Marine Stewardship Council Assessment

Kamchatka River Salmon Fisheries

Public Certification Report

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Updated October 15, 2019

MRAG Americas, Inc.

8950 Martin Luther King Jr St. North, Suite 202, St Petersburg, FL 33702, USA

Raymond Beamesderfer
Dr. Dmitry Lajus

CLIENT DETAILS:

Delta Fish Ltd.
Kamchatka, Russia

MSC reference standards:

MSC Certification Requirements (CR) Version 2.0

CONTENTS

1 EXECUTIVE SUMMARY

An assessment team of Ray Beamesderfer and Dmitry Lajus conducted the assessment using CR v2.0 (1 October 2014), with modifications to the default assessment tree for salmon fisheries as defined by the Marine Stewardship Council (MSC). The units of assessment and certification included Sockeye Salmon, Chum Salmon, Coho Salmon and Chinook Salmon harvested in Kamchatsky Bay and the Kamchatka River.

A site visit was conducted on 4-10 August, 2017 at the Delta Fish office and processing facility In Ust-Kamchatsk, fishery areas on the Kamchatka River, and government offices in Petropavlovsk-Kamchatsky, Russian Federation. The team met with the clients, with the client's consultant, federal and state salmon scientific and management agencies, and key stakeholders. The team also reviewed extensive written documentation provided by the client and the fishery management system.

Sockeye and Chum Salmon are at historically high levels of production throughout Kamchatka including the Kamchatka River. High productivity results from near-pristine habitat conditions in salmon production areas, favorable climate conditions in freshwater and the ocean, curtailment of drift gill netting in the Russian Economic Exclusion Zone and effective management to protect spawning escapements. Coho and Chinook salmon also sustain significant harvests although annual numbers are more variable due to conditions of the marine environment for these species.

Changes in the commercial fishery management system in the early 2000s have largely eliminated industrial scale illegal commercial fishing. Long-term lease agreements for fishing sites have provided strong incentives for fishing companies to protect spawning escapements and participate in stock assessment and enforcement programs. Transportation difficulties due to the remote location of the fishery preclude significant levels of other types of Illegal or unregulated harvest in this area.

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

While historical monitoring and sustainable harvest outcomes has demonstrated that current fishery strategies are effective, stock assessments have suffered reductions in recent years due government funding cutbacks. In particular, spawning surveys are much reduced. Other index data and historical information is sufficient to support the sustainability of the fishery under conditions of continuing high salmon productivity and consistent levels of fishing effort. However, the reduced stock assessment risk future sustainability in the event of changes from the current equilibrium, necessitating several conditions on this assessment.

All principle scores exceeded 80 but several performance indicators scored between 60 and 80. As a result, six conditions were identified. On the basis of this assessment, peer review, stakeholder comments, and

the completion of the objections period wth no objectiosn received, MRAG Americas has decided that the fishery should be certified.

Principle Level Scores

Principle	Salmon Species			
	Sockeye	Chum	Coho	Chinook
Principle 1 – Target Species	84.1	83.7	83.3	83.3
Principle 2 – Ecosystem	85.0			
Principle 3 – Management System	80.2			

Summary of PI Level Scores

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score			
								Sockeye	Chum	Coho	Chnk
One	1	Outcome	0.333	1.1.1	Stock status	0.5	0.167	70	70	70	70
				1.1.2	Stock rebuilding	0.5	0.167	85	85	85	85
		Management	0.333	1.2.1	Harvest strategy	0.25	0.083	80	80	80	80
				1.2.2	Harvest control rules & tools	0.25	0.083	80	80	80	80
				1.2.3	Information & monitoring	0.25	0.083	65	65	65	65
				1.2.4	Assessment of stock status	0.25	0.083	75	70	65	65
		Enhancement	0.333	1.3.1	Enhancement outcome	0.333	0.111	100	100	100	100
				1.3.2	Enhancement management	0.333	0.111	100	100	100	100
				1.3.3	Enhancement information	0.333	0.111	100	100	100	100
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.067	80			
				2.1.2	Management	0.333	0.067	80			
				2.1.3	Information	0.333	0.067	80			
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.067	100			
				2.2.2	Management	0.333	0.067	80			
				2.2.3	Information	0.333	0.067	80			
		ETP species	0.2	2.3.1	Outcome	0.333	0.067	85			
				2.3.2	Management	0.333	0.067	80			
				2.3.3	Information	0.333	0.067	80			
		Habitats	0.2	2.4.1	Outcome	0.333	0.067	95			
				2.4.2	Management	0.333	0.067	95			
				2.4.3	Information	0.333	0.067	80			
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.067	90			
				2.5.2	Management	0.333	0.067	90			
				2.5.3	Information	0.333	0.067	80			
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.3	0.150	95			
				3.1.2	Consultation, roles & responsibilities	0.3	0.150	80			
				3.1.3	Long term objectives	0.3	0.150	80			
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	0.125	80			
				3.2.2	Decision making processes	0.25	0.125	75			
				3.2.3	Compliance & enforcement	0.25	0.125	70			
				3.2.4	Management performance evaluation	0.25	0.125	80			

Summary of Conditions

Condition number	Condition	Performance Indicator	Timeline for compliance
1	Demonstrate that Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River are at or fluctuating around escapement levels which maintain high production and provide a low probability of falling to levels where recruitment would be impaired.	1.1.1	**3rd Annual Surveillance**
2	Regularly monitor spawning escapement of Sockeye, Chum, Coho and Chinook Salmon at a level of accuracy and coverage sufficient to ensure effective harvest controls in the Kamchatka River.	1.2.3	**3rd Annual Surveillance**
3	Provide information on the level and locations of illegal fishery removals of Sockeye, Chum, Coho and Chinook Salmon from the Kamchatka River.	1.2.3	**3rd Annual Surveillance**
4	Estimate stock status of Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.	1.2.4	**3rd Annual Surveillance**
5	Demonstrate that information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	3.2.2	**3rd Annual Surveillance**
6	Demonstrate that a monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules, and that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	3.2.3	**3rd Annual Surveillance**

2 AUTHORSHIP AND PEER REVIEWERS

The assessment team consisted of the following individuals, who collectively have knowledge of the stock status and assessment, ecosystem impacts, and management systems applicable to this fishery:

2.1 Assessment Team

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

Dr. Dmitry Lajus, Associate Professor in the Department of Ichthyology and Hydrobiology of St Petersburg State University. Dr. Lajus holds a BS and MS from St. Petersburg University, and a PhD from the Zoological Institute of the Russian Academy of Sciences. His research interests include population biology of marine fish and invertebrates, population phenogenetics, stress assessment, history of fisheries, historical ecology, and population dynamics. Dr. Lajus has authored numerous scientific articles, book chapters, and scientific reports, and conducted certification pre-assessments and assessments for a number of fisheries in Russia.

2.2 Peer Reviewers

MRAG appointed the following peer reviewers following an opportunity for public comment. The peer reviewers are considered peers of the experts comprising the assessment team and have expertise in one or more of the following: the fishery under assessment, stock assessment issues, relevant ecosystem interactions, and fishery management.

Dr. Greg Ruggerone has investigated population dynamics, ecology, and management of Pacific salmon in Alaska and the Pacific Northwest since 1979. He was the Project Leader of the Alaska Salmon Program, University of Washington, from the mid-1980s to early 1990s where he was responsible for conducting and guiding research at the Chignik and Bristol Bay field stations, preparing salmon forecasts, and evaluating salmon management issues. Most of his research involves factors that affect survival of salmon in freshwater and marine habitats, including climate shifts, habitat degradation, predator-prey interactions, and hatchery/wild salmon interactions. He is currently a member of the Columbia River Independent Scientific Advisory Board and the Independent Scientific Review Panel. He recently served as the fish ecologist on the Secretary of Interior review of dam removal on the Klamath River. During the past six years, he has evaluated salmon fisheries for sustainability using guidelines developed by the Marine Stewardship Council.

Dr. Jocelyn Drugan has over 14 years of fisheries science experience, having received her B. Sc. in Ecology and Evolutionary Biology from Yale University and her M. Sc. and Ph.D. in Fisheries Science from the University of Washington. Her graduate work focused on populations genetics and eco-evolutionary dynamics of wild salmon populations. In 2013 she was a postdoctoral research associate at the NOAA Alaska Fisheries Science Center in Seattle, developing a model for simulating effects of fish movement on

population genetic structure in five groundfish species. She is currently the Analytics Team Director at Ocean Outcomes, a global fishery improvement organization that works with high-risk fisheries that face big conservation challenges. She has helped conduct MSC pre-assessments of two Russian salmon fisheries and assessed U.S. West Coast and British Columbia salmon fisheries for the Monterey Bay Aquarium Seafood Watch Program. She has also evaluated the sustainability of eleven species in Japan, including mackerels, tuna, and Japanese flying squid. In addition to native proficiency in English, Jocelyn has language skills in Japanese and Mandarin Chinese.

3 DESCRIPTION OF THE FISHERY

3.1 Unit(s) of Assessment (UoA) and Scope of Certification Sought

3.1.1 UoA and Proposed Unit of Certification (UoC)

The assessment team determined that the fishery is within scope as required by the MSC.

Table 1. The units of assessment and certification consist of:

Species	Sockeye Salmon *Oncorhynchus nerka* Chum Salmon *Oncorhynchus keta* Coho Salmon *Oncorhynchus kisutch* Chinook Salmon *Oncorhynchus tshawytscha*
Geographical range of fishing operations	Kamchatsky Bay & Kamchatka River, Eastern Kamchatka, Kamchatka Kray, Russian Federation
Methods of capture	Coastal trapnets, beach seines, set and drift gillnets
Stocks	Populations of Pacific salmon spawning in the Kamchatka River, and potentially intercepted populations
Management	Federal Agency for Fisheries, FAR Regional divisions of Federal Agency for Fisheries, SVTU. Local (Kamchatka) Research Institute for Fisheries and Oceanography, KamchatNIRO. Regional (Russian Far East) Research Institute for Fisheries and Oceanography, TINRO-Center. All-Russia Research Institute for Fisheries and Oceanography, VNIRO.
Client group	The client for this assessment is: Delta Fish Ltd. Petropavlovsk-Kamchatsky, Kamchatsky region, Russian Federation Contact: Mikhail Zemnitstkyi, Deputy Director Email: mixail.delta@yandex.ru

3.1.2 Final UoC(s)

The final Units of Certification include Sockeye, Chum, Coho and Chinook Salmon harvested in Kamchatsky Bay and the Kamchatka River spawning in the Kamchatka River and also adjacent rivers whose populations can be intercepted by the fishery.

3.1.3 Total Allowable Catch and Catch Data

	Year	Amount of Salmon (metric tonnes)			
		Sockeye	Chum	Coho	Chinook
Recommended Catch	**NA[a]**	**NA[a]**	**NA[a]**	**NA[a]**	**NA[a]**
UoA share of Recommended Catch	**NA[a]**	**NA[a]**	**NA[a]**	**NA[a]**	**NA[a]**
UoC share of Recommended Catch	**NA[a]**	**NA[a]**	**NA[a]**	**NA[a]**	**NA[a]**
Total green weight catch by UoC	**2016**	**735**	**918**	**126**	**93**
	2017	**552**	**624**	**149**	**25**

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

3.1.4 Scope of Assessment in Relation to Enhanced Fisheries

The fishery targets naturally reproducing salmon stocks returning to rivers within the certification unit. There are no hatcheries located within the proposed certification unit. Therefore, this is not considered an enhanced fishery.

3.1.5 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

The fishery does not include introduced species.

3.2 Overview of the Fishery

The fishery occurs in Kamchatsky Bay and the Kamchatka River in the Eastern part of Kamchatka Peninsula and Kamchatka Kray on the Bering Sea coast (Figure 2). At 750 km in length, the Kamchatka River is the largest in Kamchatka. The area is largely undeveloped. Watersheds are in excellent condition and salmon habitat is diverse and highly productive.

The human population is concentrated in Ust-Kamchatsk and several other towns along the river. Ust-Kamchatsk is located in the mouth of the Kamchatka River. The area of the Ust-Kamchatsky administrative district is 40.8 square km, population - 10.3 thousand people (2016). It has a functioning seaport. The population of the town is 4,352 people (2016). Other significant settlements are village Klyuchi (5,011 people) and the village Kozyrevsk (1,225 people).

A road connects Petropavlovsk-Kamchatsky with Ust-Kamchatsk at a distance of 522 km. Regular bus and air (planes and helicopters) service also connects with more developed areas in the southern parts of the peninsula. The local population has been declining recently due to limited economic opportunity in the region. During the fishing season, many people come to the region from Petropavlovsk-Kamchatsky and from mainland Russia for seasonal work with the fishing companies.

Delta Fish Ltd was founded in 1999 and operates in Kamchatsky Bay. The company operates fishing parcels in marine and fresh waters and processes its catch in its own factories. Fish processing factory of Delta Fish Ltd. was completely reconstructed in 2013. Production of factories goes to the Russian market and also is sold abroad to Japan, China and Korea.

3.2.1 Historical Development of the Fishery

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

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

Figure 1. Trapnet fishery operating in Kamchatskiy Bay.

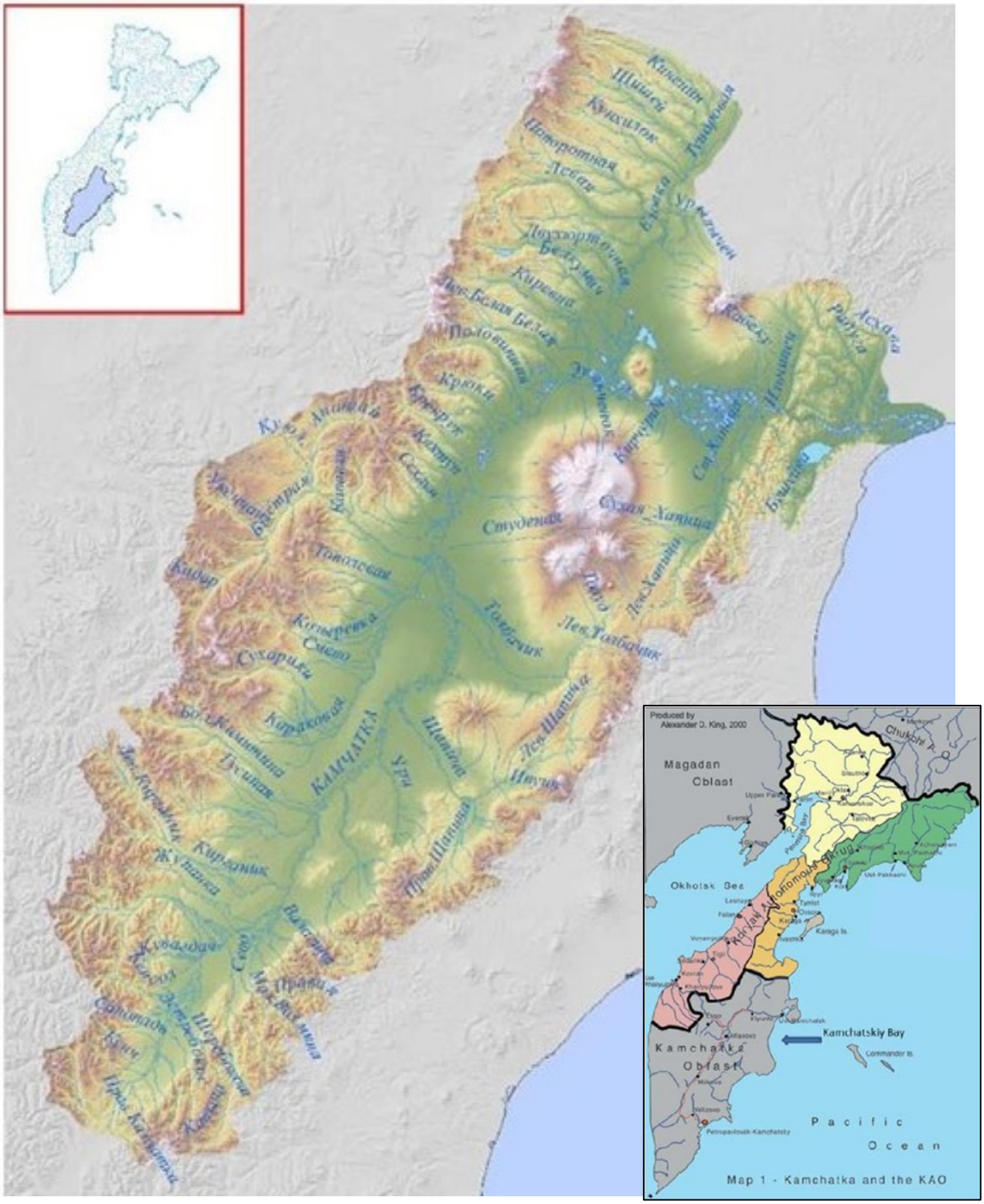

Figure 2. Kamchatka River, Eastern Kamchatka region of the fishery assessment.

3.2.2 Fishing Methods

In Kamchatsky Bay the fishery is prosecuted with coastal trapnets in nearshore marine waters; in Kamchatka River beach seines and gillnets are used.

Trapnets typically consist of a central net wall (length up to 2000 m) which is set up perpendicular to shore to guide fish into one or more traps where narrowing fykes make it difficult for fish to exit (Figure 3). In Kamchatsky Bay, traps are typically 210 m long and 14 m deep. The mesh size of the central net and the traps is being chosen to prevent fish from being entangled in the mesh. Requirements for the mesh size are regulated by the local Fishing Rules to be at least 40 mm (from knot to knot). Traps are constructed of net on a steel frame, the wall height can vary depending on the individual characteristics of the area and the shoreline in such a way, that the trap does not reach bottom. Coastal trapnets are effective because tidal amplitude is relatively small and coastal areas are wide and gradually-sloped. This type of fishing is passive and catch per unit effort is related to the fish abundance. Coastal trapnets are operated from small boats. Catch is typically taken from traps and dip netted into the boats for transport a short distance to shore or the fish processing plant where they are off-loaded by crane or hand at the beach.

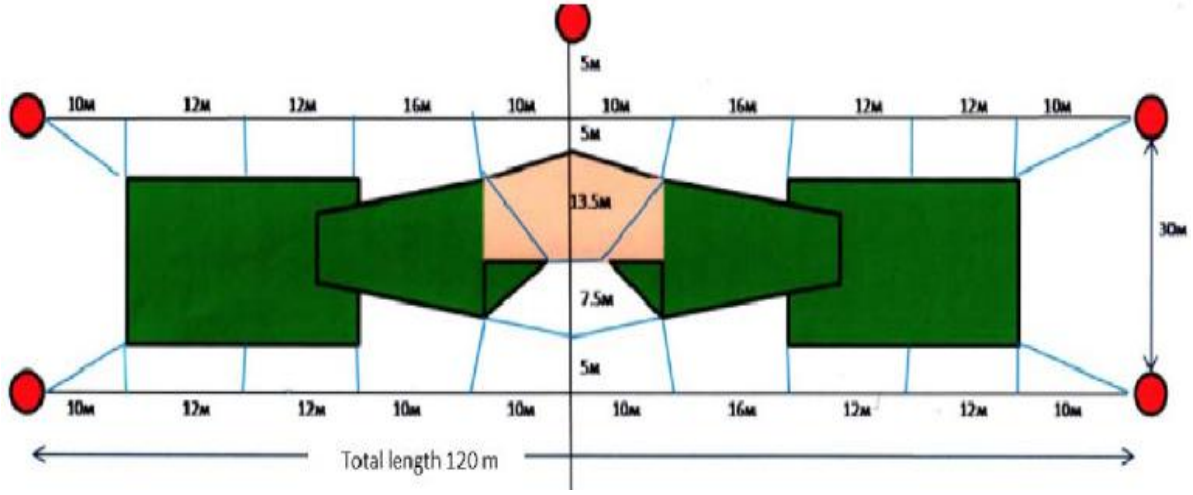

Figure 3. Diagram of a trapnet. Length of all sections is in meters.

Beach seines are typically 100 m long nets used to encircle and crowd fish toward shore where they are landed (Figure 4). Seines are used in the shallow waters of the downstream part of the rivers, where the current is relatively slow and the river is shallow. Seines are set from small skiffs and hauled from shore with special vehicles and by hand. According to the Fisheries Rules, the beach seine should not block more than 2/3 of the river width during the fishing operations. The width (height) in the middle part of the beach seine is 8 meters. The length of the towing rope is 3.5 meters. The mesh size is 35 mm.

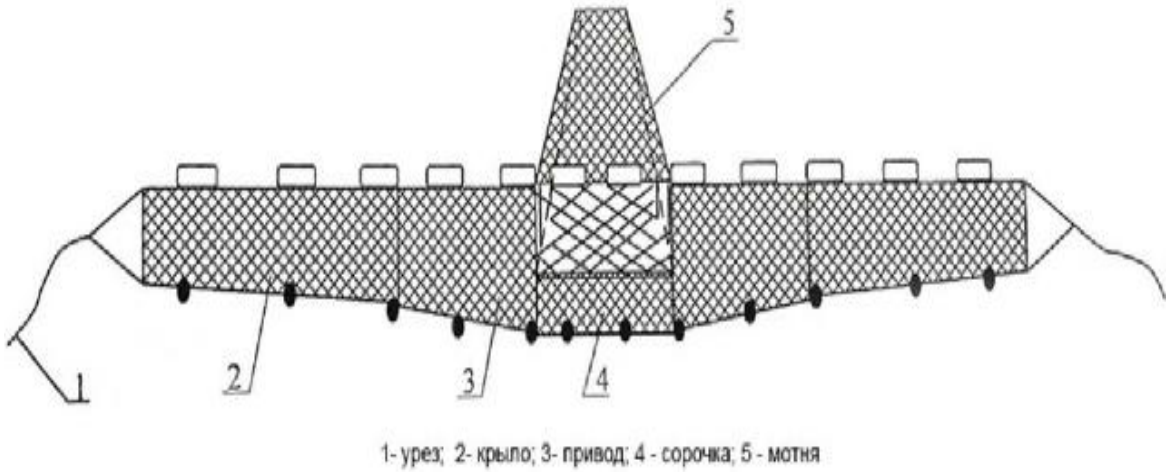

Figure 4. Beach seine used by Delta Fish Ltd. 1 – ground warp, 2 - leader, 3 - shoulder, 4 – "shirt", 5 – seine sack.

Gill nets are used in both Kamchatsky Bay and the Kamchatka River. Nets may be fixed or fished by drifting. Nets are typically 350 m long and 6 m deep. Mesh size varies from 55 to 80 mm, depending on the species to be harvested. The installed fishing gear should be marked with the buoys or signs. Each fishing gear has an individual marking, which contains information about the owner and about a number of the fishing permit.

3.2.3 Organization & User Rights

Administratively, the fishing areas are part of Kamchatka Krai of Far East Federal Region of the Russian Federation. Management of fisheries in this region is based on fisheries zones, subzones and management units (Figure 5). This fishery is situated in the Petropavlovsk-Komandor subzone (Kamchatsky Bay). Delta Fish Ltd. has 3 fishing parcels in this fishery (1 in the sea and 2 in the river).

The permit to use it is leased to fishing companies under a long-term lease arrangement. Fishing parcels (Figure 6) were distributed for period 2008-2027. Only commercial fishing occurs in sea fishing parcels. River parcels may be allocated for commercial fishing, sport fishing or hatchery purposes. Delta Fish Ltd. also participates in marine fisheries for white fish.

Fishermen are hired by contract – they receive a salary and then extra pay by their results based on catch. In addition to employing the local inhabitants in fish processing factories, the companies also pay considerable attention to investing in community development projects of the settlements where they are based.

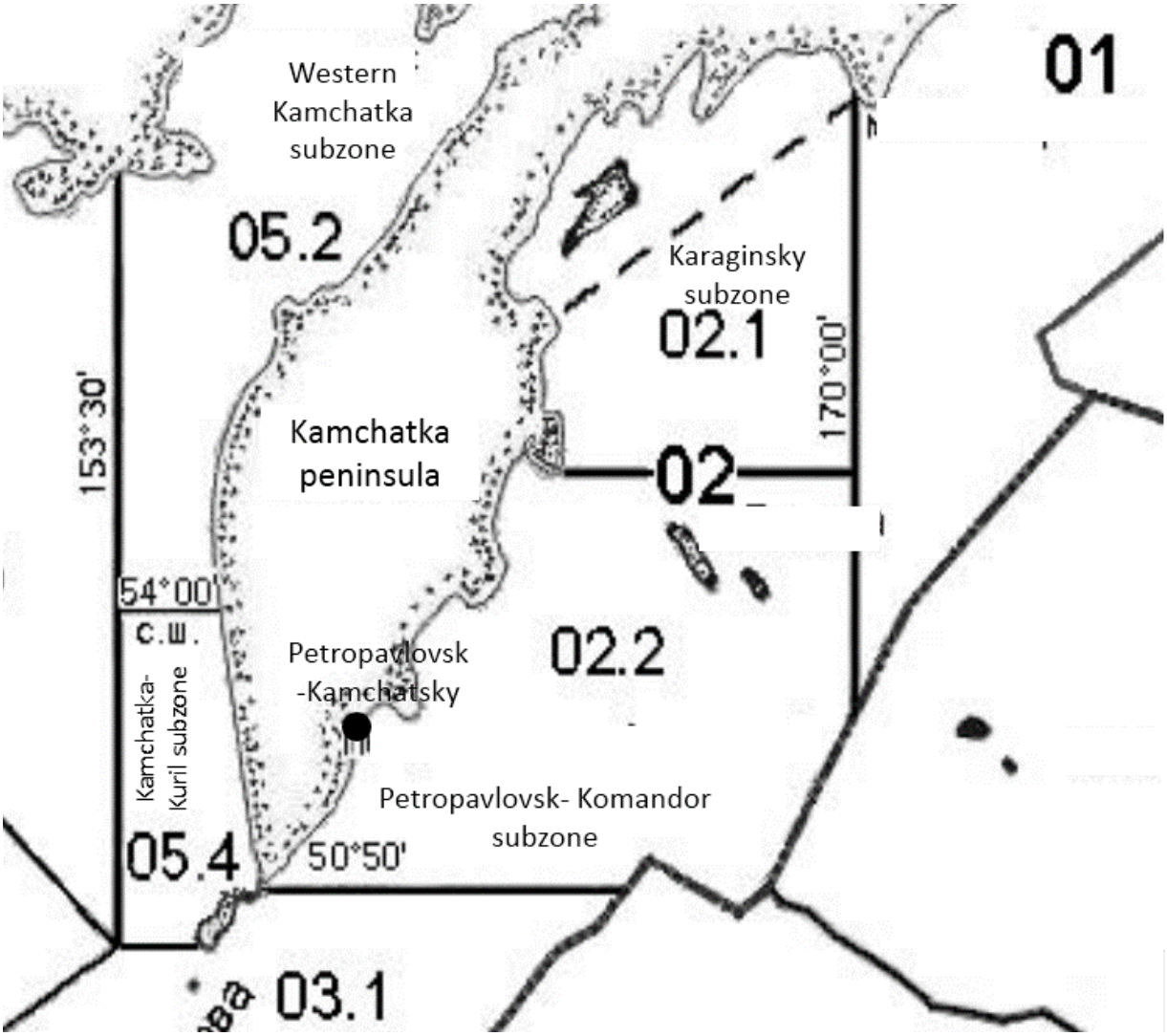

Figure 5. Administrative units for Kamchatka peninsula fishery management.

Table 2. Fishing parcels leased by Delta Fish in Kamchatsky Bay and the Kamchatka River.

Parcel	Area	Coordinates	Size	Borders	Fishing gears
832	Kamchatka River, fishing parcel "Khvalyenka"		Length - 3500 m	Low point – 27,500 m from the lighthouse. Top point – 31,000 m from the lighthouse. Both shores	Beach seines, set gillnets, drift gillnets
833	Kamchatka River		Length - 3000 m	Low point – 32,000 m from the lighthouse. Top point – 35,000 m from the lighthouse. Left shore	Beach seines, set gillnets, drift gillnets
277	Kamchatsky Bay	N 56°13'17", 162° 32'09"	Length - 300 m. Width - 2000 m	By 150 m from the base point to each side along the coastline. By the perpendicular to the shoreline from the base point	All fishing gears permitted

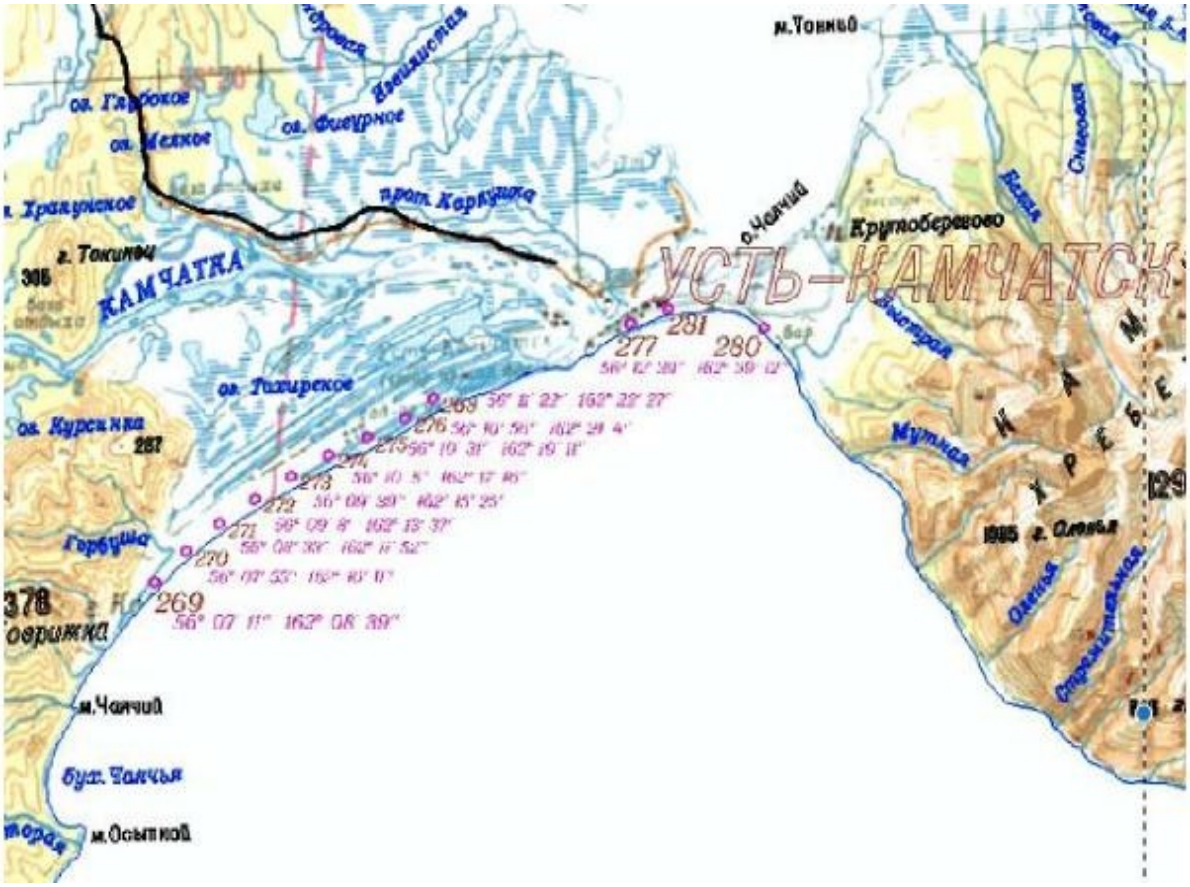

Figure 6. Location of the fishing parcels in Kamchatsky Bay.

3.2.4 Seasons

Commercial salmon fishing seasons generally runs from June till September. Salmon species return and are harvested in broadly overlapping patterns throughout this period (Figure 7). Fishing usually continues as long as fish migration and weather permit. Sea trapnets are typically removed in September after the most of the salmon run is completed, and before autumn storms begin. Fishing may continue in river parcels as long as fish are available. Fishing seasons may be adjusted to runs of salmon.

The commercial season typically begins in the first week of June to target the early run of Sockeye in both the sea and the river. Chinook are harvested concurrent with Sockeye. Sockeye and Chinook are harvested in significant numbers through July. Chum and Pink harvest occurs from late July through August. Coho are harvested primarily in August. Smaller numbers of Coho are harvested in the river during September after sea nets have been removed.

3.2.5 Harvest

The large majority of the salmon harvest (90%) occurs in the commercial fishery. Salmon are also harvested by sport fishing; for personal consumption fisheries by communities, families and individual representatives of indigenous peoples; and by salmon hatcheries for reproduction purposes (although no hatcheries occur on the rivers in the UoA).

Commercial Fishery

Annual 10-year average salmon harvest in eastern Kamchatka commercial fisheries is about 95,000 mt (Figure 8). Pink Salmon account for about 70% of the salmon harvest followed by Chum at 16%, Sockeye at 13% and Coho at 2%. In Kamchatsky Bay and the Kamchatka River, Sockeye Salmon account for about 60% of the harvest, followed by Chum at 21%, Coho at 11%, Pink at 5% and Chinook at 4%. Catch by Delta Fish accounts for about 10% of the total salmon catch for all gear types in the basin of the Kamchatka River. The average annual catch of salmon by Delta Fish Ltd. in 2008-2016 is 1808 mt (Table 3), of which about 40% occurs in the river and 60% on the sea. The catch data include also Arctic Char which comprise about 1-3% of the total catch.

Extensive catch records are kept by the commercial fisheries. The procedure for accounting catches of salmon and other aquatic biological resources is strictly regulated by the Fisheries Rules and other regulatory documents. The size of salmon catches can be determined by one of three methods: 1) direct weighing, 2) volume-weight method, 3) individual counting. The Fisheries Rules require reporting of salmon catches at least once every five days. But according to the decision of the Anadromous Fish Commission, the companies engaged in salmon fishing are obliged to provide daily reporting of catches.

A daily catch report is submitted by a company for each fishing parcel with an indication of the fishing license number. The daily catch is indicated in the daily report for the specified date for each type of aquatic biological resources, indicated in the catch permit, as well as bycatch. Also, the daily report contains information on the accumulated catch for each type of aquatic biological resources and each fishing parcel for comparison with the quota. Daily reporting is submitted to the territorial administration of the Federal Agency for Fisheries. In addition to the daily summary, companies provide a consolidated 15-day catch report. The 15-day operational report is submitted to the Kamchatka branch of the "Centre of Fishery Monitoring and Communications" (Tsentr sistemy monitoringa rybolovstva i sviazi) in an encrypted form for automatic processing in the Fisheries Monitoring Branch System. In addition to the daily and operational reports, a quarterly statistical report according to Form 1-P is submitted to Federal Fishery Agency.

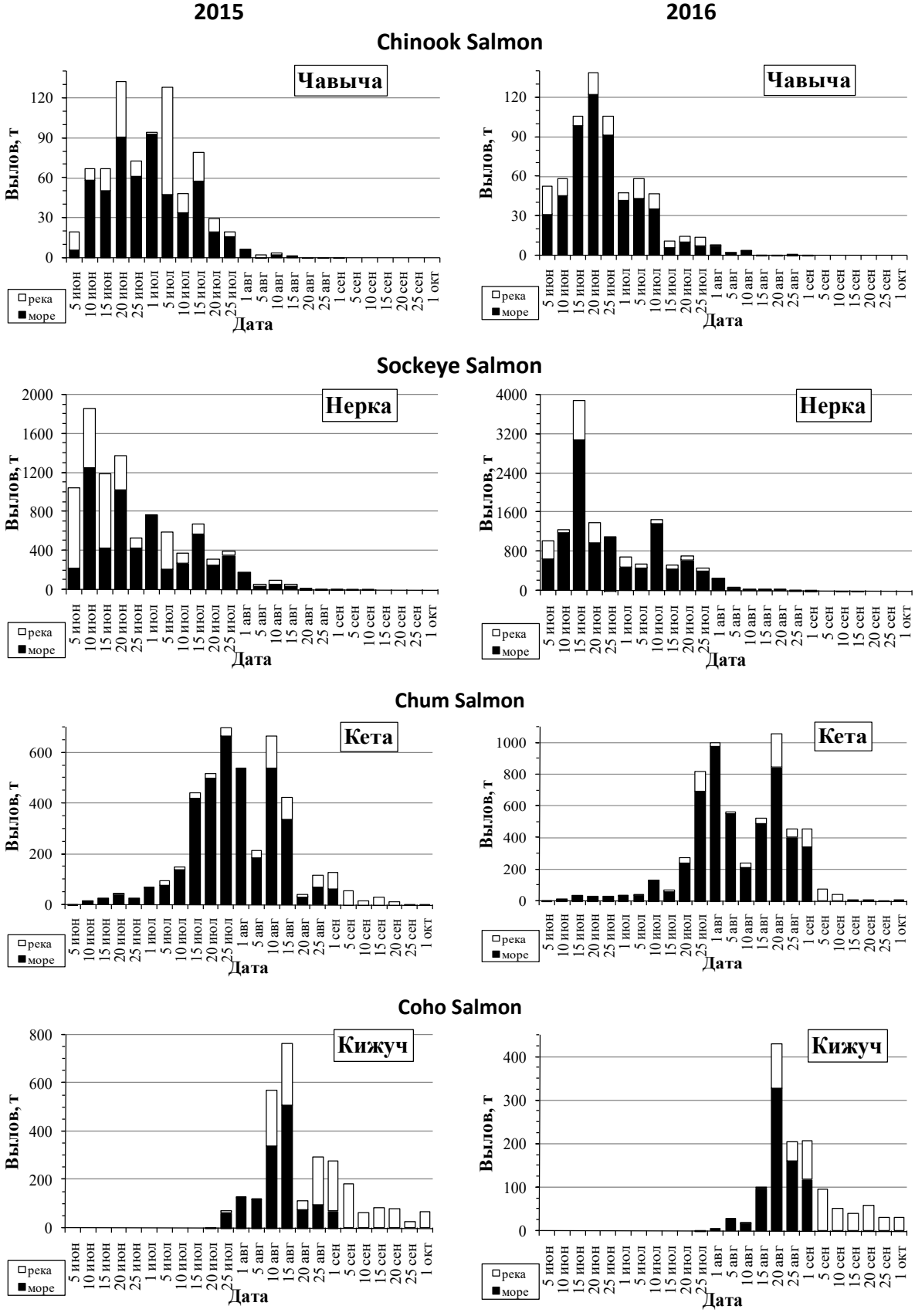

Figure 7. Harvest of salmon by 5-day intervals (for period 5 from June to 1 October) in Kamchatsky Bay and the Kamchatka River (■ sea, □ river).

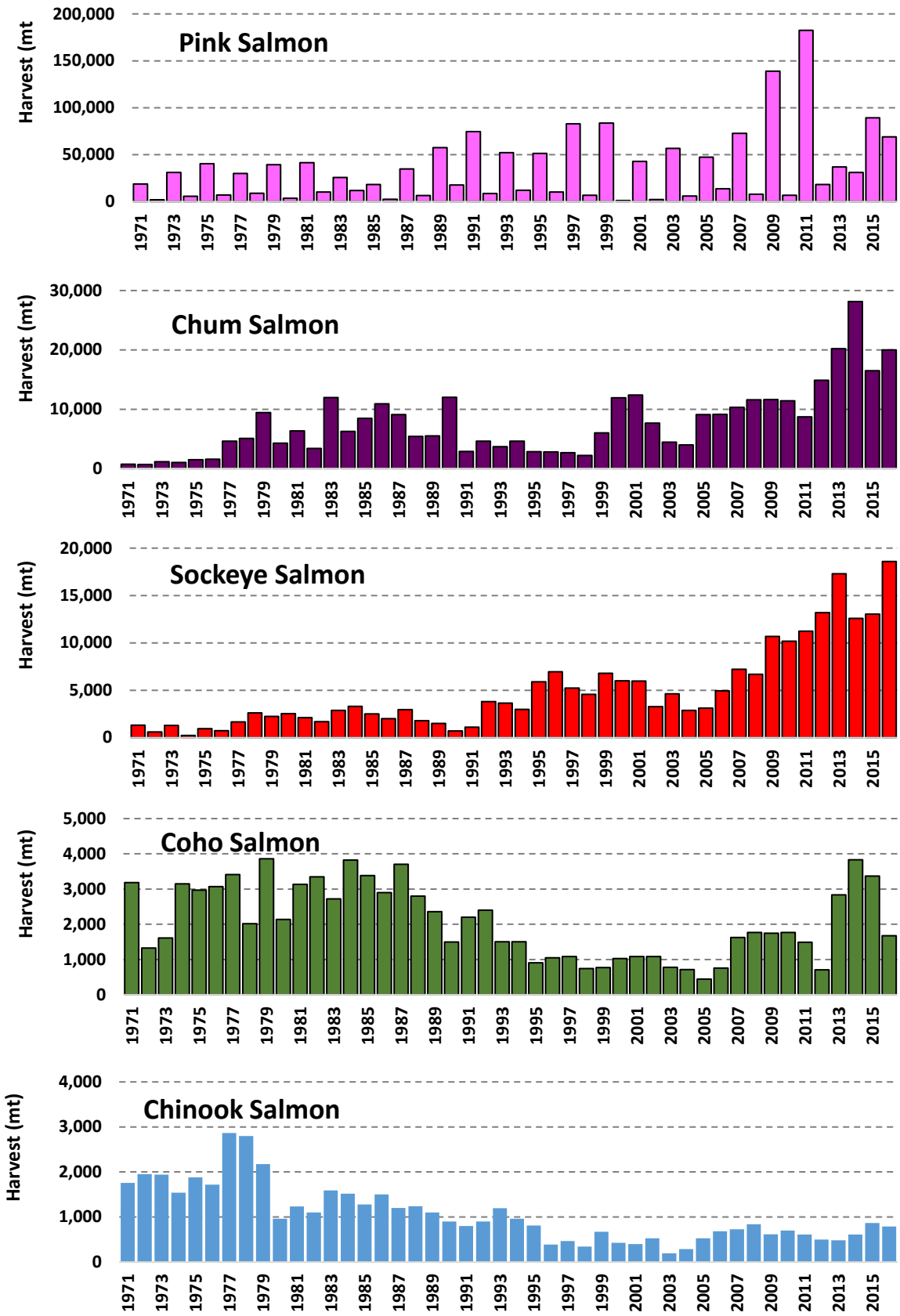

Figure 8. **Total harvest (metric tonnes) of Pacific salmon in the Eastern Kamchatka area (North Pacific Anadromous Fish Commission).**

Table 3. Catch of Pacific salmon by Delta Fish Ltd. in 2008-2016, metric tonnes (data from Client).

Year	Sockeye	Chum	Coho	Pink	Chinook	Char	Total
2008	520.1	209.7	191.2	2.9	73.4	14.9	1,012.1
2009	655.2	153.9	130.3	462.1	68.7	5.6	1,475.7
2010	587.3	811.0	247.1	5.5	107.7	29.0	1,787.6
2011	818.7	250.0	249.7	630.2	47.9	28.7	2,025.2
2012	861.6	378.5	146.3	2.7	35.0	4.9	1,429.0
2013	1370.3	579.6	403.0	112.6	43.1	23.7	2,532.2
2014	695.6	772.1	362.8	39.3	42.9	67.5	1,980.2
2015	986.8	523.0	525.1	27.7	92.6	12.5	2,167.7
2016	734.8	918.0	125.8	22.2	52.9	11.8	1,865.5
2017	552.0	624.0	149.0	383.0	25.0	3.0	1,736.0
Avg.	***778.2***	***522.0***	***253.0***	***168.8***	***58.9***	***20.2***	***1,801.1***

The procedure for catch accounting for salmon fishing is as follows. On the sea fishing parcel, when the catch is loaded from the trapnet to the live-fish carrier, a preliminary receipt for it is prepared. The catch size of the target species is determined by the volume-weight method. When transporting the catch from the fishing site, the foreman of the fishing parcel issues a receipt for the catch, where the volume of the fish (for each species separately) is indicated.

When the catch is loaded from the trap into the slot, the primary sorting of the catch takes place to sort out non-target species. All non-target species are recorded in accordance with the Fishing Rules. In the event of the capture of sea mammals or birds, the fact is necessarily recorded; bycatch returns to the environment with minimal possible damage. When non-target species are presented in the catch, they are also recorded. For those species for which TAC is not established, permissible percentage in total catch is 49%; for those under TAC regulation, permissible percentage is established as 2%. Primary accounting of catches on river parcels takes place in the same way.

After determining the actual size of the catch, the catch data are recorded in the Fishing Logbook. The Fishing Logbook is kept by the foreman at each parcel. The template and procedure for filling the Fishing Logbook are strictly regulated and determined by the order of the Ministry of Agriculture (which includes FAR). The Fishing Logbook is compulsorily stored at the fishing parcel and can be checked by the enforcement agencies during inspections. The foreman accepting the catch sorts it by species, weights it with a dynamometer (the dynamometer at the beginning of the season undergoes a checkout) and records the data in the Fishing Logbook.

After weighing, the catch is placed into the thermally insulated container and with the delivery note it should be sent to the factory. The catch is delivered from the fishing parcel to the fish processing plant in a thermally insulated container of 660 liters volume. The catch is transported to the factory at first by the boat and then is reloaded to a car. The time of delivery of the catch from the river parcels to the factory of Delta Fish Ltd in the town of Ust-Kamchatsk is about 90 to 120 minutes (depending on the distance of the parcel). At the factory, the catch is poured from thermally insulated containers with a hydraulic tipping device into a storage bin (volume is 20 cubic meters). Further, the fish on the conveyor is sent from the storage bin to the sorting bins. At the Delta Fish Ltd factory there are four receiving bins, the already sorted fish is poured into the bins. Sizes and types of fish products are recorded in the Technology Logbook on the basis of data from the Fishing Logbook.

Sport Fishery

In the Russian Far East, all species of Pacific salmon are object of sport, or recreational fishing. This type of fishing is done with sport fishing gear (spinning or rod) or various types of gillnets. Sport fishing occurs in designated fishing parcels some of which may be leased to fishing companies. Coho and Chinook Salmon are the favorite objects of sport fishing. Chinook Salmon recreational fishing catches increased until 2010, when a maximum (12.9 tons) catch was recorded. Further on, the catch decreased and remained during 2011-2015 approximately at the same level, varying from 7.2-9.2 tons, with some increase of Chinook catch in 2016 up to 11.4 mt (KamchatNIRO 2017). For this type of fishing for Pacific salmon during the period 2002-2016 it was observed decreasing trend, and for Arctic Char – increasing.

Table 4. Sport harvest of salmon in Kamchatsky Bay and the Kamchatka River (2002-2016 average).

	Pink	Chum	Sockeye	Coho	Chinook	Char
Harvest (mt)	1.1 (0-6.0)	13.8 (0-24.4)	13.1 (0.2-24.4)	12.2 (1.1-28.2)	6.7 (0-12.9)	0.3 (0-2.0)
Avg % of salmon harvest (min-max)	0.5% (0-4%)	0.5% (0-1.2%)	0.3% (0-1%)	1% (0.1-2.2%)	1.3% (0-2.5%)	0% (0-0.3%)

Indigenous Fishery

All species of salmon are harvested for consumption by communities, families and individual representatives of indigenous peoples (officially called as Small Indigenous Peoples of the North, Siberia and Far East). In 2009, the government decreed in Document №631 that the indigenous peoples of Kamchatka territory were allowed to fish for personal consumption without written permits/documents. A personal limit of 50 kg per year is allocated for indigenous people. Indigenous communities may also be provided with a specific allocation which varies from river to river. Indigenous quota has priority relative to industrial quota. Indigenous catch may be retained for subsistence and personal use or sold. For all salmon species, except Coho Salmon, proportion of indigenous fishing increased during 2002-2016, but decreased for Coho (KamchatNIRO 2017).

Table 5. Indigenous harvest of salmon in Kamchatsky Bay and the Kamchatka River (2002-2016 average).

	Pink	Chum	Sockeye	Coho	Chinook	Char
Harvest (mt) (min-max)	17.2 (0.0-36.0)	54.2 (27.0-113.6)	104.8 (20.9-270.9)	20.4 (10.2-40.1)	14.3 (5.7-24.4)	16.4 (0.3-49.1)
Avg % of salmon harvest (min-max)	11.2% (0-58.8%)	2.1% (1.1-4.8%)	1.5% (0.5-4.0%)	2.1% (0.6-5.7%)	2.9% (1.2-5.0%)	5.0% (0.1-17.4%)

Marine Drift Net Fishery

Kamchatka Sockeye are subject to harvest in Russian and Japanese drift net fisheries occurring in areas of the Pacific Ocean, Sea of Okhotsk, and Bering Sea (Bugaev and Dubynin 2000; Bugaev et al. 2009). This fishery primarily targeted mature Sockeye, using net mesh size to avoid catch of smaller, immature fish. By-catch of Pink, Chum, and Masu Salmon taken in high seas drift nets was typically discarded. The research institute estimates that the combined Chum and Pink discard roughly equals the reported Sockeye catch.

Marine harvest rates of Kamchatka salmon have varied considerably over the years in response to changes in management of the drift fisheries. High returns of salmon in Kamchatka occurred during 1941-1950

with the reduction and cessation of the Japanese marine drift net fishery. Resumption of the unregulated drift net fishery in marine waters resulted in an extended period of low salmon returns until the 1970s. Prior to introduction of the 200-mile exclusive economic zone in 1977 and 1978, most harvest of Kamchatka salmon occurred in this fishery. The drift net fishery outside of the EEZ was finally banned in 1993.

From 1977 until 1991, drift fishing effort within the EEZ was very limited and corresponding harvest of Kamchatka Sockeye was very low. However, drift fisheries continued in the Pacific Ocean outside of the EEZ until 1993. This fishery harvested large numbers of salmon including those of Kamchatka origin but estimation of specific numbers is difficult due to incomplete catch data and the mixed stock nature of the far-flung fishery. In 1993, drift fisheries outside of the EEZ's were banned by agreement between Russia, Japan, Canada, and the United States under the "Convention for the Conservation of Anadromous Fish Stocks in the North Pacific Ocean."

Beginning in 1992, Russia began leasing some drift fishing rights inside the EEZ to Japanese vessels under bilateral agreements between the governments of the USSR and Japan adopted in 1984 and 1985. For instance, Japan has secured quota from Russia for 10,275 tons of salmon in 2007 and 9,735 tons of salmon in 2008 from the Russian EEZ. Pressure of ocean driftnet fishing was relatively stable in years before the complete closure. The high seas drift gillnet fishery was closed in the Russian Exclusive Economic Zone beginning in 2015. This closure included Russian vessels based on Sakhalin and Japanese vessels licensed to operate in Russian waters. Despite to closure, some consequences of the driftnet fishing may persist until now.

Illegal, Unregulated & Unreported Harvest

Illegal fishing has long been a serious problem for salmon in Kamchatka (Clarke 2007; Clarke et al. 2009; Dronova and Spiridonov 2008). It is fundamentally a social problem resulting from economic factors and ineffective enforcement. Illegal fishing can take various forms (Maksimov and Leman 2008):

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

Industrial and everyday poaching use both fish and roe, whereas criminal poaching generally uses only roe. Geographically, industrial poaching takes place mostly in sea, mouths of spawning rivers and in large rivers, while criminal and everyday poaching are located in spawning rivers and in spawning grounds. In most cases it is poaching for roe. Roe is extracted from fish caught with gillnets, beach seines or weirs (in case of small river). Both locals and outside people poach, although locals predominate.

Large-scale illegal harvest grew rapidly after 1988 during uncertain economic times accompanying the dissolution of the Soviet Union. During the political and economic upheaval of the 1990s, many of the local people lost their working places and began fishing illegally, focusing on the valuable caviar market. State enforcement efforts during this period were weak. During this period high levels of poaching substantially influenced salmon population dynamics. The volume of historical levels of illegal harvest is difficult to estimate reliably but a 2008 study by TRAFFIC Russia (Dronova and Spiridonov 2008) concluded that scale of illegal harvest varies considerably from area to area depending on transportation

infrastructure; illegal harvest may be comparable or exceed official catch by up to threefold in a number of large river systems which are major contributors of commercial catch.

Since 2002 KamchatNIRO has conducted research on scale of poaching in Kamchatka (Zaporozhets et al. 2007, 2008). The following approaches were used for analysis of poaching production:

- Analysis of changes of sex ratio in the river mouth and spawning ground (assuming that poaching is mostly targeted on females).
- Comparison of official data and total removal obtained by modeling of catch per unit effort data.
- Comparison of current fisheries statistics and past statistical data assuming acceptable level of misreporting.
- Confidential surveys of people who have direct or indirect relation to poaching (legal and illegal businessmen, fisheries inspection, and the local population).
- Analysis of economical indices of the fishery (official catch data, amount of product after adjusting to raw weight, total amount of fish products sold locally and imported adjusted to raw weight).

The change in ratio of males to females between the river mouth and spawning grounds was taken as one of the clearest indicators of the magnitude of illegal harvest. Females are selectively removed by poachers fishing for caviar while males are thrown back. This selective harvest can also confound estimates of the effective spawning escapement when it is heavily skewed toward males.

Illegal harvest during 2002-2006 was estimated to equal or exceed the legal catch depending on species. The studies have shown that in the period 2000-2006, the illegal catch of salmon averaged about 75% of the total runs of fish to the mouth of the river, excluding Pink Salmon, for which this indicator was at the level of about 15%. The levels of illegal harvest likely had serious and direct consequences for salmon populations throughout this period.

Poaching pressure on low-abundance and commercially more valuable species (Sockeye, Coho, Chinook) was typically much higher than on high-abundance species with lower market prices (Pink and Chum).

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

Illegal harvest appears to have been considerably reduced since 2002-2006 due to economic improvements, changes in the management system, and an increased commitment to enforcement. Economic conditions have continued to improve over time following the upheaval of the 1990s and these improvements have provided other opportunities for employment.

Currently, illegal fishing in the UoA areas of this assessment is reported to be negligible because of inaccessibility, absence of potential poachers because most of local peoples are primarily employed by the fishing companies, and fishing companies are heavily involved in fishing enforcement activities.

Reforms in the fishery management in 2008 have substantially reduced incentives for industrial poaching (Shevlyakov et al. 2016). Fishing parcels were allocated to specific users for 20 years. Harvest quotas are

now established for management units rather than individual companies (Vinnikov et al., 2012). Under the current "Olympic" system, companies may harvest as many fish as they can at designated sites when the fishery is open. Companies no longer need to hide the catch because of absence of individual total allowable catches (TAC). Moreover, the size of official catch is taken into consideration during competition for fishing parcels, and therefore companies with larger catch will have advantages at next distribution of leases. Where fishing is regulated exclusively by days closed to fishing, commercial poaching basically means fishing during closed days. This is not easy to do, especially in those fishing parcels that are adjacent to settlements, because all fishing operations in the lower part of the river are easily observed from the town. Commercial catch reporting is now believed to be close to actual catch because of these changes.

Enforcement efforts have been improved in recent years by state agencies and their cooperation with fisheries companies. Governmental resources for enforcement remain limited but increased support from fishing companies has been key to reducing the incidence of illegal fishing. Long term leases of fishing parcels have now incentivized investments by fishing companies in resource protection. Many of the larger companies provide joint enforcement efforts with the state enforcement agency, Northwest territorial administration of FAR (SVTU), in their fishing areas. In addition to river patrols, enforcement agencies conduct regular inspections of fishing plants and records. Disparate catches in adjacent set nets or fishing sites are an indicator of accepting illegal fish. Enforcement has instruments for limiting catches of suspicious companies even though there as an Olympic system.

There's an estimation that illegal harvest by the commercial sector has been substantially reduced since 2009 from historical levels (Figure 9). Criminal and common illegal harvest continues at a chronic background level. Illegal harvest in the traditional sector has increased. However, there is a net decrease in total illegal harvest due to the decrease in the commercial sector. The information about the exact location of the illegal fishing is not available, but it is situated in the mouth, downstream part of the river, its bed. Probably, some poaching also took place near the spawning grounds, but likely not very much because spawning grounds, situated in the upstream parts of rivers is usually quite difficult to access. Thus, the illegal fishing is mostly located downstream of the areas where spawning escapement surveys take place.

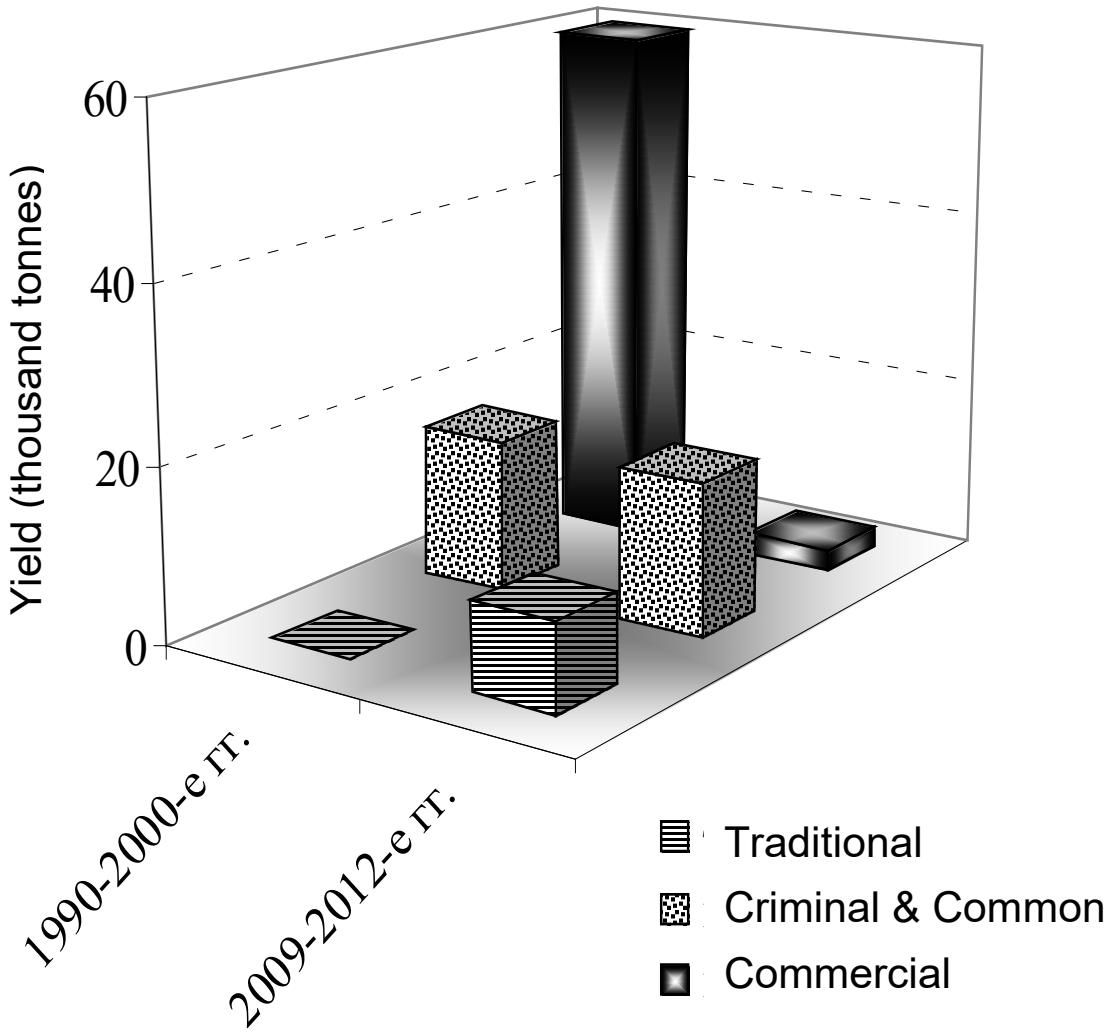

Figure 9. Dynamics of illegal harvest of Pacific salmon in the Kamchatka Region (Shevlyakov et al. 2014).

3.3 Principle One: Target Species Background

Target species include Sockeye Salmon, Chum Salmon, Coho Salmon and Chinook Salmon.

3.3.1 Sockeye Salmon

Distribution

Sockeye occur throughout the north Pacific from Washington USA to Kamchatka. Two large populations comprise the majority of the Sockeye return in Kamchatka, the Ozernaya (with Kurilsky Lake) in western Kamchatka and the Kamchatka River in eastern Kamchatka. Sockeye spawn throughout the Kamchatka River system (Figure 10, Figure 11).

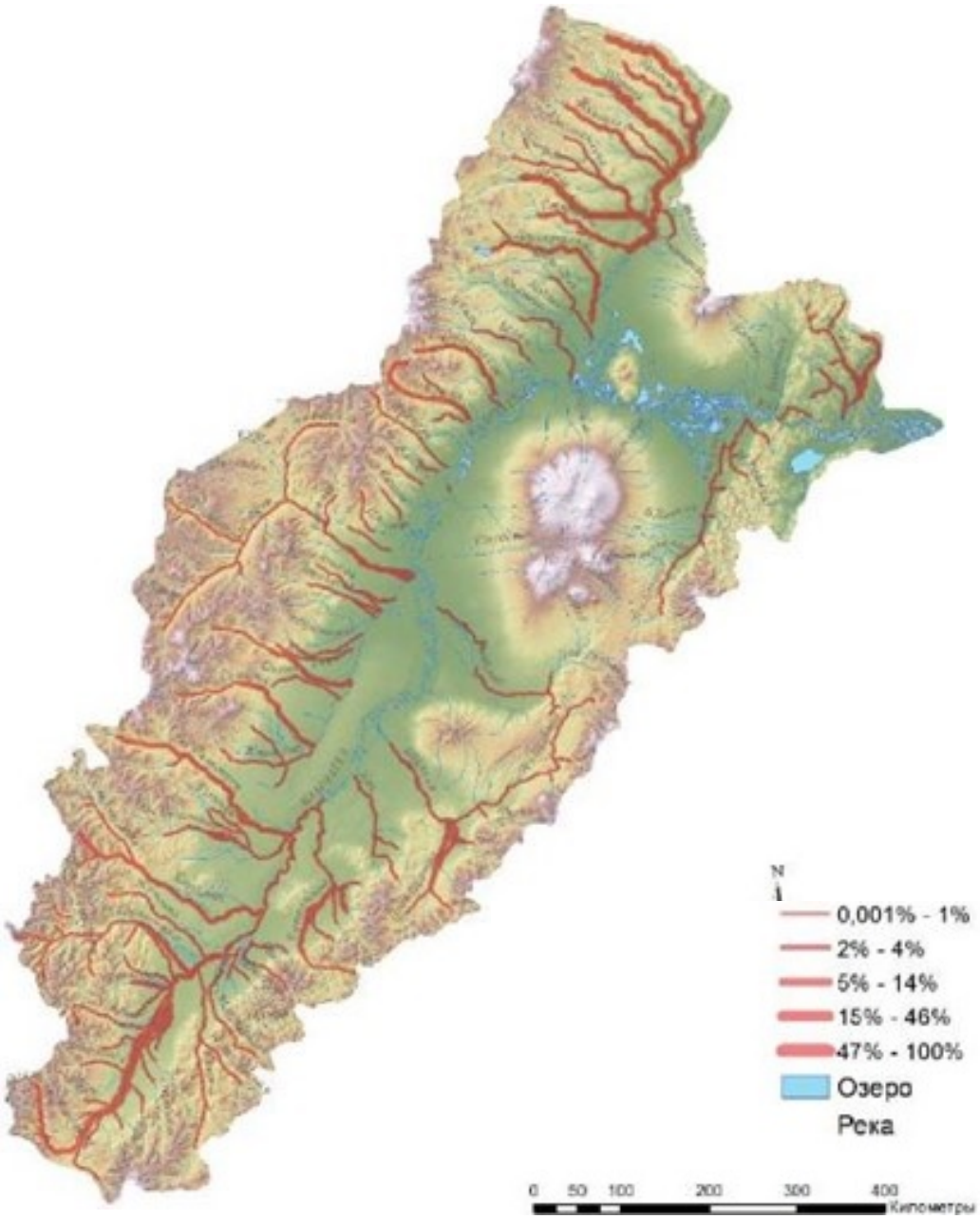

Figure 10. Distribution of spawning grounds of Sockeye Salmon in the Kamchatka River basin. Width of red lines shows relative density of spawning grounds.

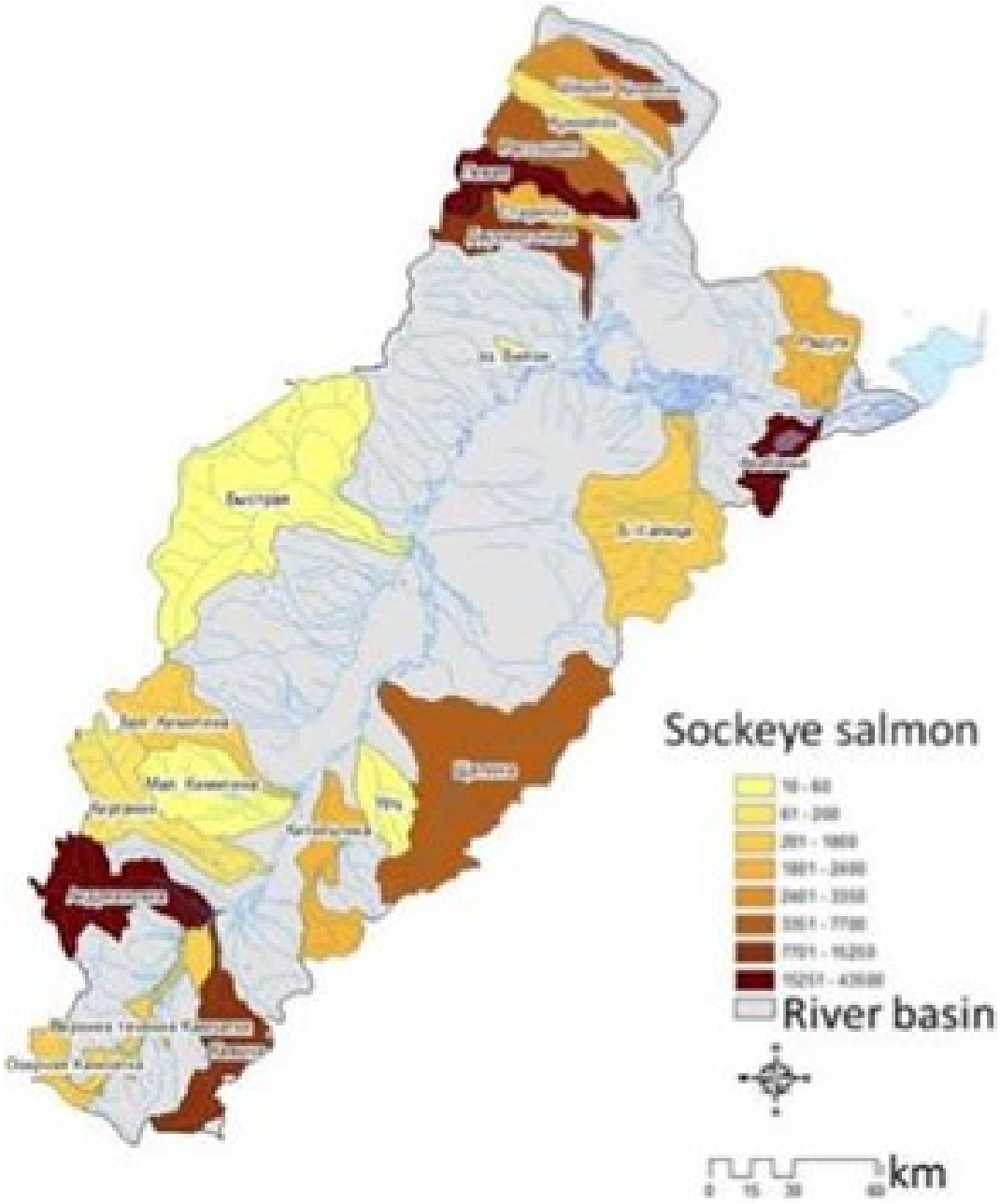

Figure 11. Density of the Sockeye Salmon spawners in the basin of the River Kamchatka.

Life History

Sockeye Salmon is a Pacific salmon with a long freshwater and marine life periods. In general, Sockeye Salmon prefer lake and lake-river systems because they rear primarily in lakes and can achieve large abundances in these systems (Bugaev 1995, 2011). Sockeye Salmon production in small and medium river basins is low. Spawning may occur in lake tributaries, outlet streams or along the lake shore. Fry usually spend in fresh water from 1+ to 3+ years, then it runs to the sea, where lives 1-4 (sometimes 5), more often 2-3 years (Foerster 1968; Konovalov 1980; Bugaev 1995; Shuntov and Temnykh 2008). The maximum lifespan of anadromous Sockeye Salmon in fresh waters is forced and can be even up to 5+ - 6+ years. From the basins of a number of rivers, a part of young fish runs to the sea with fingerlings (at the age of 0+) (Bugaev 1995).

According to the observations of KamchatNIRO, individual specimens of Sockeye Salmon come into the Kamchatka River at the end of the second decade of May, an intensive run starts from the beginning of the second decade of June and continues until the beginning of July. Sockeye Salmon appear in the catches until the end of July and beginning of August, and later (before the beginning of September) only single specimens are caught (Bugaev 1995).

Reliable data on the age structure of the Sockeye Salmon of the Kamchatka River is available since 1978. Materials on the age composition of previous years are not considered in connection with the lack of guidance on the method and place of fishing, which is fundamental for Sockeye Salmon in the Kamchatka River, where the age composition of catches of sexually mature fish from drift nets and trapnets differ considerably. As a standard, materials collected from catches of trapnets with the lowest selectivity are taken (Bugaev, 1995).

Sexually mature Sockeye Salmon in the Kamchatka River currently have 20 age groups. The most common are individuals at the age of 1.3 and 2.3, rarely 0.3 and 2.2 (KamchatNIRO 2017). The average percentage of Sockeye Salmon females in the Kamchatka River in the runs in 2003-2016 (against 1992-2002) increased and is equal for early Sockeye Salmon 53%, for the late - 58% (KamchatNIRO 2017). For Sockeye Salmon in the Kamchatka River, both males and females of the late form in general have larger sizes and body weights than the individuals of the early form. For the period 1995-2016 in sexually mature Sockeye Salmon reliable negative trends for the length are registered, but the body mass index over these years did not show any clear temporal trend (KamchatNIRO 2017).

Average absolute fecundity of Sockeye Salmon females in the Kamchatka River in 2007¬2016 was equal to: early Sockeye Salmon - 3342 (2982-3793), late Sockeye Salmon - 3833 (3205-4210) eggs per female (KamchatNIRO 2017).

Stock Structure

Sockeye runs are generally comprised of populations returning to specific spawning and rearing areas. These populations are typically demographically and genetically distinct. Stock of Sockeye Salmon of the Kamchatka River has a complex hierarchical population structure. There are four local stocks (A, D, H and K) and four groupings of local populations of the second order (C, B, E and H) (Bugaev, 1995). All local stocks and some groupings include early (spring) and late (summer) seasonal races (E, A, H, D, K). Some groups are represented by only one seasonal race: C - early, B - late. The only exception is grouping C, which is reproduced in Lake Ushkovskoe, a late seasonal race that migrates to the sea as yearlings. It has been established (aerial survey data and results of identification of fish in catches) that grouping E and local stock D consist of 95% of early spawners and 5% of late spawners. Local stock A - 70% of early spawners and 30% of late ones. Stocks K, H and grouping H the early Sockeye Salmon comprises 5%, and late - 95%.

The Kamchatka River Sockeye become mature mostly in the age of three years in the sea. The most numerous are local stock A and grouping E, which comprise together in average more than 70% of the Kamchatka River Sockeye. Grouping C, B and stock D have a much lower abundance, while the local stocks H and K are practically negligible at the present time. All local stocks and groupings have specific population dynamics (Bugaev, 1995, 2011). Despite complex population structure, Sockeye Salmon of Kamchatka River starting from the 2003, monitoring of the stocks is carried out using combined data. This allows quite high accuracy of forecasts and therefore considered to be adequate approach for the management.

Status

Sockeye Salmon abundance is currently at high levels (Figure 12, Figure 13). Returns to Kamchatka streams have increased substantially since restrictions of the high seas drift net fishery and the shift to more productive ocean conditions for salmon in the North Pacific since the late 1970s. More accurate harvest reporting may also have contributed to higher numbers since 2008, as a result of changes to the management system.

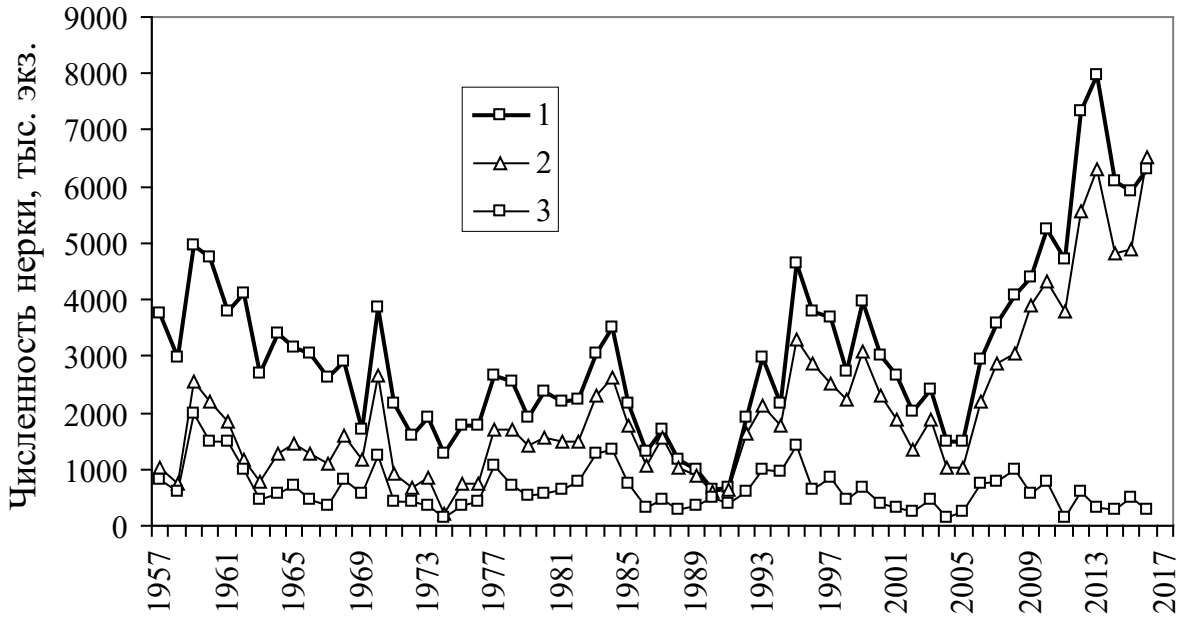

Figure 12. Abundance of Kamchatka River Sockeye Salmon in the sea (1), at the approach to the mouth of the river (2) and at spawning grounds (3), in 1957-2016.

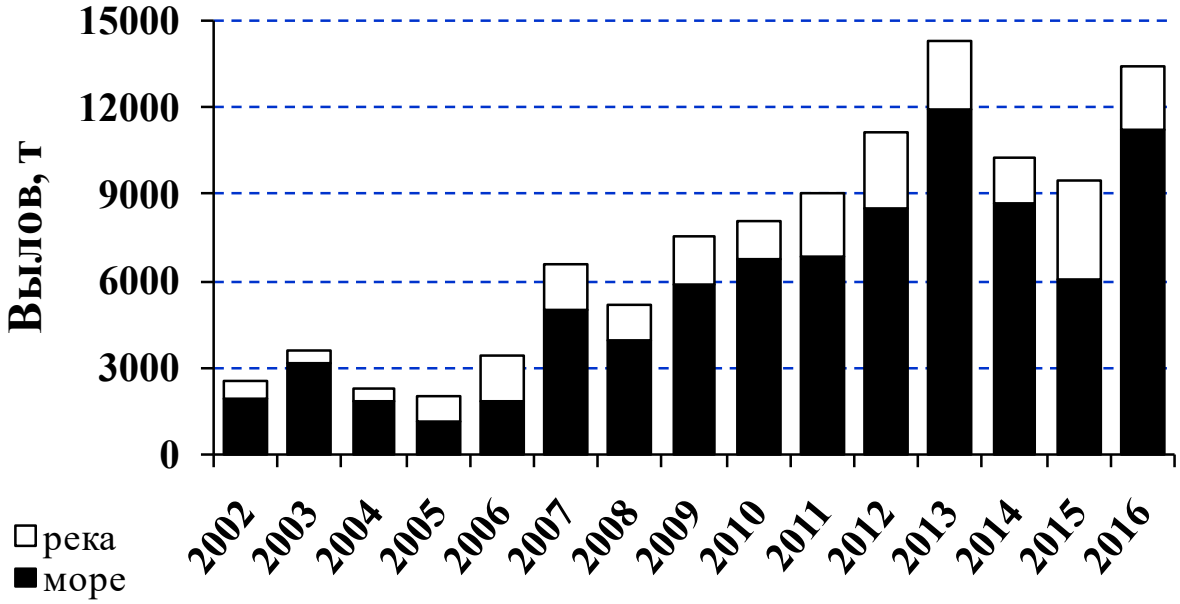

Figure 13. Harvest of Sockeye Salmon (tonnes) in the Kamchatsky Bay and Kamchatka River (■ sea, □ river).

Escapement of Sockeye is assessed based on aerial surveys of representative spawning areas and a sonar counter in the Azabachya River. Aerial survey effort has been much reduced since 2010 due to budget limitations but limited surveys have continued in the Kamchatka River for Sockeye. In 2016, aerial surveys were conducted throughout the Kamchatka River basin from July 19 to 22. Surveys showed that the highest density of Sockeye Salmon spawning was observed in the lower reaches of the Kamchatka River - in the basin of Lake Azabachya and in the tributaries of the third order of the rivers Dvukhyurtochnaya, Levaya and Kinenin. In fact, the number of Sockeye Salmon in the Yelovka River basin amounted to more than 84 thousand individuals, in Lake Azabachye, air and acoustic observations estimate an escapement of 104.5 thousand Sockeye Salmon.

Management

The average long-term value of the spawning escapement is at the level of 600 thousand fish, which corresponds to the earlier accepted ideas about the optimum spawning escapement. However, in recent years, the value of the optimal escapement was accepted on the level of 460 thousand individuals (Figure 14).

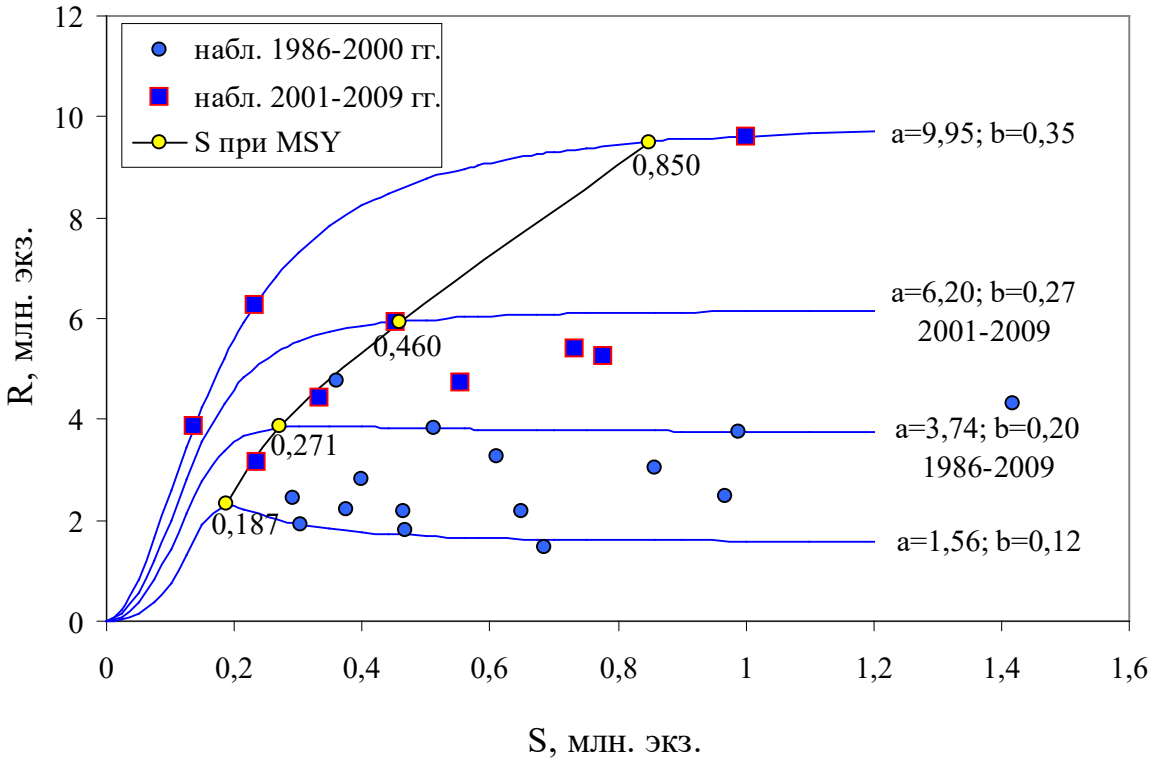

Figure 14. Recruits (y-axis) versus spawners (x-axis) for Kamchatka River Sockeye Salmon (KamchatNIRO 2017).

Escapements, during the entire period of research, varied from 112,000 to 2 million individuals (Figure 15). According to KamchatNIRO model, spawning escapement goal for Kamchatka River Sockeye for period 2001-2009 is 497,000 individuals, and maximum border is 850,000 individuals, and the limit reference point is 163,000 individuals. Given the lack of aerial surveys, KamchatNIRO considers status of Sockeye stock to be satisfactory, but recognizes the need to increase escapement to spawning grounds.

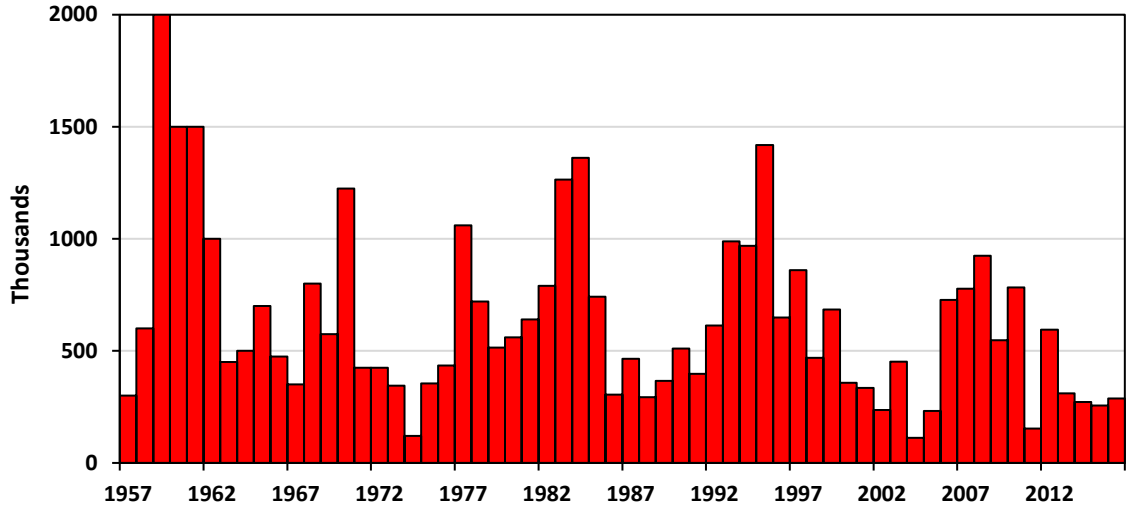

Figure 15. Spawning escapement of Sockeye Salmon in Kamchatka River (thousands of individuals).

3.3.2 Chum Salmon

Distribution

Chum Salmon have the widest distribution of any of the Pacific salmon. Chum Salmon generally spawn in low gradient temperate and subarctic rivers and streams throughout the north Pacific. They range south to the Sacramento River in California and the island of Kyushu in the Sea of Japan. In the north they range east in the Arctic Ocean to the Mackenzie River in Canada and west to the Lena River in Siberia. Chum Salmon are abundant in eastern Kamchatka streams. This species is abundant in large tributaries throughout the Kamchatka River basin (Figure 16).

Life History

Chum Salmon generally return to western Kamchatka from late June through October (Nikolaeva 1975; Zavarina 2003). Numbers peak in late August and early September. Chum Salmon typically reach their spawning grounds in August and September. Spawning typically occurs in the lower and middle reaches of streams, rivers and sometimes the intertidal zone at the mouths of streams. Spawning areas often occur in areas of upwelling springs.

Length of Chum Salmon in the Kamchatka River basin varies from 47 to 81 cm, weight – 1.4¬7.6 kg (KamchatNIRO 2017). The average long-term values for 15 years were at the level of 62.9 cm and 3.3 kg. Age of maturity is 2 to 6 years (primarily at 4 years of age). Individual absolute fecundity typically ranges between 731 and 7,900 eggs (KamchatNIRO 2017). Eggs incubate over the winter before hatching in early spring. Juvenile Chum Salmon spend one-two months in the fresh water after hatching and then migrate to the sea soon after emergence in the spring.

Stock Structure

Kamchatka Chum include spring, summer and fall runs, returning in June, July-August, and October-November, respectively. Different runs typically spawn in different portions of a basin with earlier fish generally traveling farther upstream. Genetic analyses have generally identified system and run-specific differences among Chum populations in others regions. All three stocks are present in the area of this assessment.

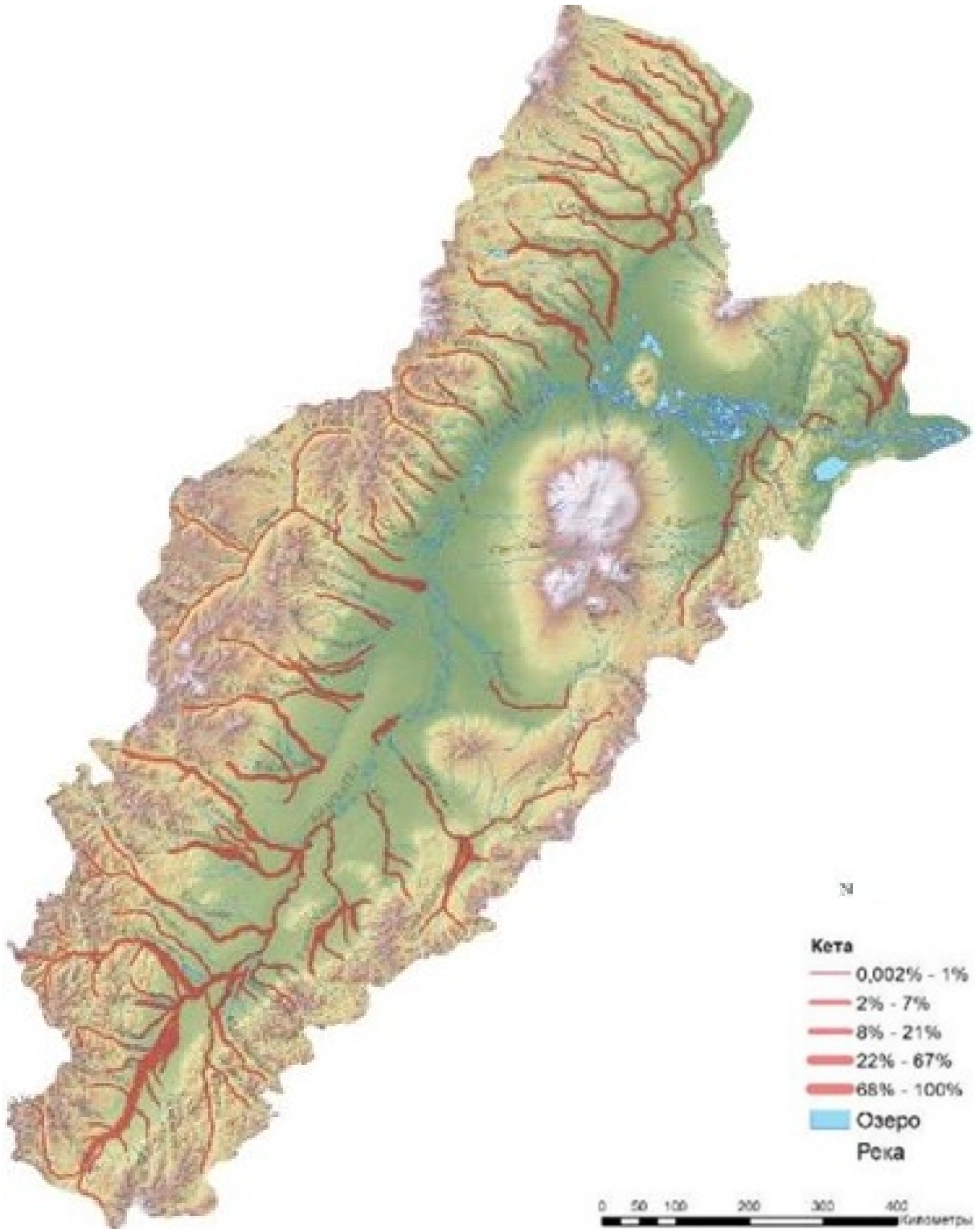

Figure 16. Distribution of spawning grounds of Chum Salmon in the Kamchatka River basin. Width of red lines shows relative density of spawning grounds.

Status

Chum Salmon returns and commercial harvest rates have steadily increased in eastern Kamchatka from very low levels observed in the 1970s. Total run size averaged about 420,000 fish from 1970-1985 with commercial catch and exploitation rate averaging 300 mt and 20%, respectively. From 1986-2000 run size averaged 1.3 million fish with commercial catch and exploitation rate averaging 2,000 mt and about 44%, respectively. Since 2010, runs have averaged about 5 million Chum per year, and exploitation rates have averaged 90% for an annual average harvest of 17,000 mt. In Kamchatsky Bay and Kamchatka River, recent Chum harvests have been 4000 to 6000 tonnes (Figure 17). The assessment team suspects that apparent increases in run size and harvest since 2008 result from more accurate commercial catch reporting following the implementation of the "Olympic" management system. Underestimation of spawners on spawning grounds due to lack of funding of aerial surveys also occurred (see below).

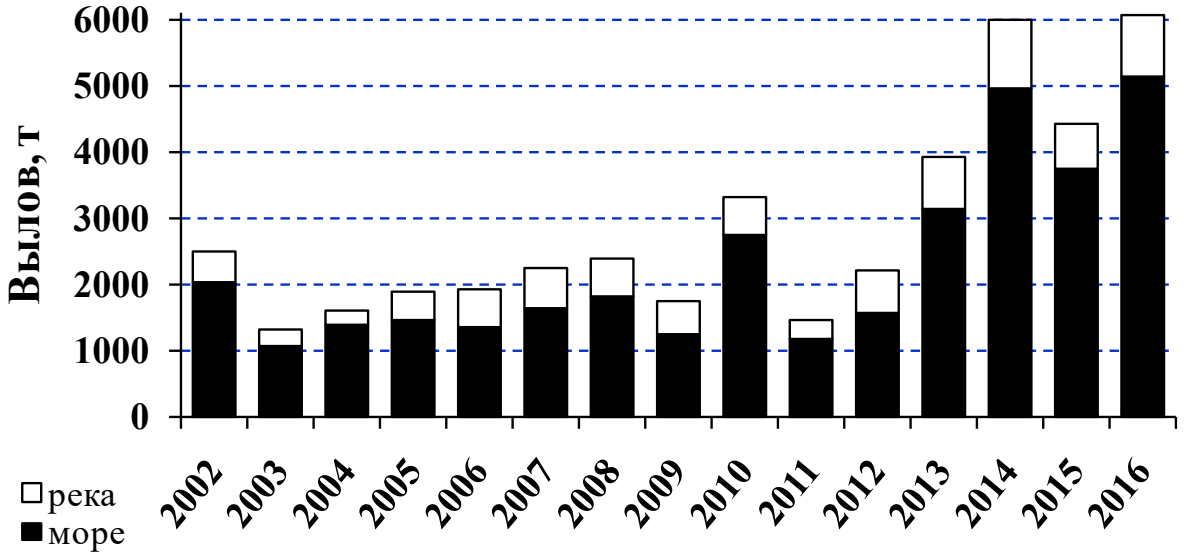

Figure 17. Harvest of Chum Salmon (tonnes) in the Kamchatsky Bay and Kamchatka River (■ sea, □ river).

Historical abundance of Chum Salmon has varied widely as evidenced by harvest numbers relative to escapements. Mortality of juvenile Chum Salmon in the Japanese drift net fishery in the open ocean explains much of the variation (Shevlyakov 2013). High catches in Kamchatka during 1941-1950 coincide with the reduction and cessation of the drift fishery. Returns declined from 1960 - 1980 with the resumption of the drift fishery and climatic factors. Numbers rebounded beginning in the 1990s with regulation of the high seas drift net fishery and favorable ocean conditions for salmon throughout the north Pacific.

Spawning escapement of Chum Salmon is estimated based on expansions of aerial counts in a series of index areas throughout Kamchatka since 1957. Spawning escapement is assessed based on aerial surveys in index rivers – escapements in other areas are inferred from historical distribution patterns. Analyses by KamchatNIRO (2017) have demonstrated a high degree of correlation in numbers among adjacent systems. Spawner-recruit analyses have recently been completed to identify escapement-based biological reference points. Historical escapements have generally been demonstrated to be consistent with these values although escapement data is more limited in recent years due to budget reductions. Thus, recent escapement numbers reflect a lack of assessment, rather than a lack of escapement.

Since late 1960s spawning escapement in Kamchatka River is on stable level (Figure 18), and at the moment KamchatNIRO considers stock status as favorable. Number of spawners in the spawning grounds of the Kamchatka River in the years 2002-2016 varied from 6 to 288 thousand individuals (about 97 thousand in average) (Figure 18). Due to inadequate funding, complete aerial surveys have not been carried out since 2010. Thus, recent escapement numbers reflect a lack of assessment, rather than a lack of escapement.

Exploitation rate of Chum Salmon in the basin of the river Kamchatka is quite large, exceeding 80% in some years (although estimates appear to be inflated by incomplete spawning escapement estimates). Since the mid-1970s, the intensity of fishing has been steadily increasing, reaching a maximum in the last 11 years. Chum are currently the primary focus of the commercial fishery in odd-numbered years when Pink Salmon are less abundant. Chum Salmon escapement objectives may limit the catch of Pink Salmon in large Pink return years. According to KamchatNIRO researchers, the recent decrease of apparent Chum spawning escapement is caused by lack of observations.

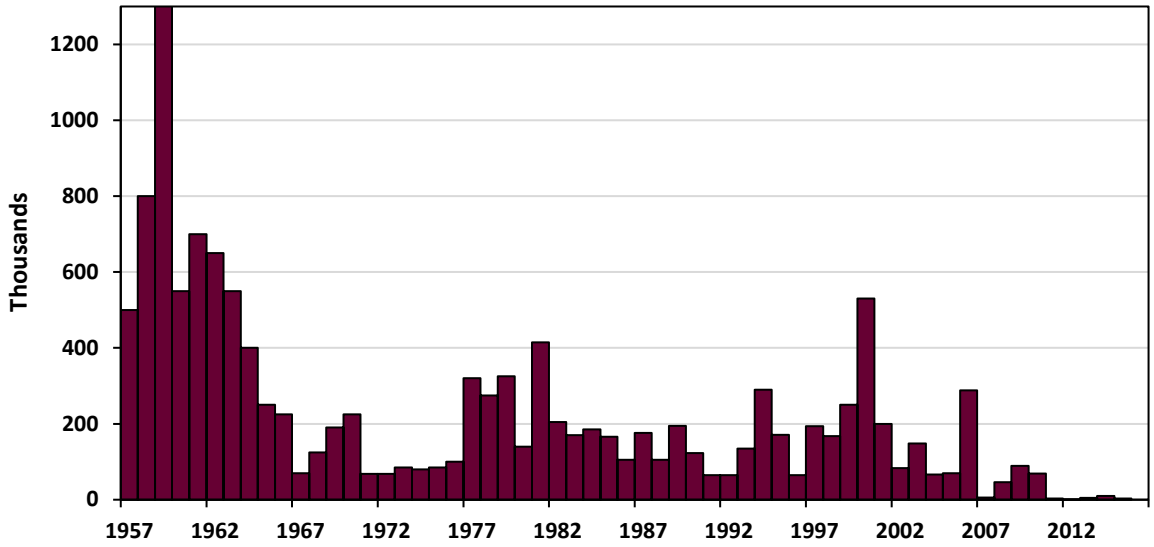

Figure 18. Spawning escapement of Chum Salmon in Kamchatka River in 1957-2010 (thousands of individuals).

Management

Escapement objectives are identified for Chum Salmon based on historical production patterns (Figure 19). Target reference point for the last ten years is 142 thousand (upper level of the estimate is 363 thousand), and the limit reference point is 46 thousand individuals. The relationship between juvenile production and spawning recruitment of Chum Salmon is not as clear as for other species of Pacific salmon. Juvenile Chum production is related more to the relative abundance of spawning Pink Salmon (Shevlyakov and Zavarina 2004). Low Pink Salmon escapements do not provide sufficient nutrients for foraging juvenile fish, and excessively large (greater than 60 million) Pink Salmon escapements can reduce Chum egg survival due to associated oxygen depletion in the river systems.

Biological guidelines for stock control of Kamchatka River Chum Salmon have been identified by KamchatNIRO 2017) from the stock-recruitment relationship. The spawning escapement target is located in the zone between the SMSY estimate of 142,000 copies for the period 1947-2010, and its maximum

limit is S * MSY = 363,000. As a buffer reference point S_{buf} (the minimum permissible manufacturers' pass), the parameter S0 = 46,000 individuals is used.

Fisheries are regulated with passing days to ensure that significant spawning escapement into area rivers sufficient to sustain continuing high levels of production. Historical data indicates that harvest control rules based on the passing day strategy is generally adequate to control exploitation rates and ensure significant escapement in most years (as long as stock productivity, fishing effort or fishery efficiency are comparable which they appear to be in the short term).

Fisheries are regulated to ensure that significant escapements are distributed among individual rivers within the Kamchatka River basin but each river is not managed to achieve a specific goal as long as the aggregate goal is being achieved. Thus, some rivers are fished at higher rates and some at lower rates. Estimated exploitation rates of Chum Salmon in some rivers can approach 95% rate in some years. Such high rates would exceed average values in other wild Chum fisheries throughout the Pacific with the exception of years of big returns for productive stocks. However, KamchatNIRO suggests that high rates in recent years are overestimates due to undercounting of escapement during large run years (Shevyakov et al. 2016).

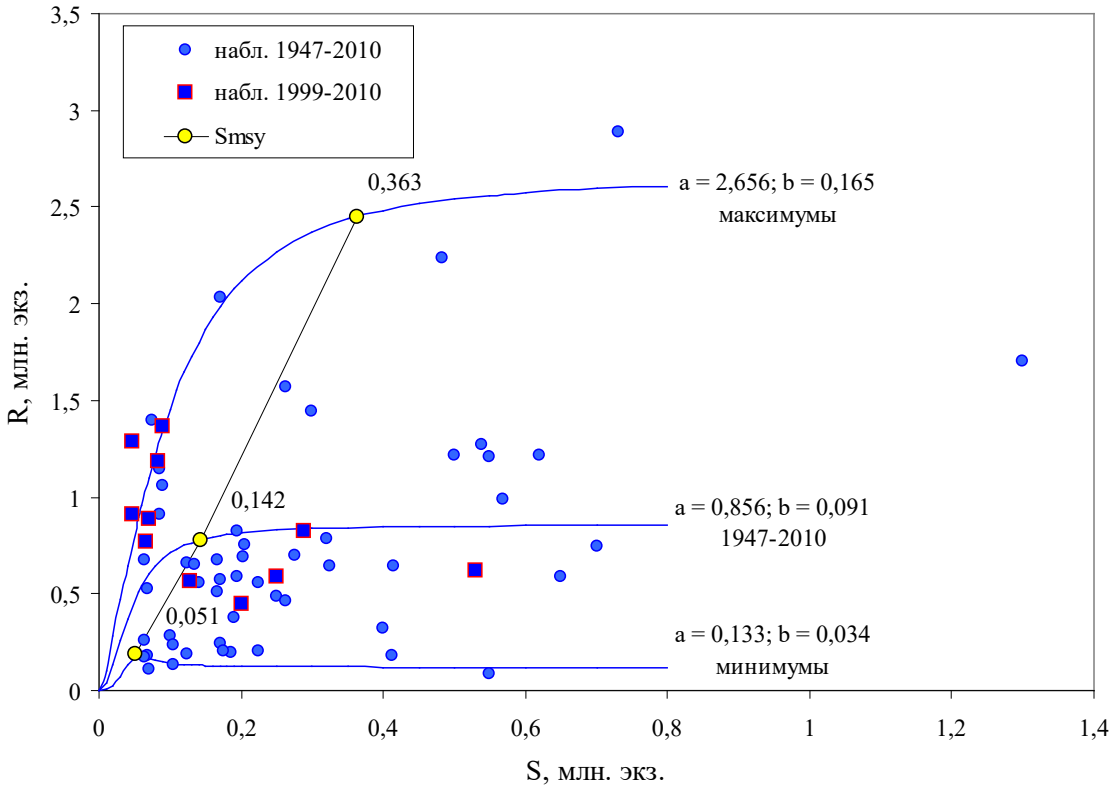

Figure 19. Recruits (y-axis) versus spawners (x-axis) for Kamchatka River Chum Salmon (millions) (KamchatNIRO 2017).

3.3.3 Coho Salmon

Distribution

Coho Salmon are generally distributed in streams and rivers throughout the subartic and temperate north Pacific from the Sea of Okhotsk to northern California (Sandercock 1991). Distribution in Kamchatka is generally limited to the southern portion of the Peninsula where they may be found in most mid-large and large bodies of water (Figure 20). On the east coast of Kamchatka, the main area for the reproduction and fishing of Coho Salmon is the rivers of the southeast of Kamchatka (Petropavlovsk-Komandorskaya subzone), among which the Kamchatka River has the primary importance as the largest river on the peninsula with a length of 758 km (Zorbidi, 2010). The Kamchatka River plays a significant role in the reproduction of Coho Salmon, currently providing 80-90% of the total catch of the species on the eastern coast of the peninsula, consistently occupying the first place in the catch in Asia (Bugaev et al., 2007; KamchatNIRO 2017).

Life History

Coho return over a protracted period from August to December with spawning as late as February. Spawning typically occurs in a wide range of rivers and streams, including the uppermost accessible tributaries. Low water temperatures and the presence of shallow gravel areas allow Coho Salmon to spawn along nearly the entire lengths of the rivers. Coho Salmon prefer to spawn in areas with intra-gravel water flow and/or areas with groundwater upwelling. Juvenile Coho may rear in streams for one to three years before undergoing a physiological transformation to smolts and migrating to the sea.

Adults typically return to spawn at 3 to 5 years of age after 1 year at sea. As with other species that have a protracted freshwater rearing period, Coho Salmon are characterized by a complex age structure. In some years in the Kamchatka River up to 9 age groups of Coho Salmon were identified, far from equal in frequency. More typically, there are 7 groups in this river. On the average about 95% of fish are age 2.1+ and 1.1+, there are fewer fish - 3.1+. A small number of “jacks” or “kaiyrkas” return to freshwater in the same year they out-migrate to sea (1.0, 2.0, 3.0). The proportion of fish that spent 2 winters in the sea, as well as individuals maturing in the first summer of life in the sea is not large (KamchatNIRO 2017).

The length and weight of Coho Salmon in the reproduction areas vary. Coho are noticeably smaller on East coast of Kamchatka than on the west coast. The differences in the size and weight indices of males and females among East Kamchatka rivers are usually not large (Zorbidi, 2010). The mean length and weight of Coho Salmon in the Kamchatka River over the past 15 years were 59.4 cm and 2.8 kg, respectively (KamchatNIRO 2017). Sizes vary from year to year. In the last decade, Coho tend to be smaller in even years than in odd years. In 2016 in the Kamchatka River, and along the eastern coast as a whole, Coho averaged 55.1 cm and 2.2 kg. Maximum average sizes of 66.5 cm and 3.5 kg in the Kamchatka River were recorded in 1995.

<u>Stock Structure</u>

Rivers with significant groundwater upwelling areas typically include two distinct Coho Salmon runs - summer and autumn (early and late). The early run includes fish returning in August and September. The late run includes fish returning beginning in late September. In years of high Coho Salmon returns, competition for available spawning area forces some fish to spawn in sub-optimal habitats where the egg survival is poor.

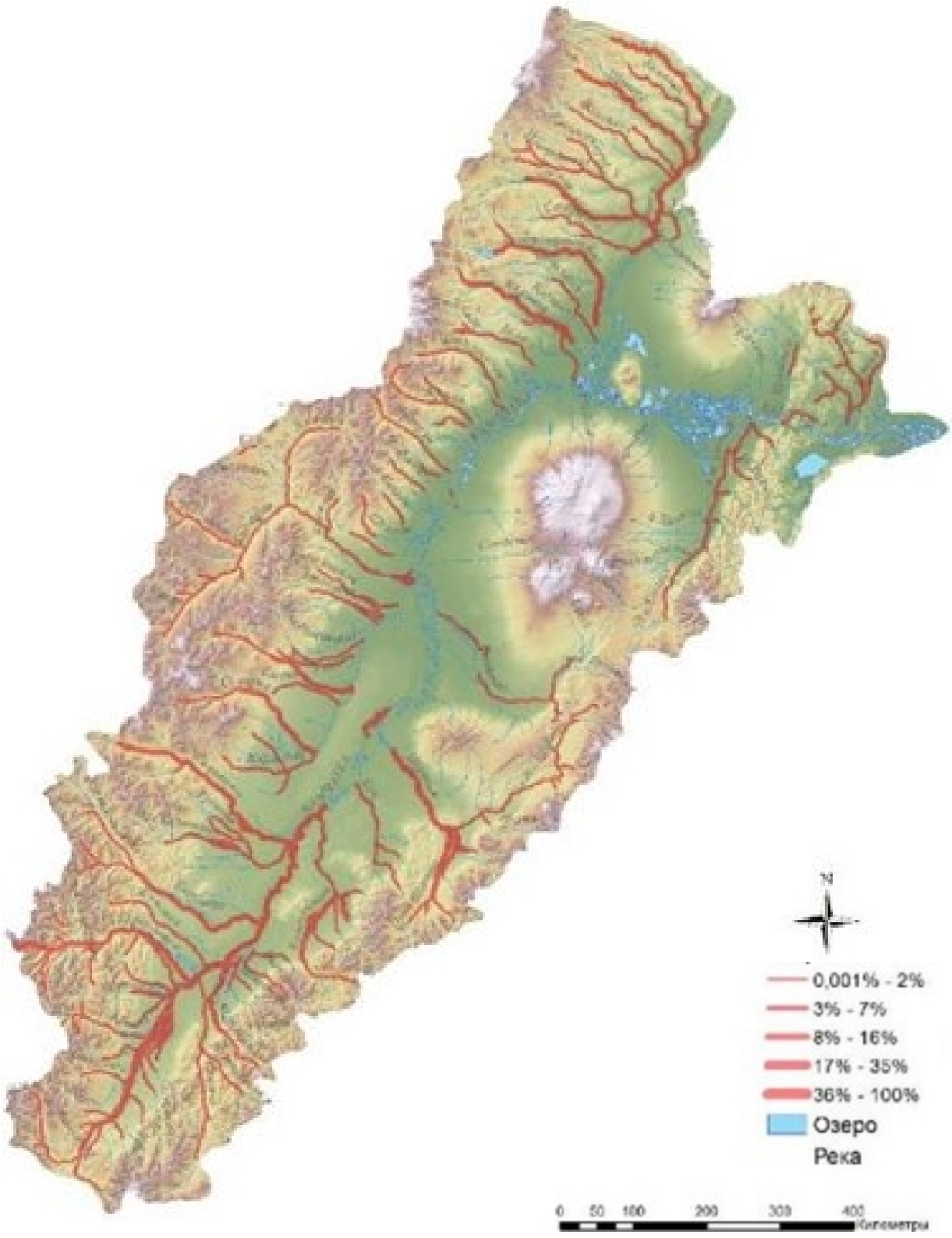

Figure 20. Distribution of spawning grounds of Coho Salmon in the Kamchatka River basin. Width of red lines shows relative density of spawning grounds.

Status

KamchatNIRO reports that reliable fishing statistics are available since 1970 but additional data are available as far back as 1934 (Figure 21). Numbers vary substantially from year to year with no clear trend since 1970 (Zorbidi 2010). Coho Salmon landings increased since the early 2000s, but some of this increase may have resulted in improvements in catch reporting due to changes of management system.

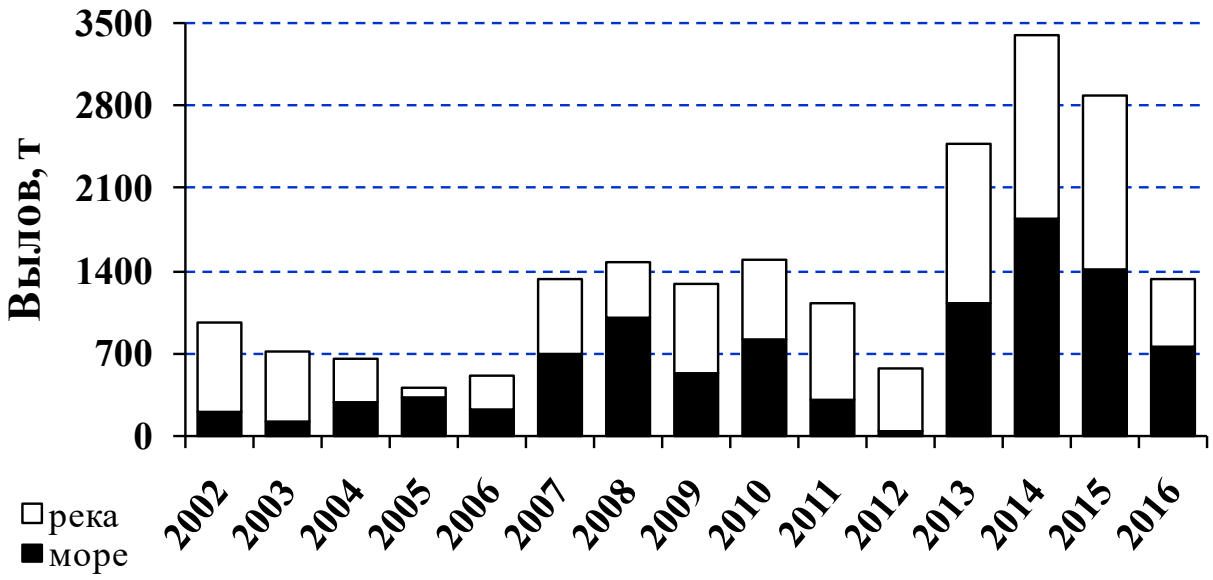

Figure 21. Harvest of Coho Salmon (tonnes) in the Kamchatsky Bay and Kamchatka River (■ sea, □ river).

Spawning escapement of Coho Salmon was historically estimated based on aerial surveys of a series of index areas. The aerial surveys of Coho spawning escapement were started later than of other commercial salmon species – in the mid-1970s (Figure 22). Estimates are limited to the early portion of the run due to the protracted run timing of Coho and difficulty of conducting surveys later in the year. Most Coho Salmon spawn late in the season after aerial surveys have been conducted (Shevlyakov et al. 2014) so escapements are likely underestimated. KamchatNIRO estimates that counts include only 50 to 70% of the total number. Aerial survey effort for Coho has decreased in the last decade due to budget reductions in KamchatNIRO. During this period, aerial survey effort in the Kamchatka River has been prioritized for other salmon species. Thus, lower counts depicted in Figure 22 for recent years reflect the decrease in survey effort rather than reduced abundance.

Due to recent reductions in aerial coho salmon surveys, current stock assessments are based on a combination of aerial surveys for other salmon species, fishery catch per effort, hydroacoustic data, and other relevant information (KamchatNIRO 2018). These indicators were correlated to historical aerial survey results and these relationships were used to infer run size and escapement from current index data (Figure 23).

Coho Salmon returns were heavily impacted by unregulated drift gillnet fishing in the ocean from 1950 until the 1970s. Run sizes improved from 1979-1990 with the restriction and closure of the drift fishery (Figure 22). Run size and escapements has declined to relatively low levels from 1990-2012 (Figure 22, Figure 23). Higher returns since 2012 were attributed by KamchatNIRO more-favorable ocean conditions.

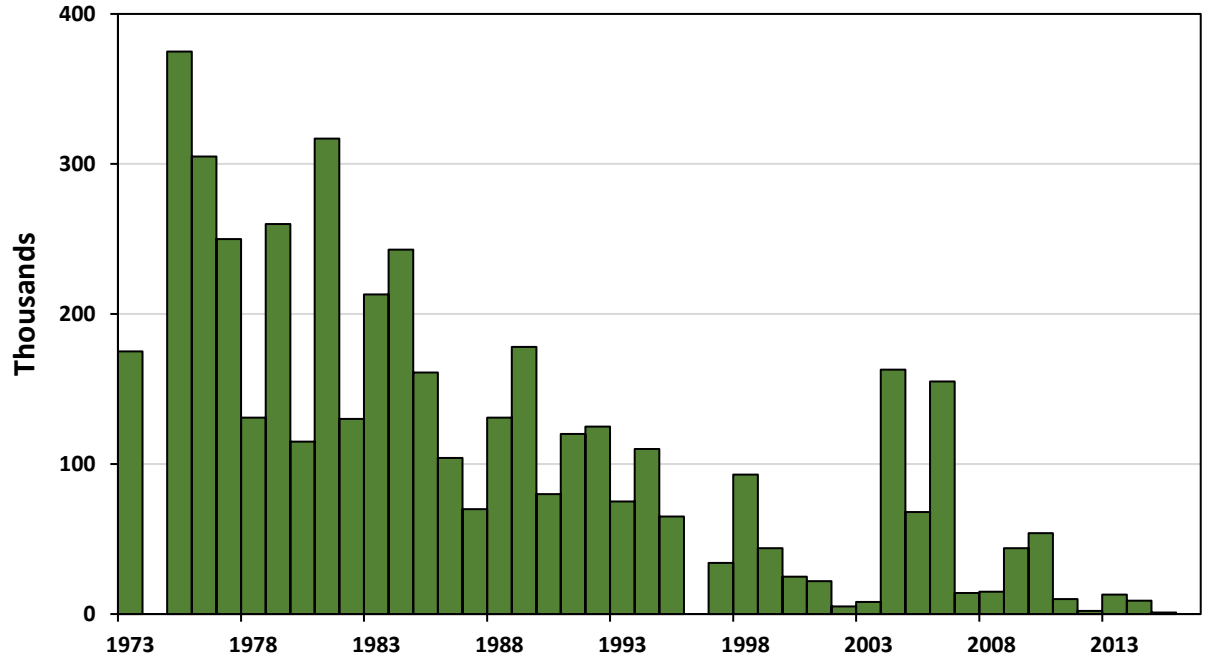

Figure 22. Spawning escapement of Coho Salmon in Kamchatka River based on aerial surveys. (Aerial surveys are incomplete for Coho Salmon in recent years due to budget reductions.)

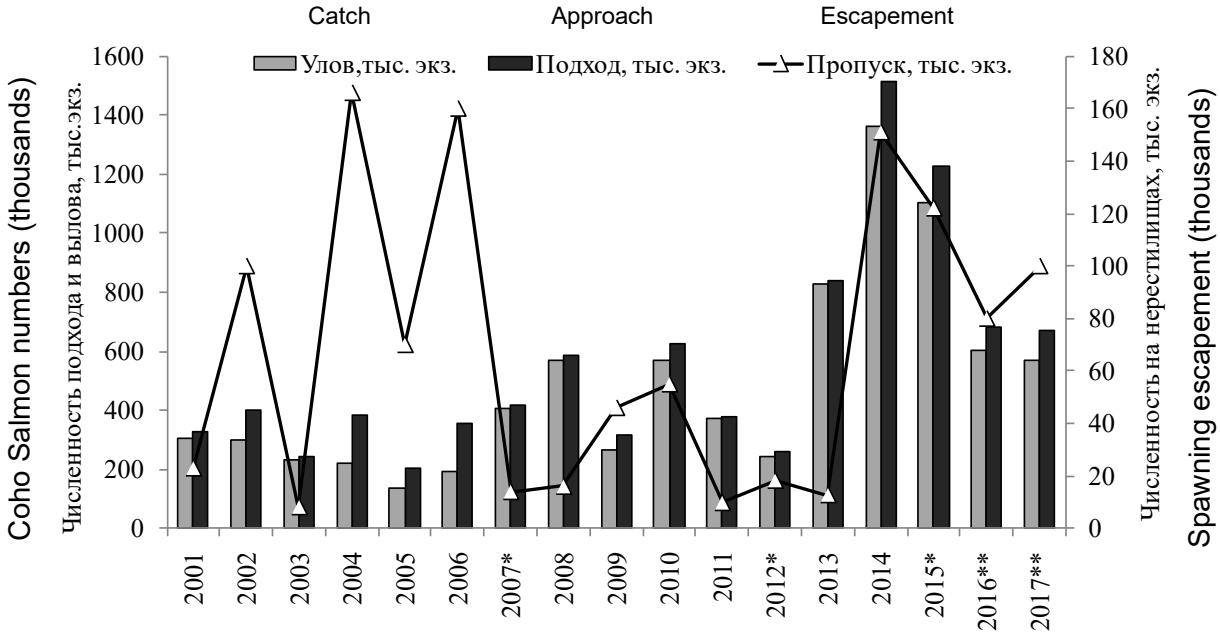

Figure 23. Approach, yield and data on filling of coho salmon spawning grounds in drainage basin of Kamchatka River (KamchatNIRO 2018). Estimates of spawning escapement for 2007 and 2015-2017 are based on indicator data. Other years are based on aerial surveys.

Management

KamchatNIRO (2017) has estimated biological reference points for Kamchatka River Coho Salmon based on historical stock-recruitment data (Figure 24). Optimal spawning escapement is 108,000, the upper goal is 187,000, and the minimum goal is 27,500 spawners. Recent average escapements generally meet or exceed a range between described by precautionary boundary although lower goals were generally not achieved during previous low run years. Based on control survey data and given the lengthy duration of the Coho spawning migration, KamchatNIRO (2018) estimated spawning escapement to the drainage basin of Kamchatka River to exceed the estimated value in Figure 23 and might amount to some 80,000 individuals in 2016 and at least 100,000 individuals in 2017.

KamchatNIRO (2017, 2018) has concluded that Coho Salmon in the Kamchatka River basin are currently functioning at a sustainable level as evidenced by continuing run sizes and yields based on observed spawning escapements.

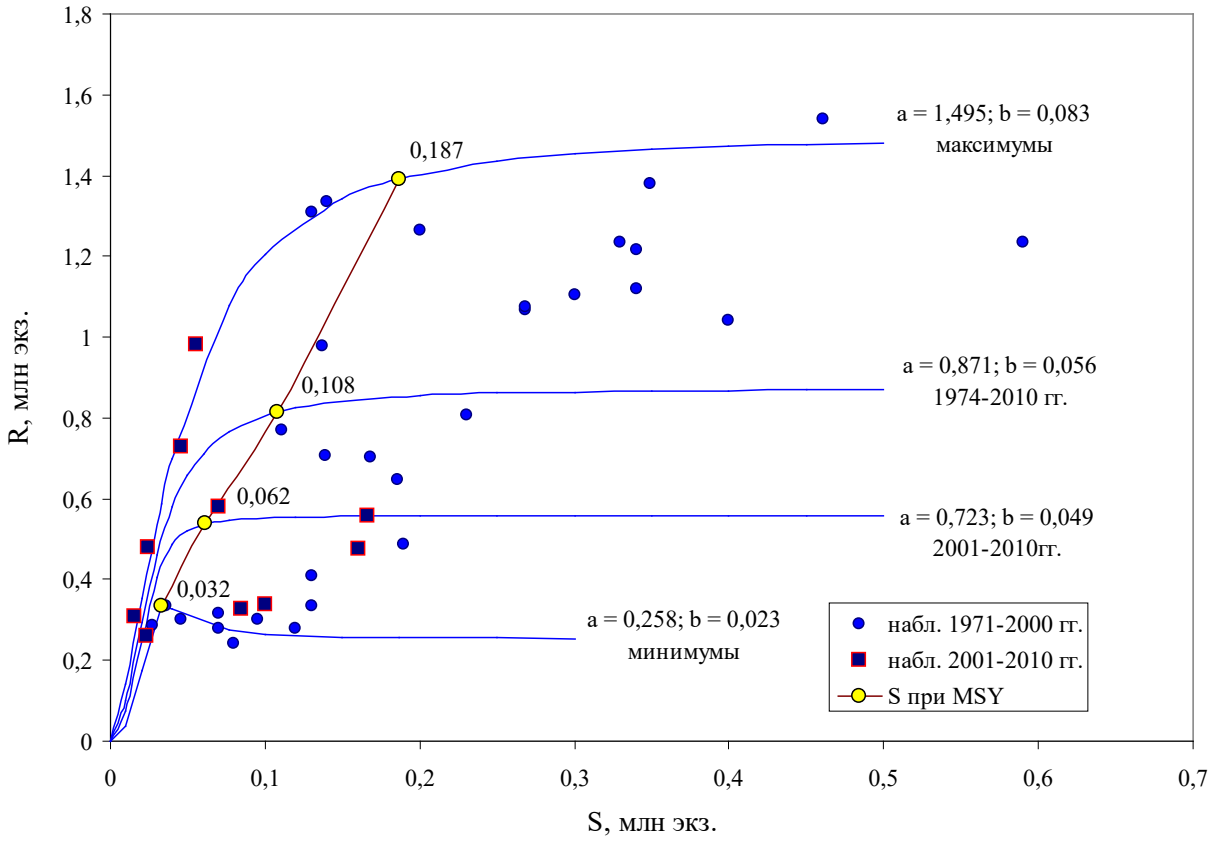

Figure 24. Recruits (y-axis) versus spawners (x-axis) for Kamchatka River Coho Salmon (KamchatNIRO 2017).

3.3.4 Chinook Salmon

Distribution

Chinook Salmon production in Asia is primarily limited to the Kamchatka peninsula where significant populations may be found in large rivers of the western and eastern coasts. The bulk of the Chinook Salmon reproduces on the eastern coast of the peninsula in the basin of the Kamchatka River (KamchatNIRO 2017). Spawning grounds in the Kamchatka River basin are shown in Figure 25 and Figure 26.

Life History

Chinook return to the Kamchatka River from mid-May until early August (Vronskiy 1972, 1994; Groot and Margolis 1991; Zikunova 2016). The first individuals observed in the river even before the ice breaks. Peak returns occur in the middle of June and early June with a lull in between. Chinook Salmon migrate into the river mainly with immature gonads. Spawning in different parts of the basin occurs from the middle of June to the beginning of September.

Spawning occurs in the main channels of river and tributaries. Fry hatch in October-November, and the most part leave the redds in late April-first half of May. Juveniles then move to gain weight in the vast shallows of rivers, where they feed on benthic organisms (Vronskiy, 1972). Chinook migrate to the sea mostly at the age of 1+ (96%) with smaller numbers at age 1+ (1.5%) or 2+ (2.5%). Migration to the sea occurs from June through August with a peak in late June - early July. In the lower reaches of the river and in the estuary zone, fry feed on crustaceans and other prey (Bugaev et al. 2007).

Chinook spend 2-4 years in the sea before returning to their native rivers. Age structure is complex including up to 12 age groups. Ages 1.2, 1.3 and 1.4 predominate. Five-year-old fish (1.3) are generally most common, but in some years, it is four-year-old fish group (1.2 in 2003 - 66%). The proportion of six-year (1.4) individuals averages 10%, and three-year oldd (1.1) average 2% (KamchatNIRO 2017). Since 2002, the age structure of Kamchatka River Chinook has shifted to younger ages mirroring similar changes throughout the North Pacific including Alaska. Age 1.2 increased from 5 to 40%, while age 1.4 decreased from 15 to 5%. (KamchatNIRO 2017). Age 1.3 decreased slightly with sex ratio varying by years.

Average size has declined along with average age. Weight and length have averaged 6.3 kg and 74.3 cm in 2002-2016 (KamchatNIRO 2017). In recent years, the average body weight of the harvested mature Chinook Salmon rarely exceeds 5.5 kg. By 2012, sizes decreased to an historical low (4.1 kg and 64.9 cm).

Female proportion has similarly declined. Age 1.2 is represented exclusively by males. Age 1.4 fish are typically 50-60% female. Age 1.5 are typically 80% female. Typically, 99% of females are ages 1.3 and 1.4. In the modern period the percentage of females rarely exceeds 30%. In 2012, females comprised only 12% of the run. Fecundity varies from 7.0-9.3 thousand eggs with an average of 8,000 eggs.

Stock Structure

Run patterns suggest that the aggregate return includes a number of substocks. These include an early run with a peak return in the middle of June and a late run with a peak return in early June. For the early race of Chinook Salmon, the main site of reproduction is currently the areas located mainly along the upper course of the Kamchatka River and its two tributaries, the Andrianovka and Ozernaya Kamchatka Rivers.

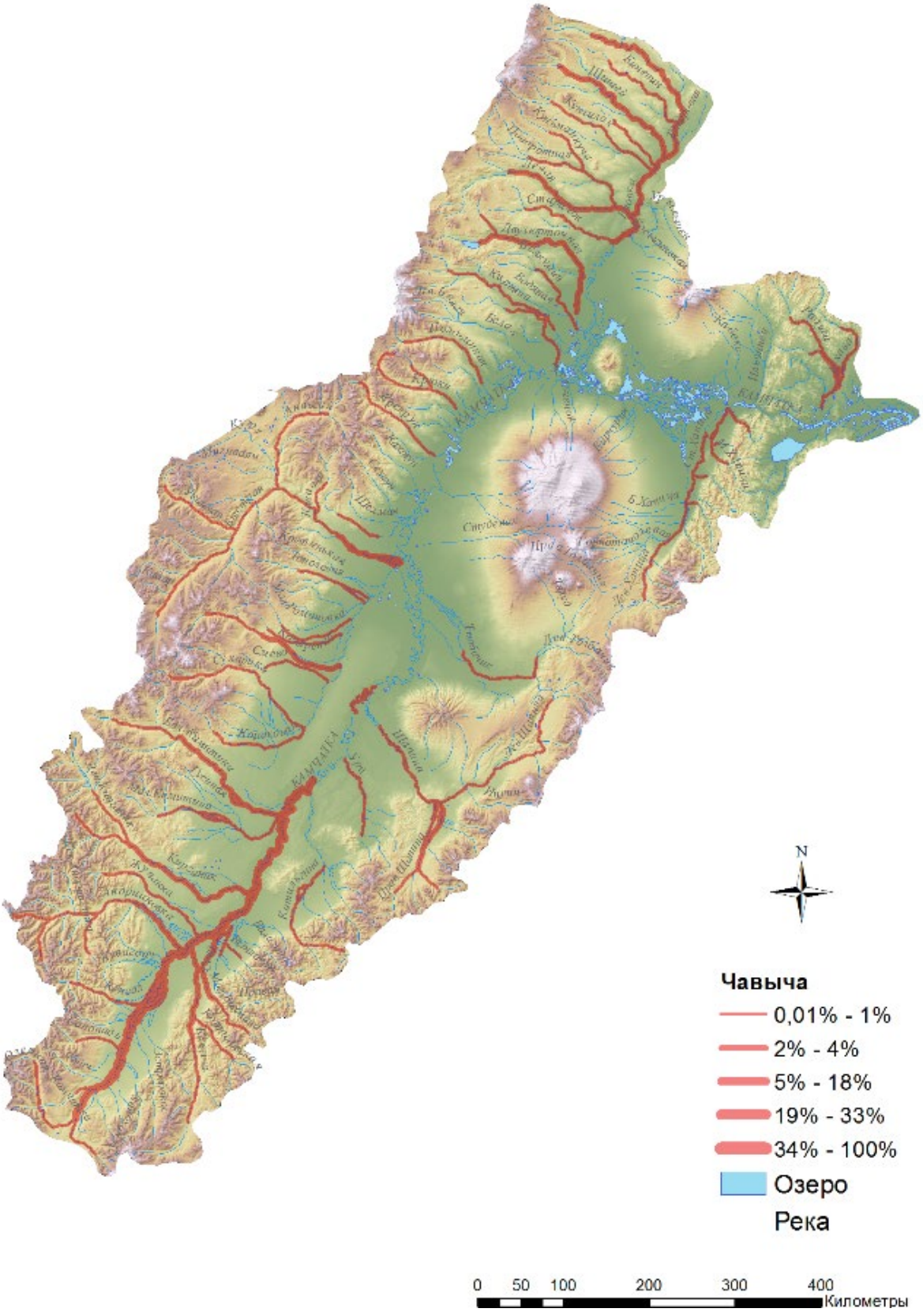

Figure 25. Distribution of spawning grounds of Chinook Salmon in the Kamchatka River basin. Width of red lines shows relative density of spawning grounds.

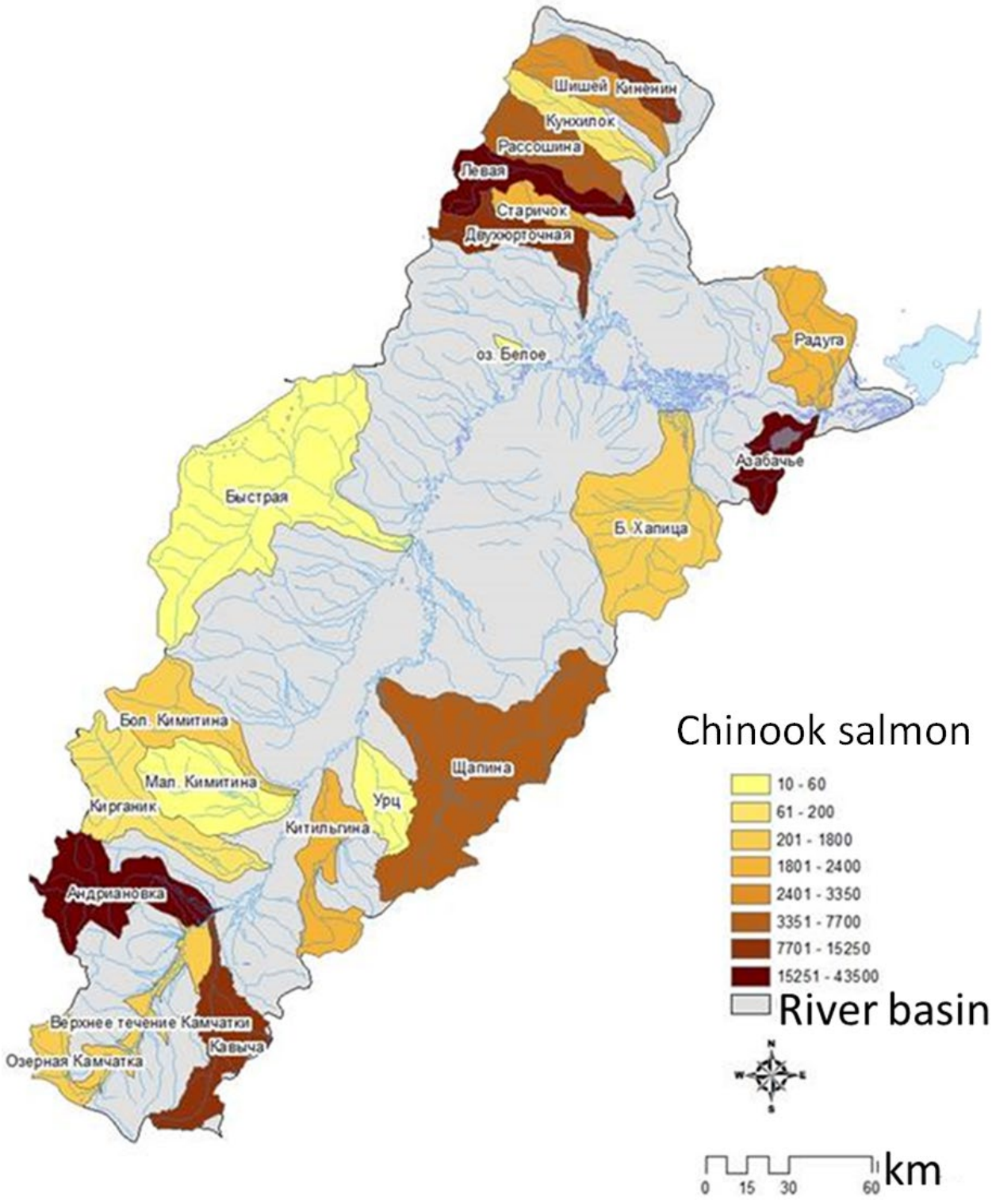

Figure 26. Density of the Chinook Salmon spawners in the basin of the River Kamchatka.

Status

Chinook numbers in the Kamchatka River peaked during the 1970s, declined to low levels in the early 2000s (Heard et al. 2007), and have gradually improved until present. Similar patterns have been observed for Chinook Salmon stocks throughout the North Pacific and are related in part to patterns of ocean productivity. In Kamchatka, declines were also exacerbated by commercial and illegal harvest in some areas. More conservative fishery management and reductions in illegal harvest have contributed to improvements (Figure 27).

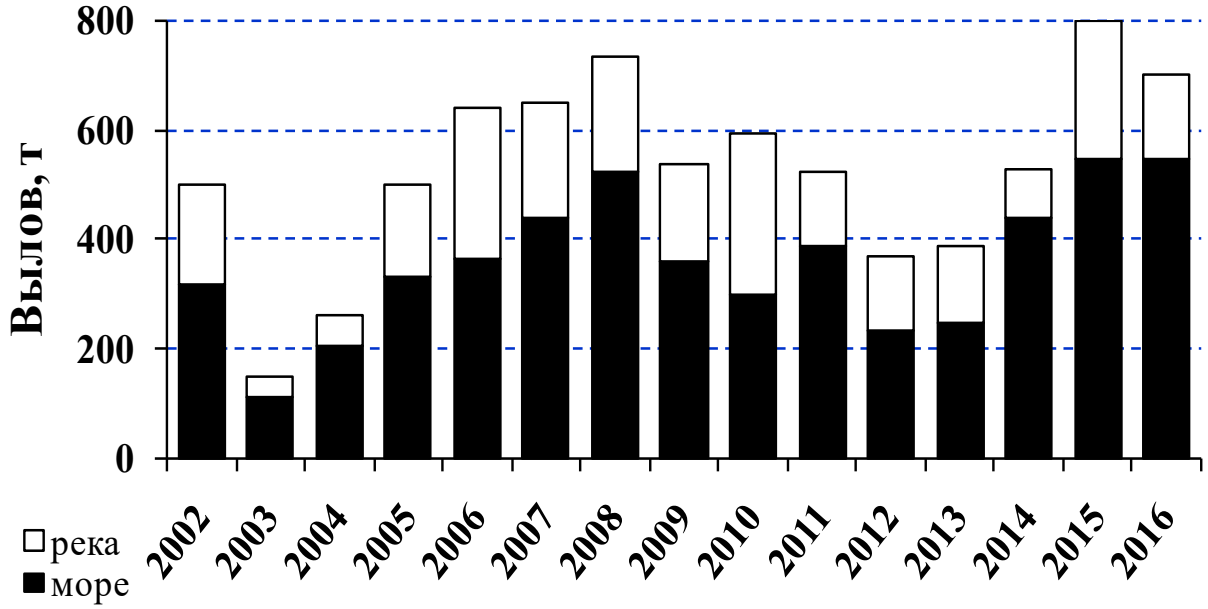

Figure 27. Harvest of Chinook Salmon (tonnes) in the Kamchatsky Bay and Kamchatka River (■ sea, □ river).

Escapement of Kamchatka River Chinook from 1957 to 2010 averaged about 50,000 and ranged from 18,000 to 138,000 (Figure 28). Escapement of Chinook is assessed based on aerial surveys of representative spawning areas. Since 2010, aerial surveys for Chinook have been much reduced due to reduced funding. Surveys are primarily focused on Sockeye Salmon but also include partial counts of Chinook. For instance, 13,000 Chinook were counted in 2016 (Figure 28). Estimates of Chinook run size since 2010 were based on yield data and data on fish passage into the river for the period of 1975–2000 which is characterized by objective estimates of Chinook spawner numbers entering the river (KamchatNIRO 2018). Beginning in 2016, monitoring data for salmon, primarily Chinook, passage for spawning and analysis of relationship between catch per effort in the control river segment and spawner passage dynamic for the hydroacoustic control cross section in Azabachya Channel.

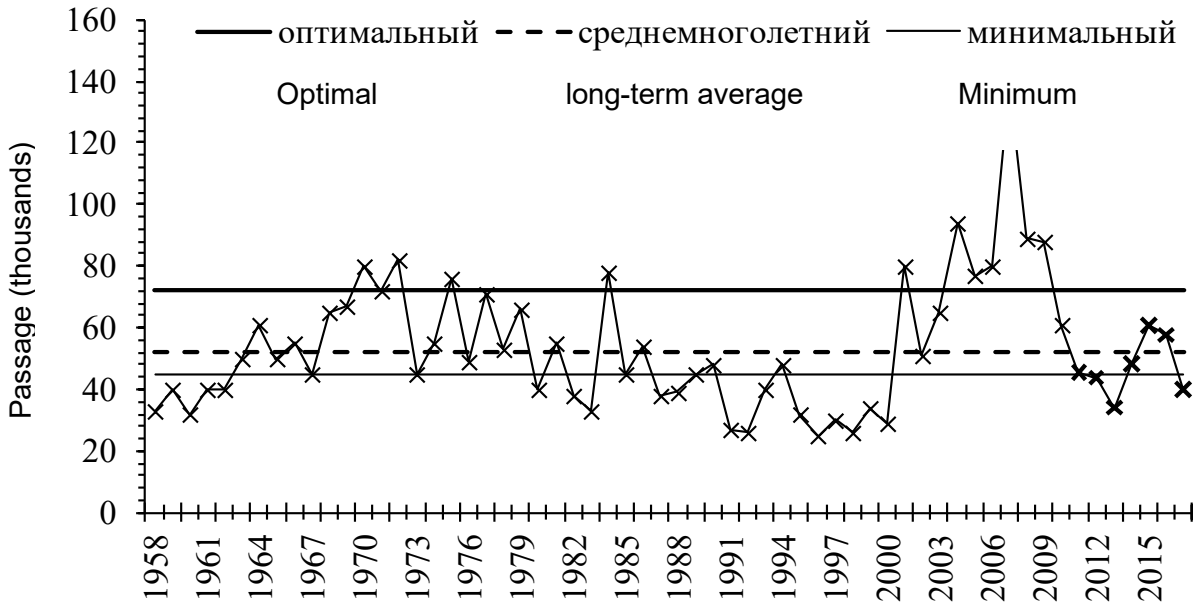

Figure 28. Spawning escapement of the Chinook Salmon in the spawning grounds of the Kamchatka River in 1957-2010 (KamchatNIRO 2018).

Management

Over the history of the coastal fishing in Eastern Kamchatka, about 80-90% of the Chinook Salmon was caught in the basin of the Kamchatka River where they have long been a favorite target of the fishery. Since the mid-1990s the fishery focus has shifted to Sockeye Salmon, which began to have a higher export value. Nevertheless, in the domestic market, the Chinook Salmon continues to be a priority fish among other species of Pacific salmon (Bugaev et al., 2007). Currently, there is no targeted commercial fishing for Chinook Salmon in the river; it is caught exclusively as a bycatch in the Sockeye Salmon fishery. Gill net mesh size limitations have recently been enacted to reduce harvest rates of Chinook during a period of reduced productivity.

Optimum spawning escapements have been identified based on historical data. Escapement objectives are identified for Chinook Salmon based on historical production patterns (Figure 29). The optimal goal is 72,000 and the minimum goal is 45,000 individuals.

Escapements consistently fell below optimum levels from 1980-2000. Higher returns from 2002-2009 were believed to have restored escapement to optimum or near-optimum levels in some rivers but not in all. However, lower returns were estimated since 2010. It should also be recognized that historical optimums may be difficult to achieve under conditions of reduced ocean productivity for Chinook Salmon (KamchatNIRO 2017).

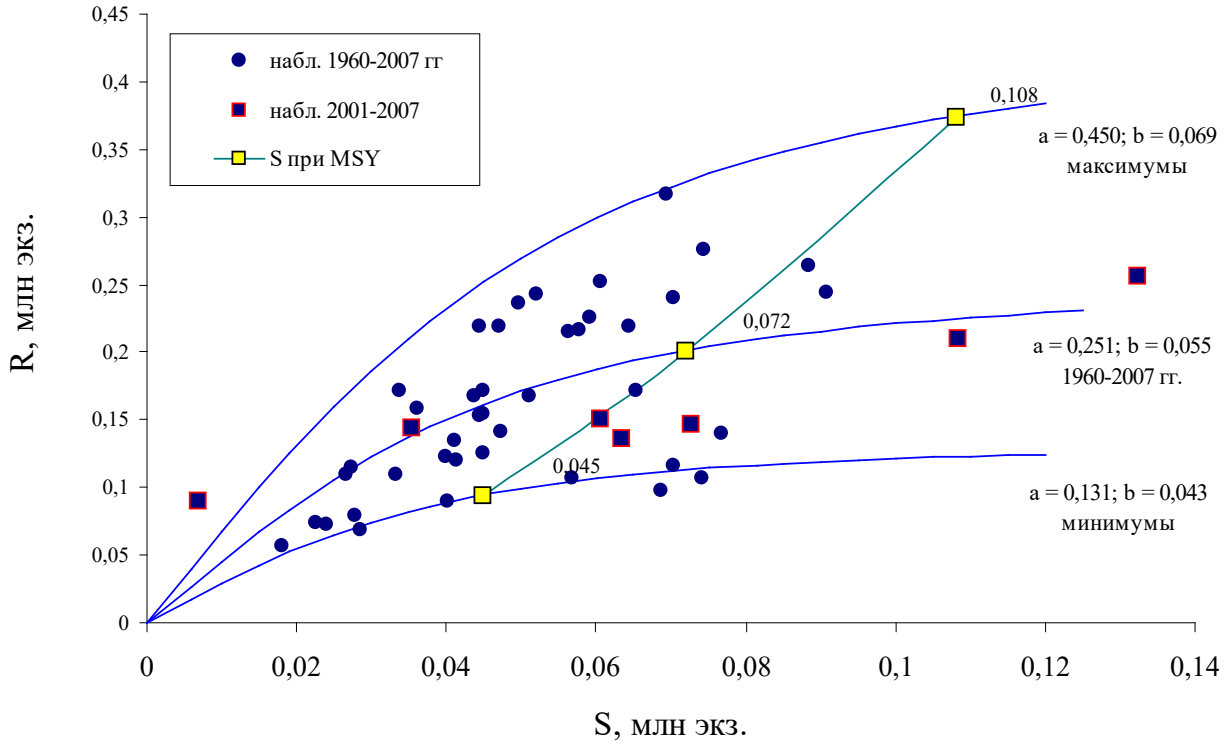

Figure 29. Recruits (y-axis) versus spawners (x-axis) for Kamchatka River Chinook Salmon (millions) (KamchatNIRO 2017).

Table 6. Biological reference points for Kamchatka River area Chinook Salmon (KamchatNIRO 2017). See Figure 32 for parameter definitions.

	Parameters, thousands of individuals						
Model levels	a	b	So	S_{MSY}	R_{MSY}	MSY	U_{MSY}
Maximum	450	69	7	108	381	272	72%
Middle	251	55	7	72	200	128	64%
Minimum	131	43	7	45	95	50	53%

3.3.5 Management

Assessment Methods

Stock assessments for fishery management purposes include catch estimation based on daily reporting of commercial fishery landings, fishery catch per unit effort, regular subsampling of the catch for estimation of biological characteristics, and estimation of run size and spawning escapement. Stock assessment data have been collected for all species of Pacific salmon in the area under assessment since 1957. Catch data and occasional research are available since the 1920s.

Detailed records on daily harvest are kept because fishermen are paid in part based on their catch volume and companies are required to maintain detailed records for production and licensing purposes. Fish volumes are recorded upon delivery to the processing plants. All fish delivered to the plants for processing and sale are weighed. Amounts are then recorded at several stages throughout processing. Numbers are reported by the fishing companies to the management authorities who compile the information for each fishing area for weekly reporting to the Anadromous Fish Commission which is responsible for in-season management decisions.

Biological sampling of the catch is conducted periodically throughout at fishing season in fish processing plants by government inspectors and at commercial fishing sites. Measurements include length, weight, sex and age.

Run size and spawning escapement data is estimated with a combination of aerial surveys, ground surveys, and remote sensing. Aerial surveys are a primary assessment tool throughout Kamchatka due to the numerous rivers and vast area involved. Species composition and catch per effort are also sampled at control fishing sites in the mouth of the river. Remote methods including hydroacoustics, and photo and video recording were also evaluated as an alternative for stock assessment (Degtev et al. 2012). The hydroacoustic method and its various modifications are used only in spawner migration routes to Azabachye Lake which is currently second-largest sockeye spawning water body in the drainage area of Kamchatka River (KamchatNIRO). Similar equipment has long been used in Alaska, but they are not extensively used so far in Russia and in Kamchatka in particularly. KamchatNIRO (2018) reports that this information taken together make it possible to get a fairly objective picture of the passage of spawners belonging to different Pacific salmon species to the drainage area of Kamchatka R. in its dynamic. Accordingly, harvest can be controlled on a reliable scientific basis.

Aerial surveys have been conducted since 1950 almost without interruption. Flights are made mostly by helicopter from a height of 50-150 m and, to a lesser extent by plane from a height of 150-250 m. Counts are made of live fish, carcasses (“snenka”) and/or redds depending on the species and counting conditions in specific rivers. Surveys are ideally at least two or three times per year but single peak or maximum counts are sometimes used. The historical aerial survey program targeted a total of 600 hours of flight time for the purposes of total accounting of all species of Pacific salmon mature fish in all major water bodies of the region. However, assessment time has been declining over the last decade due to budgetary constraints (Figure 30). Current effort is allocated to high value index areas and flights are timed to allow counting of multiple species (Shevlyakov and Maslov 2011). Aerial surveys have continued to include selected index areas of the Kamchatka River since 2011 (Figure 31). Index areas were established by selecting the most representative areas in the comprehensive historical data set. Counts from index areas are expanded to non-index areas based on formulae established from historical sampling data.

In 2016, aerial surveys were conducted throughout the Kamchatka River basin from July 19 to 22. The early form of Sockeye Salmon, Chinook Salmon and Chum Salmon were surveyed. Surveys did not include the Kozyrevka River and a number of small tributaries below the Bystraya River, from the Sekhlun River to the Polovinnaya River in the Kamchatka River basin remained unexplored.

Extensive on-ground surveys of spawners number were made to supplement aerial surveys. Surveys were made weekly or every other week. On-ground surveys also included smaller streams which were not included in aerial surveys. Biological samples are collected concurrently by beach seines. Fisheries associations and several fishing companies, including companies in the client group currently help to support the stock assessment program by providing food, accommodation and transportation.

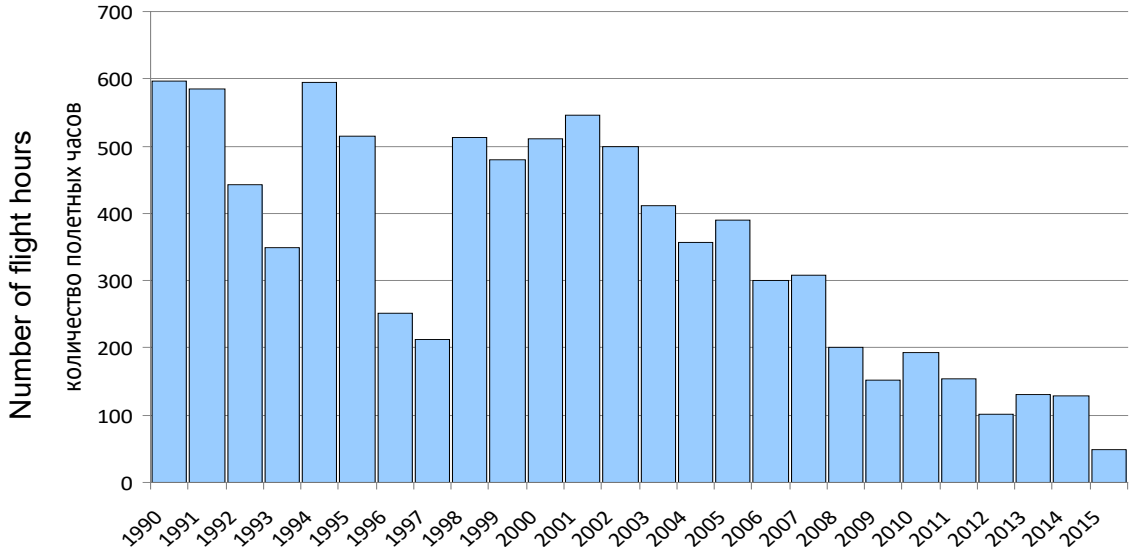

Figure 30. Aerial salmon stock survey effort (flight hours) in Kamchatka (east and west included), 1999-2015 (Shevlyakov et al. 2016; KamchatNIRO 2017).

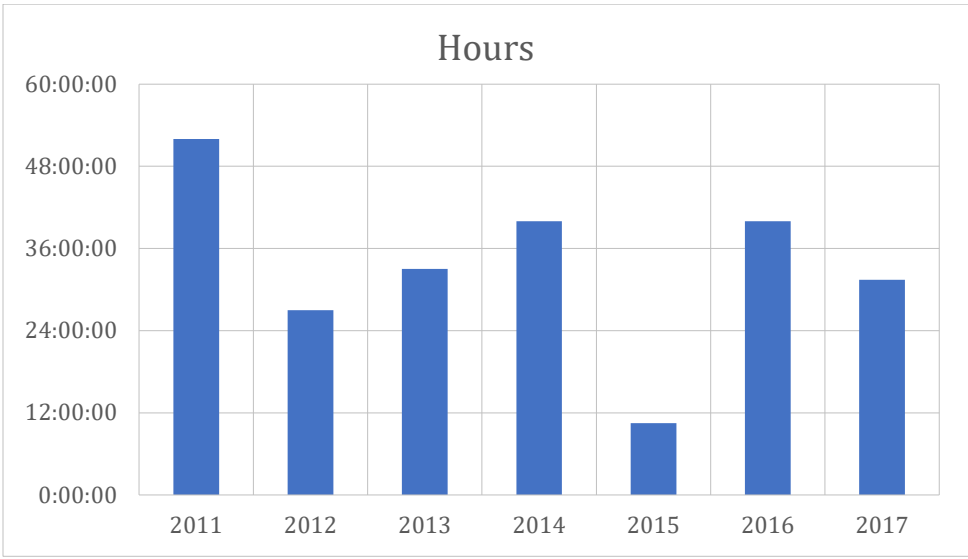

Figure 31. Aerial salmon stock survey effort (flight hours) in the Kamchatka River (KamchatNIRO 2018).

Reference Points

Optimum escapement objectives are established by KamchatNIRO for each salmon species and management area based on analysis of historical production patterns. In most cases, this involves stock-recruitment analysis where comparisons of numbers of progeny vs. parents (using for instance, a Ricker model) are used to calculate spawning escapements that produce maximum levels of sustained yield. Species summaries in this report included a number of examples of these stock-recruitment analyses. In most cases, stock-recruitment analyses where based on aggregate species run reconstructions for multiple rivers within western Kamchatka. River specific objectives were then defined by apportioning the totals based on relative population sizes in the various areas. The portions were generally based on relative run sizes and available spawning habitats. Formal limit reference points are not used in management of salmon fisheries in Russia. KamchatNIRO has explored the development of limit reference points from existing information but have not yet implemented these reference points into management practice. In this system, target reference points based on maximum yields function as operational equivalents of limit reference points.

Recent work by KamchatNIRO has developed river-specific reference points based on stock-recruitment analysis (Figure 32). Values are documented for each species in previous sections of this assessment report. These quantities are not currently used to drive management decisions although it is expected that future evaluations will consider in management. Definitions of references points from Shevlyakov et al. 2016 are as follows:

S_{lim} = boundary reference point set to the model parameter S_0 (spawner level S with maximum survival recruits per spawner)

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

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

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

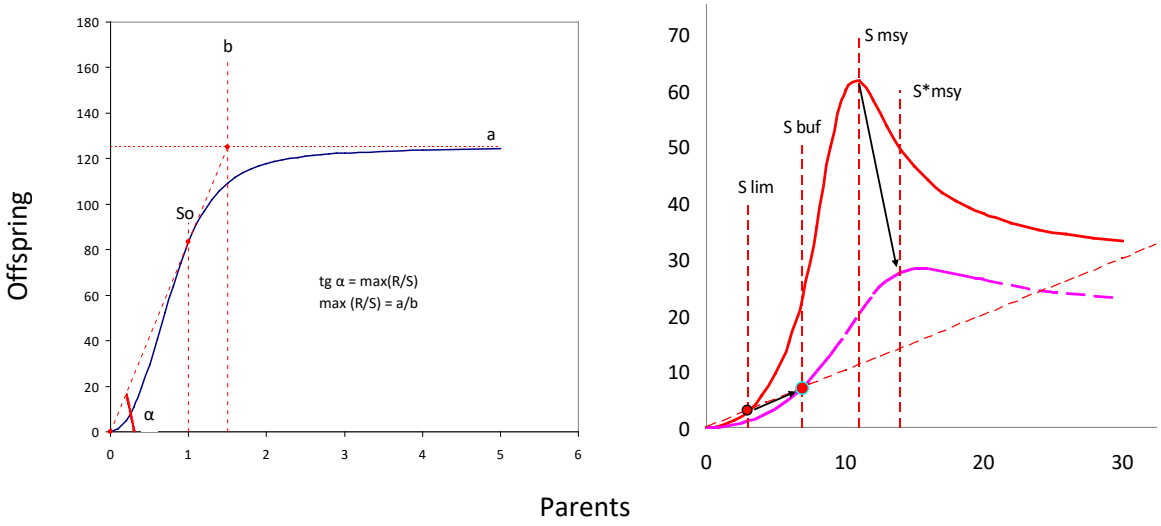

Figure 32. Depiction of boundary and buffer reference points (right) defined for salmon stock-recruitment model (left).

Management Strategy

For management purposes, the Kamchatka peninsula coastal zone is subdivided into several management units. Each management unit contains several fishing parcels.

Pre-season run forecasts are made for each salmon species by the Fisheries Research Institute (KamchatNIRO). The fishery management agency (FAR) approves a recommended annual catch for each fishery subzone based of this forecast. The pre-season forecast is now used primarily for planning purposes and possibly to establish quotas for some non-commercial fisheries. The forecast was historically used to establish total allowable catches and quotas for fishing companies. However, this system has now been replaced with an "Olympic" system where fishing companies operate in designated areas and periods and are allowed to harvest fish as available, as opposed to artificially limited by a specific allocation. Harvest quotas are still established for the fishery as a whole in each river but these quotas are adjusted in-season based on real time data.

The fishery is managed in-season with time and area openings and closures based on catch, biological characteristics of the catch, run size and escapement information. Management occurs with time and area closures. Fishery openings and closures may be made on short notice based on fish availability and progress in meeting spawning escapement objectives.

A primary means of controlling harvest in freshwater is through the use of passing days where fishing is closed. On large rivers, passing days are managed by river zone because fishery is spread over a large area and fish need to pass the fishing areas. Area closures are staggered to provide passage. The freshwater fishing area is more concentrated in smaller systems, so passing days are typically applied to the entire river. The number of passing days may be reduced to avoid exceeding established escapement goals.

Areas and dates when coastal trapnets can be used are also regulated. Regulations may take the form of temporary closures where leads and traps are tied up so as to allow fish to pass or season-long closures where nets are removed. Coastal trapnets are very effective and can take up to 90% of the catch if unregulated.

Management Actions

Passing days were required for coastal trapnets in 2010 for the first time. All the regulation of the passage was achieved by fishing restrictions on river fishing parcels. The increase in the number of nets, and subsequently the rate of processing, along with the factors of economic development in the post-perestroika period, are closely related to the growth of stocks of Pacific salmon. By 2010, it was realized that 10 coastal trapnets operating in the Kamchatka Bay, combined with the capacities of the processing plants in Ust-Kamchatsk, could not only reduce in-river fishing, but also make in-river operations practically unprofitable, and, what is the most important, provide a deficit of spawners on spawning grounds. For the late forms of salmon in 2015, according to acoustic data, the exploitation rate of stocks exceeded the level of the past years and reached levels over 95% of the number of spawning migrants approaching the coastal area and threatened their reproduction (KamchatNIRO 2017).

The timing of the late Sockeye salmon run is similar to that of the Chum Salmon and early Coho Salmon of the basin of the Kamchatka River. Conclusions about the high fishing pressure of marine trapnets in the Kamchatka Bay on the spawning migrants of late Sockeye migrants are applicable also to the Chum Salmon, which do not have other abundant seasonal forms, and perform spawning migration after the end of the early Sockeye Salmon run. Coho Salmon traditionally completed the spawning migration of

Pacific salmons, mostly after the removing the trapnets, and because of that proportion of its catch in the sea trapnets is not high (KamchatNIRO 2017).

For the present level of salmon abundance, the run size of 3,000 tons (the weight estimate of total run for all salmon species in Kamchatka Bay) is equivalent to the work of four coastal trapnets, or all 14 commercial river parcels during the whole season. However, the restriction of in-river fishing is an unreasonable and irrational measure, resulting in the loss of a large number of jobs for the local population. In addition, the ban of in-river fishing would limit possibilities to conduct real-time monitoring of in-river salmon spawning migration using commercial fishing (KamchatNIRO 2017). Based on that, KamchatNIRO suggested introduction of passing days in sea trapnets after the massive run of the main commercial species - early Sockeye Salmon. This measure would reduce the high fishing pressure on late Sockeye Salmon runs and Chinook Salmon, as well as on Chum and Coho Salmon. Recommendations on this issue can be formulated as follows:

As a measure to regulate the escapement of Pacific salmon to the spawning grounds of the Kamchatka River, determine the regime of passing days (i.e. restriction of fishing) on the part of the Kamchatka River basin (including its tributaries) and in the Kamchatka Bay for commercial, recreational and sport fishing, as well as for traditional fishing by communities and persons belonging to indigenous peoples:

- in the Kamchatka Bay in marine fishing parcels, starting from July 20 - Monday, Tuesday;

- in all river fishing parcels for all categories - Monday, Tuesday, Wednesday (KamchatNIRO 2017).

3.3.6 Enhancement

In total, five hatcheries exist in the Kamchatka region, three on the eastern coast and two in the western coast on the Bolshaya River (Malkinsky and Ozerki hatcheries). Hatchery objectives are to increase salmon returns for commercial fisheries. No hatcheries are present in the Kamchatka River, with the nearest hatcheries 400 km from the mouth of the River.

3.4 Principle Two: Ecosystem Background

3.4.1 Primary Species

For the purposes of this assessment, primary species in the catch are defined as those not included under Principle 1 in the Unit of Assessment but subject to management tools and measures intended to achieve stock management objectives reflected in either target or limit reference points. MSC assessment criteria further distinguish Principle II species based on level of harvest. “Main species” constitute 5% or more of the catch by weight. There are also provisions for identifying a “main” primary species if there is concern that the fishery is having a negative impact on the stock status or if the volume of the fishery is very large. All other species are identified as “not main.” For the purposes of this assessment, all gears are combined for scoring purposes.

Pink Salmon are a main primary species in this fishery. The Kamchatka River run of Pink Salmon is relatively small in relation to other East Kamchatka areas farther north, including rivers and streams of Karaginsky and Olyutorskiy Bays. Pink Salmon generally comprise less than 5% of the total salmon harvest in the Kamchatsky Bay and Kamchatka River fishery. However, percentages as high as 30% have been observed in occasional years of large Pink Salmon runs. Most of the UoA fishery harvest occurs in the sea where Pink Salmon are intercepted as they migrate north along the coast to their rivers of origin. Pink Salmon are actively managed in Karaginsky and Olyutorskiy Bays.

Neither Cherry Salmon nor Steelhead occur in significant numbers in the area of this fishery (KamchatNIRO 2017).

Pink Salmon

Distribution

Among Pacific salmons, Pink Salmon has the second largest distribution area after Chum Salmon. In the Russian Far East, this species is common from Primorye to Chukotka (KamchatNIRO 2017). The Northeast is the most important area of Pink Salmon spawning and fishing in Kamchatka. Pink Salmon are abundant in Olyutorskiy Bay but less so in the Kamchatsky Bay and Kamchatka River. Spawning is scattered in streams throughout the Kamchatka River system (Figure 33).

Russian Pink Salmon generally range into ocean waters of the Okhotsk and Bering seas. The deep-water part of the Okhotsk Sea is the major feeding ground of juvenile salmon within the Russian EEZ. The western Bering Sea has a low foraging importance for juveniles (Shuntov and Temnykh 2008, 2011). High seas tag-and-recapture experiments have revealed that Pink Salmon originating from specific coastal areas have characteristic distributions at sea which are overlapping, nonrandom, and similar from year to year.

Life History

Pink Salmon return to Kamchatka primarily in July and August, and spawning occurs in August and September. Accordingly, the timing of the spawning run shifts from north to south: the earliest runs are observed in the Olyutorskiy Bay (from the late June up early July), then the runs occur in the northern part of the Karaginsky Bay (the first and the second decades of July), and further - in the southern part of the Karaginsky Bay (the second and the third decades of July) (KamchatNIRO 2017). Spawning typically occurs in the lower and middle reaches of streams, rivers and sometimes the intertidal zone at the mouths of streams.

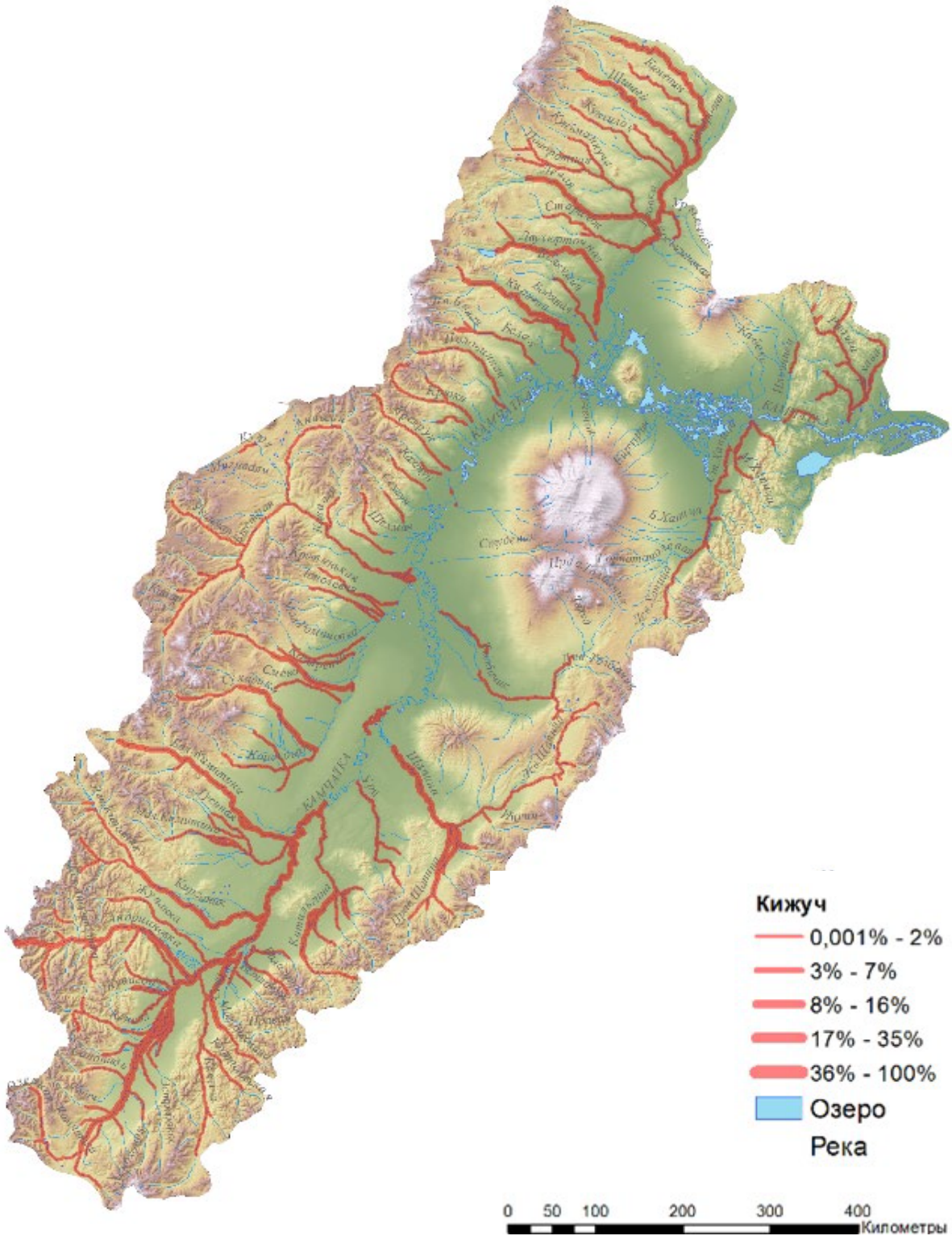

Figure 33. Distribution of spawning grounds of Pink Salmon in the Kamchatka River basin. Width of red lines shows relative density of spawning grounds.

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

Pink Salmon typically average 1.2 - 1.5 kg and 50 cm. Extensive information on Pink Salmon size and sex is collected by KamchatNIRO (2014) on an annual basis from the commercial catch in East Kamchatka rivers. All Pink Salmon spawn at age of two years. As a result, this species forms two independent populations in the same river, entering the river in odd and even years. The odd-year or even-year cycle will typically predominate, although in some streams both odd- and even-year Pink Salmon are about equally abundant. Cycle dominance will occasionally shift with the previously weak cycle becoming most abundant.

Stock Structure

Genetic analyses of Pink Salmon stock structure have generally identified broad geographical patterns but little or no difference among local populations in any given region. Genetic differences appear to be less in Asian Pink Salmon than in North American Pink Salmon (Zhivotovsky, personal communication). Natural straying among local populations of Pink Salmon is generally assumed to be more significant than in other salmon species (Sharp et al. 1994; Salmenkova et al. 2006). However, the available information on Pink Salmon genetic stock structure and straying patterns is not conclusive. It remains unclear whether historical genetic methods found no stock structure because none existed or because the available methods lacked sufficient power to identify differences. More recent genetic analyses of Pink Salmon using microsatellites have been similarly inconclusive.

Run patterns in larger river systems suggest that the aggregate return includes a number of substocks. For instance, KamchatNIRO (2013) reports that up to five overlapping runs can be distinguished in large systems like the Bolshaya River based on run timing, size and sex ratio. Smaller systems may support fewer types. Significant stock structure is likely not significant in the Kamchatka River due to the low abundance of Pink Salmon.

Status

This species is currently at historical levels of high production throughout the western Pacific including the east Kamchatka rivers. High levels of production are demonstrated by high levels of commercial harvest during even years since the late 1990s. This follows an extended period of low returns from the 1950s through the 1970s due to impact of the Japanese high seas drift net fishery and unfavorable ocean environmental conditions. Harvest of the now-dominant even-year return increased substantially in western Kamchatka after the 1983 collapse of the dominant odd-year cycle. Annual harvest (Figure 34) and escapement (Figure 35) of Pink Salmon in Kamchatsky Bay and the Kamchatka River is highly variable.

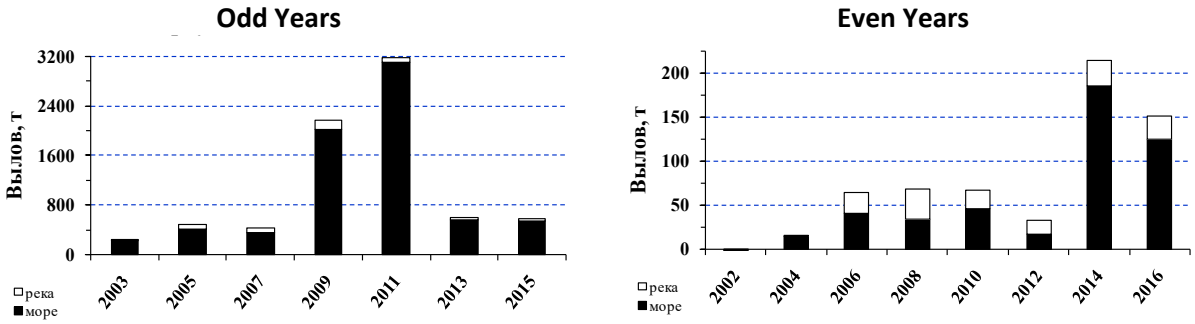

Figure 34. Catches of Pink Salmon in the Kamchatsky Bay and Kamchatka river during 2002¬2016 (■ sea, □ river).

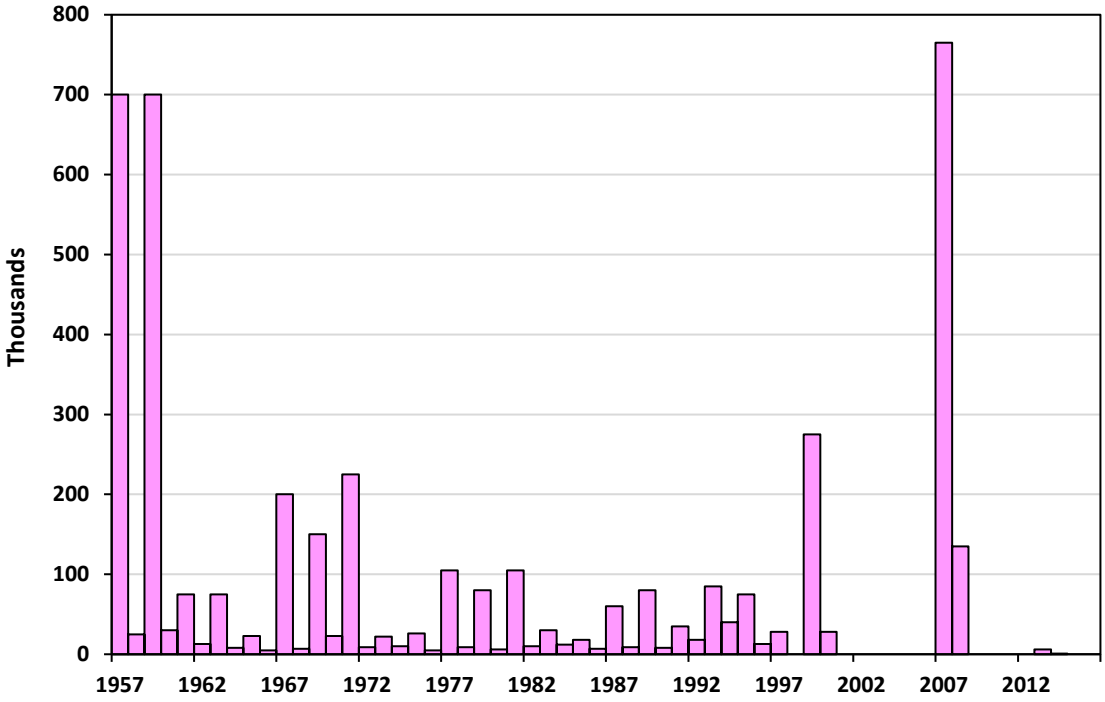

Figure 35. Spawning escapement of Pink Salmon in the Kamchatka River.

3.4.2 Secondary Species

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

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

Other species that are not typically processed for commercial value are treated as bycatch. Some bycatch species are released at fishing sites and additional sorting occurs at the processing plants. By-catch of non-

retained species comprises a negligible portion of the harvest in the fishery. Due to the very low percentage of bycatch relative to the total fishery, no 'main' bycatch species are identified. By-catch can include a variety of marine and freshwater species including codfish (Gadidae), flatfish (*Platichthys stellatus* sp.), smelt (*Osmerus* sp.), sculpins (*Cottus* sp.) and jellyfish (Blikshteyn 2011; Semanov et al. 2015). Bycatch species are abundant within the habitat boundaries and incidental levels of harvest in salmon fisheries pose no danger to bycatch species (Shevlyakov et al. 2016).

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

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

Because of its low volume, by-catch is not assessed by the fishery or the management system. There is no official reporting of bycatch such as cod, flounder, silver smelt and birds in these fisheries (Shevlyakov et al., 2014). By-catch species are reported to be abundant throughout the region and fishery managers do not consider harvest levels to significantly affect these species.

By-catch assessments in other similar salmon fisheries in the Russian Far East, including Iturup, Sakhalin Island, and Ozernaya Sockeye, have found similar low levels of by-catch. For instance, a quantitative bycatch sampling program conducted in 2011 for the Ozernaya Sockeye fishery (Blikshteyn 2011) found that by weight, by-catch numbers comprised a negligible percentage of the total harvest consisting of tons of retained species.

Char

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

Char is retained during commercial salmon seasons and sold. Target commercial char fisheries also occur in some areas. Char catch as a percentage of the total harvest during salmon seasons varies from year to year due to differences in Pink Salmon abundance of the even and odd year runs. The proportion also varies from river to river but does not exceed 1% of the total catch (KamchatNIRO 2017). Therefore, it is a minor secondary species.

Harvest levels are established for char by the management system based on historical catch levels, i.e., some elements of management of this species is presented, but research supporting this management is

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

The bycatches of char in the considered period in the Kamchatka River averaged 308.4 mt (91.3-666.6) or 2.8% (0.8-9.2) of the catch of Pacific salmon. Only once the bycatch of char exceeded 5% level in 2002 – 9% (Figure 36) (KamchatNIRO 2017).

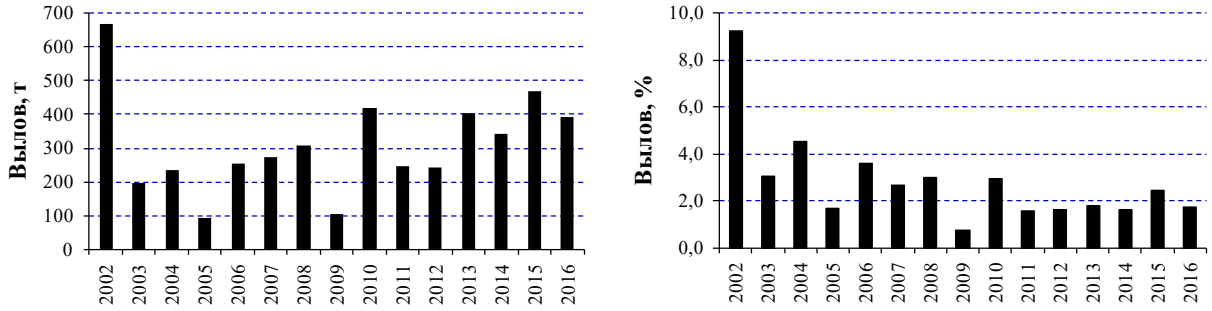

Figure 36. Catches of char in the area of the river Kamchatka in 2002-2016.

3.4.3 ETP Species

Status

For the purposes of this assessment, endangered, threatened, or protected species are those that are recognized by national legislation, binding international agreements (e.g., CITES) to which jurisdictions controlling the fishery under assessment are party, or 'out-of-scope' species (amphibians, reptiles, birds and mammals) that are listed in the IUCN Red List as vulnerable (VU), endangered (EN) or critically endangered (CE). In this case, national legislation provides for protection of ETP species identified in the Russian Federation *Red Data Book,* also known simply as the *Red Book*. The Red Book is based largely on the International Union for Protection of Nature and Natural Resources (IUCN), which formally designates protected species subject to enhanced regulatory protection. Related natural conservation legislation was adopted in 1980s-1990s including laws for protection of natural environment and fauna, natural (wildlife) areas under special protection, ecological expertise along with a number of various decrees by the Russian Federation Government. These regulations established conservation priorities for the Red Book's rare fauna and flora species and liabilities for damage inflicted to the species and their habitats.

There is one red-listed species of marine mammals in this area - Steller sea lion (*Eumetopias jubatus*). Another seal species is quite common - harbor seal (Phoca vitulina). These as well as a number of other fish, marine mammals and birds are also discussed briefly below. Although no ongoing observer program exists for the fisheries, federal scientists, managers, and inspectors regularly visit the fishing sites and processing plants throughout the season. Over the course of the many years of fishing operations, none of these species is observed to have adverse impacts from the fishery. The fishing authorities have

determined that the fishery has such low impacts that it needs no specific data collections on interactions with ETP species.

Information on population abundance of Kamchatka marine mammals is well documented in the scientific literature (Burkanov, 1986, 1988; Lagerev, 1988; Kosygin et al., 1986). Spotted seals (larga) and sea lions feed largely on fish and are the most likely to be encountered in or around fishing gear.

Steller sea lions are included in the Red book of Kamchatka (2006), and hunting of this species is illegal. This species inhabits the coast of eastern Kamchatka year-round, but its distribution and number changes seasonally. In autumn, with a decrease in the temperature of air and water, some animals probably migrate from the northern half of the eastern coast to the southern one. In winter, Steller sea lions focus in the areas of work of the fishing fleet, where it is probably easier for animals to obtain food (KamchatNIRO 2017). Sea lions sometimes enter the trap or fish well where they feed on fish. Large males sometimes damage nets to get at salmon.

In Russia, the major Steller Sea Lion rookeries were protected under a Northern Fur Seal and Sea Otter conservation act in the late 1950s. They were listed as endangered (category 2) in the Russian Red Data Book in 1994 and harvest was prohibited.3 These measures had a positive effect in the western portion of the range as the population increased around Sakhalin Island, the Kuril Islands, and in the northern Sea of Okhotsk. Take of sea lions is illegal as it is a protected species.

Other seals are abundant in the area and frequently observed around the marine trapnets. The most numerous species in the Russian Far East is spotted seal or larga. A number of researchers consider that harbor seal (*Phoca vitulina*) in the Russian Far East is represented by subspecies called Phoca vitulina largha, but others consider them as a separate species *Phoca largha*. This species is found in local waters year-round. Main breeding areas of seals off the coast of Eastern Kamchatka are in the Karaginsky and Ozernovskiy Bays (KamchatNIRO 2017). These seals concentrate near estuaries and capes to feed almost exclusively in salmon during salmon spawning runs. These seals constantly enter marine net traps, eat or damage fish, and then freely leave the nets. Beach seines do not normally affect marine mammals. Incidental take of these seals or sea lions by tangling in gear has not been observed due to the nature of the gear.

Seals may be hunted with the proper license but the harvest allocation is considerably underused because of degradation of hunting infrastructure. Licenses can be obtained for commercial harvest but have not by the assessment companies. Seals are regarded as a nuisance by fishers. KamchatNIRO scientists report that fishermen drove off seals from nets in the past prior to adoption of the company policy prohibiting firearms on boats. The available information indicates that this occurred at a low level, is not systematic, and fishermen generally complied with the law.

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

One red listed bird species, Steller sea eagle *Haliaeetus pelagicus*, depends on Pacific salmon as an important food item. Steller sea eagle feeds on various animals such as aquatic birds, small mammals, marine invertebrates, but mostly they prey on Pacific salmon. They feed both on live and dead fish. Some other birds and mammals feed on remains from fish killed by Steller sea eagle. In a whole, the population

of this species is stable, but it is considered that nesting gathering in the mouth of the Kamchatka River is under threat because of decline of salmon stock in this area (Red List of Kamchatka, 2006).

Another related species, white-tail eagle *H. albicilla*, also depends on salmon as a food source. Similarly, with the previous Steller sea eagle, the population is quite stable in general, but nesting gathering in the area of Kamchatka River mouth may suffer from decrease of salmon in the Kamchatka River due fishing. Some other birds of prey, such as bald eagle *H. leucocephalus* and golden eagle *Aquila chrysaetos* also depend of salmon in their feeding, but in less extent than above mentioned species.

Management

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

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

3.4.4 Habitats

Condition

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

Fishing activities with traps, seines and gill nets do not have a significant long-term impact on habitat. Any effects of stationary trap construction or operation are localized and temporary. The traps are anchored to the sea bottom with large bags full of sand. Permits are required to dig. Net leads and wings are weighted to rest on the bottom but trap boxes constructed on steel frames are constructed on floats and do not contact the bottom where mechanical damage to benthic organisms might occur. KamchatNIRO

scientists report no harmful effect on bottom flora or fauna. Assessments of this gear in other regions (i.e., Iturup and Sakhalin) have also shown minimal impacts. There is a special agency, State Sanitary-epidimeological inspection that monitors whether the fishery affects the fishing operation zone. In a case of violations, it is a usual practice to levy fines on the company.

Beach seines and gill nets used in the river and estuary may be dragged along the bottom but any impact is minor and temporary. The river bottom is comprised of gravel and cobble which is regularly redistributed by flood flows.

Discharge of fish waste from processing plants is limited to liquids because offal is processed into fish meal. This liquid is discharged to the ocean by permit and a fee is paid to the government for discharge. The government also monitors quality of the discharge. As part of plant reconstruction, the fishing companies have acquired new equipment to also make fish oil which will further reduce discharge as well as discharge license fees.

Environmental Protection

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

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

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

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

3.4.5 Ecosystem Structure and Function

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

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

Removal of Pacific salmon by the fishery has consequences for river ecosystems. The relationships between salmon and the population dynamics of their terrestrial predators has been well documented (Gende et al. 2002). Possibly, the most serious of them is the decrease of food for predator animals and predator birds, which to a considerable extent consists of spawning salmon. The following animals depend on salmon in their diet: brown bear *Ursus arctos*, Kamchatka fox *Vulpes vulpes*, sable *Martes zibellina*, ermine *Mustela erminea kaneii*, mink *Mustela vison*, Steller's sea eagle *Haliaeetus pelagicus*, Pacific seagull *Larus schistisagus*, whooper swan *Cygnus cygnus* and many other mammals and birds.

Among these species, brown bear occupies a special place in terms of feeding on salmon because this species consumes much more salmon than others and depends on salmon in higher extent than other species. Salmon are particularly important for bears in the years, when they experience lack of cedar nuts. The number of Kamchatka bears is inseparably linked with the abundance of spawning salmon entering rivers. In periods of high salmon abundance, bear population grows due to increase in the birth rate and survival of offspring, and, on the contrary, in the years of depression, salmon stocks limit the number of consumers, both young and adults. With introduction of the large-scale salmon fishing, former relationships in the local ecosystem changed. It is assumed that in the wild ecosystem, without human influence, fluctuations of salmon abundance were higher than now. Indirectly, this can be judged from the periodically occurring famine of the indigenous peoples inhabiting Kamchatka (Krashninnikov 1949, Steller 1999). According to modern ideas, the periods of low salmon returns could be a consequence of a change in the cycles of salmon population growth and its fall as a result of mechanisms of density-dependent regulation of the size of populations.

In different years, depending on the periods of operation and the accounting methods used, the number of brown bear on the peninsula was estimated from 8-10 thousand to 15-20 thousand individuals (Ostroumov, 1968; Gordienkoand Gordienko 2005, Seriodkin et al. 2006). In the modern period as of April 2015, according to experts of the Agency of Forestry and Wildlife Conservation in Kamchatka, there are about 21.5 thousand individuals, of which 5,665 thousand are in the area of the Kamchatka River. It is clear, that these values possess some uncertainties; however, at present they are the only estimates obtained using standard methods in the field. Therefore, it is seen that there is no decrease of bear population in Kamchatka, and even there is some increase.

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

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

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

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

3.5 Principle Three: Management System Background

3.5.1 Legal & Customary Framework

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

The fundamental legal act determining the basics of fisheries management, including Salmon fisheries is the federal law "On Fishery and Conservation of Aquatic Biological Resources" which was amended in 2008 to reflect changes regarding fishery of anadromous fish in inland waters of Russian Federation and territorial seas of Russian Federation (Article 291 of the Federal Law of December 20 2004 № 166-FZ). This law gave the government the authority to assign fishery sections to individual lease holders for up to 20 years, and salmon fisheries management was entrusted to the regional executive authorities. This regulation replaced the previous system, which was based on Total Allowable Catch allocations and centralized fishery management decisions through Moscow, with a much more responsive and effective regional system. The current system is widely viewed as an improvement for fisheries management as it can react more quickly to changes in run strength. In addition, fishing companies no longer have an incentive to under-report their catch, because management is now based on achieving spawning escapement rather than by quota limitations of a TAC.

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

- the right of a person on favorable environment;

- scientifically justified combination of interests of person, society and state with a goal of sustainable development and favorable environment;

- conservation, reproduction and rational use of natural resources as necessary preconditions of providing of favorable environment and ecological safety;

- presumption of ecological danger of planned business activities;

- compulsion of environmental assessment of planned business projects;

- priority of preservation of natural ecosystems, natural landscapes and natural complexes;

- protection of biodiversity;

- Prohibition of any activity with unpredictable environmental consequences, and realization of projects which may result in degradation of natural ecosystems and change or destruction of genetic diversity of plants, animals and other organisms, exhausting of natural resources and other negative changes of environment.

Article 26 reads in part: The amount of admissible extraction of components of natural environment must be established in accordance with limitation of the amount of extraction with the aim to conservation of natural and nature-anthropogenic objects, providing of sustainable functioning of natural ecosystems and preventing their degradation.

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

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

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

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

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

3.5.2 Management Structure - Consultation, Roles & Responsibilities

Management of Kamchatka salmon fisheries is administered by Federal and Regional governmental agencies (Figure 37). Kamchatka Kray, which includes Kamchatka Oblast and Koryak Autonomous Okrug is the subject of the Russian Federation and is a part of Far Eastern Federal Region (Okrug). It is under the direction and control of the Government of the Russian Federation. Fisheries of Russia are managed and controlled by Federal Fishery Agency (FAR) of the Russian Federation, which located in Moscow and also represented by a local office in Kamchatka. Operational management of all activities is performed by the Governor of the Kamchatsky Kray. In total, 69 different governmental agencies control the fisheries (data of Vityaz-Avto company), and the most important of them are addressed below.

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

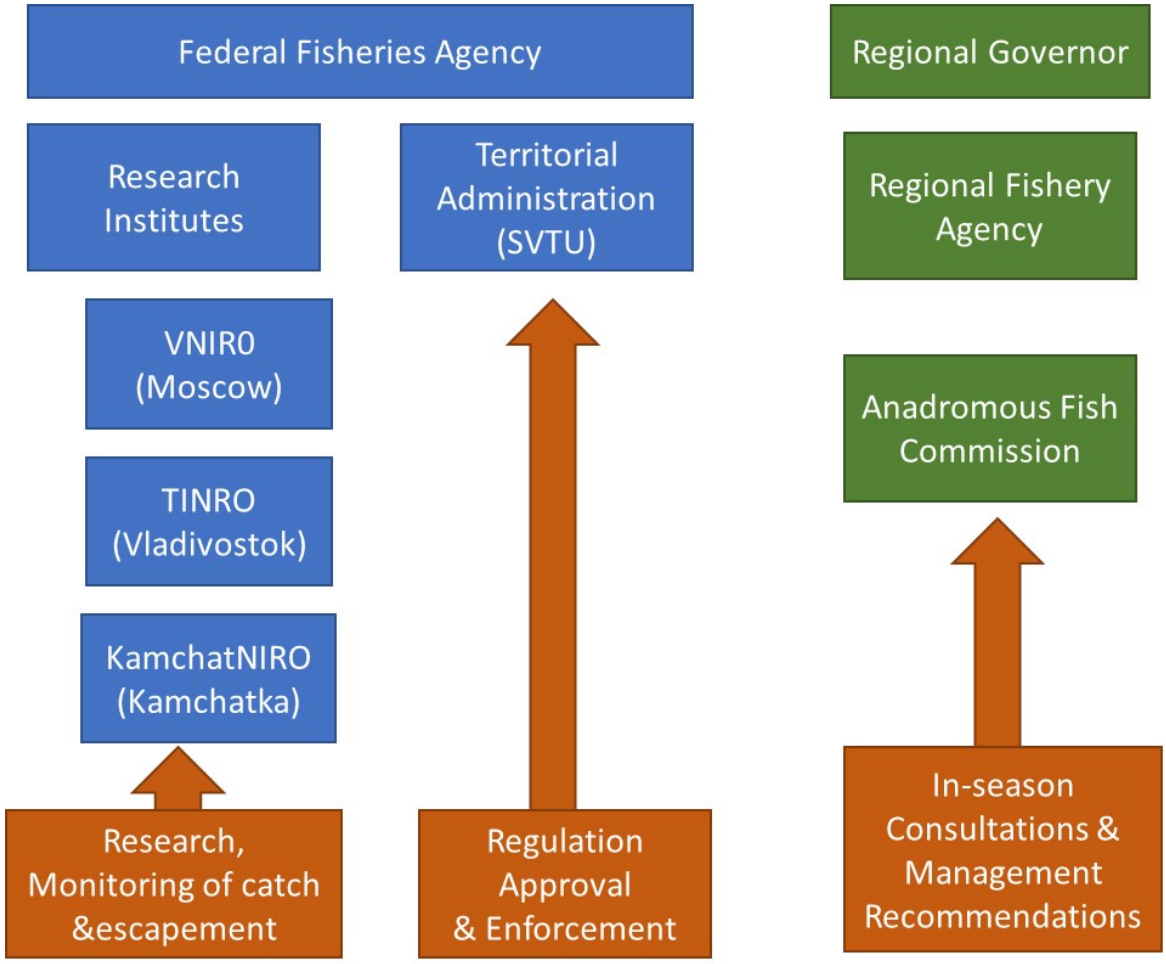

Figure 37. Organization of Federal and Regional salmon fishery management structure for Kamchatka Region salmon fisheries.

Federal Fishery Agency

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

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

technologies in the fisheries complex, and prepares federal-level and agency-level reports on the fishing industry.

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

Northeastern Territorial Administration of FAR

FAR has territorial departments in all regions of the Russian Federation, which have been created in order to accelerate the implementation of many of the functions of the FAR on the level of Russian Federation subjects. *Northeastern Territorial Administration of FAR (SVTU) (Северо-восточное территоральное управление ФАР, СВТУ or Severo-vostochnoe upravlenie FAR)* is the local management and enforcement arm of FAR for Kamchatka Kray and Chukcha Autonomous Okrug, which is located in city of Petropavlovsk-Kamchatsky. SVTU has final approval of fishing concessions and in-season fishery management regulation actions (to open and close fisheries). They give fishing companies permission to harvest, monitor fishing companies and processors to ensure regulation compliance, and patrol streams to reduce poaching activities. SVTU posts all approved management decision of Anadromous Fish Commission on its website (www.terkamfish.ru).

Federal Fishery Research Institutes

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

Research for the Pacific aquatic biological resources is conducted by the following scientific regional research institutes: TINRO-Center (Vladivostok) (Тихоокеанский научно-исследовательский институт Рыбололовства и Океанографии, ТИНРО-Центр or Tikhookeanslii nauchno-issledovatelskii institute rybolovstva i okeanografii) with branches in Khabarovsk and Anadyr; MagadanNIRO (Magadan) (Магаданский научно-исследовательский институт рыбного хозяйства и океанографии, МагаданНИРО or Magadanskii nauchno-issledovatelskii institute rybolovstva i okeanografii), KamchatNIRO (Petropavlovsk-Kamchatsky) (Камчатский научно-исследовательский институт рыбного хозяйства и океанографии, KamchatNIRO or Kamchatskii nauchno-issledovatelskii institute rybolovstva i okeanografii) and SakhNIRO (Yuzhno-Sakhalinsk) (Сахалинский научно-исследовательский институт рыбного хозяйства и океанографии, СахНИРО or Sakhalinskii nauchno-issledovatelskii institute rybolovstva i okeanografii). Studying of aquatic biological resources of the Arctic, northern Atlantic Ocean,

Baltic Sea and Atlantic Ocean and that of Black, Azov and Caspian seas and, biological resources of internal freshwater bodies is performed by other territorial institutions. KamchatNIRO conducts research of marine and freshwater resources in the Kamchatka region to monitor the status of commercial species, including salmon, and preparing annual forecasts of commercial species and the proposal on the volume of their potential catch. Each October KamchatNIRO issues forecast for recommended catch of salmon for the next season.

Northeastern Rybvod (SevvostRybvod)

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

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

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

Federal Agency for Veterinary and Phytosanitary Supervision (Rosselkhoznadzor)

Rosselkhoznadzor (Россельхознадзор) is the Federal enforcement and control agency for biological resources under the Russian Ministry of Agriculture. Responsibilities include accounting for and analysis of violations of technical regulations and other regulatory documentation, supervision of compliance with Russian Federation laws by the state agencies, local government, and the public, supervision of marine fishery ports and vessels, and administration of the Convention on the International Trade in Endangered Species of Wild Fauna and Flora.

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

Public Council for FAR

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

Far East Scientific Commercial Fisheries Council (FESFC)

Far East Scientific Commercial Fisheries Council, FESFC (Дальневосточный рыбопромысловый совет, Dalnevostochny rybopromyslovy sovet) is an independent council made up of representative of the Federal Fisheries Agency, scientific research institutes, non-profit commercial associations of commercial

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

Ministry of Fisheries of Kamchatka Kray

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

Commission on the Regulation of Harvesting Anadromous Fishes

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

Upon the request of companies, the AFC sets up the recommended catch for a management unit area and accepts applications from the users, each of which cannot exceed the total recommended catch for management unit. In case of approaching recommended catch for some management unit, AFC can close fishing or increase the recommended catch following recommendations of KamchatNiro. The recommended catch is authorized by FAR and accounts for the number of salmon required for filling in the spawning areas and broodstock hatcheries, as well as quotas for sport fishing and harvest by the indigenous population. The AFC meets weekly for the purpose of considering in-season fishery management decisions. Based on the reports about filling of the spawning grounds, the AFC makes operational decisions on the time and duration of fishing by either closing fishing in spawning grounds in case of insufficient filling or by increasing the quotas in order to harvest excessive spawners from the mouths of rivers to avoid overflow of spawning grounds. The AFC's decisions are made through discussions and consultations with stakeholders. All meetings are open to the public. All decisions of AFCs

on fisheries management are subject to final approval by Territorial Administrations of FAR. Meeting minutes and decisions are posted on the Territorial Administration website (http://www.terkamfish.ru).

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

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

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

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

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

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

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

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

Item 13. Commission's resolution is documented in a protocol no later than in 2 days after conduct of a regular meeting to be signed by the Commission Chairman or, in its absence, by Deputy Commission

Chairman chairing the meeting, and initialed by the Executive Secretary, as well as by all members of the Commission present at the meeting.

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

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

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

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

3.5.3 Fishery Objectives & Measures

Management Objectives

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

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

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

Fishery Measures

Fishery methods, areas and seasons are designed based on historical information to regulate harvest and exploitation rates consistent with escapement goals. Fish numbers, biological characteristics and fishery statistics are then monitored in-season and fisheries are adjusted based on abundance. Fishing may continue through the run if spawning escapement is on schedule to meet its goals. Fishing is reduced in years of low runs in order to protect escapements. Fishing is expanded in year of large runs in order to access harvestable surpluses in excess of escapement needs.

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

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

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

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

Fishing effort during established fishing seasons is regulated using a system of passing days when fishery is prohibited. Weekly passing days are established prior to the fishing season in each fishery area. The system of pass-days creates kind of moving window for fish to safely approach the spawning grounds (Shevliakov et al. 2011). Based on experience of last years, there are two free-of-fishing days per week in Kamchatskiy Bay and three per week in the Kamchatka River. If spawning escapement is not sufficient based on in-season monitoring data, additional off days are set up in the river, and, if needed, in the sea. Historical data indicates that harvest control rules based on the passing day strategy is generally adequate to control exploitation rates and ensure significant escapement in most years (as long as stock productivity, fishing effort or fishery efficiency are comparable which they appear to be in the short term).

Preseason Forecasts

Run size forecasts continue to be made for preseason planning purposes although fishery regulation has changed from TAC management to recommended catch management (Figure 38). The local research fisheries institution, KamchatNIRO, plays a key role in producing fishery forecasts. Expected catch is calculated as a difference between total number of returning fish estimated for a season and the target amount of spawners, taking in account a total area of spawning grounds in the district and optimal density of spawners, which depends on river and species. Forecasts are subject to an extensive review process by the TINRO-Center, the Far East Salmon Council, which was created within the TINRO-center with the goal of coordinating the research and forecasting of salmon in the Far Eastern basin, and VNIRO which reviews forecast of recommended catch by the FESC. During the period of approval, discussion with stakeholders takes place with active participation of representatives of fisheries companies, local administrations and federal ministries. On the basis of this forecast FAR approves the recommended annual catch for each fishery subzone.

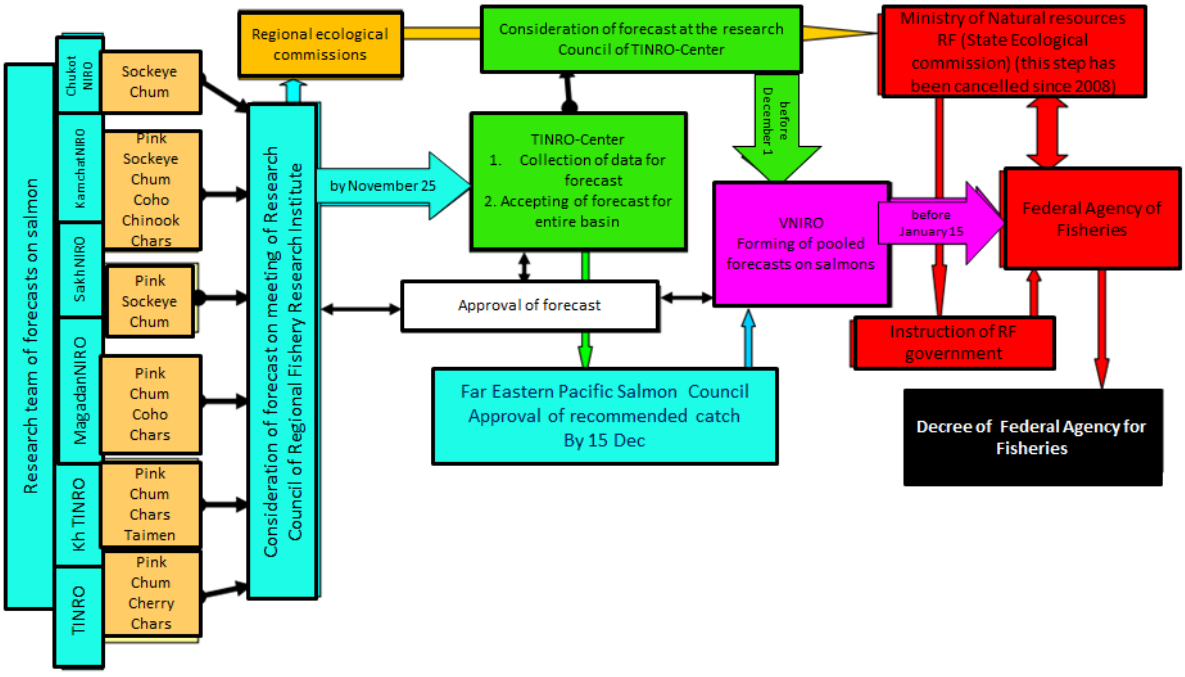

Figure 38. A procedure of issuing of the Pacific salmon recommended catch (Rassadnikov 2006).

In-season Process

The Anadromous Fish Commission (AFC) opens and closes fishery times and areas based on harvest and escapement relative to expectations and objectives (Figure 39). Usually, all these operations are done by decisions of AFC based on recommendations of KamchatNIRO.

Approved value of annual recommended catch may be adjusted by AFC based on real-time data on the number of the salmon approaching the fishing areas and spawning grounds. In order to assist in this adjustment, KamchatNIRO monitors the dynamics of catches and biological indicators of salmon runs in the main areas of operation, in the migration routes and the reproduction of the species. Each coastal set net or river beach seine is served by a crew of fishermen. The crew leaders report directly to the company's Directors. Each crew keeps fishing log according to the template specified by the FAR. This log records: coordinates of seine; daily catch (in metric tons); and species composition and bycatch. Each company submits information on the catch volumes and species composition to SVTU daily which is then summarized for reporting to the AFC. The monitoring results are used for developing operational guidelines on salmon fishing.

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

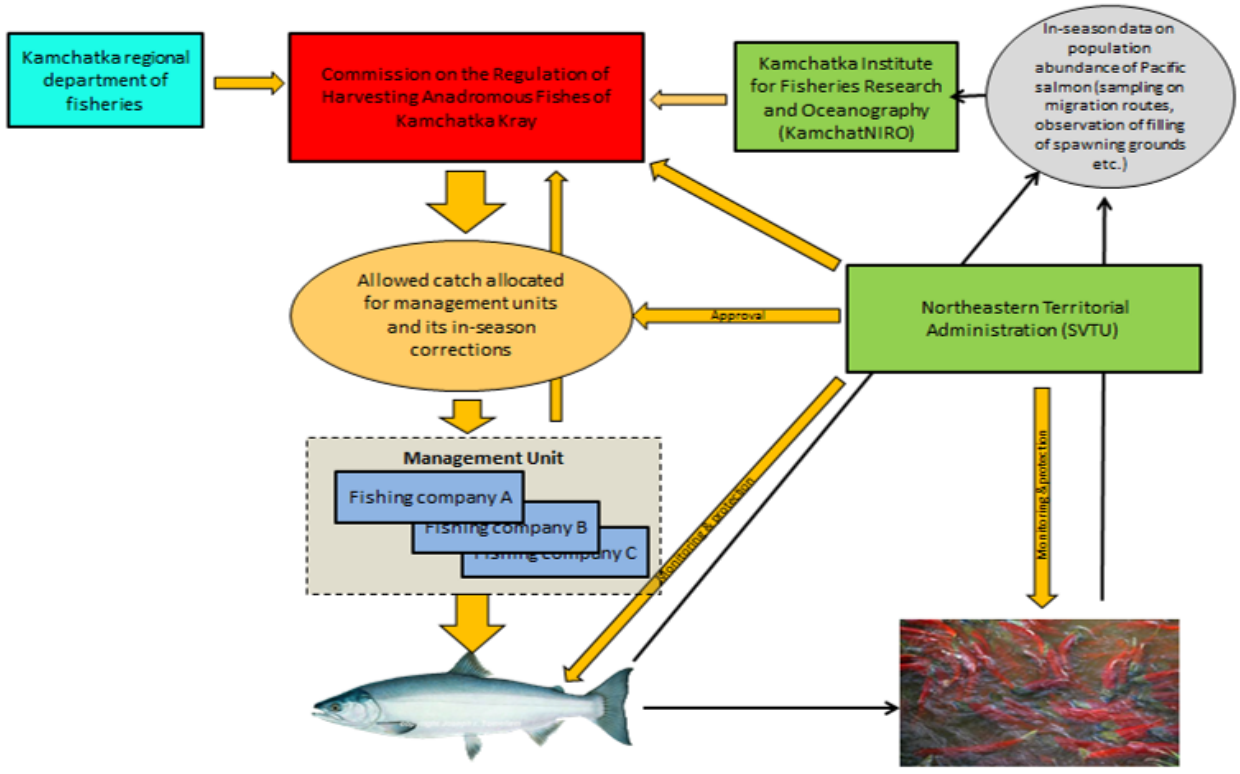

Figure 39. In-season management of the Kamchatka salmon fishery.

3.5.4 Enforcement

SVTU controls the compliance with the law and rules of fishing. SVTU contains in total 12 departments and among them the department of state control, supervision and protection of aquatic resources and habitats with enforcement functions. SVTU includes 12 local departments situated in every administrative district of Kamchatka Oblast. Fishing area assessed in this report is in the territory of Ust-Kamchatsky district departments. The level of protection depends on season. In the fishing season, local SVTU department has 10 state inspectors. Ust-Kamchatsky fishermen association that includes all 6 fishing companies operating in the area provides additional 16 inspectors. Besides inspectors, association uses two drones to monitor the river, and works in cooperation with the SVTU. SVTU has responded to concerns of bribery and corruption of enforcement officers by monitoring agents through undercover surveillance of officers and monitoring changes in officer life styles; encouraging reporting by competitors and acquaintances; and by increasing penalties including fines and job loss for convictions. SVTU reports that corruption cases have declined to about one per year, with none in 2013-14.

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

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

The companies in this certification process take active part in the protection of salmon spawning grounds. Companies clearly understand that it is a must to protect their resource and SVTU understands it does not have sufficient resources to do this effectively without support from the companies.

Legal challenges are not currently reported.

3.5.5 Research plan

For long time research of Pacific salmon is performed in the framework of large state research programs. Until mid-1990's the studies of salmon in the Far East Russian Federation were performed according to the complex target program "Salmon," which was controlled by the former Committee on Fisheries of Russian Federation (Federal Agency for Fishery). This program was designed for every 5 years starting with mid-1980s. Studies in second half of 1990s were performed according to 5-year programs, which took into account the basin and partly the ecosystem approaches. In 2005, the TINRO-center with the participation of regional NIROs, have developed "The concept of the Far East basin program for the complex study of Pacific Salmon for period 2006-2010", which was approved by Rosrybolovstvo (which is now FAR). In accordance with this concept TINRO-center has developed the "Far East basin program for complex study of Pacific Salmon for period 2007-2012". in 2009, VNIRO has developed the departmental comprehensive

target research program for fisheries of Russian Federation for 2010-2014 named “Scientific support and monitoring of conservation of reproduction and rational using of resources of fisheries base”. Within that program the “Far East basin program of complex study of Pacific Salmon for period 2010-2014” was adopted in which the succession of approach and research directions was preserved. At the end of the year, the results of these programs were discussed in the Far East Salmon Council at TINRO-center and published in the annual edition of The Bulletin of the Implementation of the “Concept of the Far East basin program for the complex study of Pacific Salmon”. A total of 9 bulletins for the period 2006-2014 have been published (in 2011-2014 the books were entitled “Bulletin of study of Pacific salmon).

Currently, scientific research on Pacific salmon in Kamchatka is performed under state funding, mostly, in KamchatNIRO, according to the institute’s research plan. In the institute, there is a Department of freshwater and anadromous fish (head A. V. Bugaev), which includes three laboratories: Laboratory of abundance and improving of forecasting of salmonids (head Y.A. Shevlyakov), Laboratory of sea studies of salmon (head V. G. Yerokhin), and Laboratory of freshwater aquatic resources and aquaculture (Pogodaev Ye. A.). Also, in KamchatNIRO there is a Laboratory of population genetics of commercial fish.

Laboratory of abundance and improving of forecasting of salmonids is one of the most important and large scientific divisions of the Institute. The laboratory staff consists of 52 highly qualified specialists, scientific and technical workers. The main tasks of this laboratory are stock assessment and recommendations for the rational use of Pacific salmon resources. For this purpose, laboratory specialists monitor the most important stocks of salmon at special seasonal observation stations in different parts of Kamchatka. Annual observations are made on the structure and abundance of spawners, reproduction patterns and embryogenesis in natural conditions, biology of juveniles in the freshwater period of life, and observation on their downstream migration. Annually, aerial surveys are carried out to control the filling of spawning grounds. There is a large number of observations of the status of ecosystems of important water bodies, such as Dalneye, Kurilskoye and Azabachye lakes; rivers Kamchatka, Bolshaya, etc.

Laboratory of sea studies of salmon focuses on estimation of the number and habitat conditions of salmon at different ages in the sea (estuarine, early marine, oceanic) and develop on this basis recommendations for improving the fishery forecasts of individual stocks, as well as the operational management of the salmon fisheries.

Laboratory of freshwater aquatic resources and aquaculture, among other tasks, implementation monitoring of Pacific salmon of hatchery origin and develop methods of identification of the origin of Pacific salmon (natural of hatchery) in mixed populations in rivers and in the sea.

Laboratory of population genetics of commercial fish studies the intraspecific structure of Pacific salmon, develops genetic markers for identification of salmon stocks and creates reference databases for identification of the main stocks of North Pacific salmon in the sea. The laboratory utilizes modern research techniques such as microsatellite DNA analysis, haplotypic variability of mitochondrial DNA and single nucleotide substitution (SNP). Work is under way to preserve the biological diversity of salmon populations for artificial reproduction and in the long-term monitoring of stocks under anthropogenic pressure.

In addition to KamchatNIRO, research on Pacific salmon is done in other local institutions of the Far East and by the headquarter of fisheries research in Russia VNIRO in Moscow. Therefore, the system of salmon research in Russia covers all important parts of the Pacific salmon distribution range and various aspects of its biology.

3.5.6 International Management

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

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

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

4 EVALUATION PROCEDURE

4.1 Harmonized Fishery Assessment

Scores of this assessment were compared with those of four other assessments of Kamchatka salmon fisheries. All assessments are subject to the same management system. Scores and conditions among assessments were reconciled to the extent possible recognizing specific circumstances in different rivers and additional or new information that has become available between assessments. In several cases, differences in scores reflect new information available to the assessment team.

Table 7. Summary of current salmon fishery assessments in the Kamchatka region.

	Area	VA-D W. Kamchatka (MRAG 2016)	VA-D Ozernaya (MRAG 2017)	NS-B W Kamchatka (MRAG 2017)	Delta Fish Kamchatka R (MRAG 2017)	Delfin Olyutorskiy (MRAG 2017)
West Kamchatka	Vorovskaya	Pink, Chum	--	--	--	--
	Kol	Pink, Chum, Coho	--	--	--	--
	Kikhchik	--	--	Pink, Chum	--	--
	Mukhina	--	--	Pink, Chum	--	--
	Khomutina	--	--	Pink, Chum	--	--
	Bolshaya	--	--	Pink, Chum	--	--
	Opala	Pink, Chum	--	Pink, Chum	--	--
	Golygina	Pink, Chum	--	--	--	--
	Kochegochek	Pink, Chum	--	--	--	--
	Ozernaya	Pink, Chum	Sockeye	--	--	--
East	Kamchatsky Bay & Kamchatka R	--	--	--	Sockeye, Chum, Coho, Chinook	--
	Olyutorskiy Bay & rivers entering	--	--	--	--	Pink, Sockeye, Chum

Table 8. Summary of PI Level Scores for Kamchatka Peninsula salmon fisheries.

Principle	Species	VA-D W Kamchatka	VA-D Ozernaya	NS-B W Kamchatka	Delta Fish Kamchatka R	Delfin Olyutorskiy
P1 – Target Spp.	Pink	82.9[a]	--	85.4	--	85.4
	Chum	82.9[a]	--	83.2	83.7	85.4
	Coho	82.9[a]	--	--	83.3	--
	Sockeye	--	97.9	--	84.1	85.4
	Chinook				83.3	--
P2 – Ecosystem	All	85.7	85.7	85.0	85.0	87.3
P3 –Mgmt. System	All	81.9	81.9	81.9	80.2	82.3

[a] *Reported as 81.9 (errata) in West Kamchatka assessment (MRAG 2016).*

Table 9. Summary of PI levels scores for Kamchatka salmon fisheries.

Prin.	Component	PI	Performance Indicator (PI)	VA-D W. Kamchatka			VA-D Ozernaya	NS-B W Kamchatka		Delta Fish Kamchatsky Bay / Kamchatka R			
				Pink	Chum	Coho	Sockeye	Pink	Chum	Sock	Chum	Coho	Chnk
P1 – Target Species	Outcome	1.1.1	Stock status	70	70	70	100	80	80	70	70	70	70
		1.1.2	Stock rebuilding	80	80	80	na	na	Na	85	85	85	85
	Management	1.2.1	Harvest strategy	85	85	85	95	85	85	85	85	85	85
		1.2.2	Harvest control rules & tools	70	70	70	95	80	80	80	80	80	80
		1.2.3	Information & monitoring	65	65	65	90	65	65	65	65	65	65
		1.2.4	Assessment of stock status	75	75	75	95	75	75	75	70	65	65
	Enhancement	1.3.1	Enhancement outcome	100	100	100	100	100	100	100	100	100	100
		1.3.2	Enhancement management	100	100	100	100	100	90	100	100	100	100
		1.3.3	Enhancement information	100	100	100	100	100	90	100	100	100	100
P2 - Ecosystem	Retained species	2.1.1	Outcome	80			80	80		80			
		2.1.2	Management	90			90	90		80			
		2.1.3	Information	70			70	95		70			
	Bycatch species	2.2.1	Outcome	100			100	100		100			
		2.2.2	Management	80			80	80		80			
		2.2.3	Information	80			80	85		80			
	ETP species	2.3.1	Outcome	85			85	85		85			
		2.3.2	Management	90			90	85		80			
		2.3.3	Information	80			80	80		80			
	Habitats	2.4.1	Outcome	95			95	95		95			
		2.4.2	Management	95			95	95		95			
		2.4.3	Information	80			80	80		80			
	Ecosystem	2.5.1	Outcome	90			90	80		90			
		2.5.2	Management	90			90	90		90			
		2.5.3	Information	80			80	80		80			
P3 - System	Governance & policy	3.1.1	Legal/customary framework	100			100	100		95			
		3.1.2	Consultation, roles, etc.	85			85	85		80			
		3.1.3	Long term objectives	80			80	80		80			
	Management system	3.2.1	Fishery specific objectives	80			80	80		80			
		3.2.2	Decision making processes	75			75	75		75			
		3.2.3	Compliance & enforcement	70			70	70		70			
		3.2.4	Performance evaluation	80			80	80		80			

4.2 Previous assessments

This fishery was not subject to previous full assessments; however, a pre-assessment was conducted in 2017 by Dimitry Lajus, one of the team members for the present assessment.

4.3 Assessment Methodologies

This assessment used FCR v2.0 (1 October 2014), with modifications to the default assessment tree for salmon fisheries as defined by the Marine Stewardship Council (MSC). The report was produced with MSC Full Assessment Reporting Template: Salmon fisheries v1.0 (8 October 2014). The default assessment tree for salmon fisheries was used without adjustments.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

A site visit was conducted on 4-10 August, 2017 at the Delta Fish office and processing facility In Ust-Kamchatsk, fishery areas on the Kamchatka River, and government offices in Petropavlovsk-Kamchatsky, Russian Federation. The visit included Ray Beamesderfer and Dr. Dmitry Lajus. The team met with the clients, with the client's consultant, federal and state salmon scientific and management agencies, and key stakeholders. The team also reviewed extensive written documentation provided by the client and the fishery management system.

Date	Name	Affiliation	Subject
8/5	Aleksey Buglak	Client consultant	Schedule & background
8/6	Aleksey Buglak	Client consultant	Coordination
	Mikhail Zemnitstkyi	Delta Fish Ltd. Deputy Director	Company activities
	Alexander Kulichev	Delta Fish Ltd. Chief Factory Manager	Factory activities, catch processing
	Alexander Galushkin	Delta Fish Ltd. Chief Engineer	Company facilities
8/7	Aleksey Buglak	Client consultant	Fishing site tour
	Roman Kirienko	Ustkamchatryba Co., General Director, Vice-president of Ust-Kamchatksy Fishermen Association	Certificate participation Industry activities
	Sergei Martunyk	President of Ust-Kamchatsky Fishermen Association, general director of Energiya Co.	
	Yuri Usov	General director of Vostok-ryba Co.	
	Yuri Lelikov	Ustkamchatryba Co., Head of production department	
	Stepan Gushansky	Delta Fish Ltd.	River fishing site Chief of operations
	Evgeniy Fadeev	KamchatNIRO	Science, Fishery information and monitoring
	Alexey Sazonov	Delta Fish Ltd. Captain of Fishing	Sea fishing site Chief of operations
8/8	Aleksey Buglak	Client consultant	Travel day
	Mikhail Zemnitstkyi	Delta Fish Ltd.	
8/9	Aleksey Buglak	Client consultant	Coordination
	Alexander Bugaev	Federal Fishery Research Institutes - KamchatNIRO	Stock & fishery assessment and management strategy
	Nina Shpigalskaya		
	Evgeny Shevlyakov		

	Mikhail Zemnitstkyi	Delta Fish Ltd. Deputy Director	Fishery operations
	Denis Selin	Delfin Co. Ltd	Fishery operations
	Vladimir Davydov	Head of fisheries department, Ministry of Kamchatsky krai; Secretary of Kamchatka anadromous commission	Management system
	Sergei Kostenko	Delta Fish Ltd. Director	Fishery operations
	Vasily Vashenko	Delta Fish Ltd. Enforcement officer	Enforcement activities
	Sergey Korostelev	World Wildlife Fund – RU Former Director of KamchatNIRO	Public involvement, Stock Assessment, Fishery Management
	Yrui Kislyak	Press-secretary of WWF Kamchatka	
8/10	Aleksey Buglak	Client consultant	Coordination
	Alexander Khistenko	Federal Fisheries Agency, Northeastern Territorial Administration (SVTU)	Management System, enforcement
	Alexander Tarasov		
	Anna Potulitsyna		
	Mikhail Zemnitstkyi	Delta Fish Ltd. Deputy Director	Fishery operations
	Sergei Kostenko	Delta Fish Ltd. Director	
	Denis Selin	Delfin Co. Ltd.	

4.4.2 Consultations

The fishery was announced as entering assessment 6 July 2017 with posting to the MSC website. The assessment team was announced at the same time. Stakeholders (identified above) were interviewed during the site visit.

4.4.3 Evaluation Techniques

MRAG Americas compiled a stakeholder list based on interest expressed during the assessment and used that list plus any additions to directly notify stakeholders of the process. Client consultants helped inform stakeholders in the region of the assessment, as the MRAG Americas announcements were issued in English and stakeholders primarily speak Russian.

The MRAG Americas assessment team reviewed available information relative to the assessment tree that was developed for this fishery. Discussions within the team reached scoring conclusions by consensus. The assessment team followed the MSC CR that specified how to score each indictor, and in order for the fishery to be recommended for certification, that each performance indicator must score 60 or higher and that each principle must have a weighted average of 80 or above. The team used the “few, many, most” protocol for scoring performance indicators depending on if individual scoring issues were met or not met, as described in the MSC CR.

The MRAG Assessment Team prepared a list of Principle 1 and 2 species (Section 3.4) in advance of scoring (Table 10). The species were assigned to Primary, Secondary, or ETP as described in Section 3.4. Scoring elements are identified in Table 10.

The RBF was not used for this assessment.

Table 10. Scoring elements

Component	Scoring elements	Main/not main	Retained?	Data-deficient?
Principle 1	Chum Salmon[a]	--	Yes	No
Principle 1	Sockeye Salmon [b]	--	Yes	No
Principle 1	Chinook Salmon [a]	--	Yes	No
Principle 1	Coho Salmon	--	Yes	No
Primary	Pink Salmon[a]	Main	Yes	No
Secondary	Char	Not Main	Yes	No
Secondary	Miscellaneous marine species	Not Main	No	No
ETP	Steller sea lion	--	No	No
ETP	Steller sea eagle	--	No	No
Habitat	Sand, silt, gravel bottom	Main	No	No
Ecosystem	Freshwater & Marine	--	--	No

5 TRACEABILITY

5.1 Eligibility Date

The eligibility date for product from the fishery to bear the MSC label will be the date of release of the PCDR (12 April 2018), When the eligibility date is before certification, any fish harvested after the eligibility date but before certification shall be stored as under-assessment fish and handled in conformity with the relevant under-assessment product requirements in the MSC CoC Standard v4. However, the eligibility date occurred prior to the start of the fishing season.

5.2 Traceability within the Fishery

Daily catch of salmon from traps is delivered by boats to the shore, where it is weighed and reloaded to mobile containers that transport chilled fish. Catch from beach seines is brought ashore by the nets and loaded to mobile containers that transport chilled fish. Ice is used for cooling the fish. While the catch is transported, it is accompanied by a document specifying the place and the crew that captured it, the weights of the transported fish, and the processing facility where the catch is being delivered. Upon delivery, the fish are weighted again by the processing facility and then the catch is sent for processing. The processing plants track numbers of salmon by species by day for each fishing parcel. Transshipment does not occur.

Arriving catch is recorded in the log of the processing facility. The processing plants track numbers of salmon by species by day for each fishing parcel. The record contains the location of the catch and company which submits catch. Both the companies' logs and the processing facilities' logs are regularly checked by SKTU inspectors, sanitary-epidemiological control and territorial RosPrirodNadzor. The facts of such inspections are also being recorded in appropriate logs.

Table 11. Points of landing for fishing parcels permitted for use by fishing companies in this assessment. All points of landing are adjacent to shoreline fishing sites.

Parcel	Water body	Point of landing	Processing location
832	Kamchatka River	River	Ust-Kamchatsk
833	Kamchatka River	River	Ust-Kamchatsk
277	Kamchatsky Bay	Ocean beach	Ust-Kamchatsk

All fish delivered from landing sites have documentation that shows date, location, volumes, species, and fishing operator. Since each operator has a commercial fishing permit that also identifies gear type,

documentation of the different gear types and operators would prevent substitution at delivery. Subsequent chain of custody would assure separation after the initial delivery.

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

MSC traceability requirements were checked only as far as salmon landed at authorized fishing parcels by legally permitted fishing companies under the certificate sharing agreement and delivered to processing facilities, where the landings can be monitored in accordance with MSC chain of custody requirements. Under the certificate sharing agreement, authorized fishing companies may use the certificate and apply the MSC logo if they deliver to a processing facility that holds MSC chain of custody certification.

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

Table 12. Traceability factors within the Fishery:

Traceability Factor	**Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)**
Potential for non-certified gear/s to be used within the fishery	Not present – all gears employed in the fishery are included in the unit of certification
Potential for vessels from the Unit of Certification to fish outside the Unit of Certification or in different geographical areas (on the same trips or different trips)	Not present – Vessels are owned by the companies and are assigned to the active fishing parcels. Vessels could not obtain fish from beyond company fishing activities without detection because the plants and the government inspectors compare logbook records from a parcel with landing at the plant.
Potential for vessels outside of the Unit of Certification or client group fishing the same stock	Client group companies do not accept fish from other companies, and process only their own fish. No legally caught fish from other companies could surreptitiously enter the processing plants of client group companies as all fish must have documentation checked frequently by federal authorities, and documentation of fish from other companies would easily be evident.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at	Not present – all covered by chain of custody. All fish delivered from landing sites have documentation that shows date, location, volumes, species, and fishing operator. Since each operator has a commercial fishing permit that also

sea and on land, points of landing, and sales at auction)	identifies gear type, documentation of the different gear types and operators would prevent substitution at delivery.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	Not present – chain of custody starts at delivery to the processing plant, with chain of custody documented in all subsequent processing steps. As the harvest of unique salmon species do overlap with species outside the UoC, there is system in place to ensure segregation and traceability to prevent mixing between certified and non-certified catch based on species separation in processing and labeling.
Risks of mixing between certified and non-certified catch during transhipment	Appropriate systems and records are in place at: (1) the point of landing, (2) reloading, (3) boxing into container and (4) transport to processing facility to ensure traceability back to UoC. Further while there is no transhipment prior to point of landing, there is also no transhipment from point of reloading to the start of CoC (i.e. processing facility). Only salmon harvested in the UoC are processed in the certificate holding processing facilities.
Any other risks of substitution between fish from the Unit of Certification (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	Not present

5.3 Eligibility to Enter Further Chains of Custody

Acting as a client for the current certification, Delta Fish Ltd., may share certification with other fishing companies operated in the UoC on terms of Certificate Sharing Agreement. The current list of companies and their fishing parcels eligible for the current fishery certification will be published at the MSC website and may be changed. Salmon species specified in the UoC of the assessment, harvested by the companies of the Client Group with gears allowed in the Fishing Rules, and landed from authorized parcels in the rivers of the Kamchatka Bay and Kamchatka River are eligible to enter further chain of custody.

Chain of custody begins at delivery of salmon to a processing facility in the client group or at a point of change in ownership of the fish. Members of the Client Group own the fish they catch, commencing at the point of fish catch. Fishing sites are leased and operated by the members of the Client Group, which also operate the processing plants. Documentation of the fish is sufficient (see section 5.2) such that chain of custody is not necessary for transport of wholly-owned fish from the point of catch to delivery at the processing plant.

Should other companies share the certificate at some point in the future and sell fish to the client group or other companies holding chain of custody, chain of custody would start at the point of sale, but no later than delivery to a processing plant. Any companies buying from processing facilities that receive certified product are required to have chain of custody certification for further sale and distribution. This certification did not evaluate other landing sites that are not part of the certification determination or subsequent distribution for chain of custody. To use the MSC logo, subsequent links in the distribution chain must enter into a separate chain of custody certification that proves they can track the salmon product to a chain of custody holder.

5.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody

The fishery does not include IPI species.

6 EVALUATION RESULTS

6.1 Principle Level Scores

Principle		Salmon Species		
	Sockeye	Chum	Coho	Chinook
Principle 1 – Target Species	84.1	83.7	83.3	83.3
Principle 2 – Ecosystem	85.0			
Principle 3 – Management System	80.2			

6.2 Summary of PI Level Scores

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score Sockeye	Chum	Coho	Chnk
One	1	Outcome	0.333	1.1.1	Stock status	0.5	0.167	70	70	70	70
				1.1.2	Stock rebuilding	0.5	0.167	85	85	85	85
		Management	0.333	1.2.1	Harvest strategy	0.25	0.083	80	80	80	80
				1.2.2	Harvest control rules & tools	0.25	0.083	80	80	80	80
				1.2.3	Information & monitoring	0.25	0.083	65	65	65	65
				1.2.4	Assessment of stock status	0.25	0.083	75	70	65	65
		Enhancement	0.333	1.3.1	Enhancement outcome	0.333	0.111	100	100	100	100
				1.3.2	Enhancement management	0.333	0.111	100	100	100	100
				1.3.3	Enhancement information	0.333	0.111	100	100	100	100
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.067	80			
				2.1.2	Management	0.333	0.067	80			
				2.1.3	Information	0.333	0.067	80			
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.067	100			
				2.2.2	Management	0.333	0.067	80			
				2.2.3	Information	0.333	0.067	80			
		ETP species	0.2	2.3.1	Outcome	0.333	0.067	85			
				2.3.2	Management	0.333	0.067	80			
				2.3.3	Information	0.333	0.067	80			
		Habitats	0.2	2.4.1	Outcome	0.333	0.067	95			
				2.4.2	Management	0.333	0.067	95			
				2.4.3	Information	0.333	0.067	80			
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.067	90			
				2.5.2	Management	0.333	0.067	90			
				2.5.3	Information	0.333	0.067	80			
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.3	0.150	95			
				3.1.2	Consultation, roles & responsibilities	0.3	0.150	80			
				3.1.3	Long term objectives	0.3	0.150	80			
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	0.125	80			
				3.2.2	Decision making processes	0.25	0.125	75			
				3.2.3	Compliance & enforcement	0.25	0.125	70			
				3.2.4	Management performance evaluation	0.25	0.125	80			

6.3 Summary of Conditions

The fishery received six conditions for performance indicators that scored less than 80.

Table 13. Summary of Conditions

Condition number	Condition	Performance Indicator
1	Demonstrate that Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River are at or fluctuating around escapement levels which maintain high production and provide a low probability of falling to levels where recruitment would be impaired.	1.1.1
2	Regularly monitor spawning escapement of Sockeye, Chum, Coho and Chinook Salmon at a level of accuracy and coverage sufficient to ensure effective harvest controls in the Kamchatka River.	1.2.3
3	Provide information on the level and locations of illegal fishery removals of Sockeye, Chum and Chinook Salmon from the Kamchatka River.	1.2.3
4	Estimate stock status of Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.	1.2.4
5	Demonstrate that information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	3.2.2
6	Demonstrate that a monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules, and that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	3.2.3

6.4 Determination, Formal Conclusion and Agreement

All principle scores exceeded 80 but several performance indicators scored between 60 and 80. As a result, six conditions were identified. On the basis of this assessment, peer review, stakeholder comments, and the completion of the objections period wth no objectiosn received, MRAG Americas has decided that the fishery should be certified.

Changes in the fishery prior to and since Pre-Assessment

None

7 REFERENCES

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

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

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

Bugaev V. F., Dubynin V. A. Factors which influencing biological indices and population dynamics of Sockeye Salmon *Oncorhynchus nerka* of Ozernaya and Kamchatka Rivers. Izvestia TINRO, 2000. V. 10, P. II: pp. 679-757.

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

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

Burkanov V. N. The distribution and number of seals off the coast of Kamchatka in August 1985 // Research on marine mammals of the Northern Pacific in 1984-1985. M: VNIRO, 1986. Pp. 45-50.

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

Clarke S. Trading tails: Russian salmon fisheries and the East Asian markets. TRAFFIC East Asia. 2007. http://www.traffic.org/fish

Clarke S. C., McAllister M. K., Kirkpatrick R. C. Estimating legal and illegal catches of Russian Sockeye Salmon from trade and market data. ICES Journal of Marine Sciences, 2009. V. 66. Pp. 532-545.

Degtev A. I., Shevlyakov E. A., Malykh K. M., Dubynin V. A. Experience of quantitative assessment of juveniles and manufacturers of Pacific salmon hydro-acoustic method of migration routes in freshwater bodies, Izvestia TINRO. 2012, V. 170. Pp. 113-135.

Dronova N. A., Spiridonov V. A. Illegal, unreported, and unregulated Pacific salmon fishing at Kamchatka. World Wildlife Foundation and Traffic International. 2008. www.traffic.org/species-reports/traffic_species_fish32.pdf

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

Foerster R. E. The Sockeye Salmon, *Oncorhynchus nerka* // Fish. Res. Bd. of Canada. 1968. Bull. 162. 442 pp.

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

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

Gordienko V. N., Gordienko T.A. 2005. Buryi medved Kamchatki: kratkoe prakticheskoe posobie po ekologii i predotvrascheniu konfliktov. Petropavlovsk-Kamchatsky. Kamchatpress

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

Heard W. R., Shevlyakov E. A., Zikunova O. V., McNicol R. E. Chinook Salmon – trends in abundance and biological characteristics // The North Pacific Anadromous Fish Commission. Bull. 2007. № 4. P. 77–91.

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

KamchatNIRO. 2017. Information materials prepared for the pre-assessment of salmon fisheries on the Kamchatka River and Kamchatka Bay of the Petropavlovsk-Commander subzone against the standards on sustainable fisheries of Marine Stewardship Council. Petropavlovsk-Kamchatsky, March 2017.

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

Konovalov S. M. Population biology of Pacific salmon // L.: Nauka, 1980. 237 p.

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

Krashninnikov S.P. 1949. Opisanie zemli Kamchatki [Description of the Kamchatka land]. Moscow-Leningrad. Izdatelstvo Glavsevmorputi.

Lagerev S. R. Results of aviation studies of coastal rookeries of seals in the sea of Okhotsk in 1986 // Scientific research works on marine mammals of the Northern Pacific Ocean in 1986-1987. M: VNIRO, 1988. Pp. 80-89.

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

Maksimov S. V., Leman V. N. (eds.). Regional concept of reduction of illegal salmon fishing in Kamchatka region. 2008. Expert version submitted for public discussion. Izdatelstvo VNIRO.

MRAG 2016. VA-Delta Kamchatka salmon fisheries. PCR report. September 2016. MSC.org

MRAG 2017. Ozernaya River Sockeye Salmon fishery. Public certification report. https://fisheries.msc.org/en/fisheries/va-delta-kamchatka-salmon-fisheries/@@assessment-documentsets?documentset_name=Public+certification+report&phase_name=Public+certification+report+and+certificate+issue&start_date=2017-02-08&title=Scope+Extension

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

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

Nikolaeva, E. T. 1975. Biology of Kamchatka Chum Salmon stocks // Archive of KamchatNIRO. Petropavlovsk-Kamchatsky. 207 p.

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

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

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

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

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

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

Ruggerone G. T., Zimmermann M., Myers K. W., Nielsen J. L., Rogers D. E. 2003. Competition between Asian Pink Salmon (Oncorhynchus gorbuscha) and Alaskan Sockeye Salmon (*O. nerka*) in the North Pacific Ocean. Fisheries Oceanography. V. 12 (3): pp. 209–219.

Ruggerone G. T., Farley E., Nielsen J., Hagen P. 2005. Seasonal marine growth of Bristol Bay Sockeye Salmon (*Oncorhynchus nerka*) in relation to competition with Asian Pink Salmon (*O. gorbuscha*) and the 1977 ocean regime shift. Fish. Bull. V. 103: pp. 355¬370.

Ruggerone G. T., Peterman R. M., Dorner B., Myers K. W. 2010. Magnitude and trends in abundance of hatchery and wild Pink, Chum, and Sockeye Salmon in the North Pacific Ocean. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science, V. 2: pp. 306-328.

Salmenkova E.A., Gordeeva N.V., Omel'chenko V.T., Altukhov Iu.P., Afanas'ev K.I., Rubtsova G.A., and Vasil'eva Iu, V. 2006. Genetic differentiation of Pink Salmon *oncorhynchus gorbuscha* Walbaum in the Asian part of the range. Genetika. 2006 Oct;42(10):1371-87.

Sandercock F. K. 1991. Life history of Coho Salmon (*Oncorhynchus kistuch*). Pages 395 to 446 in C. Groot and L. Margolis, editors. Pacific salmon life histories. University of British Columbia Press. Vancouver, British Columbia, Canada.

Schindler DE, Scheurell MD, Moore JW, Gende SM, Francis TB, Palen WJ (2003) Pacific salmon and the ecology of coastal ecosystems. Front Ecol Environ 1:31–37.

Semenov D., Yanislavsky V., Markov P. 2015. Independent Observers Vityaz-Avto and Delta Fishery Report. Kamchatka Fish Fund. Petropavlovsk-Kamchatsky

Seryodkin J. I., Paczkowski V., Shuntov V.P., Raygorodetsky G.R. (editors). Buryi medved Kamchatki: ekologia, okhrana i ratsionalnoe ispolzovanie [Kamchatka Brown Bear: Ecology, Conservation, and Sustainable Use]. Vladivostok, Dalnauka, 2006.

Sharp, D., S. Sharr, and C. Peckham. 1994. Homing and straying patterns of coded wire tagged Pink salmon in Prince William Sound. Proceedings of the 16th northeast Pacific Pink and Chum Salmon workshop. University of Alaska, Sea Grant Program, Report 94-02:77–82. (Fairbanks.)

Shevlyakov E. A. 2013. Structure and dynamics of illegal coastal fishing of Pacific salmon in Kamchatka region in modern period // Rybnoe khozyaystvo, №2. C. 58-65.

Shevlyakov E. A., Zavarina L. O. 2004. To the question about the features of population dynamics and methods of forecasting Chum Salmon stocks (*Oncorchynchus keta*) of Western Kamchatka) //

Research of aquatic biological resources of the Kamchatka and Northern-Western part of the Pacific Ocean: Sat. scientific papers. Petropavlovsk-Kamchatsky: KamchatNIRO, Vol. 7. Pp. 181-186.

Shevlyakov, E. A., Dubynin, V. A., and A. Bugaev. 2011. Improving environmental responsibility of the resource: practical recommendations for implementing principles of sustainable fishery based on voluntary environmental standards for MSC certification. Federal Agency for Fisheries, Kamchatka Research Institute of Fisheries and Oceanography. Report to the World Wildlife Federation (Project WWF19/RU007020/GLM). Petropavlovsk-Kamchatsky.

Shevlyakov E. A., Dubynin V. A., Zaporozhets O. M., Golobokova V. N. 2014. Report on the Contract N28/13-BO on topic: scientific support of certification MSC of Bolsheretsk LTD". KamchatNIRO.

Shevlyakov, E. A., V. A. Dubynin, M. G. Feldman, L. O. Zavarina, I. V. Tiller, S.V. Shubkin, O. A. Zakharova, O. V. Zikunova N. B. Artyukhina, and V. N. Baeva. 2016. Report under Contract No. 04/15-НИР dated 23.06.2015 Subject: Pacific salmon (Humpback, Chum, red, Coho, Chinook) population characteristics, target indexes and harvest management system in certain rivers (Vorovskaya, Kol, Opala, Golygina, Koshegochek, Ozernaya) in West Kamchatka (scientific justification of Pacific salmon harvest certification to MSC standards for Vityaz-Avto LLC and Delta LLC). KamchatNiro, Petropavlosk.

Shevlyakov, E.A., and A. V. Maslov. 2011. Critical rivers for the reproduction of Pacific salmon in Kamchatka, as reference rivers for estimating spawning escapement. Izvestia TINRO. T. C. 114-139.

Shuntov V. P., Temnykh O. S. Pacific salmon in marine and ocean ecosystems: monograph. V. 1 // Vladivostok: TINRO-Tsentr, 2008. 481 p.

Shuntov V. P., Temnykh O. S. Pacific salmon in marine and ocean ecosystems: monograph. Pacific Scientific-Research Fisheries Center. Vladivostok: TINRO-Tsentr, 2011. V. 2. 473 p.

Steller G.V. 1999. Opisanie zemli Kamchatki [Description of the Kamchatka land]. Petropavlovsk-Kamchatsky. Kamchatsky Knizhnyi Dvor.

Temnykh O. S., Zavolokin A. V., Koval M. V. 2010. Russian Research under the NPAFC Research Plan 2006-2010: A Review and Future Issues. Pacific Research Fisheries Center (TINRO-Center), Vladivostok, Russia. NPAFC Doc. 1238. 23 pp. (Available at www.npafc.org).

Urawa S., Sato S., Crane P. A., Agler B., Josephson R., Azumaya T. 2009. Stock-specific ocean distribution and migration of Chum Salmon in the Bering Sea and North Pacific Ocean. N. Pac. Anadr. Fish Comm. Bull. V. 5: pp. 131-146.

Vinnikov A. V., Shevlyakov E. A., Grohotova L. I., Vinnikova E. V., Denisov Yu. A., Tatarinov A. V. Peculiarities of application of the Olympic system fishing of Pacific salmon on the basin principle in the Kamchatka region in 2010 // Research on water biological resources of the Kamchatka and Northern-Western part of the Pacific Ocean. Sb. nauch. Tr. KamchatNII Ryb. Khoz-va i okeanografii. Vol. 26. Part 2. 2012. P. 43-46.

Vronskiy B. B. Materials on the reproduction of the Oncorhynchus tschawytscha (Walbaum) of the River Kamchatka // Vopr. Ikhtiologii. 1972. V. 12. № 2. P. 293-308.

Vronskiy B. B. Dependence of reproduction efficiency of Chinook Salmon in the basin of the river Kamchatka from the hydrological regime // Systematics, biology and biotechnology of salmonids breeding. St. Petersburg. Materials of the Fifth All-Russian Conference. 1994. P. 34-35.

Zavarina L. O. 2003. Biological structure of the Chum Salmon Oncorhynchus keta of the northeastern coast of Kamchatka // Readings of the memory of V. Ya. Levanidov. Issue 2. Vladivostok, March 19-21, 2003. Vladivostok. Dal'nauka. Pp. 531-540.

Zaporozhets O. M., Shevlyakov E. A., Zaporozhets G.V. 2007. Analysis of the population dynamics of Kamchatka salmon in the 20-21 centuries with regard to their legal and illegal seizure // Bulletin №2

(implementation of the «Concept of the far Eastern basin program for the study of Pacific salmon». Publisher: Vladivostok.

Zaporozhets O. M., Shevlyakov E. A., Zaporozhets G.V. Population dynamics of Kamchatka salmon with regard to their legal and illegal fishing, Izv. TINRO. 2008. V. 153. Pp. 109¬134.

Zikunova O. V. Biological characteristics of the Oncorhynchus tschawytscha (Walbaum) breeding stock of the River Kamchatka basin // Issled. Vodn. Biol. Resursov Kamchatki i sev.-zap. chasti Tikhogo okeana. Sb. Nauch. Tr. Kamchat. NII ryb. khoz-va i okeanografii. 2014. Issue 32. Pp. 48-58.

Zikunova O. V. Dynamics of the Chinook Salmon stock state of the River Kamchatka in connection with the dynamics of its fishery // Issled. Vodn. Biol. Resursov Kamchatki i sev.-zap. chasti Tikhogo okeana. Sb. Nauch. Tr. Kamchat. NNI ryb. khoz-va i okeanografii. 2016. Issue 42. P. 5-17.

Zorbidi Zh. Kh. Asian stocks of Coho Salmon. Petropavlovsk-Kamchatsky: KamchatNIRO, 2010. 306 p.

APPENDIX 1 – PERFORMANCE INDICATOR SCORING AND RATIONALES

Evaluation Table for PI 1.1.1 – Stock status

PI 1.1.1		**The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)**		
Scoring Issue		SG 60	SG 80	SG 100
A	Stock status			
	Guidepost	It is **likely** that the SMU is above the limit reference point (LRP).	It is **highly likely** that the SMU is above the LRP.	There is a **high degree of certainty** that the SMU is above the LRP.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG 60 – See SG80. SG80 – Quantitative data on long-term production trends and escapement provide strong evidence that these salmon species are highly likely above the point where recruitment would be impaired by the current commercial fishery. "Highly likely" for the purposes of this scoring issue is defined in SC2.2.3.1 to mean greater than or equal to 80% of the most recent 15 years (i.e., 12 of 15 years). This criterium is clearly achieved based on minimum escapement goal targets recently identified by KamchatNIRO for Kamchatka River sockeye (87% exceedance: Figure 15) and Chinook (87% exceedance: Figure 28). The available escapement data did not indicate that objectives were consistently achieved for Kamchatka River Chum and Coho salmon. However, escapement survey effort by KamchatNIRO has been reduced in recent years and recent escapements have been substantially underestimated. Sustained high catches of Kamchatka River Chum (Figure 17) and Coho (Figure 21) demonstrate that escapements have been sufficient to maintain high production and exceed a point of significant reproductive impairment. This information supports achievement of the 80 scoring standard for this issue. Freshwater habitat conditions in eastern Kamchatka, with a few exceptions, are excellent for salmon production. Watersheds are virtually pristine and support tremendous diversity of aquatic systems including rivers, streams, lakes and wetlands which provide ideal conductions for salmon production. These conditions are conducive to high levels of salmon productivity and inherent resilience to harvest which in turn can sustain robust levels of fishery exploitation. An extended period of favorable ocean conditions throughout the northern Pacific has contributed to continuing high returns of Sockeye, Chum and Pink Salmon to east Kamchatka. Ocean conditions have been more variable for Coho and Chinook Salmon but escapements and production of this species has been protected by changes in management to reduce exploitation rates. Consistent high levels of salmon production over the last decade confirm that the management strategy has effectively maintained the reproductive capacity of the aggregate stock of each species (Figure 12, Figure 17, Figure 21, Figure 27). Current numbers are at historical levels of sustained abundance. These stocks have also benefited by improvements in fishery management structures and enforcement which appear to have substantially reduced the illegal and unreported harvest which reduced spawning escapements. Salmon fisheries in Kamchatka are managed for optimum spawning escapement levels which have been consistently demonstrated to provide high levels of sustained yield. This approach provides a conservative standard for protecting populations from critical low levels that impact diversity, resilience and future production. Management for optimum		

PI 1.1.1		The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)		
Scoring Issue		SG 60	SG 80	SG 100
		escapement objectives effectively provides an operational equivalent of a limit reference point in salmon management systems by effectively avoiding lower escapements to the extent that this is possible by regulating fisheries. Fishing effort and strategies have been identified based on historical information to ensure adequate spawning escapement during most years in most areas. Fishery management intensity is scaled to the vast area of the region and the limitations of the available institutional resources for stock assessment and management. Stocks of each species are effectively managed as regional aggregates which is generally appropriate given the productivity of the habitat and the normal covariation among substocks resulting from shared freshwater and ocean productivity patterns. System-specific regulatory mechanisms are implemented based on local abundance and fishery dynamics. Highly variable annual run sizes are characteristic of salmon. Thus, it is not always possible to meet optimum targets in every population and year. Occasional poor run years and escapements into portions of some systems are characteristic of salmon. Long term population viability and fishery sustainability for salmon is maintained under these circumstances by a diverse meta-population structure including multiple, interacting populations and subpopulations, and by only a portion of each population or brood year cohort returning to spawn in any given year (McElhany et al. 2000). However, effective management for target reference points should ensure that average escapements will be maintained over the long term above the level at which there is an appreciable risk of impairing reproductive capacity. Fishing effort may also be adjusted somewhat in-season based on annual stock assessments but the fishery is not intensively managed at a fine scale in order to maximize harvest in any given year. Given the demonstrated success of this approach it is not necessary to quantify river-specific escapement of every stock in every year. Over the last decade, the federal fishery scientific agency (KamchatNiro) has been refining the scientific basis for salmon management by developing productivity functions for stocks and populations throughout Kamchatka. With this work, KamchatNIRO has been formalizing estimation and application of quantitative reference points including optimum spawning levels and points of potential reproductive impairment. This information is currently being tested by the management systems but has not yet been fully incorporated, in part due to limitations in annual stock assessments which are addressed in PI 1.2.4. (Due to past reductions in aerial survey effort, data on spawning escapements in some rivers is lacking in some years and corresponding escapement are reported as low values by KamchatNIRO). This assessment reports results of recent estimates of spawning escapement relative to preliminary reference points identified by KamchatNIRO but these results are not the primary basis for scoring of the PI which places more emphasis on long turn abundance and harvest trends under current fishing intensity. However, KamchatNIRO reports that spawning escapements consistent with optimum production levels are regularly achieved and the range of escapement values for the most species tends to or exceeds the target reference points (Shevlyakov et al. 2016; Bugaev et al. 2019a). SG100 – A high degree of certainty is precluded for the SMU because explicit limit reference points limit reference points have not yet been fully integrated into management practice. Certainty it is also limited by incomplete stock assessment data in recent years due to funding reductions for aerial surveys. Application is complicated by overlap in run timing of salmon species, interannual variation in run sizes of different species, different fishing capacity and intensity in different systems, and a higher incidence of illegal, unaccounted, non-industrial fishing in some areas. The management system has developed a methodology for identifying precautionary limit reference points for the UoA		

PI 1.1.1		The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)		
Scoring Issue		SG 60	SG 80	SG 100
		and it is expected that the applicability and utility of these reference points will be further evaluated in coming years.		
B	Stock status in relation to target reference point (TRP, e.g. target escapement goal or target harvest rate)			
	Guidepost		The SMU is at or fluctuating around its TRP.	There is a **high degree of certainty** that the SMU has been fluctuating around its TRP, or has been above its target reference point over recent years.
	Met?		Sockeye – No Chum – No Coho – No Chinook – No	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG80 – This standard is met. Status relative to reference points is documented for Sockeye Salmon in Figure 14, Chum Salmon in Figure 19, Coho Salmon in Figure 24, and Chinook Salmon in Figure 29. Low escapements have been documented since 2010 but appear to be an artifact of recent reductions in aerial survey efforts rather than an actual decrease (based on fishery-related stock indicators assessed by KamchatNIRO). Previous to the recent decline in stock assessment, quantitative stock assessments indicated that Sockeye and Chum Salmon stocks in the Unit of Assessment were generally fluctuating around spawning escapements that consistently produce high levels of fishery yields under the current management system adopted in 2008. These species are managed for optimum levels of spawning escapement identified for each species by KamchatNIRO. Historical practices of managing for spawning escapement observed to sustain continuing high harvests have more recently been formalized with the identification of optimum escapement objectives for Sockeye and Chum Salmon (KamchatNIRO 2017). Objectives are based on production functions defined by stock-recruitment curves relating spawner numbers with adults produced in the next generation of return. Status of Coho and Chinook escapements are less clear. Productivity of Chinook, unlike Sockeye and Chum, appears to have declined in the last decade, apparently in response to ocean conditions. Recent fishery measures including a delayed start date, gillnet mesh size limits, and marine passing days are expected to reduce exploitation and increase escapement of Chinook but status is unclear. Coho run sizes and escapements have been highly variable. Escapements have periodically fallen below minimum goal ranges although numbers subsequently rebounded, indicating no long-term impairment in productivity. SG100 – The SG100 standard is not achieved because species-specific escapement goals have only recently been formally quantified and because a high degree of certainty is precluded in recent years by reductions in annual assessments of spawning escapement due to budget limitations.		
C	Status of component populations			
	Guidepost			The **majority** of component populations in the SMU are within the range of expected variability
	Met?			Sockeye – No Chum – No Coho – No

PI 1.1.1		The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)		
Scoring Issue		SG 60	SG 80	SG 100
				Chinook – No
	Justification	The Kamchatka River is a large and complex system comprised of a variety of diverse habitats. This system supports multiple stocks and populations of each salmon species returning to specific areas. Management generally seeks to meet spawning escapement objectives throughout the available habitat but has not reported population-specific values. While the majority of the component populations are within the range of expected variability under the aggregate stock assessment approach, it cannot be concluded that target reference points provide a standard sufficient to meet the 100 scoring guidepost without explicit consideration of stock-specific escapement goals derived independently for each species.		
References		See Section 3.3.3 Target Species		

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)	**Sockeye:**	**163,000**	**2002-2016: avg. 444,000 Met 13 of 15 years**
	Chum:	**46,000**	**2002-2016: avg. 63,000 Met 7 of 15 years***
	Coho:	**27,500**	**2002-2016: avg. 40,000 Met 5 of 15 years***
	Chinook:	**45,000**	**2002-2016: avg. 69,000 Met 13 of 15 years***
Reference point used in scoring stock relative to MSY (SIb)	**Sockeye:**	**497,000**	**2002-2016: avg. 444,000 Met 6 of 15 years**
	Chum:	**142,000**	**2002-2016: avg. 63,000 Met 2 of 15 years***
	Coho:	**108,000**	**2002-2016: avg. 40,000 Met 2 of 15 years***
	Chinook:	**72,000**	**2002-2016: avg. 69,000 Met 6 of 15 years***
* Spawning escapements are underestimated in many years due to reductions in historical survey effort.			

OVERALL PERFORMANCE INDICATOR SCORE:	Sockeye – 70 Chum – 70 Coho – 70 Chinook – 70

CONDITION NUMBER (if relevant):

Condition 1. Demonstrate that Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River are at or fluctuating around escapement levels which maintain high production and provide a low probability of falling to levels where recruitment would be impaired.

Evaluation Table for PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock management unit (SMU) is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
	Rebuilding timeframes			

PI 1.1.2		Where the stock management unit (SMU) is reduced, there is evidence of stock rebuilding within a specified timeframe		
A	**Guidepost**	A rebuilding timeframe is specified for the SMU **that is the shorter of 20 years or 2 times its generation time**. For cases where 2 generations are less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for SMU.
	Met?	Sockeye – Yes Chum - Yes Coho – Yes Chinook – Yes		Sockeye – No Chum - No Coho – No Chinook – No
	Justification	Scoring of PI 1.1.2 is required for scores less than 80 in PI 1.1.1. It is unclear whether spawning escapement of these species is below objective levels because incomplete aerial surveys in recent years may have led to incomplete estimates of abundance (although other indicators suggest that escapement goals are being met). Fishery measures have been implemented for Coho and Chinook that can be expected to rebuild the stock within two generations (approximately 10 years for Chinook). For Chinook, these strategies include a delay in the start of the fishing season to protect the early portion of the Chinook run, maximum mesh size limits for gillnets in the river to reduce the catchability of Chinook, and the institution of passing days in the sea to reduce exploitation rates. Both species will also benefit from the adoption of passing days in marine waters of Kamchatsky Bay. There is no information that Sockeye or Chum Salmon are reduced. Recent estimates of low escapement are reported to be due to incomplete aerial survey efforts in recent years. Additional aerial surveys planned as a condition of the certification are expected to demonstrate that these species are not depleted within one generation (approximately 5 years). Qualitative and quantitative information suggests that Sockeye, Chum Coho and Chinook Salmon are currently fluctuating in a range that continues to sustain high levels of production.		
B	Rebuilding evaluation			
	Guidepost	Monitoring is in place to determine whether the fishery-based rebuilding strategies are effective in rebuilding the SMU within the specified timeframe.	There is **evidence** that the fishery-based rebuilding strategies are being implemented effectively, or it is likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the SMU within the specified timeframe.	There is **strong evidence** that the rebuilding strategies are being implemented effectively, or it is highly likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the SMU within the specified timeframe.
	Met?	Sockeye – Yes Chum - Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum - Yes Coho – Yes Chinook – Yes	Sockeye – No Chum - No Coho – No Chinook - No
	Justification	SG60 – See SG80 SG80 - Reduced spawning escapement surveys have led to underestimates of abundance, but the surveys and other indicators continue to provide some index value. Monitoring of catch data also provides evidence that fishery-based rebuilding strategies for Coho and Chinook have been or are being implemented effectively. Additional aerial surveys planned		

PI 1.1.2		Where the stock management unit (SMU) is reduced, there is evidence of stock rebuilding within a specified timeframe		
		as a condition of the certification are expected to demonstrate that Sockeye, Chum and Coho species are not depleted within one generation (approximately 5 years). SG100 – This standard will not be met until such time as strong evidence of successful implementation of rebuilding strategies, or such info as modelling results or prior experience that rebuilding is highly likely.		
C	Use of enhancement in stock rebuilding			
	Guidepost	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.	Enhancement activities are **very seldom used** as a stock rebuilding strategy.	Enhancement activities are **not used** as a stock rebuilding strategy.
	Met?	Yes	Yes	Yes
	Justification	No enhancement occurs in the Unit of Assessment.		
References		See sections 3.3.1 Sockeye Salmon, 3.3.2 Chum Salmon, and 3.3.4 Chinook Salmon for specific reference points		
OVERALL PERFORMANCE INDICATOR SCORE:				Sockeye – 85 Chum - 85 Coho – 85 Chinook **– 85**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for 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			
	Guidepost	The harvest strategy is **expected** to achieve SMU management objectives reflected in PI 1.1.1 SG80 including measures that address component population status issues.	The harvest strategy is responsive to the state of the SMU and the elements of the harvest strategy **work together** towards achieving SMU management objectives reflected in PI 1.1.1 SG80 including measures that address component population status issues.	The harvest strategy is responsive to the state of the SMU and is **designed** to achieve SMU management objectives reflected in PI 1.1.1 SG80 including measures that address component population status issues.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	SG60 - See SG80 SG80 - The harvest strategy in place is responsive to the state of the SMU and works effectively to achieve escapement-based management objectives defined for the species management unit. The strategy involves establishing fishing seasons; scheduled passing days of no fishing to limit exploitation rates and distribute escapement throughout the season; gear specifications; in-season monitoring of harvest, species composition, biological indicators, and spawning escapements; and in-season fishery management based on this information. Fishery times and areas are designed and regulated specifically to fill the available natural spawning areas and to achieve corresponding escapement objectives. Fishing areas, specific gears or dates may be closed based on abundance to ensure escapement. Meeting escapement targets is a priority of the management system. SG100 – The SG100 standard is not met because the species-based strategy employed in the Kamchatka River may not by-design meet stock and population-specific objectives in every case owing to limitations in specific information.		
b	Harvest strategy evaluation			
	Guidepost	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been **fully tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain SMUs at target levels.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 - See SG80 SG80 - Direct evidence, including documentation of in-season restrictions based on abundance and assessments of spawning escapement, demonstrates that the harvest strategy is generally achieving its objectives. Fishery restrictions based on time and area closures are regularly adopted in-season based on real-time information on run size and catch composition. Established regulations and in-season measures have consistently distributed spawning escapements around established goals. Regulations are also periodically re-evaluated based on changes in the fisheries – most recently passing days were established in response to increasing fishery effort. Consistent high levels of salmon production over the last decade confirm that the management strategy has effectively maintained the reproductive capacity of the aggregate stock of each species. Highly variable annual run sizes are characteristic of salmon. Occasional poor run years and escapements into portions of some systems occur. Thus, it is not always possible to meet optimum targets in every population and year. Long term population viability and fishery sustainability for salmon is maintained under these circumstances by a diverse meta-population structure including multiple, interacting populations and subpopulations, and by only a portion of each population or brood year cohort returning to spawn in any given year. SG100 - The current harvest strategy has been in place since only 2008 and may not have been fully tested under a wide range of conditions including the variable abundance and run timing of salmon. In particular, it is not clear whether the system has been challenged by an extended interval of low salmon productivity.		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes		
	Justification	SG60 - The harvest strategy involves extensive in-season monitoring of harvest, catch per unit effort, biological indicators (sex and age), and spawning escapement. These indicators are compared with historical values and patterns to determine run size and timing, and to guide adjustments in fishing times and areas. The harvest strategy is grounded in a well-developed system of scientific assessment and monitoring. Run forecasts are made based on brood year escapements and recent production patterns to identify recommended harvest levels as preseason planning tools. Once the fishing season begins, management to control exploitation rates is based on in-season data. Data are referenced to seasonal patterns in previous years to distinguish run timing and strength. Forecasts are typically uncertain and run timing may also vary from year to year. Overfishing might occur when run timing effects are mistaken for run size (for instance, mistaking a strong earlier-than-average return for a larger-than-forecast number). In-season management utilizes indicators based on biological characteristics of the harvest to avoid this potential problem. For instance, the early portion of each run typically includes a larger percentage of males which declines as the run progresses. Average fish size varies in tandem as male and female sizes are different.		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG100 - The harvest strategy is periodically reviewed and improved as necessary. Extensive changes in the strategies adopted by the regional management system since 2008 provide for more local and responsive regulation are evidence to this effect. Recent work to develop population-specific limit and target reference points based on river-specific stock-recruitment data provide more evidence to this effect. Another example is the recent establishment of passing days in marine areas in response to increasing fishing effort. However, questions regarding the sufficiency of review in light of recent reductions in stock assessment information cause this indicator not to pass the SG100 level.		
e	Shark finning			
	Guidepost	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	No sharks are caught in this fishery.		
	Review of alternative measures			

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
f	Guidepost	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Not applicable	Not applicable	Not applicable
	Justification	There is no unwanted catch of the target stock		
References		See Section 3.3.5. Management		
OVERALL PERFORMANCE INDICATOR SCORE:				Sockeye – 85 Chum – 85 Coho – 85 Chinook – 85
CONDITION NUMBER (if relevant):				--

Evaluation Table for PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
A	HCRs design and application			
	Guidepost	**Generally understood** HCRs are in place or available which are expected to reduce the exploitation rate as the SMU LRP is approached.	**Well defined** HCRs are in place that ensure that the exploitation rate is reduced as the LRP is approached, are expected to keep the SMU fluctuating around a target level consistent with MSY.	The HCRs are expected to keep the SMU fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 – See SG100 SG80 – Well-defined control rules include season dates, establishing passing days, and time/area closures based on real time escapement monitoring data in conjunction with other indicators of run strength and timing based on harvest and biological composition of the harvest. Operation of the fishing gear is modified in response to whether escapement goals are being met. Harvest control rules are specifically defined in licenses issued for commercial fishery operation and in-season regulation changes adopted by an Anadromous Fish Commission as appropriate at the recommendation of scientific and fishery management authorities. In-season management has the effect of reducing exploitation rates at low abundance and consistently sustaining high levels of yield. Harvest control rules are generally sufficient to keep the SMU fluctuating around a target		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		level consistent with MSY although MSY escapement may not be achieved in every river in every year. SG100 – The SG100 standard is not met because harvest control rules are not expected to keep the SMU at or above target levels consistent with maximum sustained yield. Escapements of some species in some rivers periodically fall below target levels due to normal variation in run strength and limited inseason data for management in some areas.		
b	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide range** of uncertainties including the ecological role of the SMU, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG80 – The main uncertainty affecting adequacy of harvest control rules results from annual variation in run strength and timing. Forecasts of abundance are made prior to the season based on brood year patterns and estimates are adjusted over the course of the fishing season based on fishery catch rates and biological information. In-season management is generally effective in guiding fishery management measures for regulating harvest rates based on observed abundance to provide for spawning escapement. SG100 – The SG100 standard is not met because it is unclear whether harvest control rules are sufficiently robust to maintain appropriate levels of escapement under conditions of a prolonged period of reduced ocean productivity. HCR's appear to be generally effective in regulating exploitation rates during the current period of high productivity of Sockeye, and Chum in East Kamchatka corresponding to a period of favorable marine conditions. However, high harvests create an expectation for continuing high harvest and a fishery infrastructure scaled to corresponding expectations. A decline marine productivity of salmon can pose significant challenges to harvest control rules in the implementation of timely restrictions of fisheries consistent with reduced stock productivity. The risk is significant overfishing relative to yield potential. This concern is compounded by uncertainty in stock assessments associated with recent reductions in aerial survey efforts. Reduced certainty in stock assessments will make it difficult to recognize reduced returns in-season and to implement timely fishery restrictions necessary to protect spawning escapement. Reduced certainty in stock assessments may also make it difficult to recognize extended productivity downturns which warrant more conservative preseason measures. These concerns are acknowledged by the management system. Uncertainties in population-specific escapement goals are recognized with the development of precautionary escapement reference points but these reference points have not yet been fully incorporated into annual management.		
c	**HCRs evaluation**			
	Guidepost	There is **some evidence** that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence** indicates that the tools in use are appropriate and effective in achieving the	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
			exploitation levels required under the HCRs.	
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 - see SG80 SG80 – Significant escapements of target stocks are consistently achieved and continuing high levels of salmon production provide evidence that harvest control rules are effective in producing appropriate exploitation rates. The fishery is managed on a daily basis using real time stock assessment information to regulate harvest consistent with escapement targets. Fisheries are restricted as appropriate based on actual run size and escapement. For instance, the harvest strategy for Chinook was revised, with gillnet mesh limits to reduce harvest. Similarly, passing days were established in the marine fishery in order to regulate harvest rates of all salmon species. SG100 - It remains to be seen whether harvest control rules will be adequate to control exploitation extended periods of reduced salmon productivity.		
d	Maintenance of wild population components			
	Guidepost	It is **likely** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).	It is **highly likely**, that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).	There is a **high degree of certainty** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 – See SG80 SG80 – Diversity in salmon is represented among stocks and populations inhabiting different rivers within a species management unit and substocks returning to different areas within each river, often with different run timing (early vs. late for instance). The management practice of establishing weekly passing days maintains diversity by protecting escapements in all rivers and across the duration of the run. Stock assessment data indicates this system is generally effective. SG100 – The SG 100 is not met because specific objectives for component populations and substocks are not explicitly incorporated in management.		
References		See Section 3.3.5 Management		
OVERALL PERFORMANCE INDICATOR SCORE:				Sockeye – 80 Chum – 80 Coho – 80 Chinook – 80
CONDITION NUMBER (if relevant):				--

Evaluation Table for 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			
	Guidepost	**Some** relevant information related to SMU structure, SMU production and fleet composition is available to support the harvest strategy. Indirect or direct information is available on some component populations.	**Sufficient** relevant information related to SMU structure, SMU production, fleet composition and other data is available to support the harvest strategy, including harvests and spawning escapements for a representative range of wild component populations.	A **comprehensive range** of information (on SMU structure, SMU production, fleet composition, SMU abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available, including estimates of the impacts of fishery harvests on the SMU and the majority of wild component populations.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 – This standard is met for all four salmon species. A large amount of relevant information is collected to support the harvest strategy. This includes extensive data on stock structure, stock productivity, fleet composition and other data on biological characteristics of the run, run timing, spawning distribution, and spawning escapement. Assessments also include direct estimates of natural stock productivity by salmon species. SG80 – This standard is met for all four species. Escapement is currently estimated in index areas with basin-wide inferences based on historical distribution patterns. Historical information on catches and escapements in relation to abundance and passing days supports the effectiveness of the current harvest strategy. Passing days have been effectively shown to provide opportunities for significant spawning escapement sufficient to sustain yields under current conditions of high marine productivity which prevail for Sockeye and Chum. Therefore, the available assessments based on index stocks and historical distribution patterns are generally adequate for current management of these species. SG100 – This standard is not met because recent reductions in aerial surveys of escapement mean that a majority of wild component populations are no longer represented. Assessments based on index stocks and historical distribution patterns may not be adequate for long-term management under conditions of changing fishery dynamics, fish productivity or fish distribution patterns.		
B	Monitoring			
	Guidepost	SMU wild abundance and UoA removals are monitored and at **least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	SMU wild abundance and UoA removals are **regularly monitored** at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are	**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

PI 1.2.3		Relevant information is collected to support the harvest strategy		
			available and monitored with sufficient frequency to support the harvest control rule.	information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 – Extensive information is collected on harvest in the commercial salmon fishery. Numbers are estimated multiple stages of the harvest and processing chain. Detailed records are required and kept by the fishery and the government. Changes in the management system over the previous decade ensure accuracy of catch reporting by removing incentives for inaccurate accounting to avoid taxes or remain within a designated allocation. Catch data are reported on a real-time basis during the fishing season. Catch data are assessed in-season relative to historical levels which effectively provide for spawning escapement under the passing day system of management. This sufficiently supports the control rule to reach SG 60. SG-80 - The continuing effectives of the harvest strategy will depend also on monitoring of spawning escapements. The SG80 standard for regular monitoring is not met because recent reductions in aerial survey intensity have substantially reduced the accuracy and precision of spawning escapement estimates used to guide management decisions. Surveys have been reduced due to budget limitations. The current survey intensity likely provides sufficient precision to distinguish large and small runs but lack the resolution to avoid estimation bias due to differences in run timing or fish distribution. Historical assessments have generally been sufficient to support the current harvest strategy but current survey frequency may not be sufficient to identify any future changes in productivity or distribution patterns which might confound effective implementation of the harvest control rules.		
C	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals from the SMU.	
	Met?		Sockeye – No Chum – No Coho – No Chinook – No	
	Justification	SG 80 – KamchatNIRO has conducted extensive study on historical and current levels of salmon removals by illegal fishing in Kamchatka Rivers (Shevlyakov 2013; Shevlyakov et al. 2016). Illegal harvest has long been a very significant problem in Kamchatka salmon fisheries but the incidence has been greatly reduced by changes in the management system. KamchatNIRO has estimated that illegal harvest substantially reduced historical spawning escapements in many rivers. However, industrial levels of poaching have been largely eliminated by changes in the management system. In 2008, with introduction of the Olympic system, individual quotas disappeared. With that change, incentives to exceed the quota disappeared too, thus eliminating industrial illegal fishing which a significant problem before 2008. Harvest of Kamchatka salmon also historically occurred outside the UoC in commercial drift gillnet fisheries in marine waters of the Russian Exclusive Economic Zone. These catches were subject to a reporting and monitoring system which estimated catch levels for high value species such as Sockeye. This fishery has now been closed.		

PI 1.2.3		Relevant information is collected to support the harvest strategy	
		While illegal harvest has been substantially reduced from historical levels and current levels are constrained by the remoteness of the area, illegal harvest remains a chronic problem in the Kamchatka River (KamchatNIRO 2017). Therefore, this standard is not met.	
References		See section 3.3.5 Management	
OVERALL PERFORMANCE INDICATOR SCORE:			Sockeye – 65 Chum – 65 Coho – 65 Chinook – 65
CONDITION NUMBER (if relevant): **Condition 2. Regularly monitor spawning escapement of Sockeye, Chum, Coho and Chinook Salmon at a level of accuracy and coverage sufficient to ensure effective harvest controls in the Kamchatka River.** **Condition 3. Provide information on the level and location of illegal fishery removals of Sockeye, Chum, Coho and Chinook Salmon from the Kamchatka River.**			

Evaluation Table for PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
Scoring Issue		SG 60	SG 80	SG 100
A	Appropriateness of assessment to stock under consideration			
	Guidepost		The assessment **is appropriate** for the SMU and for the harvest control rule.	The assessment **takes into account** the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG 80 - The assessment includes in-season estimation of harvest, catch per effort, biological characteristics, timing and distribution of harvest and returns, and spawning escapement. Spawning escapement is estimated with aerial surveys supplemented in some cases with sonar and ground surveys. This information is used to design and make in-season adjustments of harvest control rules intended to ensure escapement sufficient to sustain future production. Annual spawning escapement is estimated for representative samples of stock management units for each species. Adequacy of harvest control rules relative to escapement has been assessed over time and the assessment has been used to refine control rules. The identification of escapement-based reference points has been formalized in recent years based on analysis of historical production patterns using stock-recruitment analyses. SG100 – Not all major features of stock structure are fully addressed by the stock assessment. While some consideration is given to component stocks (particularly for Sockeye), assessments are generally based on species aggregates rather than component stocks.		
B	Assessment approach			
	Guidepost	The assessment estimates stock status relative to	The assessment estimates stock status relative to	The assessment estimates with a high level of

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
		generic reference points appropriate to salmon.	reference points that are appropriate to the SMU and can be estimated.	confidence both stock status and reference points that are appropriate to the SMU and its wild component populations.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG 60 - Stock status is estimated from aerial surveys of escapement by species and sometimes major substocks based on index surveys and distribution patterns. These estimates are evaluated relative to spawner objectives identified for each species based on historical values that were shown over time to sustain high returns and fishery harvests. In recent years, the management system has also explored development of more explicitly defined escapement goals for each species based on spawner-recruit analyses (KamchatNIRO 2017). Management for escapement-based reference points is a standard and effective practice in salmon fisheries throughout the Pacific. SG80 – The SG80 standard is not met for this performance indicator due to the generic nature of historical application of reference points and questions regarding their application in specific areas of the region. This fishery historically estimated stock status relative to aggregate escapement goals based on annual index area surveys. Escapements were generally compared to historical values that were shown over time to sustain high returns and fishery harvests. However, goals were not always explicitly defined in historical practice and comparisons of specific escapement values with defined goals are not always available. In recent years, the management system has also explored development of goals based on population-specific analyses. However, population-specific goals have not yet been fully incorporated into management and effective application may be limited due to recent reductions in aerial survey coverage of a range of representative populations and time periods for each species. Reduced surveys provide low resolution on major stock subcomponents and will limit the effective development and application of population-specific reference points.		
C	Uncertainty in the assessment			
	Guidepost	The assessment **identifies major sources** of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – No Chinook – No	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 - The stock assessment has identified major sources of uncertainty including normal environmentally-driven variability in productivity; normal annual variability in run timing and distribution; and heterogeneity in productivity of major stock subcomponents. SG80 – Major uncertainties are taken into account in management. Harvest is controlled in-season based on real-time data on spawning escapement in aerial spawning ground surveys as well as numbers and characteristics of fish entering the fishery. In-season assessments allow fisheries to be regulated based on normal annual variability in productivity and run timing. Assessments incorporate spatial patterns which address heterogeneity in major stock subcomponents. The management system is also exploring more-explicit quantification of goals based on stock-recruitment analyses. These analyses have been provided by KamchatNIRO (2017a) for Sockeye and Chum. These goals include		

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
		explicit precautionary safety factors based on statistical analysis of uncertainty. However, substantial uncertainty has been introduced into recent stock assessments of Coho and Chinook due to the variability of historical productivity and the lack of recent stock assessment information. This uncertainty has not been fully taken into account. Therefore, neither Coho or Chinook do not meet this standard. SG100 - Uncertainty in escapement estimates has not been quantified. Stock status is not evaluated relative to reference points in a probabilistic way (although probabilistic analyses are beginning to be incorporated into analyses of management effectiveness: KamchatNIRO 2017).		
D	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Sockeye – No Chum – No Coho – No Chinook – No
	Justification	A rigorous exploration of alternative hypotheses and approaches has not been reported.		
E	Peer review of assessment			
	Guidepost		The assessment of SMU status, including the choice of indicator populations and methods for evaluating wild salmon in enhanced fisheries is subject to peer review.	The assessment, including design for using indicator populations and methods for evaluating wild salmon in enhanced fisheries, has been **internally and externally** peer reviewed.
	Met?		Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG80 - The stock assessment is subject to extensive peer review within the management system. KamchatNIRO scientists regularly review and improve assessment methodologies and results which are subject to additional review by the regional scientific institute (VNIRO). In-season assessment information receives extensive review as part of the annual management process overseen by the Anadromous Fish Commission. SG100 - External peer review is limited.		
F	Representativeness of indicator populations			
	Guidepost	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some scientific basis** for the indicators selection.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some evidence of coherence** between the status of the indicator streams and the	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, the status of the indicator streams are **well correlated** with other populations they represent

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
			status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity (i.e., those with a higher conservation risk) to match those of the representative SMU where applicable.	within the management unit, including stocks with lower productivity (i.e., those with a higher conservation risk).
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – No Chum – No Coho – No Chinook – No	Sockeye – No Chum – No Coho – No Chinook – No
	Justification	SG60 – The stock assessment historically surveyed representative areas of most river systems for each salmon species. Index reaches were selected for their representative nature based on analysis of a fuller complement of historical survey areas. SG80 – The SG 80 guidepost is not met. It is unclear whether current assessments now fully represent the less-productive populations in the management unit in light of recent reductions in stock assessment effort. Stock assessment has become increasingly reliant on indicator streams with the reduction in sampling rate but changing distribution patterns over time at different scales of abundance and productivity can confound interpretation of index samples. Reliance on index areas may also not provide representative estimates for a full spectrum of strong and weak stock subcomponents within a system. Peak spawner counts from the most productive habitats may not be representative of the total stock under conditions of low productivity or declining returns. This problem is even worsening due to reduction of aerial surveys. Resulting reductions in the accuracy and precision of stock assessments can impair management effectiveness in the event of changing stock productivity and distribution or fishery patterns. Reduced surveys also provide low resolution on major stock subcomponents and will limit the effective development and application of population-specific reference points. Escapement goals are generally based on production functions for aggregate stock and river populations of a species. Curves and goals thus represent an average stock and may be disproportionately driven by large strong stocks in the aggregate.		
g	Definition of Stock Management Units (SMUs)			
	Guidepost	The majority of SMUs are defined with a clear rationale for conservation, fishery management and stock assessment requirements.	The SMUs are **well-defined** and include definitions of the major populations with a clear rationale for conservation, fishery management and stock assessment requirements.	There is an **unambiguous description** of each SMU that may include the geographic location, run timing, migration patterns, and/or genetics of component populations with a clear rationale for conservation, fishery management and stock assessment requirements.
	Met?	Sockeye – Yes Chum – Yes Coho – No Chinook – Yes	Sockeye – Yes Chum – No Coho – No Chinook – No	Sockeye – No Chum – No Coho – No Chinook – No

PI 1.2.4		There is an adequate assessment of the stock status of the SMU	
	Justification	SG60 – The large size and diversity of the Kamchatka River has resulted in the development a complex stock structure. Each species is comprised of a hierarchy of subcomponents including stocks (e. g., early and late runs) and demographically-independent populations (e.g. species returning to home rivers or lakes). Major stocks of each species are defined based on run timing, and spawning distribution. Detailed information is available on the stock-structure of Sockeye in particular, owing to their high fishery value. Early and late runs of Chinook have also been recognized. This stock structure is considered in conservation, fishery management and stock assessment requirements. SG80 – This standard is met for Sockeye but not for Chum, Coho or Chinook. The complex stock structure of Kamchatka River Sockeye Salmon is well defined. Stock structure is not well defined at the substock or population level for Chum, Coho or Chinook. The fishery in the sea and river mainstem operates on a complex of overlapping species, stocks and population. As a result, stock-specific information on harvest, exploitation and escapement is limited for some species.	
References		See sections 3.3.1 Sockeye Salmon, 3.3.2 Chum Salmon, and 3.3.4 Chinook Salmon.	
OVERALL PERFORMANCE INDICATOR SCORE:			Sockeye – 75 Chum – 70 Coho – 65 Chinook – 65
CONDITION NUMBER (if relevant): **Condition 4.** **Estimate stock status of Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.**			

Evaluation table for PI 1.3.1 – Enhancement outcomes

PI 1.3.1		Enhancement activities do not negatively impact wild stock(s)		
Scoring Issue		SG 60	SG 80	SG 100
a	Enhancement impacts			
	Guidepost	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance or productivity and diversity of wild stocks.	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance or productivity and diversity of wild stocks.	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance or productivity and diversity of wild stocks.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes
	Justification	No hatchery enhancement of any salmon species occurs in unit of certification systems.		
References		See Section 3.3.6		
OVERALL PERFORMANCE INDICATOR SCORE:				Sockeye – 100 Chum – 100

PI 1.3.1	Enhancement activities do not negatively impact wild stock(s)
	Coho – 100 Chinook – 100
CONDITION NUMBER (if relevant):	--

Evaluation table for PI 1.3.2 – Enhancement management

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock(s).		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	**Practices and protocols** are in place to protect wild stocks from significant negative impacts of enhancement.	There is a **partial strategy** in place to protect wild stocks from significant negative impacts of enhancement.	There is a **comprehensive strategy** in place to protect wild stocks from significant negative impacts of enhancement.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes
	Justification	No hatchery enhancement of any salmon species occurs in unit of certification systems.		
b	Management strategy evaluation			
	Guidepost	The practices and protocols in place are **considered likely** to be effective based on plausible argument.	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts.	There is **clear evidence** that the comprehensive strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes
	Justification	No hatchery enhancement of any salmon species occurs in unit of certification systems.		
References		See Section 3.3.6		
OVERALL PERFORMANCE INDICATOR SCORE:				Sockeye – 100 Chum – 100 Coho – 100 Chinook – 100
CONDITION NUMBER (if relevant):				--

Evaluation table for PI 1.3.3 – Enhancement information

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock(s).		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy			
	Guidepost	**Some** relevant information is available on the contribution of enhanced fish to the fishery harvest, total escapement (wild plus enhanced), and hatchery broodstock.	**Sufficient** relevant qualitative and quantitative information is available on the contribution of enhanced fish to the fishery harvest, total escapement (wild plus enhanced) and hatchery broodstock.	A **comprehensive range** of relevant quantitative information is available on the contribution of enhanced fish to the fishery harvest, total escapement (wild plus enhanced) and hatchery broodstock.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes
	Justification	No hatchery enhancement of any salmon species occurs in unit of certification systems.		
b	Use of information in assessment			
	Guidepost	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account qualitatively.	A **moderate-level analysis** of relevant information is conducted and used by decision makers to quantitatively estimate the impact of enhancement activities on wild-stock status, productivity, and diversity.	A **comprehensive analysis** of relevant information is conducted and routinely used by decision makers to determine, with a high degree of certainty, the quantitative impact of enhancement activities on wild-stock status, productivity, and diversity.
	Met?	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes	Sockeye – Yes Chum – Yes Coho – Yes Chinook – Yes
	Justification	No hatchery enhancement of any salmon species occurs in unit of certification systems.		
References		See Section 3.3.6		
OVERALL PERFORMANCE INDICATOR SCORE:				Sockeye – 100 Chum – 100 Coho – 100 Chinook – 100
CONDITION NUMBER (if relevant):				--

Evaluation Table for PI 2.1.1 – Primary species outcome

PI 2.1.1	The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
Scoring Issue	SG 60	SG 80	SG 100

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
A	Main primary species stock status			
	Guidepost	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 PRI and are fluctuating around a level consistent with MSY.
	Met?	Yes	Yes	No
	Justification	Main primary species are Pink Salmon. Kamchatka River habitat are not conducive to a large Pink Salmon run. This species is taken incidental to fisheries targeting other species. The large majority of the Pink Salmon harvest occurs in marine trapnets and originates from rivers farther north. Catches are generally small with occasional years of good catches in large run years when migration conditions bring them into the fishery area. SG60 – see SG80 SG80 –Long-term harvest and limited escapement data provide strong evidence that Pink Salmon are highly likely above the point where recruitment would be impaired by the current commercial fishery. Numbers have varied but historical escapements have continued to produce substantial returns and harvests over the last decade. In part, this is related to an extended period of favorable ocean conditions for these species throughout the northern Pacific. This stock has also benefited from improvements in fishery management structures and enforcement which appear to have substantially reduced the illegal and unreported harvest that reduced spawning escapements. Pink salmon are assigned as a main primary species which is consistent guidance in SA3.1.3. Pink Salmon do not return in significant numbers to the Kamchatka River which does not provide suitable habitats. Pink Salmon primarily return to smaller rivers and streams in East Kamchatka areas north of the Kamchatka River. Harvest of Pink Salmon in marine areas of Kamchatsky Bay is significant in years of very large returns to East Kamchatka and when oceanographic conditions favor a more southerly migration route upon return to spawning grounds. The large majority the harvest of Pink Salmon occurs in terminal areas adjacent to spawning destinations. Fisheries in these areas are actively managed to achieve local spawning escapements. Catches of Pink Salmon in Kamchatsky Bay are considered to be incidental and do not appreciably affect spawning escapement of fish destined for other areas. Freshwater habitat conditions in major production areas north of the Kamchatka River are excellent for salmon production. Watersheds are virtually pristine and support tremendous diversity of aquatic systems including rivers, streams, lakes and wetlands which provide ideal conditions for salmon production. These conditions are conducive to high levels of salmon productivity and lead to inherent resilience to harvest which in turn can sustain robust levels of fishery exploitation.		

PI 2.1.1		**The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.**		
		Management to ensure significant spawning escapement provides a conservative standard for protecting populations from a point of recruitment impairment. Highly variable annual run sizes are characteristic of salmon, with occasional poor run years and escapements into portions of some systems. Long term population viability and fishery sustainability for salmon is maintained under these circumstances by a diverse meta-population structure including multiple, interacting populations and subpopulations. While escapements may periodically fall below optimum levels, historical data indicates that escapements are sufficient to sustain significant production and harvest, particularly in years of favorable environmental conditions. Because Pink Salmon are observed to sustain significant levels of production, it is likely that these species are within biologically based limits of exploitation consistent long-term sustainability. SG100 –Pink Salmon escapements in the Kamchatka River are uncertain and inconsistent in recent years. It cannot be concluded with a high degree of certainty that this populations are fluctuating around MSY at this time (although they generally appear to be above the point of significant long-term recruitment impairment).		
B	Minor primary species stock status			
	Guidepost			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?			Not relevant
	Justification	There are no minor Primary Species		
References		See Section 3.4.1 Primary Species		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.1.2 – Primary species management

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**			
	Guidepost	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 above	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	There is a **strategy** in place for the UoA for managing main and minor primary species.

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.		
		the point where recruitment would be impaired.	above the point where recruitment would be impaired.	
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 – A partial strategy for management of Pink Salmon in Kamchatka River exists. Pink Salmon are not a target of the fishery and are caught primarily in sea nets. The large majority of the harvest is of stocks migrating to rivers farther north where they are actively managed to meet spawning escapement goals. In the sea, Pink Salmon harvest is limited by the use of weekly passing days which limit exploitation rates and distribute escapement throughout the duration of the run. Little harvest of Pink Salmon occurs in the river where use of gill net mesh sizes targeting larger salmon species affords substantial protection to local escapements of the smaller Pink Salmon. SG100 –This standard is not met for Pink Salmon in the Kamchatka River where they are not actively managed based on local escapements.		
B	**Management strategy evaluation**			
	Guidepost	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
	Justification	SG60 - See SG80 SG80 –Documentation of fishery regulations and assessments of escapement and stock dynamics of Pink Salmon in the Kamchatka River provide an objective basis for confidence that management measures are effective for sustaining these runs. Fishery restrictions based on time and area closures are regularly adopted in-season based on real-time information on run size and catch composition. Examples of recent fishery actions are detailed in Section 3. Measures have consistently produced significant spawning escapements in most years. Pink Salmon are currently at very high levels of production throughout Eastern Kamchatka and large escapements are consistently observed in all areas. SG100 - The current harvest strategy has been in place since only 2008 and may not have been fully tested under a wide range of conditions including the inherent variability in abundance and run timing of salmon. In particular, it is not clear whether the system has been challenged by an extended interval of low salmon productivity.		
c	**Management strategy implementation**			
	Guidepost		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

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.		
	Justification	SG80 –Documentation of harvest patterns, fishery regulations, and assessments of spawning escapement throughout Eastern Kamchatka, provide some evidence that management measures are being implemented successfully to maintain Pink Salmon above a point of recruitment impairment. SG100 –This standard is not met for Pink Salmon in the Kamchatka River where they are not actively managed based on local escapements.		
d	**Shark finning**			
	Guidepost	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
	Justification	No sharks are caught in this fishery.		
e	**Review of alternative measures**			
	Guidepost	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?	Not relevant	Not relevant	No
	Justification	SG60 & SG80 - There is no unwanted catch of main primary species (Coho and Pink Salmon). SG100 – Regular review of the effectiveness of management measures for the protection of all salmon species is incorporated in the current management program. These measures were adopted following extensive review of the previous management strategy which included commercial harvest, but biennial review does not occur.		
References		See Section 3.4.1 Primary Species		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for 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**			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary

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		
		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.	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.	species with respect to status.
	Met?	Yes	Yes	No
	Justification	SG60 – A large amount of quantitative information is collected to support the harvest strategy for primary species. This includes stock structure, stock productivity, fleet composition and other data on biological characteristics of the run, run timing, spawning distribution, and spawning escapement. Detailed information is collected on harvest in the commercial salmon fishery. Numbers are estimated at multiple stages of the harvest and processing chain. Detailed records are required and kept by the fishery and the government. Changes in the management system over the previous decade ensure accuracy of catch reporting by removing incentives for inaccurate accounting to avoid taxes or remain within a designated allocation. Catch data are reported on a real-time basis during the fishing season. Assessments also include direct estimates of natural stock productivity on a regional and population-specific. SG80 - The SG80 standard is met for Pink Salmon because some quantitative information is available for assessing the impact of the fishery with respect to status. Quantitative information includes catch, catch per effort and run size indices from inriver stock assessments. SG100 - The SG100 standard is not met due to limitations of past and present aerial surveys for assessing Pink Salmon escapement and production in the Kamchatka River.		
b	**Information adequacy for assessment of impact on minor primary species**			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Not relevant
	Justification	There are no minor primary species.		
c	**Information adequacy for management strategy**			
	Guidepost	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** Primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	Met?	Yes	Yes	No

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	
	Justification	SG60 – See SG80 SG80 - Information on harvest and escapement is generally adequate to support measures and a partial strategy for to manage main primary species. SG100 – SG100 is not met for Pink Salmon because they are not actively managed for local escapements which are also not consistently assessed in the Kamchatka River.	
References		See Section 3.4.1 Primary Species	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			--

Evaluation Table for 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			
	Guidepost	Main Secondary species are **likely** to be within 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 also 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 within biologically based limits.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible. There are no main secondary species (see detailed descriptions in Section 3.4.2). Secondary species in this fishery predominately include char which are retained for commercial use. No secondary species comprises anywhere near 5% of the total catch which would categorize it as a main retained species. Char comprise		

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.		
		approximately 1% of the catch on average. No secondary species is less resilient or otherwise vulnerable. Non-retained catch includes a variety of species, none of which comprise a significant volume of catch. These include codfish (Gadidae), flatfish (Platichthys stellatus sp.), smelt (Osmerus sp.), sculpins (Cottus sp.) and jellyfish. A large proportion of the non-retained catch is released alive from trapnets and beach seines.		
b	**Minor secondary species stock status**			
	Guidepost			Minor secondary species are highly likely to be above biologically based limits OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species.
	Met?			Yes
	Justification	SG100 – Secondary species comprise a very small proportion of the catch. Fishing methods, locations, and periods are very highly selective for migrating salmon. Char are highly likely to be above biologically based limits corresponding to a point of recruitment impairment based on historical trends in catch volume and age composition estimated by KamchatNIRO from commercial catch sampling. Catches appear to be fluctuating around long-term average values. KamchatNIRO has also concluded that current harvest levels are sustainable based on a broad and relatively stable size and age composition of this iteroparous species. (Overfishing would truncate the size structure because high mortality would reduce survival to older ages.) No other secondary species is harvested in numbers sufficient to significantly affect status. The fishery is remarkably clean from the standpoint of bycatch due to the focus on times and areas of salmon abundance. The low incidence of other secondary species documented in this fishery provides a high degree of certainty that the fishery does not significantly affect production of these species. Species-specific biologically-based limits have not been established for non-salmonid species in this fishery because exploitation rates in the salmon fishery are deemed to be so low as to constitute no discernable impact on the status of these lightly or unexploited species. Other secondary finfish species have no commercial value, are widespread throughout the region, and the fishery footprint from ocean traps and river beach seines is very small relative to the distribution of the species. This information provides qualitative justification that other finfish bycatch in the fishery satisfies the high degree of certainty outcome guideposts at the 100-scoring level.		
References		See Section 3.4.2 Secondary Species		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.2.2 – Secondary species management

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 minimize the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Management strategy in place**			
	Guidepost	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 within 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 within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 – There is a partial strategy for managing and minimizing catch of secondary species in the commercial salmon fishery by use of fixed trapnets and beach seines, which have a low capture rate of secondary species, and monitoring catch of some secondary species. These gears are very effective in concentrating harvest on salmon during spawning migrations while also avoiding significant catches of other non-migratory local fish species. There are no main secondary species. Catch monitoring demonstrates use of gears with low capture rate and ensures that incidental harvest levels of minor secondary species such as char in the salmon fishery do not substantially reduce sustainability. Other minor secondary species are generally not retained and many are released alive in order to limit fishery impacts. SG100 – The SG100 is not met because a comprehensive strategy for managing secondary species has not been defined. The management system regards bycatch reduction strategies beyond current levels as unnecessary because current exploitation rates are considered to be minor.		
B	**Management strategy evaluation**			
	Guidepost	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
	Justification	SG60 - See SG80 SG80 - The very low incidence of secondary species in the catch, based on information directly about the fishery and the species involved, provides a strong objective basis that this strategy is effective. Information from independent observer efforts of other similar fisheries in the region (Ozernaya, Iturup and Sakhalin salmon) supports high confidence that the fishery strategy is effective for managing bycatch. There is also an objective basis for confidence that the strategy is effective for flatfish and other finfish, for which there is management strategy for these species. The nearshore salmon fishery comprises a negligible portion of the total harvest of flatfish.		

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 minimize the mortality of unwanted catch.		
		SG100 – Catch monitoring and biological sampling of char retained and sold by the fishery provides sound testing to support high confidence that the management strategy is effective for this species. SG100 is not met because the strategy has not been tested directly with a regular quantitative bycatch sampling program for other species, many of which are not retained or only partially retained.		
c	**Management strategy implementation**			
	Guidepost		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
	Justification	SG80 – Periodic observer observations of salmon fisheries throughout the region provide evidence that the fishing strategy is being implemented successfully to harvest salmon with minimal catch of other secondary species, as the trapnets inherently have low bycatch rates and allow for live releases of some bycatch species. SG100 - Catch monitoring and biological sampling of char retained and sold by the fishery provides evidence that the partial management strategy is effective for this species. However, a regular quantitative bycatch sampling program is not conducted for other species, many of which are not retained or only partially retained.		
d	**Shark finning**			
	Guidepost	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	Scoring issue need not be scored if no secondary species are sharks.		
e	**Review of alternative measures to minimize mortality of unwanted catch**			
	Justification	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 minimize 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 minimize UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	Not relevant	Not relevant	No
	Guidepost	SG60 – See SG80 SG80 – There are no main secondary species. Very small numbers of unwanted catch of minor secondary species occur. SG100 - There is no biennial review of alternative measures for these minor species because the level of exploitation is negligible.		
References		See Section 3.4.2 Secondary Species		

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 minimize the mortality of unwanted catch.	
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		**--**

Evaluation Table for 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**			
	Guidepost	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?	Not relevant	Not relevant	Not relevant
	Justification	There are no main secondary species in this fishery.		
B	**Information adequacy for assessment of impacts on minor secondary species**			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			No
	Justification	Quantitative information is available on the level of annual harvest of char in this fishery. Sustainability of current char harvest levels is inferred from long term trends in catch and size composition. However, estimates of abundance are not available for use in estimating exploitation rates of char. Qualitative information on the amount of other minor secondary species affected by the fishery is available from limited observer sampling. This information is sufficient to confirm that there catch of other secondary species in relatively insignificant. However, catch and the status of bycatch species is not quantified in regular management practice.		
	Information adequacy for management strategy			

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.		
C	Guidepost	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	Not relevant	Not relevant	No
	Justification	SG60 - There are no main secondary species in this fishery. SG80 - There are no main secondary species in this fishery. SG100 - Qualitative information on the amount of other minor secondary species affected by the fishery is available from limited observer sampling. This information is sufficient to confirm that the catch of other secondary species in relatively insignificant. However, catch and the status of bycatch species is not quantified in regular management practice, so does not meet SG100.		
References		See Section 3.4.2 Secondary Species		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				--

Evaluation Table for PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species. The UoA and associated enhancement activities do not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stocks within national or international limits, where applicable			
	Guidepost	Where national and international requirements set limits for ETP species, the effects of the UoA and associated enhancement activities on the population/stock are known and likely to be within these limits.	Where national and/ or international requirements set limits for ETP species, the **combined effects of the MSC UoAs and associated enhancement activities** on the population/stock are known and **highly likely** to be within these limits.	Where national and/ or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** and associated enhancement activities are within these limits.
	Met?	Yes	Yes	Yes
	Justification	SG60 - See SG100. For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible. SG80 - See SG100 SG100 – No limits on impacts, such as through setting Potential Biological Removal Level (the maximum number of animals, not including natural mortalities, that may be removed from a stock while allowing that stock to reach or maintain its optimum sustainable population), has been set for either species. However, national legislation requires that fishing operations avoid adverse impacts on red listed species present in this area (Steller Sea Lions, Steller Sea Eagles, White-tail Eagle, Bald Eagle, Golden Eagle). Additionally,		

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species. The UoA and associated enhancement activities do not hinder recovery of ETP species		
		rookeries for Steller sea lions have been protected in Russia. The low occurrence of ETP species in the area of this fishery provide a high likelihood that the effects of the fishery are within limits of national and international requirements for protection of ETP species. None of these species interact with the fishery or any other salmon fishery in the region to any significant degree. Therefore, there is a high degree of certainty that the combined effects of the MSC UoAs are within national requirements. Other marine animals present in the area, including seals, killer whales, white whales, and cormorants, are managed or protected by federal regulation.		
b	Direct effects			
	Guidepost	Known direct effects of the UoA including enhancement activities are **likely to not hinder recovery** of ETP species.	Direct effects of the UoA including enhancement activities are **highly likely to not hinder recovery** of ETP species.	There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA including enhancement activities on ETP species.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - Direct effects of the fishery on ETP are highly unlikely to create unacceptable impacts to these ETP species. Effects are negligible due to a lack of significant interactions of most species with the fishing gear. Incidental take of these species by tangling in gear has not been observed due to the nature of the gear. Seals are the only species regularly observed to encounter gear. These seals constantly enter net traps, eat or damage fish, and then freely leave the nets. Entanglements have not been reported. Seals are regarded as a nuisance by fishers. KamchatNIRO scientists report that fisherman drive off seas from nets by making noise. Seals are not depleted – they may be hunted with the proper license and the harvest allocation is considerably underused because of degradation of hunting infrastructure. Licenses can be obtained for commercial harvest but have not by the assessment companies. No hatchery enhancement occurs in this fishery. SG100 – The SG100 guidepost is not met due to the lack of a systematic observer program for the portion of the fishery in marine waters and limited availability of direct impact assessments and status monitoring information for Steller Sea Lions.		
c	Indirect effects			
	Guidepost		Indirect effects have been considered for the UoA including enhancement activities and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no significant detrimental indirect effects of the UoA including enhancement activities on ETP species.
	Met?		Yes	No
	Justification	SG80 - No significant indirect effects of fisheries have been identified which might pose unacceptable risk to these species. The likelihood of significant indirect effects of the fishery on protected species is considered to be very low due to the low degree of interaction. Any indirect effects would likely result from ecosystem effects of salmon harvest. However, management of fisheries to maintain high levels of salmon production		

PI 2.3.1		**The UoA meets national and international requirements for the protection of ETP species. The UoA and associated enhancement activities do not hinder recovery of ETP species**
		might be regarded as beneficial from a food chain perspective for species such as sea lions and seals. KamchatNIRO has conducted feeding studies of seal which have demonstrated that salmon are a primary seasonal food item. Predators of salmon must adapt to normally high fluctuations in salmon abundance. SG100 - The SG100 guidepost is not met due to the lack of indirect impact assessments and status monitoring information for Steller Sea Lions.
References		See Section 3.4.3 Endangered, Threatened and Protected Species
OVERALL PERFORMANCE INDICATOR SCORE:		**85**
CONDITION NUMBER (if relevant):		**--**

Evaluation Table for PI 2.3.2 – ETP species management strategy

PI 2.3.2		**The UoA and associated enhancement activities have in place precautionary management strategies designed to:** • **meet national and international requirements** • **ensure the UoA does not hinder recovery of ETP species** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
A	Management strategy in place (national and international requirements)			
	Guidepost	There are **measures** in place that minimize the UoA-related mortality of ETP species due to the UoA including enhancement activities, and are **expected to be highly likely** to achieve national and international requirements for the protection of ETP species.	There is a **strategy** in place for managing the UoA and enhancement activities' impact on ETP species, including measures to minimize mortality, which is **designed to be highly likely** to achieve national and international requirements for the protection of ETP species.	There is a **comprehensive strategy** in place for managing the UoA and enhancement activities' impact on ETP species, including measures to minimize mortality, which is **designed to achieve** above national and international requirements for the protection of ETP species.
	Met?	Yes	Yes	Yes
	Justification	SG60 - See SG100 SG80 - See SG100 SG100 - National legislation provides for protection of ETP species identified in the Russian Federation Red Data Book. In addition to general protection of ETP species, in particularly, imposing fines for their retaining, the timing and operation of the fishery assure minimal adverse interactions with ETP species. The strategy involves fishery times and areas where ETP species are uncommon and a ban on retention of these species. Catch of any Red listed species in Russia is prohibited and in case of catch, they must be immediately released. The absence of enhancement precludes impacts on ETP species.		
B	Management strategy in place (alternative)			
	Guidepost	There are **measures** in place that are expected to ensure	There is a **strategy** in place that is expected to ensure	There is a **comprehensive strategy** in place for

PI 2.3.2		**The UoA and associated enhancement activities have in place precautionary management strategies designed to:** • **meet national and international requirements** • **ensure the UoA does not hinder recovery of ETP species** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
		the UoA including enhancement activities do not hinder the recovery of ETP species.	the UoA including enhancement activities do not hinder the recovery of ETP species.	managing ETP species, to ensure the UoA including enhancement activities do not hinder the recovery of ETP species.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	See scoring issue A. This issue applies only where species are recognized as ETP but requirements are not defined in legislation or agreements.		
C	Management strategy evaluation			
	Guidepost	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an **objective basis for confidence** that the measures/strategy will work, based on information directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a **quantitative analysis supports high confidence** that the strategy will work.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - Observations of a low incidence of ETP catch in the fishery consistent spatial and temporal in occurrence of ETP species and the fishery, provide an objective basis for confidence that the fishery strategy based on qualitative information directly about the fishery and/or the species involved. SG100 - Information is not specifically collected on ETP species in this fishery due to the low incidence of these species in the fishery and the corresponding low level of concern.		
d	Management strategy implementation			
	Guidepost		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	Met?		Yes	No
	Justification	SG80 – The available information from KamchatNIRO and independent observer reports for other salmon fisheries in the region provides clear evidence that the strategy is being implemented successfully. The incidence of interactions with endangered or threatened species is reportedly very low. SG100 – Information is not specifically collected on ETP species in this fishery due to the low incidence of these species in the fishery and the corresponding low level of concern.		
e	Review of alternative measures to minimize mortality of ETP species			

PI 2.3.2		The UoA and associated enhancement activities have in place precautionary management strategies designed to: • **meet national and international requirements** • **ensure the UoA does not hinder recovery of ETP species** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
	Guidepost	There is a **review** of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of ETP species.	There is a **regular review** of the potential effectiveness and practicality of alternative measures to minimize UoA and enhancement related mortality of ETP species and they are implemented as appropriate.	There is a **biennial review** of the potential effectiveness and practicality of alternative measures to minimize UoA and enhancement related mortality ETP species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
	Justification	SG60 – see SG80 SG80 – Effective protection of ETP species is regularly reviewed in the normal course of activity by regional fishery management and environmental protection agencies of the Government. SG100 – Formal reviews are not scheduled in the normal course of events given the low level of concern.		
References		See Section 3.4.3 Endangered, Threatened and Protected Species		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.3.3 – ETP species information

PI 2.3.3		**Relevant information is collected to support the management of UoA and enhancement activities impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA and associated enhancement on ETP species. OR if RBF is used to score PI 2.3.1 for the UoA: Qualitative information is adequate to estimate productivity and	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA and associated enhancement may be a threat to protection and recovery of the ETP species. OR if RBF is used to score PI 2.3.1 for the UoA:	Quantitative information is **available to assess with a high degree of certainty** the magnitude of UoA- and associated enhancement related impacts, mortalities and injuries and the consequences for the status of ETP species.

PI 2.3.3		**Relevant information is collected to support the management of UoA and enhancement activities impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
		susceptibility attributes for ETP species.	Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.	
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - Information on the negligible incidence of interaction of the fishery with ETP species is sufficient to determine that any related mortality or impact is sufficiently low as to not threaten protection or impede recovery. Although no ongoing observer program exists for the fisheries, federal scientists, managers, and inspectors regularly visit the fishing sites and processing plants throughout the season. Over the course of the many years of fishing operations, none of these species are observed to have adverse impacts from the fishery. The fishing authorities have determined that the fishery has such low impacts that it needs no specific data collections on interactions with ETP species. SG100 – Impacts, mortalities and injuries are not explicitly quantified.		
b	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	Information is adequate to support a **comprehensive strategy** to manage impacts, minimize mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - Information from observations by scientists, managers, and inspectors, though not from a formal observer program, on the lack of impacts is adequate to support the management strategy for ETP species. SG100 - Impacts, mortalities and injuries are not explicitly quantified.		
References		See Section 3.4.3 Endangered, Threatened and Protected Species		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA and its associated enhancement activities do not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guidepost	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
	Justification	The only habitats commonly encountered is the coastal sand shoreline and the riverine streambed. Coastal marine fishing areas are on sandy substrates on gently sloping seafloor topographies in the sublittoral zone with a mixed epifauna biota. Riverine streambeds are on gravel and cobble substrate in low gradient deposition zones above the estuarine zone in the lower reaches of the larger rivers in the region. For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible. Enhancement does not occur in the Kamchatka River system. SG60 - See SG100 SG80 - See SG100 SG100 – The allocation of parcels to fishing companies requires that fishing activities occur at the same locations year after year. This limits the footprint of the gear to a small portion of the available habitat. The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. No significant marine habitat impacts are associated with marine trapnet use. The only conceivable effects would involve highly localized and temporary disturbances of the substrate due to net anchors or possibly occasional movement of weighed lead lines. Any related damage to the bottom communities is minor and local relative to redistribution of sediments during storms. Limited habitat effects result from beach seine or gill net site preparation activities in river fishing parcels prior to the fishing season. These might include removal of snags such as boulders or trees which might snag nets. Beach seines operation can impact the bottom, but this damage is considered minor compared to spring flooding in the rivers. Site preparation activities regulated and monitored by the government. Enhancement programs for salmon do not occur in the Kamchatka River system.		
b	VME habitat status			
	Guidepost	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	Not relevant	Not relevant	Not relevant

PI 2.4.1		**The UoA and its associated enhancement activities do not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.**		
	Justification	No Vulnerable Marine Ecosystems or potential VME are identified in the area of the unit of assessment.		
c	**Minor habitat status**			
	Guidepost			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			No
	Justification	Limited habitat effects might result from beach seine or gill net site preparation activities in river fishing parcels prior to the fishing season. Areas where these activities occur can be considered minor habitats. Serious or irreversible harm is not observed from these fishery-related activities.		
d	Impacts due to enhancement activities associated with the UoA			
	Guidepost	The enhancement activities are **unlikely** to have adverse impacts on habitat.	The enhancement activities are **highly unlikely** to have adverse impacts on habitat.	There is a **high degree of certainty** that the enhancement activities do not have adverse impacts on habitat.
	Met?	Yes	Yes	Yes
	Justification	No enhancement occurs in the area of this unit of assessment		
References		See section 3.4.4 Habitats		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.4.2 - Habitats management

PI 2.4.2		**There is a strategy in place that is designed to ensure the UoA and associated enhancement activities do not pose a risk of serious or irreversible harm to the habitats**		
Scoring Issue		SG 60	SG 80	SG 100
A	Management strategy in place			
	Guidepost	There are **measures** in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a **partial strategy** in place if necessary that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries UoA and associated enhancement activities on habitats.
	Met?	Yes	Yes	Yes

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA and associated enhancement activities do not pose a risk of serious or irreversible harm to the habitats		
	Justification	SG60 - See SG100 SG80 - See SG100 SG100 - The fishing strategy involves use of trapnets, gill nets and beach seines, none of which has significant physical habitat effects; fishing gear has *de minimis* impact relative to natural disturbances such as storms and floods. Cumulative impacts from non-MSC fisheries are similarly negligible. The enhancement strategy involves no operation of hatcheries. Ghost fishing from lost gear is largely avoided by active tending of all gears. A large portion of the catch comes in trapnets and beach seines, neither of which continue to fish effectively in the rare instance where lost. Trapnets are also quite expensive and so are typically tied up or removed prior to storms where they might be lost. Gill nets are typically fished by drifting which also involves active tending. Portions of nets can occasionally be snagged on debris but are typically cut free to salvage material.		
B	Management strategy evaluation			
	Guidepost	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/ enhancement activities/habitats).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on information directly about the UoA, enhancement activities and/or habitats involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA, enhancement activities and/or habitats involved.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - The limited scale of fishery and enhancement relative to the available habitat provides an objective basis for confidence that the partial strategy will work and is being implemented successfully. Enhancement does not occur in the Kamchatka River system. SG100 - Testing does not occur.		
c	Management strategy implementation			
	Guidepost		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	Yes
	Justification	SG80 - See SG100 SG100 - Information from observations by scientists, managers, and inspectors, though not from a formal observer program, demonstrate that the fishing operations occur within parcels and with the gear authorized. Observations of habitat conditions in the fishery zone provide clear evidence that habitat impacts are very low or negligible at a regional scale. Quantitative evidence on the successful implementation of habitat protection measures has been provided for the Ozernaya in the form of a physical habitat assessment completed as a condition of another assessment; the Ozernaya results apply to the Kamchatka system as the fishing activities are similar.		

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA and associated enhancement activities do not pose a risk of serious or irreversible harm to the habitats		
d	**Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs**			
	Guidepost	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is some **quantitative evidence** that the UoA and associated enhancement activities comply with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA and associated enhancement activities comply with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	There are no vulnerable marine ecosystems in the area of the unit of assessment. Enhancement does not occur in the Kamchatka River system.		
References		See section 3.4.4 Habitats		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.4.3 – Habitats Information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and associated enhancement activities and the effectiveness of the strategy to manage impacts on the habitat.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	The types and distribution of the main habitats are **broadly understood**. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - The nature and distribution of habitat types, including vulnerable areas, in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. The operation of the fishing gear requires the proper kind of substrate, and exploration early in the development of the fishery determined suitable sites. The distribution and		

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and associated enhancement activities and the effectiveness of the strategy to manage impacts on the habitat.		
		quality of available spawning habitat is well known from ongoing spawning ground surveys. Streams have been mapped at a regional scale. SG100 – Habitat quantity and quality have not been formally detailed for all known habitats in the region.		
b	Information adequacy for assessment of impacts			
	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use and enhancement activities on the main habitats, including spatial overlap of habitat with fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	Information is adequate to allow for identification of the main impacts of the UoA and enhancement activities on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	The physical impacts of the gear and enhancement activities on all habitats have been quantified fully.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG100 SG80 - Habitat types are identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear. Fishing gear impacts on the sand bottom in coastal and riverine fishing areas is known to be minimal and to have all signs of fishing obliterated during natural events such as storms and floods. Sufficient information is available to determine that fishery activities do not have a quantifiable impact on habitat. All such activities are licensed and monitored by the government. Enhancement does not occur in the Kamchatka River system. SG100 – Quantitative evidence of required assessment of habitat related impact as per SA3.13.1 and SA3.13.2 is limited. As a result, the 100=scoring guidepost for this indicator is not met.		
c	Monitoring			
	Guidepost		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.
	Met?		Yes	No
	Justification	SG60 - See SG80 SG80 - Risks of fishery impacts to habitat may be assessed based on the number and location of fishing parcels which are licensed and regulated by the government. Similarly,		

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and associated enhancement activities and the effectiveness of the strategy to manage impacts on the habitat.
		all fishery construction and operation are regulated by the government. There is a special agency, State Sanitary-epidimeological inspection which controls whether the fishery effects the fishing operation zone. In a case of violations, it is a usual practice to imply fines to the company. This information is sufficient to detect any risk to habitat due to changes in the fishery. SG100 – Physical habitat assessments have not been conducted (due to the lack of significant impacts).
References		See section 3.4.4 Habitats
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		**--**

Evaluation Table for PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA and associated enhancement activities do not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guidepost	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
	Justification	SG60 - See SG80 SG80 – Information on the distribution, scale and effect of the fishery provides justification for a conclusion that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. For the purposes of this assessment, all gears are combined for scoring purposes as impacts are negligible. North Pacific Ecosystem - Potential ecosystem concerns related to fishing might involve effects of changes in salmon abundance on ecosystem structure, trophic relationships, and biodiversity. For instance, decreases in salmon abundance due to fishing might favor prey species of salmon and harm predator species of salmon. However, the salmon fishery has complex short and long-term effects on salmon abundance. Salmon fishery management to provide escapements consistent with maximum sustained yield generally increases average abundance in the ocean and return relative to what can be expected in an unmanaged system. Conversely, high exploitation rates and management for optimum rather than equilibrium escapements will substantially reduce the average number of fish escaping to freshwater. Effects of salmon abundance on ecosystem productivity in the ocean have been the subject of extensive research over the last 20 years and the scientific literature generally suggests that high abundance of salmon on the high seas due to the net effects of fishery		

PI 2.5.1		The UoA and associated enhancement activities do not cause serious or irreversible harm to the key elements of ecosystem structure and function		
		management and hatchery enhancement throughout the north Pacific Rim has may have contributed to ecosystem changes. However, the contribution from any specific area to total salmon abundance in the ocean is relatively small. Therefore, the UoAs are highly unlikely to serious or irreversible harm to the structure and function of the North Pacific ecosystem. Riverine Ecosystem - Effects of salmon abundance on ecosystem productivity in freshwater have also been well documented in other systems. Larger escapements provide more food for salmon predators such as bears and eagles and also more marine derived nutrients to support primary and secondary productivity. However, while fishery management may affect abundance, it also reduces the variability in abundance relative to what can be expected in an unmanaged system, thus providing a more stable resource and avoiding catastrophic extremes. On balance these effects are not expected to result in serious or irreversible harm to any other component of the ecosystem. Therefore, the UoAs are highly unlikely to serious or irreversible harm to the structure and function of the riverine ecosystem. SG100 - The governmental scientific agency is conducting a series of ecosystem assessments in Kamchatka. These include evaluations of the effects of salmon abundance by species on individual characteristics and population dynamics of other salmon species, assessments of food marine derived nutrient contributions and effects of salmon to freshwater ecosystems, and food web productivity. These assessments provide a basis for evaluating fishery effects on ecosystem structure and function. However, a specific analysis of the likelihood of the fishery to disrupt key elements underlying North Pacific or riverine ecosystem structure and function to a point where there would be a serious or irreversible harm has not been reported.		
b	Impacts due to enhancement			
	Guidepost	Enhancement activities are **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	Enhancement activities are **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the enhancement activities are **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Yes	Yes	Yes
	Justification	No enhancement occurs in this UoA.		
References		See Section 3.4.5 Ecosystem Structure and Function		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.5.2 – Ecosystem management

PI 2.5.2		There are measures in place to ensure the UoA and enhancement activities do not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
A	Management strategy in place			

PI 2.5.2		There are measures in place to ensure the UoA and enhancement activities do not pose a risk of serious or irreversible harm to ecosystem structure and function		
	Guidepost	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
	Justification	SG60 - See SG80 SG80 - Measures include fishery management for spawning escapements adequate an additional to provide for ecosystem needs in freshwater including bears and marine derived nutrients. This strategy also involves significant monitoring and research of ecosystem components at a regional scale. The partial strategy takes into account available information, monitors new information from the extensive research, and is expected to restrain impacts of the fishery activities on the ecosystem should the research identify any need. SG100 - It is not apparent that the strategy involves a specific plan containing measures to address all main impacts of the fishery on the North Pacific and riverine ecosystems, nor that all functional relationships between the fishery and the components and elements of the ecosystem are well understood.		
B	Management strategy evaluation			
	Guidepost	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoA/ ecosystems).	There is **some objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved	**Testing** supports **high confidence** that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - General experience and information from other systems indicate that the fishery measures are likely to minimize risks of serious or irreversible harm to ecosystem structure and function. Salmon populations are inherently dynamic with large interannual variation on run sizes due to normal environmental variation in abundance. Related ecosystems are affected by these same dynamic conditions. Management of fisheries to provide significant natural spawning escapements and minimal disruption from enhancement ensure future production of salmon to fuel future fisheries while also providing fish and marine derived nutrients critical to sustaining freshwater and nearshore marine ecosystems. SG100 – Systematic testing of the ecosystem effects of fishery is limited.		
C	**Management strategy implementation**			
	Guidepost		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).**

PI 2.5.2		There are measures in place to ensure the UoA and enhancement activities do not pose a risk of serious or irreversible harm to ecosystem structure and function		
	Met?		Yes	Yes
	Justification	SG80 - See SG100 SG100 – Monitoring of new information from the extensive research regularly occurs. Qualitative information and observations readily indicate that stream and nearshore ecosystems are intact, diverse, and productive. The area of the fishery is remote undeveloped except for a few local areas.		
d	Management of enhancement activities			
	Guidepost	There is an **established** artificial production strategy in place that is expected to achieve the Ecosystem Outcome 60 level of performance.	There is a **tested and evaluated** artificial production strategy with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that the strategy is effective in achieving the Ecosystem Outcome 80 level of performance.	There is a **comprehensive and fully evaluated** artificial production strategy to verify with certainty that the Ecosystem Outcome 100 level of performance.
	Met?	Yes	Yes	Yes
	Justification	No enhancement occurs in the area of the Unit of Assessment		
References		See Section 3.4.5 Ecosystem Structure and Function		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				**--**

Evaluation Table for PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA and associated enhancement activities on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	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	
	Justification	SG60 - See SG80 SG80 - The salmon life cycle encompasses a vast ecosystem including natal rivers and lakes, the nearshore ocean, and the high seas of the North Pacific Ocean. Key ecosystem elements include trophic structure and function (in particular key prey, predators, and competitors), community composition, productivity pattern (e.g. upwelling or spring bloom, abyssal, etc.), and characteristics of biodiversity. Key elements of the salmon ecosystem are broadly understood based on extensive work by scientists associated with the management system. Extensive research has been conducted on freshwater and		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA and associated enhancement activities on the ecosystem		
		marine aquatic ecosystems. This information consists of Kamchatka-specific research and research conducted in other salmon-producing regions.		
b	Investigation of UoA impacts			
	Guidepost	Main impacts of the UoA and associated enhancement activities on these key ecosystem elements can be inferred from existing information, and **have not been investigated in detail**.	Main impacts of the UoA and associated enhancement activities on these key ecosystem elements can be inferred from existing information and **some have been investigated in detail**.	Main interactions between the UoA and associated enhancement activities and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - Marine-derived nutrients from salmon carcasses can have a significant impact on freshwater communities as well as those communities in the freshwater to terrestrial interface. The relationships between salmon and the population dynamics of their terrestrial predators has been well documented in other systems. It has been reported that these nutrients also form a base for rich development of zooplankton in coastal area, which serves a food for young salmon just after downstream migration. Many aspects of ecosystem dynamics have been investigated in detail. For instance, estimates of the contribution of marine derived nutrients from salmon carcasses have been made for the Bolshaya system and research is underway on food web productivity. SG100 - Of particular concern to salmon fishery management throughout the North Pacific Region is the effect of ocean environmental conditions on stock productivity. Short term and long-term variability in stock productivity is now understood to be strongly related to patterns of ocean productivity. Ocean productivity regimes have been observed shift periodically to more or less favorable conditions. The region is currently in a very productive ocean regime for many northern salmon stocks including Kamchatka Pink and Chum salmon. These patterns and their effects are generally understood but future patterns are cannot be forecast. Thus, salmon productivity and sustainability would be negatively affected by a shift to a less favorable regime. It remains unclear whether knowledge of fishery-ecosystem interactions is sufficient to recognize changes and to revise management objectives and practices in a timely fashion. Thus, while information on fishery-ecosystem functions and elements is sufficient to meet 80 scoring guideposts, it does not rise to the standard of the 100 scoring guideposts.		
c	Understanding of component functions			
	Guidepost		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA and associated enhancement activities on P1 target, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		Yes	No

PI 2.5.3		There is adequate knowledge of the impacts of the UoA and associated enhancement activities on the ecosystem		
	Justification	SG80 - It is clear that salmon influence the food webs in the North Pacific although the effect varies widely between systems and is dependent on many factors like timing, scale and alternative nutrient sources, etc. SG100 - Like most large marine ecosystems, resolving interactions strengths among food web constituents is made difficult by limited data and confounding effects of environmental forcing.		
d	Information relevance			
	Guidepost		Adequate information is available on the impacts of the UoA and associated enhancement activities on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the fishery and associated enhancement activities on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		Yes	No
	Justification	SG80 - Sufficient information is available on the impacts of the fishery on these components to allow some of the main consequences for the ecosystem to be inferred. Main consequences include changes in competition levels between salmon species and nutrient contributions to freshwater food webs from marine derived nutrients delivered by salmon carcasses. Scientists of the government research institutes have collected substantial information on Pink salmon and their role in the ecosystem. Information on salmon ecosystems throughout the Pacific rim has also provided a good understanding of the salmon's function in freshwater ecosystem, particularly for supporting aquatic and terrestrial food webs either directly by feeding predators and scavengers or indirectly by the delivery of marine derived nutrients. Active fishery management might also help stabilize returns by avoiding excessively large escapements which can depress future returns under some conditions. Enhancement with hatcheries can substantially increase salmon numbers in certain times and areas although hatchery contributions to Chum salmon runs remain uncertain. Enhancement of Pacific salmon across the Pacific Rim since the 1970s has resulted in very large abundance in the North Pacific Ocean. There is some evidence that high salmon abundances in the ocean might adversely affect wild salmon through competition. As hatchery production does not occur in the UoAs, no adverse impacts are expected. SG100 – Information is not sufficient to evaluate fishery impacts on all ecosystem elements.		
e	Monitoring			
	Guidepost		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
	Justification	SG80 - Extensive research has been conducted on salmon ecosystems in western Kamchatka, particularly for Sockeye but also for other salmon species. In marine waters, extensive research has been conducted by the Russian Scientific Institutes on (1) Juvenile Anadromous Stocks in Ocean Ecosystems; (2) Anadromous Stocks in the Bering Sea Ecosystem (BASIS); and (3) Anadromous Stocks in the Western Subarctic Gyre and Gulf of Alaska Ecosystems (Temnykh et al. 2010).		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA and associated enhancement activities on the ecosystem	
		SG100 – Detailed strategies for managing ecosystem impacts have not been identified.	
References		See Section 3.4.5 Ecosystem Structure and Function	
OVERALL PERFORMANCE INDICATOR SCORE:			**80**
CONDITION NUMBER (if relevant):			**--**

Evaluation Table for 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; and** • **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**			
	Guidepost	There is an effective national legal system and **a framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - The Russian Federation has an effective salmon fishery management system. Section 3.5.1 provides details of the Russian management system, including federal and state scientific and management agencies and the laws under which they operate. Management of Kamchatka salmon fisheries is administered by Federal and Regional governmental agencies. Kamchatka Kray, which includes Kamchatka Oblast and Koryak Autonomous Okrug is the subject of the Russian Federation and is a part of Far Eastern Federal Region (Okrug). It is under the direction and control of the Government of the Russian Federation. Fisheries of Russia are managed and controlled by Federal Fishery Agency (FAR) of the Russian Federation, which located in Moscow and also represented by a local office in Kamchatka. Operational management of all activities is performed by the Governor of the Kamchatsky Kray. The Federal Law "On fisheries…" sets that all citizens, public organizations, and associations have the right to participate in decision making process. For these purposes the FAR maintains a multi-level system of public (community) and scientific fishery councils providing opportunities to participate and influence on decision process and regulations. Outcomes consistent with MSC principles 1 and 2 are achieved through the legal system through management objectives and fishery measures detailed in Section 3.5.3. Fisheries are regulated to ensure that spawning escapements are sufficient to sustain continuing high levels of production. Fisheries are regulated with gear, time and area regulations based on preseason forecast and inseason stock assessment information to regulate exploitation rates based on actual abundance. Fishery participation and effort is controlled by long-term lease of fishing sites		

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; and** • **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.**		
		SG100 – Given the continuing significance of illegal fishing by some residents of the region, it is not clear that the legal system and cooperation by all parties are 100% effective. Therefore, the SG100 standard is not achieved.		
b	**Resolution of disputes**			
	Guidepost	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 subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the UoA and has been **tested and proven to be effective**.
	Met?	Yes	Yes	Yes
	Justification	SG60 - See SG80 SG100 - The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. See Section 3.5.1 for additional details. The legal system is based on civil law system with judicial review of legislative acts. The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges (SG 80). An example of effectiveness of system of resolution of legal disputes is provided in the previous MSC assessment of the Vityaz-Avto & Delta companies of their Sockeye fisheries in the Ozernaya River (https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/ozernaya_river_Sockeye_salmon/assessment-downloads-1/20120904_PCR_SAL281.pdf) and has a direct relation to this assessment as well. This example demonstrated that the management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges (SG 100). The description of the example is as follows. Several years ago, a company, Kolkhoz Krasnyi Truzhennik, that owns a fishing parcel in Ozernaya River initiated legal processing against SVTU, Federal Agency for Fisheries and company “Vityaz –Avto” regarding incorrect determination of daily capacity of fish processing factory. According to Kolkhoz Krasnyi Truzhennik, their daily capacity was underestimated, and capacity of Vityaz-Avto was overestimated. Due to this, at the competition for distributing fishing parcels in May 2008, Kolkhoz Krasnyi Truzhennik failed while competing for the best fishing parcels. In fact, the results of the distribution of fishing parcels are very important because the best fishing parcels (one of them belongs now to Vityaz-Avto) are situated in the very downstream part of the river and are the most productive. Kolkhoz Krasnyi Truzhennik was given a fishing parcel situated upstream and thus is less productive. Arbitration court of the Kamchatka Kray considered these accusations in December 2008 and after a detailed investigation of the circumstances decided to reject the claim by Krasnyi Truzhennik (decision accepted 19 December 2008). In total, the court investigated and accepted decisions on five cases regarding not only Ozernaya River, but also four fishing parcels in the coastal area of Sea of Okhotsk. The accusations continued with two publications in the newspaper “Rybak Kamchatka” 22 and 29 July 2010 (web addresses are http://www.fishnews.ru/mag/articles/8348 and http://www.fishnews.ru/mag/articles/8364). The Kolkhoz Krasnyi truzhennik accused		

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; and** • **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.**		
		Vityaz-Avto of violating fishery regulations: fishing during off-days and fishing outside their officially determined fishing parcel. Kolkhoz appealed to the local police department, which performed special investigations, but the investigation did not find evidence in support of the accusations. Therefore, all accusations against Vityaz-Avto by Kolkhoz Krasnyi Truzhennik were investigated and not supported by the governmental authorities. 29 April 2011 Kolkhoz accused "Vityaz-Avto" in violation of Nature Conservation legislation by dragging near their fishing parcel which influences fishing parcel of Krasnyi Truzhenik (http://www.fishkamchatka.ru/?cont=long&id=29245&year=2011&today=29&month=04). During Ozernaya Sockeye assessment, the assessment team discussed this issue with company Vityaz Avto and with a head of Kolkhoz Krasnyi Truzhennik, chairman Mikhail Puzyrev, during site visit in May 2011 and tried to get all available information. Based on these discussions the assessment team has no basis to dispute the official investigations. Social changes in the Russian system seem to be at the root of this conflict. Under the Soviet Union socio-economic model, Kolkhoz Krasnyi Truzhennik operated as a government entity prosecuting the entire fishery, providing employment, and also maintaining housing, schools, library and stores. After the Soviet Union was disbanded in the 1990s, market-based companies came in taking a share of the fishing quotas and income, and in the process displacing the old way of life. Resolution of this dispute through the management system subject to law clearly demonstrates a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the UoA and has been tested and proven to be effective.		
c	**Respect for rights**			
	Guidepost	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
	Justification	SG60 - See SG100 SG80 - See SG100 SG100 - The management system has a mechanism to formally commit to the legal rights created explicitly and practicing by people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2 (SG 100). The federal law on indigenous peoples of the Far North applies to the management system to ensure their traditional fisheries and livelihoods. In accordance with the law, every district establishes fishing sites for indigenous peoples near their homes. While distributing quotas for salmon fishing, the Anadromous Fish Commission first sets a quota for indigenous peoples (the rate of 100 kg per person per year of aquatic biological resources for local population has been established by the government of Kamchatka Kray). The remainder of the quota is distributed among the other users of water resources. Representatives of the Association of Indigenous Peoples of Kamchatka are involved in the distribution of the quota. In the case the interests of the indigenous peoples are violated, the legal system intervenes.		

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; and** • **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.**
		Consistency with Principle 2 is addressed by the more than 30 regulatory legal acts of the Government of the Russian Federation that have been passed in development of provisions of the law for the purpose of environmental protection (See Section 3.5.1).
References		See Section 3.5
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for 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**			
	Guidepost	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organizations 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
	Justification	SG60 - See SG80 SG80 - Organizations and individuals involved in the management process have been identified (See Section 3.5.2). Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction, thus should be scored at least SG80. However, functions, roles and responsibilities related to some responsibilities and interactions remain somewhat uncertain, which does not allow to score 100. In accordance with Federal Law on Fisheries, all stakeholders are included in the decision-making process. This includes fishing companies and public organizations. All interested parties are part of main management body – The Anadromous Fish Commission on local Kamchatka level. On higher levels, there are also structures which allow to participate interested parties such as Public Council for FAR. Each representative has the right to vote and can influence the decision. This collective body bears the responsibilities for the decisions made.		
b	**Consultation processes**			
	Guidepost	The management system includes consultation processes that **obtain relevant information** from the main affected parties,	The management system includes consultation processes that **regularly seek and accept** relevant information, including local	The management system includes consultation processes that **regularly seek and accept** relevant information, including local

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**		
		including local knowledge, to inform the management system.	knowledge. The management system demonstrates consideration of the information obtained.	knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
	Met?	Yes	Yes	No
	Justification	SG60 - See SG100 SG80 - The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used through public discussions in the Anadromous Fish Commission (AFC) with decisions publicized on the internet. Consultations with stakeholders are conducted on the regional level via the AFC and through the Public Council of the FAR (see Section 3.5.2). As part of the consultation process AFC sends information used for pre-season management to all stakeholders. During its meeting, the AFC examines data on the intensity of salmon runs, hydrological regime in the spawning grounds and fill rate of spawning ground by spawners, as well as recommendation of KamchatNIRO on the timing and regulation of fishing (Section 3.5.3). AFC decisions are recorded. The protocols of the AFC meetings are sent to all interested parties and published on web site of Federal Fishery Agency. SG100 – This standard is not met because it is not clear whether decisions and protocols published include acknowledgement of how information received was used or not used.		
c	**Participation**			
	Guidepost		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
	Justification	SG80 - The consultation process provides opportunity for all interested and affected parties to be involved and facilitates their effective engagement. However, the process does not appear to always encourage and facilitate effective engagement by nongovernmental or industry interests. Mechanisms for involvement of environment and different interest groups as well as the broader community are not well developed, but there are number of non-governmental organizations that are interested in salmon fisheries in Kamchatka area. Stakeholders may have an opportunity for involvement but may have reluctance to participate as a carryover from Soviet days. SG100 - While internal information from the management agencies is technically available to the public, the process for obtaining it can be involved making access difficult. This does not allow to score this PI 100.		
References		See Section 3.5.2		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.3 – Long-term objectives

PI 3.1.3		**The management policy for the SMU and associated enhancement activities has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guidepost	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
	Justification	SG60 - See SG80 SG80 - Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. The over-arching fisheries and resource regulations cited earlier in this report lay out long-term objectives and long-term goals for the salmon fisheries of the Russian Far East (Section 3.5.3). The main objective of the salmon management system is to provide spawning escapements sufficient to sustain continuing high salmon productivity in future returns. Adequacy of escapement is assessed by observing whether all areas potentially suitable for spawning are actually used by salmon to spawn. The fishery generally managed for species-specific regional escapement ranges observed to produce significant returns in the past. The regional fisheries management demonstrates its strategy towards sustainable use of fish resources by contribution to fisheries research, increasing control over poaching, development of modern fish-processing factory, contribution to social sphere, and organization of protected areas. SG100 - However, objectives consistent with MSC Principles and Criteria and the precautionary approach are not always required by management policy.		
References		See Section 3.5.3		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific and associated enhancement management system(s) activities have clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guidepost	**Objectives,** which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery and associated enhancement management system(s).	**Short and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery and associated enhancement management system(s).	**Well defined and measurable short and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery and associated enhancement management system(s).
	Met?	Yes	Yes	No
	Justification	SG60 - See SG80 SG80 - Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and enhancement activities. These include short term objectives for spawning escapements intended to provide for maximum sustained yield and long-term objectives for fishery sustainability reflected in management regulation. More than 30 regulatory legal acts of the Government of the Russian Federation have been passed in development of provisions of the law for the purpose of environmental protection (See Section 3.5.1). Specific provisions include: - the right of a person on favorable environment; - scientifically justified combination of interests of person, society and state with a goal of sustainable development and favorable environment; - conservation, reproduction and rational use of natural resources as necessary preconditions of providing of favorable environment and ecological safety; - presumption of ecological danger of planned business activities; - compulsion of environmental assessment of planned business projects; - priority of preservation of natural ecosystems, natural landscapes and natural complexes; - protection of biodiversity; - Prohibition of any activity with unpredictable environmental consequences, and realization of projects which may result in degradation of natural ecosystems and change or destruction of genetic diversity of plants, animals and other organisms, exhausting of natural resources and other negative changes of environment. Objectives consistent with Principles 1 and 2 are also reflected in the absence of enhancement of species in areas which are under scope of this certification. Most rivers are completely free of hatcheries and in the Kamchatka River basin there are no salmon hatcheries. According to overall strategy of development salmon fisheries in Russia, hatcheries are among the priorities to increase fishery productivity. At the moment, however, there are no specific plans to further develop hatchery system nearest years in the area. SG100 - Short and long-term objectives do not always provide clear measurable standards with respect to effects of fisheries on the ecosystem. Objectives are explicit with respect to protecting spawning escapement but are less clear on the environmental/ecosystem end.		

PI 3.2.1		The fishery-specific and associated enhancement management system(s) activities have clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
		If ecosystem changes were observed, a response would be expected; but no substantive changes have occurred at the level of current monitoring. Therefore, this performance indicator might partially meet the SG100 for hatchery objectives but does not meet the SG100 for specific objectives related to fishery effects on the ecosystem.	
References		See Section 3.5	
OVERALL PERFORMANCE INDICATOR SCORE:			**80**
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific and associated enhancement management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and have an appropriate approach to actual disputes in the fishery.		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guidepost	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific and enhancement objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific and enhancement objectives.	
	Met?	Yes	Yes	
	Justification	SG60 - See SG80 SG80 - Well-established and formal decision-making processes result in measures and strategies to achieve the fishery-specific objectives. The Anadromous Fish Commission (AFC) is a central feature of the decision-making process. The AFC is responsible for the distribution of recommended yearly catch of salmon among users and identifying areas of commercial fishery, recreational fishing, and traditional fishery of the indigenous population. The AFC is chaired by the regional governor and consists of government, industry and interested stakeholders. These include representatives from Federal executive bodies, including the federal security and environment protection authorities, as well as representatives of the regional government, federal, public associations, consolidations of legal entities (associations and unions), and scientific organizations. Upon the request of fishing companies, the AFC sets up the recommended catch for a management unit area and accepts applications from the users, each of which cannot exceed the total recommended catch for management unit. In case of approaching recommended catch for some management unit, AFC can close fishing or increase the recommended catch following recommendations of KamchatNIRO. The AFC meets regularly before and over the course of the fishing season. The AFC's decisions are made through discussions and consultations with stakeholders. All meetings are open to the public.		
b	Responsiveness of decision-making processes			
	Guidepost	Decision-making processes respond to **serious issues** identified in relevant	Decision-making processes respond to **serious and other important issues**	Decision-making processes respond to **all issues** identified in relevant

PI 3.2.2		The fishery-specific and associated enhancement management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and have an appropriate approach to actual disputes in the fishery.		
		research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	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
	Justification	SG60 - See SG80 SG80 - Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. KamchatNIRO uses relevant information to provide pre-season forecasts so that fishermen, buyers, processors, and the Anadromous Fish Commission can plan for the upcoming season. The Anadromous Fish Commission considers a wide range of issues regularly reported by federal and regional agencies and those brought up by stakeholders to make in-season decisions. All stakeholders have an opportunity to attend the Anadromous Fish Commission meetings. SG100 - It cannot be concluded that decision-making processes respond to all issues due to the lack of transparency regarding many internal decisions by Russian governmental agencies. For instance, information on run size, harvest by time and area, fishery management actions, and escapement is not typically reported outside the management system except in summary form in the case of serious and other important issues addressed during public processes.		
c	Use of precautionary approach			
	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Yes	
	Justification	SG80 - Decision-making processes use the precautionary approach and are based on best available information by KamchatNIRO and SVTU. The use of optimum spawning escapement as both target and limit reference points demonstrates a precautionary element to decision making. Information received in-season assures that the management system uses current information. The target reference point occurs approximately at the midpoint of the optimal escapement range. Higher levels of precaution would occur as the target moved toward the upper end of the range.		
d	Accountability and transparency of management system and decision-making process			
	Guidepost	Some information on fishery performance and management action is generally available on request to stakeholders.	**Information on fishery performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging	Formal reporting to all interested stakeholders **provides comprehensive information on fishery performance and management actions** and describes how the management system responded to findings and

PI 3.2.2		The fishery-specific and associated enhancement management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and have an appropriate approach to actual disputes in the fishery.		
			from research, monitoring, evaluation and review activity.	relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Yes	No	No
	Justification	SG60. Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. This is achieved by transparent decision-making in the Anadromous Fish Commission, which gathers for meetings once per several days during a fishing season. For instance, in 2015 the Commission carried out 13 meetings from 17 June 21 August. Decisions are available for all interested parties and immediate (usually within few hours after the meeting) publication of its decisions at the SVTU website (http://www.terkamfish.ru/index.php/deyatelnost/info/protokols/protokolsanadromkam). The protocols contain information about participants of the meeting, questions discussed, results of voting and decisions have been made accompanying by relevant information. Moreover, significant amount of information about current situation is available from the SVTU website. SG80 - At the same time, monitoring of decision making for the fishery is limited by the inconsistent availability of information outside the local governmental management system. Results of fishing season and effectiveness of management actions undertaken are discussed at the both management agencies such as AFC, SVTU and FAR, and also at Research Councils of fisheries institutes such as KamchatNIRO, TINRO-Center and VNIRO on a regular basis. However, information on run size, harvest by time and area, fishery management actions, and escapement is not typically reported outside the management system except in rare cases. Occasional publications of related information (e.g. Shevliakov 2013) provide a historical perspective but are not sufficient to allow tracking action associated with findings and relevant recommendations. Inconsistent availability of annual fish run and fishery information outside the local governmental management system limits the availability of information for actions or lack of action associated with findings and relevant recommendations; therefore, the fishery does not score 80.		
e	Approach to disputes			
	Guidepost	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
	Justification	SG60 - See SG100 SG80 - See SG100 SG100 - The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges. The previous assessment		

PI 3.2.2		The fishery-specific and associated enhancement management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and have an appropriate approach to actual disputes in the fishery.
		of the same Client, which received MSC certificate for Ozernaya River Sockeye in June 2012, provides a good example of such disputes investigated in a court of Kamchatka Kray http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/ozernaya_river_Sockeye_salmon/assessment-downloads-1/PCDR.pdf. This dispute is directly relevant for this certification as well. After the court procedures, this conflict has been resolved. The example demonstrates that the management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenge, thus deserving SG100 for this element.
References		See Section 3.5
OVERALL PERFORMANCE INDICATOR SCORE:		**75**
CONDITION NUMBER (if relevant): **Condition 5. Demonstrate that information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.**		

Evaluation Table for PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guidepost	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and associated enhancement activities and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Yes	No	No
	Justification	SG60 - A monitoring, control and surveillance system has been implemented in the fishery under assessment (See Section 3.5.4 for a detailed description). All the enforcement agencies and stakeholders report reduction of level of illegal fishing in all the areas of Kamchatka during the last decade in comparison with extremely high level of illegal fishing during 1990s-early 2000s. Reforms in the management system have effectively addressed high historical levels of under-reported or misreported catches by commercial fishing companies (see Section). Introduction of an “Olympic system” of catch allocation has greatly increased compliance and accountability by commercial companies participating in the fishery. In this system, inseason fishery management authority is delegated from the central authority to local agencies – this makes management decisions much more responsive to inseason		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.		
		information. Fishing companies are allowed to fish their lease sites during at times when the fishery is opened by fishery managers. Catches are not artificially limited by assigned TAC shares. Fishing companies may purchase additional catch shares during the fishing season as long as fish remain available. As a result, historical incentives for noncompliance in catch reporting have been eliminated by accounts of all fishing companies, regulatory agencies and nongovernmental organizations. Well-run and profitable fishing companies, including those in the assessment, reportedly demonstrate a very high rate of compliance and also support enforcement efforts throughout the fishery. Valuable long-term leases provide a large incentive for sustainable management and for compliance. SG80 - However, significant enforcement problems still exist in some systems due to poaching by local residents and abuse of the indigenous fishery permitting system. Among the rivers included in this assessment, enforcement in the Kamchatka River is an extremely challenging task because this river system has a good access for poachers by the auto road from Petropavlovsk-Kamchatsky, not only in downstream part, but also in the upstream and middle-stream parts with several settlements, and because the river has numerous tributaries, which is difficult to control. Effective enforcement is only possible with considerable funding and cooperation among companies fishing companies depending on local fish resources. The companies fishing in the Kamchatka River basin undertake joint efforts to control poaching, mostly in the downstream part of the river, but also in the middle-stream part. The chronic nature of illegal fishing in Kamchatka indicates that the monitoring, control and surveillance system has not demonstrated a complete ability to enforce relevant rules throughout the system. Enforcement cannot be considered comprehensive because the notable level of illegal fishing is apparently still significant.		
b	Sanctions			
	Guidepost	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	No	No
	Justification	SG60 - Sanctions to deal with noncompliance exist, are consistently applied and thought to provide effective deterrence for well-run fishing companies including those in this assessment. For example, loss of opportunity to fish when convicted of serious offenses provides a major incentive for fishery operators to stay within the rules. SG80 - Questions remain regarding the consistency of application and the effectiveness of deterrence for illegal harvest activities in freshwater by non-commercial fishers. Sanctions do not appear to provide effective deterrence to components of illegal fishing which remains significant in accessible systems. While apparently much reduced from historical levels, illegal harvest remains a chronic concern in the Kamchatka River system.		
c	Compliance			
	Guidepost	Fishers and hatchery operators are **generally thought** to comply with the management system for the fishery and associated enhancement activities under assessment, including, when required, providing information of	**Some evidence exists** to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery	There is a **high degree of confidence** that fishers and hatchery operators comply with the management system under assessment, including, providing information of importance to the effective management of the fishery

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.		
		importance to the effective management of the fishery.	and associated enhancement activities.	and associated enhancement activities.
	Met?	Yes	Yes	Yes
	Justification	SG60 - See SG80 SG80 – See SG100 SG100 - There is a high degree of confidence that commercial fishing companies included in this assessment comply with the management system under assessment, including providing information of importance to the effective management of the fishery and its enhancement activities. No evidence of systematic noncompliance by commercial fishing companies included in this assessment has come to the attention of the assessment team regarding monitoring, control, and surveillance activities in the freshwater portion of this fishery. Authorities and stakeholders confirm compliance of the companies participating in this certification. The fishery closely cooperates with SVTU to protect salmon populations from illegal activities and funds enforcement hiring people to help state fish inspection. Moreover, incentives for illegal fishing for companies considerably reduced after introduction of Olympic system of management in 2010.		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Yes	
	Justification	SG80 - No evidence of systematic noncompliance has come to the attention of the assessment team regarding monitoring, control, and surveillance activities in the commercial sector of this fishery. Authorities and stakeholders confirm compliance of the companies participating in this certification.		
References		See Section 3.5		
OVERALL PERFORMANCE INDICATOR SCORE:				**70**
CONDITION NUMBER (if relevant): **Condition 6.** **Demonstrate that a monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules, and that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.**				

Evaluation Table for PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific and enhancement management system(s) against its objectives There is effective and timely review of the fishery-specific and associated enhancement program(s) management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guidepost	The fishery and associated enhancement program(s) has in place mechanisms to	The fishery and associated enhancement program(s) has in place mechanisms to	The fishery and associated enhancement program(s) has in place mechanisms to

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific and enhancement management system(s) against its objectives There is effective and timely review of the fishery-specific and associated enhancement program(s) management system		
		evaluate **some** parts of the management system.	evaluate **key** parts of the management system	evaluate **all** parts of the management system.
	Met?	Yes	Yes	No
	Justification	SG60 – See SG80. SG80 - The fishery and its enhancement programs have in place mechanisms to evaluate key parts of the management system. Key elements such as allowed catch monitoring process and the stock assessment that determine the level of removals occur during the annual fishing season and at the end to ensure the possibility of allowed catch over-run are minimized. There are mechanisms in place to adjust allowed catch or the allocation of allowed catch between management units these are evaluated annually. At the same time, available information does not prove that all parts of the management system are evaluated, which does not allow to score this element 100.		
b	Internal and/or external review			
	Guidepost	The fishery-specific and associated enhancement program(s) management system is subject to **occasional internal** review.	The fishery-specific and associated enhancement program(s) management system is subject to **regular internal and occasional external** review.	The fishery-specific and associated enhancement program(s) management system is subject to **regular internal and external** review.
	Met?	Yes	Yes	No
	Justification	SG60 – See SG80 SG80 – Guidance for this indicator considers whether there are opportunities and/or forums for decision-makers to receive feedback on the management system. The fishery has in place mechanisms to evaluate key parts of the management system and are subject to regular internal review. Results of fishing season and effectiveness of management actions undertaken are discussed at the both management agencies such as AFC, SVTU and FAR, and also at Research Councils of fisheries institutes such as KamchatNIRO, TINRO-Center and VNIRO on a regular basis (Shevlyakov et al. 2016). Methodical approaches to stock evaluation and the recommended volumes are discussed by a specialized Salmon Council of the Far East industry institutes within the research and engineering association of the Pacific Institute of Fishery and Oceanography (NTO TINRO), then assessed by the Scientific Council of KamchatNIRO, then by the Scientific Council of TINRO-Center and VNIRO (Russian Federation Research Institute of Fishery and Oceanography). After that the recommended regional volumes of Pacific salmon are reviewed and approved by the Industry Council of Rosrybolovstvo (Russian federal Fisheries Agency). The fishery also has in place mechanisms for occasional external review. External review means external to the fishery management system. This could occur by another department within an agency, another agency or organization, an external government audit, a peer organization or expert peer reviewers. The FAR interacts with various agencies at the federal level while controlling its territorial departments and provides oversight of departments under its jurisdiction. The FAR evaluates the management system through its responsibility for defining the rules and the areas of fisheries and for preparation of federal-level and agency-level reports on the fishing industry. Federal review provides periodic external review of fishery programs implemented by the FAR. The operation of this system was demonstrated by changes in the system of fishery allocation from an assigned quota by fishing company to the Olympic system where the		

PI 3.2.4		**There is a system of monitoring and evaluating the performance of the fishery-specific and enhancement management system(s) against its objectives** **There is effective and timely review of the fishery-specific and associated enhancement program(s) management system**
		harvestable surplus is not allocated by fishing company prior to the fishing season. This change occurred in response to regional and Federal review processes working on concert. SG100 – The fishery is not subject to regular external review as part of an established process.
References		See Section 3.5
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		**--**

APPENDIX 2 - CONDITIONS & CLIENT ACTION PLAN

Condition 1

Performance Indicator	**1.1.1. – Stock Status The stock management unit (SMU) is at a level which maintains high production and has a low probability of falling below its limit reference point (LRP)**
Score	70 (Sockeye, Chum, Coho and Chinook)
Rationale	It is unclear whether Sockeye, Chum, Coho or Chinook escapements are at or fluctuating around objective values due recent reductions in stock assessment. Low escapements have been documented since 2010 but appear to be an artefact of recent reductions in aerial survey efforts rather than an actual decrease (based on fishery-related stock indicators assessed by KamchatNIRO). Previous to the recent decline in aerial surveys, quantitative stock assessments indicated that Sockeye and Chum Salmon stocks in the Unit of Assessment are generally fluctuating around spawning escapements that consistently produce high levels of fishery yields under the current management system adopted in 2008. Status of Chinook and Coho are less clear. Very low escapements have been documented for Chinook since 2010 but these might be an artefact of recent reductions in aerial survey efforts. Productivity of Chinook, unlike Sockeye, Pink and Chum, appears to have declined in the last decade, apparently in response to ocean conditions. Coho run sizes and escapements have been highly variable and uncertainty of recent stock assessments has increased due to changes in survey efforts.
Condition	Demonstrate that Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River are at or fluctuating around escapement levels which maintain high production and provide a low probability of falling to levels where recruitment would be impaired.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: Assessment to be based on information identified in Condition 4.
Client action plan	See Condition 4
Consultation on condition	See Condition 4

Condition 2

Performance Indicator	**<u>1.2.3. Information and monitoring</u> - Relevant information is collected to support the harvest strategy**
Score	Sockeye – 65 Chum – 65 Coho – 65 Chinook – 65
Rationale	The continuing effectiveness of the harvest strategy will depend also on monitoring of spawning escapements. The SG80 standard for regular monitoring is not met because recent reductions in aerial survey intensity have substantially reduced the accuracy and precision of spawning escapement estimates used to guide management decisions. Surveys have been reduced due to budget limitations. The current survey intensity likely provides sufficient precision to distinguish large and small runs but lack the resolution to avoid estimation bias due to differences in run timing or fish distribution. Historical assessments have generally been sufficient to support the current harvest strategy but current survey frequency may not be sufficient to identify any future changes in productivity or distribution patterns which might confound effective implementation of the harvest control rules. Current escapement information may not be sufficient for Chinook Salmon during the current period of reduced productivity.
Condition	Regularly monitor spawning escapement of Sockeye, Chum, Coho and Chinook Salmon at a level of accuracy and coverage sufficient to ensure effective harvest controls in the Kamchatka River.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Client action plan	By the first surveillance audit the Client will provide a written report providing review of recent results of the aerial surveys on Kamchatka river, and identifying improvements to be made on escapement monitoring (including timeline for the improvements). The report will assess the current monitoring practice, consider alternatives, and identify to make sure that relevant information on spawning escapement of Sockeye, Chum, Coho, and Chinook at a level of accuracy and coverage sufficient to ensure effective harvest controls in the Kamchatka River is collected. Further annual reports will contain information on aerial survey effort including dates, locations and hours flown and annual spawning escapement by species and river system throughout the area of certification.
Consultation on condition	The Client will work with KamchatNIRO and Ust-Kamchatsk Fishermen Association.

Condition 3

Performance Indicator	**<u>1.2.3. Information and monitoring</u> - Relevant information is collected to support the harvest strategy**
Score	Sockeye – 65 Chum – 65 Coho – 65 Chinook – 65
Rationale	While illegal harvest has been substantially reduced from historical levels and current levels are constrained by the remoteness of the area, illegal harvest remains a chronic problem in the Kamchatka River (KamchatNIRO 2017). Although it is likely that illegal removals are mostly occur downstream from the spawning escapement surveys areas and hence do not affect results of the surveys, information about geographical patterns of illegal fishing is quite limited. Therefore, this standard is not met.
Condition	Provide information on the level and location of illegal fishery removals of Sockeye, Chum, Coho and Chinook Salmon from the Kamchatka River.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Client action plan	By the first surveillance audit the Client will provide a plan on a research to estimate a level of potential illegal harvest in the area. The report will include Terms of Reference, list of potential candidate experts, and mechanism to perform an evaluation. By the second SA, the client will provide a written report to confirm that the analysis has been launched. The Client will consider an option to conduct this research in connection with the condition 6. By the third SA, the client will provide a written report with estimates on the illegal fishery removals of Sockeye, Chum and Chinook Salmon from the Kamchatka River.
Consultation on condition	The Client will work together with KamchatNIRO, and Ust-Kamchatsk Fishermen Association. The Client may consider an independent researcher for the evaluation.

Condition 4

Performance Indicator	**1.2.4. Assessment of stock status - There is an adequate assessment of the stock status of the SMU**
Score	Sockeye – 75 Chum – 70 Coho – 65 Chinook – 65
Rationale	This fishery historically estimated stock status relative to generally-defined escapement goals based on annual index area surveys. More-explicit quantitative escapement goals have recently been defined but the degree to which they have been incorporated into management practice is unclear. Further, aerial survey effort has been substantially reduced in recent years due to budget issues. This reduction: 1) reduces the accuracy and precision of stock assessments; 2) can reduce management effectiveness in the event of changing stock productivity and distribution or fishery patterns; and 3) will limit the effective development and application of stock-specific reference points.
Condition	Estimate stock status of Sockeye, Chum, Coho and Chinook Salmon in the Kamchatka River relative to reference points, clearly define stocks and populations of all species, and demonstrate that survey indicator streams are representative of other populations within the management unit.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Client action plan	The Client will provide an annual report on spawning escapement of each species in the UoA in relation to escapement goals established for these species. By the second surveillance, that Client will provide a written report to demonstrate that survey indicator streams are continue to be representative of populations throughout the unit of certification.
Consultation on condition	The Client will work with KamchatNIRO.

Condition 5

Performance Indicator	**<u>3.2.2. Decision-making processes</u> - The fishery-specific and associated enhancement management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.**
Score	75
Rationale	Monitoring of decision making for the fishery is limited by the inconsistent availability of information outside the local governmental management system. Results of fishing season and effectiveness of management actions undertaken are discussed among management agencies such as AFC, SVTU and FAR, and also at Research Councils of fisheries institutes such as KamchatNIRO, TINRO-Center and VNIRO on a regular basis. Management actions are reported by the Anadromous Fish Commission. However, related information on run size, harvest by time and area, and escapement is not typically reported outside the management system except in rare cases. Occasional publications of related information (e.g. Shevlyakov 2013) provide a historical perspective but are not sufficient to allow tracking action associated with findings and relevant recommendations.
Condition	Demonstrate that information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Client action plan	Annually the Client will provide a written report explaining management actions taken during the recent season which were relevant to the fishery. The report will identify initial passing days, modifications to passing days, and season closures as well as clearly specify Anadromous Fish Commission protocols for the fishery area. The report may also include relevant information on the fishery management adopted from other management agencies and institutes.
Consultation on condition	The Client will work with SVTU, Kamchatka Ministry on Fisheries, and Ust-Kamchatsk Fishermen Association.

Condition 6

Performance Indicator	**<u>3.2.3. Compliance and Enforcement</u> - Monitoring, control and surveillance mechanisms ensure the management measures in the fishery and associated enhancement activities are enforced and complied with.**
Score	70
Rationale	Effective enforcement is only possible with considerable funding and cooperation among the fishing companies depending on local fish resources. The chronic nature of illegal fishing in some areas indicates that the monitoring, control and surveillance system has not demonstrated a complete ability to enforce relevant rules throughout the system. Enforcement cannot be considered comprehensive because the notable level of illegal fishing is apparently still significant.
Condition	Demonstrate that a monitoring, control and surveillance system has been implemented in the fishery and associated enhancement activities and has demonstrated an ability to enforce relevant management measures, strategies and/or rules, and that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.
Milestones	By the first annual surveillance, the client must present evidence that a plan is in place to address this condition. By the second annual surveillance, the client must present evidence that the plan has been implemented. By the third annual surveillance, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80.
Client action plan	The Client will provide annual report on enforcement efforts and effectiveness by the fishery and government. The report will include official enforcement statistics, sanctions, industry control activities results, overview of other sources. By the second surveillance, the Client will provide a written plan (timeline, methodology overview) on conducting an expert analysis of illegal salmon practice in the area. By the third surveillance, the Client will provide a written report describing situation with illegal fishing in the area, evaluate effectiveness of the enforcement measures.
Consultation on condition	The Client will work with SVTU, other enforcement agencies, and Ust-Kamchatsk Fishermen Association.

APPENDIX 3 - PEER REVIEW REPORTS

Peer Reviewer 1

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**No**	**CAB Response**
Justification: The AT based their overall P1 score on the current MSC guidelines (CRv2.0, SC2.8.1 and SC2,8.1.1), but these new salmon-specific guidelines appear to be inconsistent with other marine fisheries and they are inconsistent with how MSC scored salmon fisheries in the past. To improve consistency, P1.3 should be scored NA when there are no hatcheries, and it should not be allowed to inflate the P1 score to a passing level when hatcheries are small or well managed. The problem is that P1.3 is weighted equally with P1.1 and P1.2 such that a 100 score in P1.3 allows a failing fishery (i.e., <80 score for P1.1 and P1.2 combined) to pass. This approach for salmon is inconsistent with marine fish fisheries that do not have hatcheries. On the other hand, allowing a passing score along with appropriate conditions and actions could lead to improvements in fishery management. The key will be how well the conditions and action plans are implemented. As stated in the report, it is problematic that this fishery has greatly reduced its monitoring of spawning escapement in recent years at a time when harvests have increased and when management has switched from total allowable catch to the so called "Olympic System" where companies fish as much as they can with allowable gear during open fishing days. The conditions below help to address this problem, if fully implemented, but the fishery may not be adequately managed at present to meet the MSC passing score of 80 for P1, based on a combined score of <80 for P1.1 and P1.2. The only way the fishery can pass the 80 mark is by inflating the P1 score by incorporating the 100 score for P1.3 because this area does not have enhancement. I have made additional comments on scoring below.		*This assessment is based on modifications to the default assessment tree adopted specifically for salmon by the MSC in CR 2.0 (Annex SC). CR2.0 was adopted by the MSC in October 2014. In CR2.0, SC2.8.1 directs that all salmon fisheries shall be scored against the enhancement PIs. SC2.8.1.1 directs that where there are no enhancement activities associated with the UoA, the default score for these enhancement PIs should be 100.* *The assessment team must follow MSC guidelines. Moreover, these guidelines take into consideration long-term history of salmon hatcheries, which prove that in many cases they threaten wild populations, so this guideline does not look unreasonable. Moreover, it should be taking into consideration that hatcheries affect salmon population not only locally through interactions within the freshwater ecosystems, but also Pacific-wide, through limitation of ocean carrying capacity, which is well scientifically justified. This interaction is insufficiently addressed under the MSC assessments. Thus, we believe that current MSC guidelines allowing to increase overall score of P1 through high scoring of 1.3 in a case of absence of low magnitude of enhancement activities only partly compensate harm of wild salmon populations caused by hatcheries.* *The concern for reductions in spawning escapement data in recent years is recognized with two conditions for PI 1.2.3 (Information and Monitoring). Historical information on escapements in relation to current fishing strategies and effort has demonstrated that current harvest rates are consistent with high sustained yields. However, additional assessment information will be needed in the future to identify any changes in productivity or catchability which might influence sustainability.*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]	**Yes/No**	**CAB Response**
Justification: The AT did a good job in identifying the most obvious and most important conditions needed to raise the fishery to MSC standards. When reviewing the scoring text below, I raised some additional issues that may require additional conditions, or perhaps expansion of existing conditions. Condition 1. This condition should be extended to chum and sockeye salmon, too. See information below. Condition 2. Evaluation of TRP achievement should be included in condition 2, or tied to another condition. Condition 2 & 3 should also evaluate the effect of poaching on the reported spawning escapements (this would be dependent on location of poaching relative to escapement counts).		*See specific comments under corresponding PIs.* *Condition 1 was extended to chum and sockeye with corresponding scoring changes.* *Evaluation of escapement relative to target reference points is specifically identified in Condition 4. In the event, new information is available that target reference points are not being achieved based on this information, rescoring of indicators would be appropriate.* *Condition 3 already calls for providing information on the level and location of illegal fishery removals of Sockeye, Chum, Coho and Chinook Salmon from the Kamchatka River. In this system, poaching occurs primarily in the mainstem downstream from spawning grounds.*

Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]	**Yes/No**	**CAB Response**
Justification: The six conditions are closely linked and they could be described in an overall action plan. Full implementation of the plan will be needed to meet MSC standards. The funding source for these actions should be identified because the lack of monitoring in recent decade was linked to lack of funds. Will the fishing industry pay for monitoring if the government does not? **Conditions 1:** Condition 1 text should include sockeye and chum salmon and also state ....at a level of accuracy and coverage sufficient to ensure effective harvest controls and achievement of the TRPs. The action plan should mention that the survey counts will be expanded so that spawning escapement can be directly compared with the TRPs. In other words, spawner counts must be directly linked and comparable to the TRPs for each river and species. The level of monitoring in each river basin and for each species should be described and evaluated to make sure the data are sufficient to evaluate progress relative to the TRP. **Condition 2:** The level of monitoring in each river basin and for each species should be described and evaluated to make sure the data are sufficient to evaluate progress relative to the TRP. **Condition 3:** The plan should also describe the extent to which poaching may have affected the spawning escapement count. **Condition 4:** The action plan should mention that the survey counts will be expanded so that spawning escapement can be		*Previously, stock assessments were funded by the Federal government and it is government funding cuts which resulted in the decrease in stock assessment. As part of the action plan to address conditions of this certification, funding will be provided by the certified client fishing companies to KamchatNIRO for conduct of additional surveys in the subject fishing areas. Material support is also being provided in the form of equipment, travel, food, lodging, etc. This collaborative model has been effectively implemented for other certified fisheries in Kamchatka.* ***Condition 1** was extended to chum and sockeye with corresponding scoring changes.* ***Condition 2**: Evaluation of escapement relative to target reference points is specifically identified in Condition 4. In the event, new information is available that target reference points are not being achieved based on this information, rescoring of indicators would be appropriate.* ***Condition 3** calls for providing information on the level and location of illegal fishery removals of Sockeye, Chum, Coho and Chinook Salmon from the Kamchatka River. In this system,*

directly compared with the TRPs. In other words, spawner counts must be directly linked and comparable to the TRPs for each river and species. Also, the plan should explicitly state the TRP values that are used by the fishery managers to evaluate performance. **Condition 5:** This condition is also very important, but it should be strengthened. The CAP report should include annual river-specific values for spawning escapement for each species in relation to the TRP, level of monitoring effort, harvests, and run size. The annual reports should include updates to historical data and they should be made available to the public on a web page. The annual management reports in Alaska (Bristol Bay) provide a good example that the CAP should follow. **Condition 6**: Compare poaching efforts with previous data and demonstrate that poaching is declining.	*poaching occurs primarily in the mainstem downstream from spawning grounds.* *Evaluation of escapement relative to target reference points is specifically identified in **Condition 4**. In the event new information is available that target reference points are not being achieved based on this information, rescoring of indicators would be appropriate.* *The client was made aware of specific recommendations for the remaining conditions by the peer reviewer and these will be addressed in implementation of the client action plan and assessed during annual surveillance audits.*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
1.1.1	*No*	*No*	*No*	*It is not clear whether TRP for sockeye is 497,000 or 460,000 sockeye. Regardless, Fig. 15 shows that the reported escapement is well below these values during 5 of the past 6 years. Reported chum escapements are extremely low during each of the past 6 yrs (<~10,000 chum per year compared with a goal of 142,000 chum). Low counts are reportedly low because monitoring effort is low but how do we know if escapemetns are adequate and fluctuating around the TRP given that harvests have increased significantly during this period? The scoring text tends to overstate the ability of management to achive the TRP for both sockeye and chum. The scoring text is reasonable with respect to Chinook and coho. It seems this condition should be extended to sockeye and chum salmon, too.*	*Condition 1 was extended to chum and sockeye with corresponding scoring changes.*
1.1.2	*Partially*	*Partially*	*Partially*	*Scoring text is reasonable for Chinook and coho; perhaps it should be noted that spawning escapement of Chinook was modeled in recent years when monitoring effort had declined. High harvests of sockeye and chum salmon in recent yrs indicates that overall abundance is not depleted, but the spawning population might be lower than desired (TRP). Adequate monitoring and harvest management is needed to determine whether sockeye and chum are achieving the TRP and that the fishery is not "depleting" the stocks.* *Please note that the scoring table was missing the P1.1.2 score for coho.*	*Scoring of Sockeye and Chum Salmon was reassessed in light of reductions in scores for Condition 1 as per above comment.*
1.2.1	*No*	*No*	*NA*	Given the lack of monitoring in recent years, it is difficult to see how the harvest strategy is responsive to the state of the SMU and shows that the elements of the harvest strategy work together towards achieving SMU TRPs (SG80). Managers use passing days to regulate the fishery and some fixed passing day information was presented, but it is not possible to evaluate whether 2 or 3 passing days per week is adequate (they need to develop these relationships). How did passing days vary from week to week? For Chinook salmon, the text indicates that Chinook are caught incidental to sockeye salmon; do high harvests on sockeye correspond to high catches of Chinook? The text notes that small mesh size (for sockeye) may lower catch efficiency for Chinook (P. 44)--a reasonable strategy that should help Chinook. SG60 is met because the strategy is <u>expected</u> to achieve goals, but SG80 requires more evidence, including component stocks. 1.2.1d was scored 100	*The concern for reductions in spawning escapement data in recent years is recognized with two conditions for PI 1.2.3 (Information and Monitoring). Historical information on escapements in relation to current fishing strategies and effort (including passing days) has demonstrated that current harvest rates are consistent with high sustained yields. However, additional assessment information will be needed in the future to identify any changes in productivity or catchability which might influence sustainability.*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
				with regard to review of the harvest strategy, but this review should involve empirical relationships between passing days and spawning escapement. Harvest rates have been exceptionally high, especially for chum and late sockeye in recent years according to the report.	*The score for 1.2.1d was downgraded consistent with this comment.*
1.2.2	*Partial*	*Partial*	*NA*	*For 1.2.2c, it is not clear that there is evidence that the tools are effective in achieving exploitation rates required to meet the TRPs because escapement monitoring has declined in recent years. Harvests have been high in recent years. Information on relatively fixed passing days is presented but no information was provided to show how passing days influence escapement levels for each species. For 1.2.2d, high exploitation rates (>95% for chum in some rivers) may not support the statment that it is highly likely that HCRs and tools maintain diversity of component populations.*	*Sustained high returns of target salmon stocks under the current management system provide clear evidence that tools are effective. Substantial changes have been made in the licensing and regulatory structure over the last decade to address historical problems of accountability and illegal harvest, and these changes have proven to be largely successful. While stock assessment efforts have been reduced in recent years, historical information demonstrates that current fishery structure and fishing effort are consistent with providing significant spawning escapement consistent with current high levels of production.*
1.2.3	*Largely*	*Largely*	*Partially*	*The low level of escapement monitoring during recent years when harvests have been great is problematic and this condition is a good step to rectify this problem, if fully implemented. However, to link this condition to harvest control rules implies that the escapement monitoring must also be adequate to determine whether or not the region-wide and river-specific TRPs are being acheived. In other words, evaluation of TRP achievement should be included in condition 2.* *Condition 3 to quanitfy illegal fishing is needed because Fig 9 shows that traditional poaching has increased substantially and criminal poaching has remained constant over time. Condition 2 & 3 should also evaluate the effect of poaching on the reported spawning escapements (this would be dependent on location of poaching relative to escapement counts).* *Please check the overall scores for each species. All species were scored the same, but the summary scores differed with species.*	*Evaluation of escapement relative to target reference points is specifically identified in Condition 4. In the event, new information is available that target reference points are not being achieved based on this information, rescoring of indicators would be appropriate.* *Condition 3 already calls for providing information on the level and location of illegal fishery removals of Sockeye, Chum, Coho and Chinook Salmon from the Kamchatka River. In this system, poaching occurs primarily in the mainstem downstream from spawning grounds. Typographical error on summary scores were corrected.*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
1.2.4	*No*	*No*	*Partial*	1.2.4a It was not clear in the text how *"This information is used to design and make inseason adjustments of harvest control rules intended to ensure escapement sufficient to sustain future production."* How does the manager make adjustments inseason on each tributary when monitoring has been greatly reduced? I did not see information on how passing days varied from week to week and in response to species abundance. I agree that 1.2.4b is not met because stock status is not measured against TRPs in recent years. The text notes that reduced monitoring leads to increased uncertainty, but then in 1.2.4c it concludes that the assessment takes uncertainty into account for sockeye and chum but not coho and Chinook. If this were true for sockeye and chum, then I would expect to see reduced harvest rates in recent years when escapement monitoring has been reduced. Instead, we see higher exploitation rates suggesting that the assessment and management is not considering higher uncertainty. This could require a condition for chum and sockeye to demonstrate that managers reduce harvests in years when funding is inadequate to fully support the monitoring effort needed to track progress to meeting the TRPs for each river and species.	*The management system takes into account a wide range of information in consideration of the need for inseason adjustments of harvest control rules. This continues long-standing practice where the availability of spawning escapement information from aerial surveys occurs after the fish have passed the fishery. Other indicators include catch per effort in the fishery relative to historical numbers and biological information on size and sex which can be used to identify the stage of tun timing. KamchatNIRO also operates test gear in some areas to collect fishery-independent information.*
1.3.1	*Yes*	*No*	*NA*	*I generally disagree with the current MSC scoring guidelines stating that the hatchery indicators (P1.3) should receive a perfect score when there are no hatcheries. They should be scored NA. The problem is that P1.3 is weighted equally with P1.1 and P1.2 such that a 100 score in P1.3 allows a failing fishery (i.e., <80 score for P1.1 and P1.2 combined) to pass. This approach for salmon is inconsistent with marine fish fisheries that do not have hatcheries and do not score P1.3, which can raise the overall P1 score to a passing level. Likewise, when hatchery production is small and scores high, P1.3 should not be included to boost the overall P1 score to a passing score. This current approach is different from how salmon fisheries were assessed in the past and it is inconsistent with scoring of other marine fisheries.*	*Addressed in response to summary of peer reviewer comments.*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
1.3.2	*Yes*	*No*	*NA*	*I generally disagree with the current MSC scoring guidelines stating that the hatchery indicators (P1.3) should receive a perfect score when there are no hatcheries. They should be scored NA. The problem is that P1.3 is weighted equally with P1.1 and P1.2 such that a 100 score in P1.3 allows a failing fishery (i.e., <80 score for P1.1 and P1.2 combined) to pass. This approach for salmon is inconsistent with marine fish fisheries that do not have hatcheries and do not score P1.3, which can raise the overall P1 score to a passing level. Likewise, when hatchery production is small and scores high, P1.3 should not be included to boost the overall P1 score to a passing score. This current approach is different from how salmon fisheries were assessed in the past and it is inconsistent with scoring of other marine fisheries.*	*Addressed in response to summary of peer reviewer comments.*
1.3.3	*Yes*	*No*	*NA*	*I generally disagree with the current MSC scoring guidelines stating that the hatchery indicators (P1.3) should receive a perfect score when there are no hatcheries. They should be scored NA. The problem is that P1.3 is weighted equally with P1.1 and P1.2 such that a 100 score in P1.3 allows a failing fishery (i.e., <80 score for P1.1 and P1.2 combined) to pass. This approach for salmon is inconsistent with marine fish fisheries that do not have hatcheries and do not score P1.3, which can raise the overall P1 score to a passing level. Likewise, when hatchery production is small and scores high, P1.3 should not be included to boost the overall P1 score to a passing score. This current approach is different from how salmon fisheries were assessed in the past and it is inconsistent with scoring of other marine fisheries.*	*Addressed in response to summary of peer reviewer comments.*
2.1.1	*Yes*	*Yes*	*NA*	*Adequate information is presented for pink salmon, a main primary species that is robust in this region.*	*No response required*
2.1.2	*Yes*	*Yes*	*NA*	*Adequate information is presented for pink salmon, a main primary species that is robust in this region.*	*No response required*
2.1.3	*Yes*	*Yes*	*NA*	*Adequate information is presented for pink salmon, a main primary species that is robust in this region. Note: the summary score table on P 77 Table 9 shows this indicator as recieving a score of 70; this typo should be fixed.*	*Typo corrected*
2.2.1	*Yes*	*Yes*	*NA*	*Char is the key secondary species but it is not a main species as catch is less*	*No response required*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
				than 1% of total. Good habitat cointributes to relative robust populations of char along with adequate fisheries management. Bycatch of marine fishes is minimal.	
2.2.2	*Yes*	*Yes*	*NA*	*The strategy is adequate for char given their robust status in this region. Bycatch of marine fishes is minimal. Some gear allows for live release.*	*No response required*
2.2.3	*Yes*	*Yes*	*NA*	*Char catch is retained and documented. Some observations of bycatch of other species confirm this bycatch is minimal, as expected.*	*No response required*
2.3.1	*Yes*	*Yes*	*NA*	*Red listed ETP species are protected and the text describes that few of these species interact witht he fisheries. Seals are common and fishermen reportedly try to scare them away with noise. The main text should clarify whether seals are considered an ETP species based on the MSC definition of ETP species. Also, it should describe whether or not seals are illegally killed by fishermen, i.e., beyond those taken legally while hunting.*	*No response required*
2.3.2	*Yes*	*Yes*	*NA*	*The protection of ETP species and the low encounter rate of ETP species with fishing operations provides adequate evidence that the strategy is working.*	*No response required*
2.3.3	*Yes*	*Yes*	*NA*	*Information is adequate for ETP species given the low encounter rates and limited footprint of the fishery in this region.*	*No response required*
2.4.1	*Partially*	*Yes*	*NA*	*Text is adequate to justify the scores on habitat impacts related to the fishery. Impacts are localized and temporary; substrate is often soft bottom that can recover quickly. Text should describe efforts to remove lost gillnets that might continue to fish.*	*No response required*
2.4.2	*Partially*	*Yes*	*NA*	*Text is adequate to justify the scores on habitat protection strategy given that the fishing gears have minimal effect. As part of the habitat strategy, text should describe efforts to remove lost gillnets that might continue to fish.*	*No response required*
2.4.3	*Partially*	*Yes*	*NA*	*Text is generally adequate to justify the scores on habitat information bu*	*No response required*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
				text should describe efforts to remove lost gillnets that might continue to fish.	
2.5.1	*Yes*	*Yes*	*NA*	*Commercial salmon fishing is unlikely to impact the ecosystem in this area.*	*No response required*
2.5.2	*Yes*	*Yes*	*NA*	*The text is adequate with regard to the partial strategy to maintain the ecosystem and the potential impact of salmon fishing on this ecosystem.*	*No response required*
2.5.3				*Information is adequate with regard to the potential impact of salmon fishing on this ecosystem.*	*No response required*
3.1.1	*Partial*	*Partial*	*NA*	*This PI was score 100, a perfect score. I wonder if laws (and enforcement) are adequate given that poaching still occurs by residents of this region. Do existing laws and restrictions on local residents encourage poaching? Fig. 8 shows that shows that traditional poaching increased substantially and criminal poaching remained constant from 1990-2000 to 2009-2012. Also, this PI asks if the management system is capable of delivering sustainability. Given that the management system has failed to adequately monitor spawning escapement in recent years, it may not be appropriate to give the management system a perfect score in this regard.*	*Score was revised downward accordingly.*
3.1.2	*Yes*	*Yes*	*NA*	*The text adequately describes the consultation process of the management system and the score is reasonable.*	*No response required*
3.1.3	*Partial*	*Partial*	*NA*	*It is not clear that a precautionary approach is explicit within management policy. For example, in recent years, monitoring of spawning escapement has declined, yet harvests and calculated harevst rates have increased. Policy should guide the level of harvest when uncertainty increases due to the lack of monitoring. Furthermore, Fig. 9 shows that shows that traditional poaching increased substantially and criminal poaching remained constant from 1990-2000 to 2009-2012; to what extent is continued poaching considered when managing the fishery?*	*Clear long-term objectives are identified in the management system to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. Objectives for sustainability, specifically adopted into law, are summarized in Section 3.5.1 of the assessment. There are a number of cases where precautionary management has been demonstrated including adoption of Chinook protection measures and additional passing*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
					days in marine areas where fishing effort has increased. Illegal harvest in Kamchatka has been substantially reduced from historically high levels observed during the 1990s. Illegal harvest is not significant in the Olyutorskiy UoA. Despite chronic background levels of illegal harvest in other areas, production of salmon continues at a high level throughout most of Kamchatka – this trend indicates that the management system has effectively considered the incidence of illegal harvest in regulating the commercial fishery.
3.2.1	*Yes*	*Partially*	*NA*	*Short and long term objectives are mostly explicit within the fishery. However, the management system should be clearer with respect to the specific TRP that the managers are attempting to achieve. For example, scientist may conduct analyses to estimate TRPs, but it is not abundantly clear that the managers adopt these TRPs.*	*Issue of target reference points was addressed with scores and conditions under Principle 1.*
3.2.2	*Partial*	*Partial*	*Yes, partially*	*It is not clear that the decision making process uses a precautionary approach. For example, in recent years, monitoring of spawning escapement has declined, yet harvest rates have increased. Although TRPs have been set, monitoring in recent years has not always occurred. Exploitation rates were reported to be greater than 95% for late sockeye and chum salmon---values that are much too high.* *Condition 5 to improve availability of information is important. Annual management reports should be prepared that document past and current performance data.* *A condition may also be needed to better utilize a precautionary approach when monitoring is insufficient to evaluate TRP objectives.*	*PI 3.2.2 concerns the efficacy decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate appraoch to actual disputes in the fishery. Issue "c" concerns use of a precautionary approach and the best available scientific information. Well-established and formal decision-making processes result in measures and strategies to achieve the fishery-specific objectives. The Anadromous Fish Commission (AFC) is a central feature of the decision-making process. Responsibilities of the AFC include setting catch limits and regulations based on timely scientific information in the course of the fishing season. The AFC has repeatedly demonstrated application of a*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
					precautionary approach with fishery limitations and. Issues of target reference points in the form of spawning escapement goals was addressed under Principle 1 and related conditions have already been identified and addressed with a client action plan.
3.2.3	*Partial*	*Partial*	*Partial*	*3.2.3c. As part of the existing condition 6, please provide information showing that fishers and fish processing companies provide accurate harvest statistics. The Olympic system reportedly reduces under reporting, but how accurate are the counts if the companies still must pay tax on the reported catch?*	*Extensive enforcement is conducted by authorities to inspect records and shipments. This system is widely reported to be uniformly effective by both the industry and regulatory authorities While tax is paid on the harvest, fees are relatively modest and penalities for violation are severe. Allocation of fishing leases for 20 year periods and corresponding investments in fish processing facilities provide a very large disincentive for incorrect reporting which could cost someone their license. These leases and fisheries are tremendously valuable. This is not to say that some level of misreporting does not occur among some of the smaller, less successful fishing companies. However, the large majority of the catch occurs in heavily vested and successful companies.*
3.2.4	*No*	*No*	*NA*	*3.2.4a. Please discuss mechanism to evaluate key parts of the management system. Key to this evaluation is monitoring of spawning escapement in relation to the TRPs. Monitoring had greatly declined or is absent in recent years and it is not clear how managers determine whether escapements are adequate. Given that there are regular reviewers of fisheries management, what did reviewers say about the lack of escapement monitoring in recent years (3.2.4b)?*	*Effective evaluation process of the management system are clearly demonstrated by substantial changes in the licensing and regulatory structure over the last decade to address historical problems of accountability and illegal harvest, and these changes have proven to be largely successful. This fishery is consistently sustaining high levels of Pink and Chum salmon harvest under the current management system. While target reference points have not always*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
					been explicitly defined to the species and river level, a fixed passing-day regulation provides a significant degree of precautionary management for providing spawning escapements. *While stock assessment efforts have been reduced in recent years, historical information demonstrates that current fishery structure and fishing effort are consistent with providing significant spawning escapement consistent with current high levels of production.* *The client action plan to address conditions of this certification will restore significant levels of assessment necessary to respond to any future changes in stock productivity or fishery efficiency in order to continue to provide for salmon sustainability in this region.*

Peer Reviewer 2

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No** Partial	**CAB Response**
Justification: The overall conclusion seems reasonable, although I have concerns about supporting evidence for stock status outcome under Principle 1. Most of the target species may be productive (with the exception of Chinook), but clear evidence of abundant escapements is lacking, particularly in recent years. Principle 2 scores generally seemed appropriate because negative fishery impacts on the ecosystem, including those from enhancement, are limited. Principle 3 scores also appear to be reasonable. There is a well-defined management framework that manages harvests actively throughout the fishing season, but there are some weaknesses. For instance, poaching is an issue in the Kamchatka River, and agencies do not make fishery data readily available to the public.		*This fishery is consistently sustaining high levels of salmon harvest under the current management system. Substantial changes have been made in the licensing and regulatory structure over the last decade to address historical problems of accountability and illegal harvest, and these changes have proven to be largely successful. While target reference points have not always been explicitly defined to the species and river level, a fixed passing-day regulation provides a significant degree of precautionary management for providing spawning escapements. While stock assessment efforts have been reduced in recent years, historical information demonstrates that current fishery structure and fishing effort provide significant spawning escapement consistent with current high levels of production. The client action plan to address conditions of this certification will restore significant levels of assessment necessary to respond to any future changes in stock productivity or fishery efficiency in order to continue to provide for salmon sustainability in this region.*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]	**Yes/No** No	**CAB Response**
Justification: The conditions generally addressed identified deficiencies in a manner that would lead to achieving SG 80 outcomes. However, as mentioned in Table 1 of this review, Condition 1 should probably be modified to include sockeye and chum.		*Condition 1 was extended to chum and sockeye with corresponding scoring changes.*

Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]	**Yes/No** Yes	**CAB Response**
Justification: The client action plan appears adequate for addressing the identified conditions, providing details on stakeholders and potential steps to take. If possible, it would be helpful to know how willing these stakeholders, particularly KamchatNIRO, are to work with the fishery on meeting conditions.		*The UoC fishing company is contracting with KamchatNIRO to support additional aerial surveys, estimate species and river specific escapements relative to goals for key indicator populations, and to report annual harvest, stock assessment and fishery measures. These services are provided at substantial expense to the fishing company.*

Performance Indicator Review

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
1.1.1	*No*	*No*	*No*	*Provided escapement data were inadequate to support the conclusions that populations are fluctuating around TRPs (for sockeye and chum) or are are highly likely to be above the LRP (for coho and Chinook). Although the certifier does mention that recent escapement estimates are undercounts, we are largely left to take KamchatNIRO at their word that escapements have been adequate, without quantitative evidence.* *For example, escapements estimates for sockeye salmon, though above the LRP, have been significantly below the TRP for the past four years (Fig. 15). Chum escapement estimates have also been below the TRP since 2012 (Fig. 18). For coho and Chinook, the provided escapement estimates have regularly been below or fluctuating around the LRP in recent years (Figs. 22 and 28).* *To meet SG 80 performance for scoring issue (b), sockeye and chum should be included in Condition 1.*	*The concern for reductions in spawning escapement data in recent years is recognized with two conditions for PI 1.2.3 (Information and Monitoring). Historical information on escapements in relation to current fishing strategies and effort has demonstrated that current harvest rates are consistent with high sustained yields. In the absence of recent data on spawning escapement, the assessment took into consideration catch statistics, suggestions of the KamchatNIRO researchers and about a decades-long experience of MSC certification in Russia. These allow to conclude about a good status of UoC species in the UoA. However, additional assessment information will be needed in the future to identify any changes in productivity or catchability which might influence sustainability.* *For all salmon species, lower numbers in recent years reflect the lack of aerial surveys rather than lack of fish. Prior to 2011 escapement estimates varied around and often exceeded target levels. Other indicators (identified above) have led KamchatNIRO to conclude that escapements remained high.* *Condition 2 calls for reporting of annual escapements in relation to target values.* *Condition 1 was extended to chum and sockeye with corresponding scoring changes.*
1.1.2	*Yes*	*Yes*	*NA*		*No response required*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
1.2.1	*No*	*No*	*NA*	*The SG80 for scoring issue (a) states that the harvest strategy should include measures for addressing component population status issues. However, current management targets for escapements exist only at an aggregate level, and measures for component populations seem to be lacking.*	*The need for component population information is addressed with condition 2 identified under PI 1.2.4. The receommendation for this condition includes reporting annual spawning escapement of each species in relation to escapement goals established for these species; demonstrating that survey indicator streams continue to be representative of populations throughout the unit of certification; and documenting methodlogy by which survey counts are expanded so that spawning escapement can be directly compared with the spawning escapement goals. The level of monitoring in each river basin and for each species should be described and evaluated to make sure the data are sufficient to evaluate progress relative to the goals.*
1.2.2	*Yes*	*Yes*	*NA*		*No response required*
1.2.3	*Yes*	*No*	*Yes*	*The overall scores for this indicator are higher for sockeye and chum (65) than for coho and Chinook (60), and I'm not sure why because SGs for all of the species appeared to be scored the same way.*	*Typographical errors were corrected. All species score 65 for this indicator.*
1.2.4	*Yes*	*No*	*Yes*	*The certifier stated that SG 60 for scoring issue (g) was not met for coho. Is this correct? The justification did not describe why coho did not meet this guidepost, and the overall indicator score for coho was not lower than that for Chinook.*	*Additional explanation was added to the scoring rationale.*
1.3.1	*Yes*	*Yes*	*Yes*		*No response required*
1.3.2	*Yes*	*Yes*	*NA*		*No response required*
1.3.3	*Yes*	*Yes*	*NA*		*No response required*
2.1.1	*Yes*	*Yes*	*NA*		*No response required*
2.1.2	*Yes*	*Yes*	*NA*		*No response required*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
2.1.3	*Yes*	*Yes*	*NA*		*No response required*
2.2.1	*Yes*	*Yes*	*NA*		*No response required*
2.2.2	*Yes*	*Yes*	*NA*		*No response required*
2.2.3	*Yes*	*Yes*	*NA*		*No response required*
2.3.1	*Yes*	*Yes*	*NA*		*No response required*
2.3.2	*Yes*	*Yes*	*NA*		*No response required*
2.3.3	*Yes*	*Yes*	*NA*		*No response required*
2.4.1	*Yes*	*Yes*	*NA*		*No response required*
2.4.2	*Yes*	*Yes*	*NA*		*No response required*
2.4.3	*Yes*	*Yes*	*NA*		*No response required*
2.5.1	*Yes*	*Yes*	*NA*		*No response required*
2.5.2	*Yes*	*Yes*	*NA*		*No response required*
2.5.3	*Yes*	*Yes*	*NA*		*No response required*
3.1.1	*Yes*	*Yes*	*NA*		*No response required*
3.1.2	*Yes*	*Yes*	*NA*		*No response required*
3.1.3	*Yes*	*Yes*	*NA*		*No response required*

PI	Relevant Info	Score supported	Condition appropriate	Justification	CAB Response
3.2.1	*Yes*	*No*	*NA*	*As the certifier notes in the justification, 'hatcheries are among the priorities to increase fishery productivity.' This doesn't sound consistent with achieving MSC Principle 2 outcomes relating to enhancement, making it unclear whether SG 80 is completely met.*	*The referenced passage refers to other areas of the Russian Pacific. The next sentence reads "At the moment, however, there are no specific plans to further develop hatchery system in the Kamchatka."*
3.2.2	*Yes*	*Yes*	*Yes*		*No response required*
3.2.3	*Yes*	*No*	*Yes*	*The certifier gave a score of 100 for Scoring Issue (c). To meet SG 100 for that issue, there needs to be high confidence that fishers and hatchery operators are compliant. However, compliance of fishers outside the UoA was not considered. Given that illegal fishing is still a significant issue, e.g. from "poachers from outside the region and from residents, including indigenous people" (p. 73 of report), SG 100 does not appear to met.*	*Extensive enforcement is conducted by authorities to inspect records and shipments fishing companies. This system is widely reported to be uniformly effective by both the industry and regulatory authorities While tax is paid on the harvest, fees are relatively modest and penalities for violation are severe. Allocation of fishing leases for 20 year periods and corresponding investments in fish processing facilities provide a very large disincentive for incorrect reporting which could cost someone their license. These leases and fisheries are tremendously valuable. This is not to say that some level of misreporting does not occur among some of the smaller, less successful fishing companies. However, the large majority of the catch occurs in heavily vested and successful companies. Hatchery programs are very small and closely regulated – none occur in the UoC.*
3.2.4	*Yes*	*Yes*	*NA*		*No response required*

APPENDIX 4 - STAKEHOLDER SUBMISSIONS

We only received Technical Oversight comments from the MSC. See table below:

Requirement Version	Oversight Description	Pi	CAB Comment
FCR-7.10.6.1 v2.0	PI 1.1.1 SI b. Scoring Issue (b) rationale is unclear particularly the first sentence: SG80 – 'This standard is met due recent reductions in stock assessment'. Low escapements have been documented since 2010 but appear to be an artifact of recent reductions in aerial survey efforts rather than an actual decrease (based on fishery-related stock indicators assessed by KamchatNIRO). Furthermore, stock status relative to reference points is not reported in the normative template.	1.1.1,	Typographical error "due to recent reductions in stock assessment" was deleted. References were added to scoring justifications to figures in assessment showing stock status relative to reference points.
FCR-7.10.6.2 v2.0	PI 1.1.2 SI a. For scoring issue (a) there are numerically specified timeframes for rebuilding that will vary by species. However, the rationale provided does not specify what the rebuilding timeframes are for any species but Chinook. Additionally, the rationale states that there is no information that sockeye or chum are reduced - but it does not provide the required rationale that there is a rebuilding timeframe and what it is. PI 1.1.2 SI b. For scoring issue (b) no evidence is provided for sockeye and chum so it is unclear how these species/ UoAs meet the scoring guideposts. The SG80 level states types of evidence: implementation information, simulation, exploitation rates etc. but none of these are addressed in the scoring rationale, so it is not clear what evidence is used by the fishery to evaluate the rebuilding strategy.	1.1.2,	The scoring guidepost identifies rebuilding timeframes for Coho and Chinook Salmon. For Sockeye and Chum Salmon, clarification was added that additional aerial surveys planned as a condition of the certification are expected to demonstrate that these species are not depleted within one generation (approximately 5 years).
FCR-7.10.6.1 v2.0	Principle 2 - the team must demonstrate how the SG60, SG80 and SG100 level is fully and unambiguously met (FCR-7.10.6.1). Throughout P2 scoring justifications for SG60 or SG80 are referred to within the SG80 or SG100 scoring justification. This is not the intent of FCR-7.10.5 and 7.10.6 which require the team to score the PI against each of the scoring issues at SG60, then SG80, then only SG100 levels.		In order to reduce redundancy in scoring justifications, the assessment typically refers to SG80 rationales in cases where both SG60 and SG 80 guideposts are met. Where SG80 is met, the corresponding justifications clearly demonstrate that the less standards of SG60 are also met. The same format is applied to SG80 when SG100 is met.

Requirement Version	Oversight Description	Pi	CAB Comment
FCR-7.10.6.1 v2.0	PI 2.2.1 SI b. It is not clear from the rationale which minor secondary species are assessed at the SG100 level and explicitly what the outcome status is for each minor species in relation to biologically based limits. If this is not known for all minor species, only SG80 can be reached for this scoring issue. See MSC interpretation: Minor species and the scoring element approach at SG100. http://msc-info.accreditation-services.com/questions/minor-species-and-scoring-element-approach-at-sg100/	2.2.1,	Additional explanation was added to the scoring rationale. Secondary species in this fishery predominately include char which are retained for commercial use. Other secondary species can include a variety of marine and freshwater species including codfish (Gadidae), flatfish (Platichthys stellatus sp.), smelt (Osmerus sp.), sculpins (Cottus sp.) and jellyfish. Reference is added to detailed descriptions in Section 3.4.2.
FCR-7.10.6.2 v2.0	PI 2.4.2. The impact of ghost fishing from lost gear is not considered in the scoring of this PI. Please see Box GSA7 and GSA3.15.	2.4.2,	Consideration of ghost fishing from lost gear was added. Ghost fishing from lost gear is largely avoided by active tending of all gears. A large portion of the catch comes in trapnets and beach seines, neither of which continue to fish effectively in the rare instance where lost. Trapnets are also quite expensive and so are typically tied up or removed prior to storms where they might be lost. Gill nets are typically fished by drifting which also involves active tending. Portions of nets can occasionally be snagged on debris but are typically cut free to salvage material.
*N/A vn/a	PI 2.4.1. Reference is made to enhancement in Scoring Issue (a) and (b). Elsewhere it is stated that enhancement does not occur in this fishery.	2.4.1,	Words added to scoring justification in each case where enhancement is part of the scoring guidepost.
FCR-7.10.6.1 v2.0	P2 - species scoring elements: With limited information available on catch composition of primary and secondary species and interactions with ETP species (page 56), it is not clear that PI2.1.3, PI2.2.3 and 2.3.3 are fully met at SG80 level. See SA3.6 and associated guidance. No catch profile is presented in the report and, as stated in the PCDR (page 55) "There is no official reporting of bycatch such as cod, flounder, silver smelt and birds in these fisheries (Shevlyakov et al., 2014)."	2.1.1, 2.2.1, 2.3.1, 2.1.3, 2.2.3, 2.3.3,	Extensive assessments of bycatch have been conducted in similar salmon fisheries in Kamchatka, Sakhakin and the Kurile Islands as well as Alaska. Incidental catch of nontarget species is negligible because these fisheries are conducted in terminal areas where large numbers of salmon are concentrated upon their return to freshwater and passive fishing gears are not effective for other species. No official reporting occurs because bycatch is so small. On numerous occasions, the assessment team has confirmed the very low

Requirement Version	Oversight Description	Pi	CAB Comment
	Furthermore, It is not clear from scoring justification that "periodic observer observations" alone (e.g. page 117) are suitable to assess the impact of the UoA on outcome status in PI2.1.1, 2.2.1 or 2.3.1. See GSA3.6.3 and GSA3.6.3.1.		incidence of incidental catches in fishing processing plants by observation of catch sorting prior to processing.
FCR-7.10.6.1 v2.0	PI 2.3.1 SI a and b. It is indicated that there are national requirements that set limits for ETP species. In this case only scoring issue a is scored, and not scoring issue b. See SA 3.10.1. If no limits are in place, or only some ETP species have limits set for them, then scoring issue b should be scored for ETP species that do not have limits. The same approach can be considered for PI 2.3.2 scoring issues a and b.	2.3.1, 2.3.2,	Issue b is scored because specific limits are not in place for all ETP species. Regardless, ETP issues are not a significant concern in the fishery area.
FCR-7.10.6.1 v2.0	PI 2.1.1 SI a and PI 2.1.2 SI a: It is not clear that Pink Salmon is managed as per SA3.1.3 (specifically, SA3.1.3.3 and SA3.1.3.3a). It is unclear what management measures are in place for Pink Salmon, in this jurisdiction or other jurisdictions. It is unclear whether it is possible to distinguish in the catch which jurisdiction SMU Pink Salmon are coming from. I.e. it is not clear what proportion of Pink Salmon are from the managed SMU referenced in PI 2.1.2 Scoring Issue a. It is not clear if it is possible to identify what proportion of the Pink Salmon catch does not come from a managed SMU. Therefore, it is unclear that Pink Salmon meets requirements for primary species classification.	2.1.1, 2.1.2,	Pink salmon are assigned as a main primary species which is consistent guidance in SA3.1.3. Pink Salmon do not return in significant numbers to the Kamchatka River which does not provide suitable habitats. Pink Salmon primarily return to smaller rivers and streams in East Kamchatka areas north of the Kamchatka River. Harvest of Pink Salmon in marine areas of Kamchatsky Bay is significant in years of very large returns to East Kamchatka and when oceanographic conditions favor a more southerly migration route upon return to spawning grounds. The large majority the harvest of Pink Salmon occurs in terminal areas adjacent to spawning destinations. Fisheries in these areas are actively managed to achieve local spawning escapements. Catches of Pink Salmon in Kamchatsky Bay are considered to be incidental and do not appreciably affect spawning escapement of fish destined for other areas.
FCR-7.10.6.2 v2.0	PI 3.1.1 SI a. The rationale states the existence of a national legal system but does not specify how it delivers management outcomes consistent with MSC Principles 1 and 2.	3.1.1	Additional justification to this effect was added with reference to assessment section

Requirement Version	Oversight Description	Pi	CAB Comment
FCR-7.10.6.2 v2.0	PI 3.1.1 SI b. Multiple sentences in this rationale are copied and pasted from scoring guideposts in PI 3.2.2 e: 'This example demonstrated that the management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges (SG 100)'. Please see Scoring Issue Guidepost language and Guidance associated with PI 3.1.1 b for clarity. The rationale should be related back to PI 3.1.1 b Scoring Guideposts. PI 3.1.1 b. addresses the effectiveness and transparency of the mechanism in place for the resolution of disputes. Whilst referencing an example of dispute resolution is relevant and appropriate to support the score, the example provided dates from 2008 and the evaluation and conclusions of how this evidence specifically supports the score of SG 100 to demonstrate the current transparency and effectiveness of the mechanism is not clearly described.	3.1.1	Additional explanation was added to the scoring rationale. A legal dispute arose in relation to the fishery. It was litigated by the judicial system according to law. The dispute was resolved by the court. The process for dispute resolution was obviously transparent as the parties recognized the court system as an appropriate venue for litigation. Findings were publicly reported in the news media.
FCR-7.10.6.2 v2.0	PI 3.1.1 SI c. Although formal commitment is evidenced in the rationale, and is consistent with achieving Principle 1 objectives, it is not clear how the commitment is consistent with achieving Principle 2 objectives (SA 4.3.1).	3.1.1,	Additional justification added to this effect.
FCR-7.10.6.1 v2.0	PI 3.1.2 SI a. Evidence is lacking to support the score of SG 80 as the rationale does not cite the relevant section of the report where this information is presented. The rationale also contains spelling errors.	3.1.2	Specific reference is added to Section 3.5.2 where organizations involved in the management process are identified. Typographical errors are corrected.
FCR-7.10.6.1 v2.0	PI 3.1.2 SI b. Although decisions and protocols are publicized on the internet, it is not clear from the rationale whether the decisions and protocols published include acknowledgement of how the information received has been used or not used as required for SG 100.	3.1.2	The assessment team agrees with the conclusion that the SG 100 guidepost is not met and the score was revised downward accordingly.
FCR-7.10.6.2 v2.0	PI 3.1.2 SI c. Reference is made to SG 100 language 'facilitate their effective engagement' but is mis-referenced to the SG80 level rendering the rationale unclear.	3.1.2	Typographical error was corrected. Specific reference is added to Section 3.5.2 where consultation processes are described.
FCR-7.10.6.2 v2.0	PI 3.1.3 SI a. The rationale cites the wider PCDR report but does not specify where the information can be found to justify the score.	3.1.3	Additional rationale is provided with specific reference to Section 3.5.3 where objectives are described.

Requirement Version	Oversight Description	Pi	CAB Comment
FCR-7.10.6.1 v2.0	PI 3.2.1 SI a The rationale states that 'objectives are explicit with respect to protecting spawning escapement but are less clear on the environmental/ecosystem end'. This statement undermines the assertion that 'short and long-term objectives which are consistent with achieving the outcomes expressed by MSC's Principles 1 & 2 are explicit within the fishery-specific management system as required to score SG 80.	3.2.1	Additional justification was added in relation to environmental/ecosystem objectives which are specifically identified in more than 30 regulatory legal acts of the Government of the Russian Federation with specific reference to details in Section 3.5.1.
FCR-7.10.6.2 v2.0	PI 3.2.2 SI e. The rationale does not explicitly state how the example provided evidences and justifies the score of SG 100. In essence, the rationale does not explicitly describe how the fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges as required for SG 100.	3.2.2	The example clearly demonstrated timely implementation of a judicial decision arising from a significant legal challenge. The rationale has been updated.
FCR-7.10.6.1 v2.0	PI 3.2.3 SI a. There is a lack of supporting evidence within the rationale to justify the score. Examples of the methods and specific systems in place are lacking.	3.2.3	Additional rationale was provided regarding effectiveness of the current Olympic system of management for incentivizing compliance and eliminating incentives for noncompliance. Reference is added to Section 3.5.4 of the assessment where this system is described in detail.
FCR-7.6.2 v2.0	Section 5.1. If the eligibility date is before certification, the CAB shall detail and inform the fishery that any fish harvested after the eligibility date and store as under-assessment fish shall be handled in conformity with the relevant under-assessment product requirements in the MSC CoC Standard v4.0.		Section 5.1 revised accordingly
FCR_7.12.1 v2.0	Section 5.2. Please confirm if Delta Fish Ltd. is the sole processing facility or are there other processing companies eligible to process UoC fish? If so, please provide the full list of the eligible companies that are also required to have CoC certification.		Potential candidates for future certificate sharing agreements include those legally permitted to fish in the Unit of Certification. Each fishing company operates its own processing facility.
FCR_7.12.1.5.a v2.0	Table 12 Row 5. As the harvest of unique salmon species do overlap with species outside the UoC (i.e. Arctic Char), please confirm that there is a system in place to ensure segregation and traceability to prevent mixing between certified and non-certified catch.		Table 12 was revised to clarify that segregation and labeling by species will ensure that mixing does not occur between certified and noncertified catch.

Requirement Version	Oversight Description	Pi	CAB Comment
FCR_7.12.1.2 v2.0	Table 12 Row 6. Please confirm appropriate systems and records are in place at: (1) the point of landing, (2) reloading, (3) boxing into container and (4) transport to processing facility to ensure traceability back to UoC. Further while there is no transhipment prior to point of landing, please confirm if there is also no transhipment from point of reloading to the start of CoC (i.e. processing facility). Please also		Table 12 was revised to confirm that appropriate systems are in place to ensure traceability from processing back to the UoC. Only salmon harvested in the UoC are processed in the Delfin facility at Olyutorskiy Bay.
FCR_7.12.1.3 v2.0	Illegal fishing is noted as a risk throughout the report, further details of how this risk is effectively mitigated from the point of landing to the point of delivery to the processing facility i.e. the start of CoC should be clarified and the reasons for starting CoC at the point of delivery rather than the point of landing should be further substantiated.		Fishing companies operate their own fishing gear and control all catch from the point of harvest. No significant incentives exist and penalties are severe for illegal fishing for companies included in the unit of certification. Therefore, the risk of illegal fishing in the Unit of Certification is determined to be insignificant.
FCR-7.4.12 v2.0	Section 5.2. The report states 'under the certificate sharing agreement, authorized fishing companies may use the certificate and apply the MSC logo if they deliver to a processing facility that holds MSC chain of custody certification'. Please confirm if these companies are part of Delta Fish Ltd. or if not please define the entities that may be part of the final client group.		Potential candidates for future certificate sharing agreements include those legally permitted to fish in the Unit of Certification. Any such companies will be identified in certificate sharing arrangements developed with Delta Fish.

APPENDIX 5 - SURVEILLANCE FREQUENCY

If the fishery is certified, the fishery surveillance program will be default Level 6, based on the conditions, and associated deliverables and timelines. Surveillances will be conducted according to program and timeline requirements specified in FCRV2.0 7.23.

Table 14. Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
1	*On-site surveillance audit*	*2 auditors*	*From client action plan it can be deduced that information needed to verify progress towards conditions will require on site visits to review progress toward milestones and consult with the fishery client and representative of the management system who provide collaboration in meeting conditions.*
2	*On-site surveillance audit*	*2 auditors*	
3	*On-site surveillance audit*	*2 auditors*	
4	*On-site surveillance audit & recertification site visit*	*Assessment team*	

Table 15. Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1	June **2019**	March 2019	Previous year's fishery information will be available and precedes current year fishery
2	June **2020**	March 2020	
3	June **2021**	March 2021	
4	June **2022**	March 2021	

Table 16. Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 6	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & re-certification site visit