the effectiveness of the management strategy relative to larger environmental shifts. After poor environmental conditions led to declines, stocks recovered on their own, without the need for additional management measures, when conditions improved. The available information on the secondary species catch and biomass trends provides some confidence that the measures are likely to work and there is no evidence of significant declines. So SG 80 is met. But there is no testing to support high confidence that the partial strategy will work in changing ocean conditions. Therefore, SG 100 is not met.

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

Rationale

Evidence of successful partial strategy implementation includes biomass data and catch statistics that show stable populations and short term (two year) projections. SG 80 is met.

But there is not clear evidence that the strategy is meeting its objectives to keep stocks above limit levels; especially relative to large scale ocean and climate processes. SG 100 is not met. Need non-ETP seabird mortality data; summary of observer data.

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

NA. No score.

e	Review of alternative measures to minimise mortality of unwanted catch			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	**Yes**	**No**	**No**

Rationale

There are no secondary main fish species; but unwanted catch of non-ETP seabirds represents secondary main species. Measures have been reviewd to minimize seabird interactions (Artyukhin, 2020), so SG 60 is met. But there is no regular review, so SG 80 is not met. Catch composition data shows insignificant amounts of secondary minor species. But there is not a biennial review to minimize secondary minor species mortality from trawl fishing; probably because is not an important management concern. So SG 100 is not met.

References

- Artyukhin, 2020.
- Babayan, 2000.
- Babayan et al., 2018.
- KamchatNIRO, 2020.
- Terentyev et al., 2019.
- Varkentin et al., 2019.

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

Draft scoring range	**60-79**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need summary of observer data showing interactions / mortalities of seabirds.* *Need more information about how management agencies designate Recommended Catch (RC) status. Do RC stocks have biomass estimates? Or special fishing or reporting rules? Are there estimates of discard rates?*

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

Overall Performance Indicator score	
Condition number (if relevant)	**2**

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a		Information adequacy for assessment of impacts on main secondary species		
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	**Yes**	**No**	**No**
Rationale				

There are no main secondary fish species. However, team reviewed no data regarding non-ETP seabird interaction data to assess the impact of the UoA of their status. Based on harmonized findings from the West Bering Sea, UoA seabird interactions likely involve Lysan Albatross, Common Murre, Northern Fulmar and Pelagic Commorant. However, without seabird interaction data SG 80 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?			**Commander squid: Yes** **Other elements: No**
Rationale				

Fishery dependent catch data and fishery independent survey data provide some quantitative data to assess the impact of the midwater trawl fishery on minor secondary species. For some of these species, such as commander squid, managers conduct data limited stock assessments but do not set TACs or establish limit and target reference points. However, these data are not adequate to address the impact of the trawl fishery for all minor secondary species. So SG 100 is not met.

c		Information adequacy for management strategy		
	Guide	Information is adequate to support **measures** to manage	Information is adequate to support a **partial strategy** to	Information is adequate to support a **strategy** to manage

	post	**main** secondary species.	manage **main** secondary species.	**all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	**Yes**	**No**	**No**

Rationale

There are no secondary main fish species. But non-ETP seabirds represent main secondary species. Harmonized information from nearby UoAs supportmeasures to manage seabird interactions, so SG 60 is met. But without seabird interaction data specifically from the Eastern Kamchatka UoA, SG 80 is not met.

For secondary minor fish species, managers use both fishery-dependent catch data and fishery-independent surveys to support a partial strategy. Managers allow non-TAC species to be harvested under a Recommended Catch (RC) designation. But without biomass estimates relative to reference points, information is not adequate to evaluate the management strategy with a high degree of certainty. So SG 100 is not met for fish.

References

- Artyukhin, 2020.
- Babayan, 2000.
- Babayan et al., 2018.
- Belyaev, 2003.
- Ilyin et al., 2014, 2016.
- Ivanov, 2016.
- Ivanov, Sukhanov, 2012, 2013.
- KamchatNIRO, 2020.
- Radchenko, 1994.
- Shuntov, Temnykh, 2011a.
- Terentyev et al., 2019.
- Varkentin et al., 2019.
- Vasilenko et al., 1997.
- Zolotov et al., 2012, 2015.

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

Draft scoring range	**60-79**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need non-ETP seabird interaction data; from observer and DVR data.* *Need more information about stocks with RC designation. What does RC designation mean? Do RC stocks have stock assessments or biomass estimates? Or other management data?*

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

Overall Performance Indicator score	
Condition number (if relevant)	**3**

PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does 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** 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** 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** are within these limits.
	Met?	**NA**	**NA**	**NA**
Rationale				

There are no national and international requirements to set limits on ETP species; therefore SIa is Not Applicable (NA).

This assumption must be verified. The team must verify any EPT species with limits set by law or treaty.

ETP listings include those from the IUCN Red List, Red Book of the Russian Federation, Red Book of Kamchatka and Sakhalin regions, Appendix I of CITES and the Appendices of bilateral agreements concluded by Russia with the USA and Japan on protection of migrating birds. Among these listings, the team did not identify national and/or international requirements that set limits for the known ETP species that interact with the fishery. However, the team will verify any ETP requirements and limits described in these listings in a site visit; especially for Short-tailed albatross and Steller sea lions. In the meantime, SIa is Not Applicable (NA).

The team assumes that other MSC fisheries know the impacts of their UoAs on ETP species. They include:

- Western Bering Sea Pollock fishery;
- Russia Sea of Okhotsk pollock fishery;
- Western Bering Sea Pacific Cod and Pacific halibut longline fishery;
- Kuril Islands Pelagic Trawl and Danish Seine Pollock fishery; and
- Vitya-Avto Danish Seine Walleye Pollock fishery.

The team will gather and review the combined effects of these MSC UoAs if we identify national or international requirements or limits.

b	Direct effects			
	Guide post	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Direct effects of the UoA 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 on ETP species.
	Met?	**Short-tailed albatross: Yes** **Steller sea lions: Yes**	**Short-tailed albatross: Yes** **Steller sea lions: Yes**	**Short-tailed albatross: No** **Steller sea lions: No**
Rationale				

Of all ETP species, Steller sea lions and short-tailed albatross face the greatest threats from mid-water trawl operations (Acoura, 2018). KamchatNIRO observers of recorded no marine bird and mammal by-catch in 2018–2020 and no cases of ETP-species by-catch were registered in the Pacific waters of Kamchatka and northern Kuril Islands from pollock trawling operations. This provides evidence to meet SG 60 criteria for both elements.

ETP sea birds. Short-tailed albatross *(Phoebastria albatrus)* is a rare species found around coastal waters of Western Kamchatka and the Commander Islands along with several Japanese islands farther south. It is listed as “Endangered with extinction” and “vulnerable” in listings that include the IUCN Red List Red Book of the Russian Federation, Red Book of Kamchatka and Sakhalin regions, Appendix I of CITES and the Appendices of bilateral agreements concluded by Russia with the USA and Japan on protection of migrating birds. Prior to 1900, short-tailed albatross were common along the shores of western Kamchatka and Commander Islands and several Japanese islands. But in the early 20th century Japanese feather collectors almost exterminated the albatross. Bird numbers have increased since about 2000 and scientists currently estimate a population of about 4,200 individuals mostly living on Japanese islands. Kamchatka albatross are usually observed alone, but groups of up to 8-11 individuals may gather near fishery vessels. According to KamchatNIRO observers, the pollock trawl fleet recorded no short-tailed albatross mortality during 2018-2020 fishing seasons. Based on these data, the team believes that trawl fishing is highly likely to not hinder albatross recovery. So SG 80 is met. But other evidence described sea bird entanglement in fish gear. So without more information about seabird interactions, the team does not have a high degree of confidence that the trawl fishery causes no significant detrimental direct impacts to short-tailed albatross. SG 100 is not met.

ETP marine mammals. Northern Steller sea lions (*Eumetopias jubatus)* represent a Category 2 subspecies with decreasing abundance. It is listed in the IUCN Red List and the Red Books of the Russian Federation, Kamchatka and Sakhalin regions and protected under Russian law. On the Kamchatka coast, populations dropped from 8–10 thousand individuals in the late 1970s to about 700 animals in 2002. Of the three reproductive rookeries operating around 2000, only one now remains on rocks at the Cape Kozlov. According to data collected in 2006–2007, Steller sea lion abundance at Kamchatka rookeries amounted to 678 individuals, including 101 pups and in the Commander Islands 931 individuals, including 220 pups. Among causes for declining abundance, scientists suggest death in fishing gear, ocean pollution, prey depletion, killer whale predation, and climate change. But clear causes are not known. Sea otters may interact with the trawl fishery; but they inhabit near shore areas not fished by trawlers.

It is known that Steller sea lions are observed in by-catch and die in fishing gears in fishery for herring, pollock, greenling and a number of other fishes (Tikhomirov, 1964; Semenov, 1990; Burkanov et al., 2017a). A recent article by S.I. Kornev (2019) is dedicated to the impact of pollock fishery in the Sea of Okhotsk on Steller sea lions. According to this author, Steller sea lion mortality rate due to accidental by-catch during the winter-spring pollock fishery in the Sea of Okhotsk in 2017 was 91 individuals, or 0.67% of the total abundance of Steller sea lions dwelling in the Russian waters. Such a low mortality rate cannot have any appreciable adverse impact on the stock condition.

To protect marine mammals, Fishing Rules forbid fishing in less than 30 nautical miles from the Commander Islands and define 12, 6, 3 and 2 mile no fishing zones around various Kuril Islands. According to KamchatNIRO observers, the pollock trawl fleet recorded no Steller sea lion catch during the 2018 – 2020 fishing seasons. Based on these data, the team concludes that direct effects of the trawl fishery are not likely to hinder recovery of Steller sea lions. So SG 80 is met. However, male sea lions have been observed to gather around fishing vessels and operations can take place close to rookeries. Moreover there are uncertainties about the causes of continuing declines in sea lion populations and the impacts of the fishing industry. As a result there is not a high degree of certainty that the trawl fishery has no direct detrimental effects on ETP species; especially for Steller sea lions. So SG 100 is not met.

c	Indirect effects			
	Guide post		Indirect effects have been considered for the UoA 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 on ETP species.
	Met?		**Short-tailed albatross: Yes** **Steller sea lions: Yes**	**Short-tailed albatross: Yes** **Steller sea lions: No**
Rationale				

Steller sea lions eat pollock and other fish and they modify fish diets based on available resources. Moreover, sea lions often gather near fishing operations to more easily catch fish. And while Steller sea lions eat pollock as part of their diet, their consumption represents a small impact on population abundance. So it is highly likely that the trawl fishery does not now create unacceptable indirect impacts to sea lions. SG 80 is met. Similarly, there is no evidence of indirect impacts to short-tailed albatross. Therefore, the fishery scores SG 80 for both ETP elements. Most declines in short-tailed albatross probably resulted from feather collectors and loss of habitat, not from entanglement in fishing gear. And there have been no reported ETP interactions in recent years. So SG 100 for is met for short-tailed albatross. Since Steller sea lions eat pollock as a major portion of their diet and may gather around fishing vessels, there is not a high degree of confidence that the trawl fishery has no significant detrimental effects. SG 100 is not met.

References

For Steller sea lions:

- Blokhin, 2019.
- Burkanov et al. 2016, 2017a.
- Kuznetsov and Mamaev, 2016.
- Laskina and Burkanov, 2016.
- Nikulin et al., 2015.
- Semenov, 1990.
- Tikhomirov, 1964.

For Short-tailed albatross:

- Artyukhin, 2011, 2013, 2018, 2019a, 2019b, 2020.
- Fishing Rules. – 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 stage

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need to verify any ETP limits in current national or international agreements. Review ETP information from other MSC-certified fisheries operating in the region.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.3.2 – ETP species management strategy

PI 2.3.2	The UoA has 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, 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's 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's 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?	**NA**	**NA**	**NA**
Rationale				

The team assumes that there are no national and international requirements to protect ETP species. Therefore, SIa is Not Applicable (NA). This assumption will be verified in the site visit.

b	Management strategy in place (alternative)			
	Guide post	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	**Yes**	**Yes**	**No**
Rationale				

ETP species listed in the Pacific waters of Kamchatka and northern Kuril Islands include 19 bird species and 15 marine mammal species. They include species listed in the IUCN Red List, Red Book of the Russian Federation, Red Books of Kamchatka and Sakhalin regions, Appendix I of CITES and the Appendices of bilateral agreements concluded by Russia with the USA and Japan on protection of migrating birds. To protect listed species, Fishing Rules prescribes various measures to manage marine mammals and seabirds. These measures include fishing gears restrictions, prohibited ETP catch, closed seasons, and buffer zones of 30 and 2-15 miles around Steller sea lion habitats and rookeries. Managers monitor the strategy through data collected from daily vessel reports (DVRs), scientific observers, and Coast Guard inspections. These data show little impact to ETP species and the strategy is highly likely to achieve national and international requirements. So SG 80 is met. In a 2020 report PCA described an "Action (measure) plan to minimize the impact of pollock trawl fishery marine mammals." However, since these measures have not yet been implemented, they do not amount to a comprehensive strategy to ensure that the pollock fishery does not hinder sea lion recovery. There is not comprehensive strategy to manage UoA impacts to short-tailed albatross. SG 100 is not met.

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?	**All elements: Yes**	**All elements: Yes**	**All elements: No**
Rationale				

There is an objective basis for confidence that the measures/strategy will work, based on limited interactions between ETP species and the midwater pollock trawl fleet. Fishing rules, closed seasons, restricted areas, and effective monitoring combined with limited ETP interactions provide objective evidence that the measures are working. So SG 80 is met. However, the team found no evidence of quantitative analysis of direct and indirect effects of pollock trawl fishing on marine mammals and seabirds, SG 100 is not met.

d	Management strategy implementation			
	Guide post		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and **is achieving its objective as set out in scoring issue (a) or (b).**
	Met?		**All elements: Yes**	**All elements: No**
Rationale				

Evidence for successful partial strategy implementation comes from regular submission of daily vessel records (DVRs), scientific observers and Coast Guard inspectors. These information sources found no mortal interactions between the pollock trawl fleet and ETP species from 2018-2020. So SG 80 is met. However, since climatic and oceanic conditions and other non-fishery factors affect ETP populations it is difficult to separate the impact of the trawl fishery from other ETP threats; such as climate change and poachers. Since Steller sea lion and other marine populations continue to decline and sea birds remain in vulnerable status, there is no clear evidence that the strategy is stabilizing or increasing ETP populations, as defined in national and international agreements.

e	Review of alternative measures to minimise 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-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-related mortality ETP species, and they are implemented, as appropriate.
	Met?	**Yes**	**Yes**	**All elements: No**
Rationale				

Regular reviews evaluate the status of the fishery and its impacts on by-catch and ETP species. However, since there has been limited interaction between the pollock trawl fishery and ETP species, there is little incentive to review alternative measures to minimize ETP mortalities, as appropriate. SG 80 is met. But SG 100 is not met since there is not a regular biennial review of alternative measures to explicitly minimize ETP mortalities from the trawl fishery. So SG 100 is not met.

References

- Fishing Rules. – 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).
- KamchatNIRO, 2020 (Eastern Kamchatka pollock report, Chapter 4).
- PCA, 2020. Development of an action plan for minimization of potential pollock trawl fishery impacts on marine mammals in the West Bering Sea and North Kuril zones and Petropavlovsk-Commander subzone

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need more information about ETP legal enforcement. Number of inspections? Violations?* *Verify other ETP species threatened by the fishery.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.3.3 – ETP species information

PI 2.3.3	Relevant information is collected to support the management of UoA 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 UoA related mortality 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 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-related impacts, mortalities and injuries and the consequences for the status** of ETP species.
	Met?	**All elements: Yes**	**All elements: Yes**	**All elements: No**
Rationale				

No reported mortalities of ETP species from 2018-2020 provides some quantitative evidence to determine the impacts of trawl fishing on Steller sea lions and sea birds. Other research studies describe impacts on seabird and marine mammals from comparable pollock fisheries. So SG 80 is met. However, to achieve a higher degree of certainty, observer data should cover a longer time period. Moreover, there is limited information about the impacts of male sea lions gathering around fishing operations and how trawl vessels may indirectly impact rookeries and breeding areas in specific areas. The team must verify any EPT species with limits set by law or treaty. Without quantitative information to assess these impacts with a high degree of certainty SG 100 is not met.

b	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	Information is adequate to support a **comprehensive strategy** to manage impacts, minimise mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.

	Met?	**Yes**	**Yes**	**All elements: No**

Rationale

Scientific observers, Coast Guard inspectors and daily vessel records provide adequate information to manage impacts on ETP species. Since the trawl fishery recorded no recent ETP mortalities, the team assumes information is adequate to manage impacts. So SG 80 is met. However, some information may be missing concerning indirect interactions, such as the impacts of Steller sea lions and seabirds gathering around fishing vessels or of sea lion diets that depend on pollock. And it is difficult to distinguish oceanic and climatic impacts from explicit impacts from the fishery. With these gaps, information is not adequate to manage all impacts and evaluate a comprehensive strategy with a high degree of certainty. So SG 100 is not met.

References

For Steller sea lions:

- Blokhin, 2019.
- Burkanov et al. 2016.
- Kuznetsov and Mamaev, 2016.
- Laskina and Burkanov, 2016.
- Nikulin et al., 2015.

For Short-tailed albatross:

- Artyukhin, 2011, 2013, 2018, 2019a, 2019b, 2020.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need more information about possible indirect impacts on Steller sea lions; such as dietary changes, feeding behavior around fishing vessels, and likely sources of mortality. Need latest abundance and distribution estimates for short-tailed albatross. Any other important ETP species besides Steller sea lions and albatross?*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.4.1 – Habitats outcome

PI 2.4.1	The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
Scoring Issue	SG 60	SG 80	SG 100
a	**Commonly encountered habitat status**		
Guide post	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
Met?	**Yes**	**Yes**	**Yes**
Rationale			

The midwater trawl fishery is directed at the pelagic component of the ecosystem; this is the commonly encountered habitat. Vessels trawl in midwater depths with a 100 mm mesh net that mimimizes impacts to small fish. Fishing Rules do not allow bottom fishing, define protected zones around critical habitats and set closed seasons. So SG 80 is met. The long-term biological stability of the pelagic ecosystem provides evidence that trawl fishing does not reduce its structure and function. So SG 100 is 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 harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
Met?	**Yes**	**Yes**	**No**
Rationale			

Midwater trawl gear may interact with the bottom, but this is unlikely. Midwater gear uses technical processes that require a range of sophisticated technologies such as the latest echo-sounding equipment and calculated gear position in the water column. The prohibitive cost of fouling or damaging midwater gear makes it highly unlikely that operators would allow their gear to contact the seabed. Russian scientists have mapped benthic substrate and benthos since the 1950s. Moreover, scientists identified VME indicator species and they do not appear in by-catch records. Based on this evidence, the fishery is therefore highly unlikely to reduce VME structure or function to the point of serious or irreversible harm to the benthic habitat. SG 80 is met.

Although midwater gear can touch the seabed, it is unlikely to happen. Nonetheless it cannot be stated with 100% certainly that midwater gear does not impact VME habitat. Moreover, there is not adequate information to map and characterize VMEs and monitor their status. Without better bathymetric data to identify and characterize VMEs areas, there is not enough evidence to conclude no serious harm to VMEs from mid-water trawl fishing. So SG 100 is not met.

c	**Minor habitat status**		
Guide post			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a

				point where there would be serious or irreversible harm.
	Met?			**Yes**

Rationale

Minor habitats refer to all benthic habitats outside of VME areas. Managers assume that midwater trawls do not touch the bottom, but it may happen. Nonetheless long-term bottom trawl survey data of macrobenthos and substrates provide some evidence that the trawl fishery is highly unlikely to reduce structure and function of benthic habitats. So SG 100 is met.

References

- Ivanov, Sukhanov, 2008, 2010, 2012, 2013.
- Nadtochiy et al., 2017.
- Parker, Bowden, 2010.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Need maps of VMEs; bathymetry.*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does 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 on habitats.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Measures representing a partial strategy make it highly unlikely that the pollock trawl fishery disrupts habitat structure and function. Fishing Rules restrict bottom fishing, define closed seasons, and set buffer zones around marine mammal habitats. Other fishery measures set a 2% by-catch limits and define related move on rules. Vessel captains must keep records of by-catch and submit Daily Vessel Reports (DVRs) daily. By maintaining a stable community structure, Fishing Rules indirectly support habitat functions related to spawning, rearing, and feeding behaviors. These measures represent a partial strategy and the fishery meets SG 80. The no bottom fishing rule limits impacts on the benthic environment and under normal operation the mid-water pelagic trawl should not touch the bottom. Although unlikely, midwater trawl gear may interact with demersal and benthic habitats. Managers assume that midwater trawls do not interact with the benthic environment, but there is no explicit means to measure the effectiveness of this measure. Therefore SG 100 is not met.

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

The switch from bottom to midwater gear in the fishery in the 1990s was a significant development that effectively mitigated trawl gear impacts to the benthic habitat. No (or low) VME species recorded in by-catch provide some evidence that the strategy is working. Other evidence comes from long-term benthic and ecosystem research that shows stable habitat structure and function over the history of pollock fishing. SG 80 is met. There are no records of midwater gear interactions with benthic environments and there is limited mapping and long-term monitoring of VME habitats. Without more information about VMEs and tests to determine the impacts and frequencies of trawl gear interactions with the benthic environment, SG 100 is not met.

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

	Met?		**Yes**	**No**
Rationale				

There is no evidence of trawl fisheries interacting with the benthic environment or VMEs. So SG 80 is met. There is no available information about enforcement actions to protect closed areas. Without clear evidence of no bottom interaction and a strong enforcement record SG 100 is not met.

d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guide post	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies 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 complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Data showing stable benthic communities and low levels of VME indicator species in by-catch provides some quantitative that the UoA complies with Fishing Rules and avoids VMEs and protected areas. So SG 80 is met. However, there are no records of midwater gear interactions with benthic environments or VMEs and there is limited mapping and long-term monitoring of VME habitats. Without records about trawl gear interactions with the bottom and trends in VME habitats, SG 100 is not met.

References

- Fishing Rules. – 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 stage

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Any substrate and elevation maps for VMEs? Record of violations of protected areas?*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and 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?	**Pelagic: Yes** **VME: Yes**	**Pelagic: Yes** **VME: Yes**	**Pelagic: Yes** **VME: No**
Rationale				

There is an active benthic research program for Eastern Kamchatka undertaken by KamchatNIRO and other research agencies. Surveys provide baselines and describe habitat and ecosystem data since the 1950s. Historical data include information about substrate, benthos, zooplankton, invertebrates, fish, marine mammals and other species. Ecological studies about community structure and trophic relationships help evaluate related habitat stability and change. Benthic surveys identified species associated with potential VMEs. The distribution of habitat types in Eastern Kamchatka are known and documented. Daily Vessel Reports (DVRs) help identify the scale and intensity of fishing effort that overlaps with various habitat types. The overall habitat types are therefore well understood and monitored to evaluate status and trends. As a result, managers have a good understanding of the nature, distribution and vulnerability of habitats. SG 80 is met. Available information did not explicitly map VMEs areas; only identified VME indicator species. Therefore, the distribution of VME habitats is known. SG 100 is not met for VMEs but met for pelagic habitat.

b	**Information adequacy for assessment of impacts**			
	Guide post	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. OR **If CSA is used to score PI**	Information is adequate to allow for identification of the main impacts of the UoA 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	The physical impacts of the gear on all habitats have been quantified fully.

		2.4.1 for the UoA: Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	**If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	
	Met?	**Yes**	**Yes**	**No**
Rationale				

The spatial and temporal extent of the fishery is well described and the impact on the main pelagic habitat is well-known. Managers assume limited pelagic and benthic interaction from midwater trawl gear and their impacts are expected to be minimal, if they occur at all. So SG 80 is met. But there is no information to quantify the actual impacts of possible trawl impacts on VME habitats based on substrate and bathymetry. So SG 100 is not met.

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				

As described in SI(a), KamchatNIRO conducts research to monitor status and trends of main habitats including biological, chemical and physical characteristics of the pelagic and benthic environments. Ecological studies about community structure and trophic relationships help evaluate habitat stability and changes. Benthic surveys helped to define species associated with VMEs. Scientists have collected habitat and ecosystem data since the 1950s, prior to growth of pollock fishery in the 1970s. The distribution of habitat types in Eastern Kamchatka is known and documented. Managers know the distribution of fishing effort and its overlap with habitat types. As a result, there is adequate information to detect increased risks to pelagic and benthic habitats from the pollock fishery. So SG 80 is met. However, without good and current maps of benthic habitats and VMEs, managers cannot measure change in habitat changes over time. SG 100 is not met.

References

- Danilin, 2014.
- Koblikov and Nadtochiy, 1992.
- Korostelev et al., 2006.
- Kuznetsov, 1963.
- Maksimenkov, 2007, 2018a.
- Nadtochiy et al., 2017.
- Ponomareva, 1956.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Any bathymetry maps of VMEs?*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does 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

Russian scientists have studied key elements of the Eastern Kamchatka ecosystem since the 1950s; before the expansion of the pollock fishery. As a result, they have historical data monitoring phytoplankton, zooplankton, fish and marine mammals along with physical and chemical oceanographic data. These data provide a baseline to assess ecosystem structure and function and they enable scientists to detect changes. While trophic structures and community composition have changed since the 1950s, these changes results from oceanographic and climate fluctuations rather than the impacts of pollock fishing. Notably the Pacific Decadal Oscillation and Arctic Oscillation led to regime shifts in 1976/1977 and 1988/1989.

Pollock represents a mid-level predator; it preys on zooplankton, euphasids (krill), and small fish and serves as prey for higher trophic predators such as Pacific cod, Pacific halibut, and arrowhead flounder. In this mid-level trophic role, pollock potentially serves as wasp-waisted species transferring energy up the trophic chain. But populations of zooplankton and top-level predators remain high and stable, so there is no evidence of pollock removals affecting ecosystem structure and function. Moreover, the recovery of the pollock stocks in the 2000s demonstrates ecosystem resilience. Steller sea lions feed on pollock, but there is little evidence to show adverse impacts from the pollock trawl fishery on sea lion populations.

Based on these data and related inferences, it is highly unlikely that the trawl fishery disrupts ecosystem structure and function, so SG 80 is met. However, to provide more specific evidence about ecosystem change, managers should develop and operate food web modelling programs such as Ecopath with Ecosim (EwE) to examine the sensitivity and recovery time of higher trophic level groups in Eastern Kamchatka. Without a quantitative ecological food web model, SG 100 is not met.

References

- Batishcheva, 2008.
- Belyaev, 2003.
- Ivanov, 2016.
- Ivanov, Sukhanov, 2013.
- Maksimenkov, 2018a, b.
- Ponomareva, 1956.
- Zakharkov et al., 2020.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Do KamchatNIRO scientists operate ecosystem (food web) modelling programs such as Ecopath*

	with Ecosim (EwE)?

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does 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				

There is no explicit strategy to limit fishery impacts on ecosystem function and structure. However, a range of fishery management measures protect the ecosystem. They include fishing permits and species quotas, closed seasons, and buffer zones around important Steller sea lion rookeries. These measures together constitute a partial strategy to restrain impacts on the ecosystem. Therefore, SG 80 is met. However, there is no explicit plan to address main ecosystem impacts from the trawl fishery. SG 100 is not met.

b	Management strategy evaluation			
	Guide post	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar 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				

Historical data from all ecosystem levels enable researchers to monitor trends and track progress in meeting management goals. These data along with high abundances of target, primary and secondary stocks provide some objective evidence that the partial strategy defined in SIa works to protect ecosystem structure and function. So SG 80 is met. However there is no statistical food web model to test alternative scenarios. So SG 100 is not met.

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

The Eastern Kamchatka fishery is monitored by daily catch records, scientific observers and the Coastguard. As a result of effective monitoring and enforcement, the fishery follows catch and by-catch rules, avoids critical habitats, and observes closed seasons. Successful implementation of this partial strategy meets SG 80 criteria. However, without more detailed enforcement information and a plan for climate change SG 100 is not met.

References

- Fishing Rules. – 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).
- KamchatNIRO, 2020.

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

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI** *Any plan to address climate change?*

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

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA 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				

Russian scientists at KamchatNIRO, TINRO, and SakhNIRO have researched key elements of the ecosystem since the 1950s. The background section describes studies about primary production and phytoplankton distribution, zooplankton distribution and trophic role, macrobenthos, marine mammals, sea birds and fish communities. SG 80 is met.

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

Scientists know or can infer ecosystem impacts resulting from mid-water trawl fishing. Trophic studies have described food chains and the roles of pollock as both predator and prey. For example, Steller sea lion consume pollock and depend on it as a food source; but there is no evidence of UoA pollock removals affecting sea lion stocks. Another study describes male sea lions gathering around active fishing vessels. Trophic studies investigated pollock as mid-level predators transferring energy from low trophic order species to high level predators. Long-term data and existing information about phytoplankton, icthyoplankton, zooplankton, fish communities and ocean conditions allow researchers to investigate or infer UoA impacts on the ecosystem. So SG 80 is met. But pollock trawl interactions with the ecosystem have not been explicitly investigated in detail; probably because impacts present little risk. SG 100 is not 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 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**	**No**
Rationale				

Based on 70 years of research at KamchatNIRO, TINRO, and SakhNIRO, Russian scientists confidently know the main functions of components in the ecosystem. The background section describes research about primary production and phytoplankton distribution, zooplankton distribution and its trophic role, macrobenthos, marine mammals, sea birds and fish communities. SG 80 is met. But the impacts of mid-water trawl fishing on fish communities, habitats and ETP species may not be fully understood, relative to large-scale ocean and climate changes. Moreover, there are uncertainties about local impacts to primary and secondary stocks, ETPs, and VMEs. So SG 100 is not met.

d	Information relevance			
	Guide post		Adequate information is available on the impacts of the UoA 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 UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		**Yes**	**Yes**
Rationale				

An extensive ecosystem research program combined with good fishery data allow scientists to know or infer the impacts of trawl fishing on components and of the ecosystem. So SG 100 is 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				

As described in SI(a), KamchatNIRO conducts research to monitor ecosystem status and trends; including studies at all trophic levels. Ecological studies about community structure and trophic relationships help evaluate habitat stability and changes. Benthic surveys helped to define species associated with VMEs. Scientists have collected habitat and ecosystem data since the 1950s, prior to growth of pollock fishery in the 1970s. The distribution of habitat types in Eastern Kamchatka is known and documented. Managers know the distribution of fishing effort and its overlap with habitat types. As a result, there is adequate data to enable managers to detect any increase in risk level. So SG 80 is met. However, without better understanding how ocean and climate changes impact physical, chemical and biological conditions, information is not adequate to support an ecosystem management strategy. SG 100 is not met.

References

- Batishcheva, 2008.
- Belyaev, 2003.
- Ivanov, 2016.
- Ivanov, Sukhanov, 2013.
- Maksimenkov, 2018a, b.
- Ponomareva,1956.
- Zakharkov et al., 2020.

Draft scoring range	
Information gap indicator	**More information sought / Information sufficient to score PI** *Any information about the effects of climate change on marine ecosystems?* *Does KamchatNIRO have an ecological (food web) model (like EcoPath with Ecosim)?*

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

Overall Performance Indicator score	
Condition number (if relevant)	

8 Principle 3

8.1 Principle 3 background

(Note – all hyperlinks provided in the following sections were accessed successfully in November 2020).

8.1.1 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.

8.1.2 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 TA C 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. 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 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). 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-Восточное территориальное управление Федерального агенства по рыболовству – СВТУ ФАР) (Source: http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/normativnaya-pravovaya-baza.html).

8.1.3 Rights and dispute resolution

In Russia, 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. The allocation of quotas (fishing rights) in 2008 for a 10-year period was based on the historic catch of each applicant (fishing company) while the allocation in 2019 was based on the actual possession of the fishing rights (shares of fishing quotas) for stocks regulated with TACs at the moment of reallocation (both initially allocated fishing rights and acquired fishing rights in the period from allocation in 2008 to 2019). For stocks that are not regulated with TAC but with a Recommended Catch the fishing rights are provided on annual basis as part of agreements between fishing companies and the FFA.

Currently, this system is still used given fishing rights to companies or individuals with good credit history, i.e. those, with proven long-term commitment for sustainable fishing. Moreover, in order to reduce the marginal companies in the Russian fishing sector, a minimum threshold level was also introduced for different types of gears and category of vessels. Basically, if a company was not able to reach its corresponding quota it would be obligated to merge with another company, with a quota, aiming at achieving their threshold level and therefore to maintain their fishing right and access to the fishery. If not, the company would be obligated to auction off (under supervision of the FFA) its fishing rights (on the share of the quota) to other fishing companies.

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.

Total volume of all quota types should not exceed TAC level which is annually set based on biological justifications. TAC shall be distributed by fisheries types (quotas) by Ministry of Agriculture decree on FFA suggestion taking into account recommendations made by the Industry Council for Fishing Forecasting under the FFA (for more details see section 8.1.5). Only some of quota types are applicable for Alaska (Walleye) pollock fishery.

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). Alaska (Walleye) pollock quotas allocated for fishing dependent communities of indigenous people in 2020 by fishing zone are presented in Table 14.

Table 14. Volume of Alaska (Walleye) pollock quotas allocated for fishing dependent communities in 2020, metric tons.

	Chukotka zone	Kamchatsko-Kuil subzone	West-Kamchatka subzone	Petropavlovsk-Komandor subzone	West-Bering Sea zone	Total
Fishing quotas, mt	10,00	56,90	62,00	158,18	16,55	303,63

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 8.1.4) 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). The results of the citizens’ appeals to the North-eastern TA in 2019 are shown in Table 15 (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, 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).

Table 15. 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

8.1.4 Roles and responsibilities

The roles and responsibilities of the Russian fisheries management organizations are presented below (Figure 36).

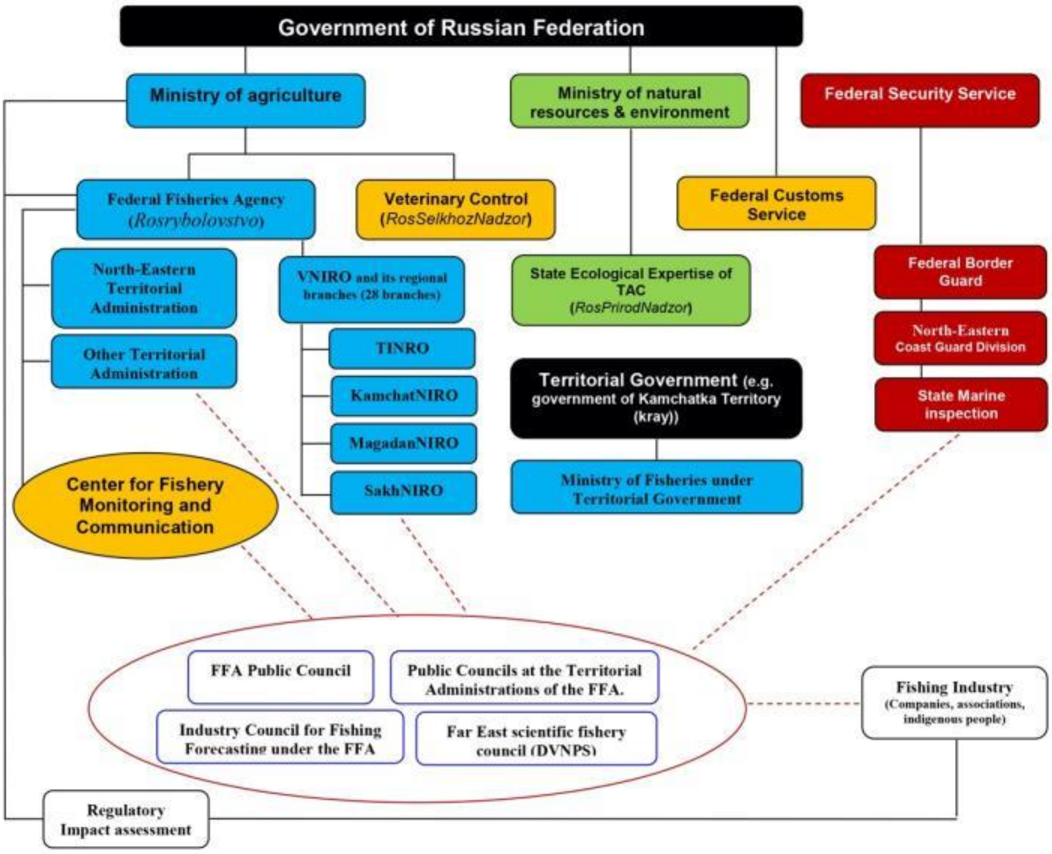

Figure 36. Structure of the fishery management system in Russia.

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 Alaska (Walleye) pollock and other Russian fishery products.

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 Alaska (Walleye) pollock fishery in the Sea of Okhotsk, KamchatNIRO is the key designer of the mathematical model for assessment and forecasting of pollock stock in the northern part of the Sea of Okhotsk. 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/).

Russian Pollock Catchers Association (PCA) (In Russian: Ассоциация Добытчиков Минтая) (the client group of the fishery under assessment http://www.pollock.ru) was established in 2006 to influence fishery policy, regulations, and economic conditions. Now it includes 30 fishing companies which control about 75% of total Alaska (Walleye) pollock catch in Russia. PCA also supports a website www.russianpollock.com providing references and scientific information about Russian pollock fisheries management and science intended for international stakeholders.

8.1.5 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). To date, five meetings of the Public Council under FFA were held during 2020. For example, the last meeting was held at FFA on 5th of November, 2020. In this meeting, the members of the Public Council discussed 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://fish.gov.ru/files/documents/otkrytoe_agentsvto/obshestvennyi_sovet/protokol_obsh_sov_5_051120.pdf). The meeting also considered 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 of main relevance for the Alaska (Walleye) pollock fisheries. This Council 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 meeting held at Vladivostok in 9th of July 2020, the members of the council discussed the following issues: 1) the results of the Okhotsk Sea fishing season in 2020; 2) the organization of the fishing season for pelagic fishing objects in 2020; 3) the export of aquatic biological resources in live form, in connection with the entry into force of the order of the Federal Service for Supervision of Natural Resources (Rosprirodnadzor) dated 30th of March, 2020 No. 338 (Source: http://fish.gov.ru/files/documents/otraslevaya_deyatelnost/organizaciya_rybolovstva/protokoly_komissij_sovetov/protokol_dvnps_090620.pdf). After hearing and discussing the information, various recommendations were provided and outlined in the minutes. For instance, the Council recommended and agreed with the proposal made by Pollock Catchers Association (PCA) on prioritizing research on the development of selective fishing gears, methods and ways to reduce the by-catch of fish with size less than commercial size (see the 5th recommendation in meeting minutes). Also to offer public fishery associations the possibility to carry out the required work in cooperation with scientific institutes subordinate to the FFA.

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 37). By June of each year, materials on the justification of the TAC or recommended catch are considered at a meeting of the Scientific Council of the VNIRO affiliates, which is responsible for organizing the relevant work and therefore these materials are submitted along with an extract from the minutes of the meeting to the central office of the VNIRO in Moscow. By August, the central office of the VNIRO examines the materials of the recommended catch received from the branches and, if any errors, incompleteness, inaccuracy, or non-compliance with the design requirements are detected, it sends comments and suggestions to the branch.

In this role, the central office of the VNIRO is entitled to request the information used in the development of the TAC or recommended catch materials available to the branch and therefore this branch should send the requested additional information, within 5 working days. By 10th October, VNIRO shall consider the materials of the recommended catch at an additional meeting of the Scientific Council.

By October 20th, based on the decision of the Scientific Council, the central office of VNIRO prepares a draft of the recommended catch volumes and sends it with an extract from the minutes of the additional meeting to the Industry Council for Fishery Forecasting at FFA (In Russian: Отраслевой совет по промысловому прогнозированию) for their consideration. The review of draft by this council should be ready before November 1st to be submitted to the FFA by November 20th. The review is also made by State Ecological Expertise (In Russian: Государственная экологическая экспертиза РФ) under the Ministry of Natural Resources and Environment. The final quotas for the fishing of aquatic biological resources are distributed by the executive authorities. The volumes and distribution of Alaska (Walleye) pollock TAC by quota types in the West Bering Sea Zone for 2019, is specified in Table 16.

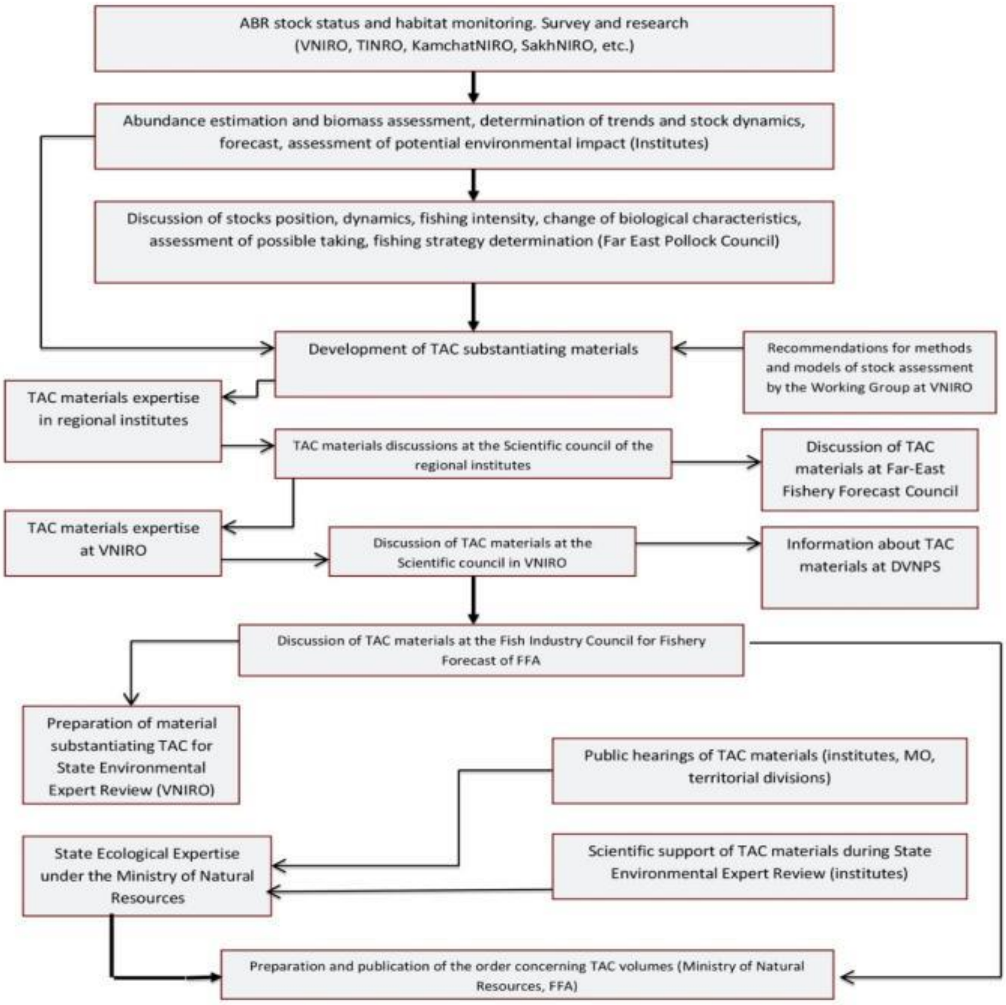

Figure 37. TAC decision-making process flow chart in the Russian Federation.

Table 16. Distribution of Alaska (Walleye) pollock TAC by quota types in the North Kuril Zone and Petropavlovsk-Kommandorsky Subzone for 2020, metric tons.

	TAC	Scientific quota	indigenous people quota	International quota	Investment quota	Industrial quota
NK zone	110800	36	-	250	3030	107484
PK subzone	89500	69,1	158	-	2447	86816

8.1.6 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 (kray)) — 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 at 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/).

8.1.7 Fisheries-Specific Management

The specific short-term (annual) objectives that tries to maintain the main target species within sustainable levels and therefore are consistent with the MSC Principles 1 are based on and specified by the annual TAC and recommended catch setting process. Quotas are reviewed annually based on surveys and clearly show an adaptive management system to current stock levels (see section 8.1.5). On the other hand, short-term objectives including management measures (e.g. gear's technical characteristics, 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 Alaska (Walleye) pollock fishery under assessment, Article 22.10. prohibits the excess of the rate of output of raw pollock roe in all types of production of fish and other products in all areas of production (catch). Article 24 prohibits the catch of certain species in certain areas using certain fishing gears. The clause (24.1.) specifies areas where and gears (including trawls) by which the fishing of pollock is prohibited. Similarly, Article 28 prohibits the catch of certain species in certain periods using certain fishing gears, in which clause (28.1.) specifies rules for pollock. Article 32.4. specifies the technical characteristics of gears to be used in commercial pollock fishery in all areas. Article 36 outlines in table 2 (of the Fishing Rules) the Minimum Landing Sizes (MLS) of different species caught in commercial fisheries in coastal areas, in which pollock MLS is set at 35 cm. Moreover, Article 38 details the percentage of allowed by-catch of less than the MLS, in which for commercial trawl pollock fishery (article 38.1.) is 20% of total catch in each trawl fishing set.

8.1.8 Monitoring, Control and Surveillance (MCS)

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.

The CFMC monitors and controls vessels activity; validates the technical control facilities (TCF) (In Russian: Технические средства контроля или ТСК / Technicheskie sredstva kontrolya or TSK) for fishing vessels providing continuous automatic transfer of information about vessels location; analyses these monitoring data to detect any violation of fisheries regulation. Satellite tracking of both Russian and foreign vessels in the EEZ takes place and also for Russian vessels fishing in other waters.

The TCF is special equipment that ensures continuous automatic transfer of a vessel's coordinates into VMS. Also, on a daily basis a daily vessel report (DVR) (In Russian: Суточные судовые донесения или ССД / Sutochnye sudovye doneseniya or SSD) about fishing activity of the vessel is prepared on the fishing vessel in a specific format and communicated via satellite. Branches of CFMC (e.g. Kamchatka office) collect, process, store and provision database with automatically transferred data about location of the Russian and foreign vessels equipped with TCF.

When the report on the vessel's position is not submitted, the branch contacts with the vessel by any means and requests to fix the TCF and request data on their position over telephone, fax or telex. If the equipment is not fixed within 48 hours the vessel should proceed to the port. This is allowed only once during the whole period of the vessel's operation. If this occurs once more, the vessel proceeds to the port for the equipment repair or replacement. According to the regulations, shutting down the TCF operation for 48 hours without getting approval leads to quota termination.

Recently, the CFMC has completed the development and testing of electronic fishing logbook tool. At the moment, this system is installed and being used on different 192 vessels of the Far Eastern basin, of which 140 vessels are engaged in Alaska (Walleye) pollock fishing in the Far Eastern basin. It is expected that electronic fishing logbook tool will be obligatory by 2021.

Beside FFA, its territorial offices and CFMC, other control and management authorities also have access to these information: Border Directorate of the Federal Security Service of Russia; sea port administrations (state port control); Fishing companies; scientific institutes.

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 Territorial FFA Department.

Being on board, the Coast Guard inspectors observe trawling operations before discarding with respect to the Fishing Rules compliance (such as gear requirements, by-catch rules for TAC and Recommended (possible) catch species, juveniles, marine mammals and seabirds interaction, bottom interaction (sea ground samples or bottom species)), proper recording of by-catch and catches. After inspection the Coast Guard inspectors fill in a special form called Catch Check Act. Foreign vessels harvesting Alaska (Walleye) pollock in the Russian EEZ within international agreements (for example, South Korean and Chinese vessels in the West Bering Sea Zone) are allowed to catch fish only having Coast Guard inspector on board.

In case of non-compliance with Fishing Rules or other regulations occur, inspector has a right to suspend a trawler from fishing, instruct it to go to the port for further investigation. Suspension depends on a gravity of violation. Furthermore fines can be imposed if there is any evidence that the gear has been in contact with the seabed (e.g. significant benthic animals in the catch). Statistics of violations detected (e.g. on pollock fishing in the Sea of Okhotsk) is regularly reported to FFA and fishing companies during weekly meetings of the coordinating group. Coast Guard Service notifies of the violations detected, carries out explanatory and preventive work, and pays attention of fishing companies to the aspects that shall be addressed to. Besides, the results of monitoring activities of pollock fishing in the Sea of Okhotsk are reported at the spring meeting of DVNPS.

In addition, among other duties, the Federal Customs Service inspects fish products landed in Russian waters and destined for export. The procedures include provision for an advance notification of port calls. Customs clearance will not be required in case of vessels leaving for fishing in the EEZ or on continental shelf without calls to any foreign port. Also, these vessels will not be subject to customs control when returning to ports with fish catches on-board destined for the domestic markets.

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).

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 17 shows the sanctions corresponding to each type of violation according to fishing regulations or rules.

Table 17. 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 documents	Administrative penalty - from 5 to 10 thousand rubles.
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.

Compliance. A compliance summary was requested by the assessment team and the client made an official request to management authorities. These data will be provided before the site visit.

News about violations and cases detected by the inspectors of the fish protection department of the North-Eastern TA of the FFA can be found at (Source: http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe; and for example http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe/31956-pokazateli-raboty-severo-vostochnogo-tu-rosrybolovstva-s-19-po-26-oktyabrya-2020-goda; http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe/31994-pokazateli-raboty-severo-vostochnogo-tu-rosrybolovstva-s-26-oktyabrya-po-02-noyabrya).

8.1.9 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) 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.

In addition, in 2017, PCA commissioned an independent external review of the Russian fisheries management system performance with the focus on the Sea of Okhotsk pollock fishery case study (Radchenko, 2017). The conclusion indicated that the fishery management system is quite effective in most of the analysed aspects, such as; management structure, enforcement system, MCS system, and supporting scientific research. He also emphasized recent changes in management like new mechanism of long-term quota allocation. Meanwhile, also recommended an improvement of catch statistical data system with an advanced development of the catch weight estimation methods. As one more potential long-term improvement, ecosystem-based fisheries management was proposed.

8.2 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.

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 meets SG 100.

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. Ф3-59 "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, the North-eastern TA (see Section 8.1.4) 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 15 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, 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, SG 80 is met, but not SG 100.

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. Alaska (Walleye) pollock quotas allocated for fishing dependent indigenous communities in 2020 by fishing zone are presented in table 14.

Therefore, this scoring issue meets SG 100 which likely to be met.

References

- Arbitration Court of Kamchatka territory (Арбитражный суд Камчатского края) (https://kamchatka.arbitr.ru/).
- 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).

- 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. N 166-ФЗ О рыболовстве и сохранении водных биологических ресурсов) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/).
- Federal Arbitration Courts of the Russian Federation (Федеральные арбитражные суды Российской Федерации) (http://www.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. N 59-ФЗ "О порядке рассмотрения обращений граждан Российской Федерации").
- 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).
- 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).
- 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).
- Submission of appeals in the Kamchatka region (Source: http://xn--b1a3aee.xn--p1ai/obrashcheniya-grazhdan/elektronnoe-obrashchenie.html).

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 8.1.4).

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 SG 80 which likely to be met. However it is difficult to guarantee that they are explicitly defined and well understood for "all" areas, so SG 100 is not met for a precautionary scoring purpose.

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. To date, five meetings of the Public Council under FFA were held during 2020. For example, the last meeting was held at FFA on 5th of November, 2020. In this meeting, the members of the Public Council discussed 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://fish.gov.ru/files/documents/otkrytoe_agentsvto/obshestvennyi_sovet/protokol_obsh_sov_5_051120.pdf). The meeting also considered 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 Alaska (Walleye) pollock 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 meeting held at Vladivostok in 9th of July 2020, the members of the council discussed the following issues: 1) the results of the Okhotsk Sea fishing season in 2020; 2) the organization of the fishing season for pelagic fishing objects in 2020; 3) the export of aquatic biological resources in live form, in connection with the entry into force of the order of the Federal Service for Supervision of Natural Resources (Rosprirodnadzor) dated 30th of March, 2020 No. 338 (Source: http://fish.gov.ru/files/documents/otraslevaya_deyatelnost/organizaciya_rybolovstva/protokoly_komissij_sovetov/protokol_dvnps_090620.pdf). After hearing and discussing the information, various recommendations were provided and outlined in the minutes. For example, the council recommended and agreed with the proposal made by Pollock Catchers Association (PCA) on prioritizing research on the development of selective fishing gears, methods and ways to reduce the by-catch of fish with size less than commercial size (see the 5th recommendation in meeting minutes). Also to offer public fishery associations the possibility to carry out the required work in cooperation with scientific institutes subordinate to the FFA.

Moreover, the TAC and recommended catch setting process is a good example for the consultation in the Russian management system (see Section 8.1.5 and Figure 37).

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 SG 80 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 SG 100 is not met.

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

Rationale

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 and the Far Eastern Basin Scientific and Fishery Council (DVNPS). Therefore SG 80 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, SG 100 cannot be fully justified and is not 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. N 166-ФЗ О рыболовстве и сохранении водных биологических ресурсов) (Source: https://legalacts.ru/doc/federalnyi-zakon-ot-20122004-n-166-fz-o/).

- Minutes of the Public Council under FFA (Общественный совет при Росрыболовстве) meeting held at FFA on 5th of November, 2020 (Source: http://fish.gov.ru/files/documents/otkrytoe_agentsvto/obshestvennyi_sovet/protokol_obsh_sov_5_051120.pdf).
- Minutes of the last meeting (held at Vladivostok in 9th of July 2020) of 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).

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 3.1.3 – Long term objectives

PI 3.1.3		The management policy 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.

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 SG 80 is met. However, such objectives are not required by management policy and hence SG 100 is not 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. N 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).

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 management system has 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-specific management system.	**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-specific management system.	**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-specific management system.
	Met?	**Yes**	**Yes**	**Partial**

Rationale

The specific short-term (annual) objectives that tries to maintain the main target species within sustainable levels and therefore are consistent with the MSC Principles 1 are based on the annual TAC and recommended catch setting process. Quotas are reviewed annually based on surveys and clearly show an adaptive management system to current stock levels (see Section 8.1.5). On the other hand, short-term objectives including effort restrictions (e.g. number of fishing permits, gear's technical characteristics, etc.) and other management measures (e.g. area closures) 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 in inland water bodies in articles 26 and 27. Similarly, periods of fishing ban for in internal sea waters, territorial seas, continental shelf and EEZ of the Russian Federation are specified in from articles 28 and 29, while in 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 Alaska (Walleye) pollock fishery under assessment, Article 22.10. prohibits the excess of the rate of output of raw pollock roe in all types of production of fish and other products in all areas of production (catch). Article 24 prohibits the catch of certain species in certain areas using certain fishing gears. The clause (24.1.) specifies areas where and gears (including trawls) by which the fishing of pollock is prohibited. Similarly, Article 28 prohibits the catch of certain species in certain periods using certain fishing gears, in which clause (28.1.) specifies rules for pollock. Article 32.4. specifies the technical characteristics of gears to be used in commercial pollock fishery in all areas. Article 36 outlines in table 2 the Minimum Landing Sizes (MLS) of different species caught in commercial fisheries in coastal areas, in which pollock MLS is set at 35 cm. Moreover, Article 38 details the percentage of allowed by-catch of less than the MLS, in which for commercial pollock fishery (article 38.1.) is 20% of total catch in each trawl fishing set.

Overall, information indicates that the SG 80 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, SG 100 is only partially met.

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 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 objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific 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 TAC-setting process includes all available information to be evaluated and reviewed by regional scientific institutes (e.g. KamchatNIRO) and at federal level VNIRO, followed by the State Ecological Expertise in Moscow and FFA (see Section 8.1.5 and Figure 37).

Overall, information indicates that the SG 80 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.

Taking into account that the decision-making processes respond to serious and other important issues, therefore SG 80 is met. However, it cannot be considered that it responds to "all" issues in timely and adaptive manner as is required for SG 100.

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 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. 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 SG 80 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 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 yet. Thus, the SG 80 is 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.

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 arise 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 8.1.4). 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 has 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 SG 60, SG 80 and SG 100.
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**

PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery 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 there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery 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 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.

In case of non-compliance with Fishing Rules or other regulations occur, inspector has a right to suspend a trawler from fishing, instruct it to go to the port for further investigation. Suspension depends on a gravity of violation. Furthermore fines can be imposed if there is any evidence that the gear has been in contact with the seabed (e.g. significant benthic animals in the catch). Statistics of violations detected (e.g. on pollock fishing in the Sea of Okhotsk) is regularly reported to FFA and fishing companies during weekly meetings of the coordinating group. Coast Guard Service notifies of the violations detected, carries out explanatory and preventive work, and pays attention of fishing companies to the aspects that shall be addressed to. Besides, the results of monitoring activities of pollock fishing in the Sea of Okhotsk are reported at the spring meeting of DVNPS.

In addition, among other duties, the Federal Customs Service inspects fish products landed in Russian waters and destined for export. The procedures include provision for an advance notification of port calls. Customs clearance will not be required in case of vessels leaving for fishing in the EEZ or on continental shelf without calls to any foreign port. Also, these vessels will not be subject to customs control when returning to ports with fish catches on-board destined for the domestic markets.

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).

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 news about violations and cases detected by the inspectors of the fish protection department of the North-eastern TA (see Section 8.1.8), therefore SG 80 is met. However, taking into account that the team doesn’t have any quantities information about MCS activity related to the Alaska (Walleye) pollock fishery or any independent information on inspections and infringements (e.g. scientific paper) or information about the magnitude of the IUU in previous years, therefore SG 100 is met.

b	Sanctions			
	Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.
	Met?	**Yes**	**Yes**	**No**

Rationale

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 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 (see Table 17).

According to the news on the FFA website, there are evidences that sanctions to deal with non-compliance exist, and are consistently applied; therefore SG 80 is met.

However, taking into account that the team doesn't have any quantitative information about enforcement activity related to the Alaska (Walleye) pollock fishery or any independent information on inspections and infringements (e.g. scientific paper) or information about the magnitude of the IUU in previous years, it cannot be concluded that sanctions provide effective deterrence, therefore SG 100 is not met.

c	Compliance			
	Guide post	Fishers are **generally thought** to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	**Yes**	**No**	**No**

Rationale

A compliance summary was requested by the Assessment Team and the client made an official request to management authorities. These data will be provided before the site visit.

News about violations and cases detected by the inspectors of the fish protection department of the North-eastern TA can be found at (Source: http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe; and for example http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe/31956-pokazateli-raboty-severo-vostochnogo-tu-rosrybolovstva-s-19-po-26-oktyabrya-2020-goda; and http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe/31994-pokazateli-raboty-severo-vostochnogo-tu-rosrybolovstva-s-26-oktyabrya-po-02-noyabrya).

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, it is generally though that fishers comply with the management regulations. However, such information is not considered enough evidence to demonstrate that fishers comply with the management system and therefore the SG 80 is not met.

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 client made an official request to management authorities. These data will be provided before the site visit.

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 SG 80 is met.

References

- "Code of the Russian Federation on Administrative Offenses" dated 30.12.2001 N 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 N 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 N 63-FZ (as amended on 31.07.2020) (In Russian: "Уголовный кодекс Российской Федерации" от 13.06.1996 N 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).
- News about violations and cases detected by the inspectors of the fish protection department of the North-eastern TA can be found at (Source: http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe; and for example http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe/31956-pokazateli-raboty-severo-vostochnogo-tu-rosrybolovstva-s-19-po-26-oktyabrya-2020-goda; and http://fish.gov.ru/territorialnye-upravleniya/severo-vostochnoe/31994-pokazateli-raboty-severo-vostochnogo-tu-rosrybolovstva-s-26-oktyabrya-po-02-noyabrya).

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): All UoAs	**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 management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific 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 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 regional scientific institutions in the Far East (e.g. KamchatNIRO) is peer reviewed by the VNIRO, and then forwarded to FFA and the federal natural resources monitoring agency Rosprirodnadzor for comments (see Section 8.1.5).

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., (2016) 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. In addition, in 2017, PCA commissioned an independent external review of the Russian fisheries management system performance with the focus on the Sea of Okhotsk pollock fishery case study (Radchenko, 2017). The conclusion indicated that the fishery management system is quite effective in most of the analysed aspects, such as; management structure, enforcement system, MCS system, and supporting scientific research. He also emphasized recent changes in management like new mechanism of long-term quota allocation. Meanwhile, also recommended an improvement of catch statistical data system with an advanced development of the catch weight estimation methods. As one more potential long-term improvement, ecosystem-based fisheries management was proposed.

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 SG 100 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 management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific 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 TAC-setting process includes the scientific reviews by regional scientific institutions in the Far East (e.g. KamchatNIRO), VNIRO, FFA and the federal natural resources monitoring agency Rosprirodnadzor. In addition to the reviews by the scientific paper and reports 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 SG 80. 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 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.

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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**

9 References

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10 Appendices

10.1 Assessment information

10.1.1 Previous assessments – delete if not applicable

The CAB shall include in the report:

- A brief summary of any previous full assessments of the client operations, noting that these are available on the MSC website.

Reference(s): FCP v2.2

The East Kamchatka Alaska (Walleye) pollock mid-water trawl Fishery has not been subjected to a previous MSC assessment (Table 18).

Table 18. Summary of previous assessment conditions

Condition	PI(s)	Year closed	Justification
Insert condition number and summary	Insert PI	State year of closure, if applicable.	

10.1.2 Small-scale fisheries

The East Kamchatka Alaska (Walleye) pollock mid-water trawl is not a small-scale fishery (Table 19).

Table 19. Small-scale fisheries.

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
1 – Alaska (Walleye) pollock (*Gadus chalcogrammus*) caught by PCA vessels in the Petropavlovsk-Commander subzone and North Kuril zone.	None	None

10.2 Evaluation processes and techniques

10.2.1 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

10.2.2 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

10.2.3 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

10.3 Peer Review reports

To be drafted at Public Comment Draft Report

The report shall include unattributed reports of the Peer Reviewers in full using the relevant templates. The report shall include 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

10.4 Stakeholder input

To be drafted at Client and Peer Review Draft Report

To be completed at Public Certification Report

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

10.5 Conditions – delete if not applicable

To be drafted from Client and Peer Review Draft Report

Table 20. Condition 1

Performance Indicator	
Score	
Justification	
Condition	State condition
Milestones	State milestones and resulting scores where applicable
Consultation on condition	Include details of any verification required to meet requirements in FCP v2.2 Section 7.19.8

Table 21. Condition 2

Performance Indicator	
Score	
Justification	
Condition	State condition
Milestones	State milestones and resulting scores where applicable
Consultation on condition	Include details of any verification required to meet requirements in FCP v2.2 Section 7.19.8

10.6 Client Action Plan

To be added from Public Comment Draft Report

The report shall include the Client Action Plan from the fishery client to address conditions.

Reference(s): FCP v2.2 Section 7.19

10.7 Surveillance

To be drafted from Client and Peer Review Draft Report

The report shall include the program for surveillance, timing of surveillance audits and a supporting rationale.

Reference(s): FCP v2.2 Section 7.28

Table 22. Fishery surveillance programme

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 23. 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 24. Surveillance level rationale

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.

10.8 Risk-Based Framework outputs – delete if not applicable

To be drafted at Client and Peer Review Draft Report stage

10.8.1 Consequence Analysis (CA)

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 25. 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			

10.8.2 Productivity Susceptibility Analysis (PSA)

The report shall include 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 26. PSA productivity 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 27. Species grouped by similar taxonomies (if FCP v.2.2 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

10.8.3 Consequence Spatial Analysis (CSA)

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 28. CSA rationale 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

10.8.4 Scale Intensity Consequence Analysis (SICA)

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 29. 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					

10.9 Harmonised fishery assessments

To be completed at Public Certification Report stage

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 team identifies five fisheries to consider for harmonization:

- Western Bering Sea Pollock fishery;
- Russia Sea of Okhotsk pollock fishery;
- Western Bering Sea Pacific Cod and Pacific halibut longline fishery;
- Kuril Islands Pelagic Trawl and Danish Seine Pollock fishery; and
- Vityaz-Avto Danish Seine Walleye Pollock fishery.

Among these fisheries none target Pollock with mid-water trawl gear in the Eastern Kamchatka UoA. So there is no harmonization required for P1. As for spatial overlap, only the Western Bering Sea Pacific Cod and Pacific halibut longline fishery overlaps the UoA in Petropavlosk-Commander subzone 61.02.2. This fishery targets different stocks with different gear, however it can be harmonized with the Eastern Kamchatka UoAfor secondary main and ETP species and VME habitats. Three fisheries target pollock with mid-water trawl gear and one with Danish seines. But they occur in different geographic areas; two pollock fisheries in the Sea of Okhotsk, one in the Western Bering Sea, and one in the South Kuril zone. According the MSC guidance, these fisheries in other areas do not need to be considered for harmonization. Howeversince they border on the Eastern Kamchatka UoA and share ecosystem characteristics, the team will consider harmonization for certain PIs in Principle 2 and Principle 3. See Table 30.

Table 30. List overlapping fisheries (to be determined)

Fishery name	Certification status and date	Performance Indicators to harmonise
Western Bering Sea Pollock fishery https://fisheries.msc.org/en/fisheries/western-bering-sea-pollock/@@view	ACDR September 2020	P1:None.Assume separate stock in WBS. P2: 2.2.1a; 2.3.1a; 2.4.2a,c. P3: PIs 3.1.1 – 3.1.3
Vityaz-Avto Danish Seine Walleye Pollock fishery https://fisheries.msc.org/en/fisheries/vityaz-avto-danish-seine-walleye-pollock-fishery/@@view	ACDR July2020	P1: None. Assume separate stock in SoO. P2: 2.2.1a; 2.3.1a; 2.4.2a,c. P3: PIs 3.1.1 – 3.1.3
Russia Sea of Okhotsk Pollock https://fisheries.msc.org/en/fisheries/russia-sea-of-okhotsk-pollock/@@view	Certified: September2013; Re-certified: August 2018; ACDR Scope extension August2020	P1: None. Assume separate stock in SoO. P2: None. Different assessment tree (CRv1.3). P3 PIs: 3.1.1, 3.1.2, 3.1.3
Kuril Islands Pelagic Trawl and Danish Seine Pollock fishery https://fisheries.msc.org/en/fisheries/kuril-islands-	ACDR August 2020	P2: 2.2.1a; 2.3.1a; 2.4.1b; 2.4.2a,c. P3: PIs 3.1.1 – 3.1.3

pelagic-trawl-and-danish-seine-pollock-fishery/@@view		
Western Bering Sea Pacific cod and Pacific halibut longline https://fisheries.msc.org/en/fisheries/western-bering-sea-pacific-cod-and-pacific-halibut-longline/@@view	Certified: October2019	For Petropavlovsk-Commander subzone 61.02.2. P1: None. Separate target stocks. P2: 2.1.1b; 2.2.1a; 2.3.1a; 2.4.2b; 2.4.2a,c. P3: PIs 3.1.1 – 3.1.3

Table 31. 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 32. 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

10.10 UoA company and vessel's list (correct at time of ACDR production)

Table 33. Vessel's list of PCA companies in UoA.

AKROS, JSC	BMRT	BORIS TROFIMENKO
	SRTM	ALEKSEY CHIRIKOV
	SRTM	PETR ILJIN
	SRTM	VIKTORIA I
	SRTM	VILYUCHINSKY
AKROS 3, JSC	BMRT	MEKHANIK KOVTUN
Blaf, JSC	RTMS	PETROPAVLOVSK
MAGADANTRALFLOT, LLC	RTMKS	MAIRONIS
Sakhalin Leasing Flot, JSC	SRTM	MYS LOVTSOVA
	SRTM	MYS MURAVJEVA
	SRTM	MYS KRUZENSHTERNA
ROLIZ, LLC	BMRT	VLADIMIR STARZHINSKY
	BMRT	KAPITAN KAYZER
Sofco Co., Ltd	BMRT	ADMIRAL KOLCHAK
	MRKT	SERGEY BOCHKAREV
Tralflot, JSC	BMRT	VASILYEVSKIY OSTROV
	MRKT	PETR 1
Fishing Collective “Farm Novyi Mir”, JSC	STR	KIREEVKA
	STR	SALMA
	STR	SEDANKA
	STR	KALINOVSK
	STR	KOSTROMA
	STR	NOGLIKI
	STR	PLASTUN
	STR	KALINOVKA
	STR	DMITRIY SHEVCHENKO
	STR	STERLYAD
	BMRT	LANGUSTA
Kurilskiy Rybak, JSC	STR	TORON
	RTMKS	PAVEL KUTAKHOV
	STR	TORLAND
	STR	GINNETON
Ostrov Sakhalin, JSC	BMRT	ALTAIR
	BATM	ANIVA
	BATM	OSTROV SAKHALIN
Pilenga, JSC	BATM	PILENGA
	BATM	PILENGA -2
Poronay, LLC	FT	MYS DATTA
	RTMKS	VASILIY KALENOV
	FV	OSTROV ITURUP
PA Sakhalinrybaksoyuz, LLC	SRTM	MYS DOKUCHAEVA
	SRTM	MYS LEVENORNA
	SRTM	MYS MENSHIKOVA
	SRTM	IOLANTA
Tranzit, Co., Ltd	BMRT	DERSU UZALA
Preobrazhenskaya Basa of Trawling	RTMK-S	ALEKSANDR KOSAREV

Fleet (PBTF), PJSC	BMRT	OSTROV SHIKOTAN
	BMRT	BUKHTA PREOBRAZHENIYA
	BMRT	GENERAL TROSHEV
	RKTS	KAPITAN DEMIDYUK
	RKTS	KAPITAN KOLESNIKOV
	FV	LENINETS
	FV	KOMANDOR
	FV	PLANETA
	LRFT	SERGEY NOVOSYOLOV
	LRFT	SEROGLAZKA
	FV	VICTOR GAVRILOV
	FST	KARYMSKIY
Collective Farm Fishery by V.I. Lenin	FST	KARPINSKIY
	FST	PUTYATIN
	FST	GROMOBOY
	FS	KAPITAN MUKOVNIKOV
	FS	KAPITAN MALYAKIN
	FS	IKHTIOLOG
	MKRTM	MYSOVOY
	BMRT	MIKHAIL STARITSIN
Dalryba, JSC	BMRT	SIGLAN
	RTMKS	TSARITSA
	BMRT	ALEKSANDR BELYAKOV
	BMRT	ILYA KONOVALOV
	BMRT	KAPITAN FALEYEV
	BMRT	KAPITAN MASLOVETS
	BMRT	MEKHANIK BRYZGALIN
Nakhodka Active Marine Fishery Base (NBAMR), PJSC	BMRT	NIKOLAY CHEPIK
	BMRT	PETROPAVLOVSK
	BMRT	SEAWIND-1
	BMRT	PELAGIAL
	BMRT	ARDATOV
	BMRT	AERONAVT
	BMRT	ASTRONOM
	SRTM	SEA HUNTER
Tikhrybcom Co., Ltd.	RTM	MORSKOY VOLK
	BMRT	EGLAINE
	BMRT	SANFISH
Mercury, Co., Ltd.	BMRT	BUTOVSK
	BMRT	MLECHNIY PUT
	BMRT	ALEKSANDR KSENOFONTOV
	BMRT	ANATOLIY PONOMAREV
	BMRT	BAKLANOVO
	BMRT	VLADIMIR BABICH
	BMRT	IRTYSHSK
	BMRT	KHOTIN
Okeanrybflot, JSC	BMRT	MATVEY KUZMIN
	BMRT	MINISTR ISHKOV
	BMRT	MOSKOVSKAYA OLIMPIADA
	BMRT	POLLUKS
	BMRT	XX SYEZD VLKSM
	BMRT	XXVII SYEZD KPSS

	BMRT	MYS OLYUTORSKIY
	BMRT	BORISOV
Ozernovsky FCP # 55, JSC	SRTM	GEROI DAMANSKOGO
Poseydon, Co., Ltd.	SRTM	MYS KURBATOVA

10.11 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

10.12 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.

10.13 Template information and copyright

This document was drafted using the ‘MSC Reporting Template v1.2’.

Table 34. Template version control.

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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