MSC Public Certification Report

for

VA-Delta Kamchatka Salmon Fisheries – Scope Extension for Pymta River Salmon

MRAG Americas, Inc.

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October 3, 2019

CLIENT DETAILS:

Pymta Co Ltd and Kamber Co Ltd

(in collaboration with Vityaz-Avto Co Ltd and Delta Co Ltd)

Kamchatka, Russia

CONTENTS

1 EXECUTIVE SUMMARY

This is a scope extension of the Vityaz-Avto/Delta (VA-D) salmon fishery in West Kamchatka to include the Pymta River. The Ozernaya Sockeye fishery has been under certification since September 2012. In 2016, the VA-D fishery was also certified for Pink Salmon and Chum Salmon spawning in the Ozernaya, Koshegochek, Golygina, Opala, Kol, and Vorovskaya Rivers of the West Coast of Kamchatka, and Coho salmon spawning in the Kol River. In 2017, the fishery for Ozernaya Sockeye was added as a scope extension in lieu of a full reassessment.

Pymta River is being added to the certification because Vityaz-Avto Co. Ltd and Delta Co. Ltd intend to accept new participants, Kamber Co. Ltd and Pymta Co. Ltd, as designated facilities/companies based on an agreement to equitably share the costs associated with obtaining and maintaining the fishery certificate in compliance with the MSC Fisheries Standard. Units of certification for this scope extension include Pink and Chum salmon originating in the Pymta River which is adjacent to areas previously certified. Coho and Sockeye salmon from the Pymta River were also considered for inclusion but the clients chose to withdraw them from consideration. Ozernaya River Sockeye and Kol River Coho are currently the only certified representatives of these species in West Kamchatka.

An assessment team of Ray Beamesderfer, Dmitry Lajus and Scott Marshall 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 site visit was conducted remotely via teleconference on 4 February 2019 (3 February in US). The team met with the clients and the client's consultant. Extensive meetings have previously been held with federal and state salmon scientific and management agencies, and key stakeholders during the certifications, scope extensions and reassessments of this fishery. The team also reviewed extensive written documentation provided by the client and the fishery management system.

As the fishery is conducted using the same gears and in the same habitat areas as the certified VA-Delta fishery and under the same management system, the Pymta River fishery was assessed only against Principle 1 of the MSC Standard, as the remaining components of the fishery are unchanged.

All principle scores exceeded 80 but several performance indicators scored between 60 and 80. As a result, three conditions were identified. On the basis of this assessment of the fisheries and review by one peer reviewer, the Assessment Team recommends that the fisheries be certified. Following this recommendation of the assessment team, stakeholders and peer-reviewers, and the successful conclusion of the objection period, MRAG Americas has **decided** to certify this fishery as sustainable according to the Marine Stewardship Council Fishery Standard.

Principle Level Scores

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

Summary of PI Level Scores

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score pink	Score chum
One	1	Outcome	0.333	1.1.1	Stock status	0.5	0.167	80	80
				1.1.2	Stock rebuilding	0.5	0.167	85	85
		Management	0.333	1.2.1	Harvest strategy	0.25	0.083	85	85
				1.2.2	Harvest control rules & tools	0.25	0.083	80	80
				1.2.3	Information & monitoring	0.25	0.083	65	65
				1.2.4	Assessment of stock status	0.25	0.083	80	80
		Enhancement	0.333	1.3.1	Enhancement outcome	0.333	0.111	100	100
				1.3.2	Enhancement management	0.333	0.111	100	100
				1.3.3	Enhancement information	0.333	0.111	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	90	
				2.1.3	Information	0.333	0.067	70	
		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	90	
				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	100	
				3.1.2	Consultation, roles &	0.3	0.150	85	
				3.1.3	Long term objectives	0.3	0.150	80	
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	0.125	80	
				3.2.2	Decision making processes	0.25	0.125	75	
				3.2.3	Compliance & enforcement	0.25	0.125	80	
				3.2.4	Management performance	0.25	0.125	80	

Summary of Conditions

The fishery received three conditions for performance indicators that scored less than 80. These conditions are in common with the Vityaz-Avto Delta West Kamchatka salmon certification and consider new information and closure of four conditions for the Vityaz-Avto Delta West Kamchatka salmon certification closed as a result of the 3rd annual surveillance in 2019.

Condition number	Condition	Performance Indicator
1	Provide sufficient information on wild spawning escapement for a representative range of wild Pink, Chum (and Kol Coho) populations in the unit of certification to support the harvest strategy and demonstrate that wild abundance is regularly monitored at a level of accuracy and coverage consistent with the harvest control rule.	1.2.3
2	Provide quantitative information on escapement of (non-Ozernaya) Sockeye and (non-Kol) Coho Salmon adequate to assess the impact of the UoA with respect to status.	2.1.3
3	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

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), Fish Science Solutions. 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. 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 led or assisted MRAG and others in assessments of 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. Dr. Lajus has conducted multiple MSC pre-assessments and full assessments for a number of fisheries in the European and Asian parts of Russia. He also provides consultations to fisheries in their MSC certification projects in Russia and EU. Dmitry's research interests include population biology of marine fish and invertebrates, population phenogenetics, stress assessment, history of fisheries, fisheries management, historical ecology, and population dynamics. He authored numerous peer-reviewed research articles and book chapters.

Mr. Scott Marshall earned a B.S. in Fisheries from Oregon State University, and a M.S. in Fisheries Science from the University of Washington. He has held multiple positions in fisheries, including Project Leader at the Fisheries Research Institute (UW); Research Project Leader, Principal Fishery Scientist and SE Region Supervisor for the Division of Commercial Fisheries for the Alaska Department of Fish and Game; staff biologist for Idaho Department of Fish and Game; and Fisheries Administrator in charge of the Lower Snake River Compensation Plan for the US Fish and Wildlife Service. He has served on Scientific and Statistical Committee of the North Pacific Fisheries Management Council and as Co-Chairman of the Transboundary Rivers Panel of the Pacific Salmon commission. He has also served as a team member on the Alaska Salmon MSC assessments.

2.2 Peer Reviewers

Peer review was conducted by a member of the peer reviewer college. The peer reviewer is considered the peer of the experts comprising the assessment team, and has expertise in the fishery under assessment and/or stock assessment issues. However, since this is a scope extension and only one peer reviewer was engaged, the review was provided anonymously.

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

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

Species	Pink Salmon *Oncorhynchus gorbuscha*
Geographical range of fishing operations	Western Kamchatka, Sea of Okhotsk
Method of capture	Set (trap) nets, beach seines
Stock	Populations of Pacific salmon spawning in Western coast of Kamchatka (Ozernaya, Koshegochek, Golygina, Opala, Kol, Vorovskaya and Pymta rivers) and also adjacent rivers whose populations can be intercepted by the fishery
Management	Federal Agency for Fisheries SVTU, regional divisions of Federal Agency for Fisheries. All-Russia Fisheries Research Institute, VNIRO and its regional branches: KamchatkaResearch Institute Fisheries for Fisheries and Oceanography, KamchatNIRO and Pacific Research Institute for Fisheries and Oceanography, TINRO-Center. SevvostRybvod.
Client group	The clients for this assessment are: “Vityaz-Avto Co” Ltd and “Delta Co” Ltd Str. Stepnaya 5 Petropavlovsk-Kamchatsky, Kamchatsky region, Russian Federation Contact: Mr. Andrei Bokov andrei-bokov@bk.ru Kamber Co. Ltd. and Pymta Co. Ltd. 684200, Kamchatsky Krai, Sobolevskii district, v.Sobolevo, 7-1, Komsomolskaya Str. Contact: Larisa Grabar grabar_larisa@mail.ru

Species	Chum Salmon *O. keta*
Geographical range of fishing operations	Western Kamchatka, Sea of Okhotsk
Method of capture	Set (trap) nets, beach seines
Stock	Populations of Pacific salmon spawning in Western coast of Kamchatka (Ozernaya, Koshegochek, Golygina, Opala, Kol, Vorovskaya and Pymta rivers) and also adjacent rivers whose populations can be intercepted by the fishery
Management	Federal Agency for Fisheries SVTU, regional divisions of Federal Agency for Fisheries. All-Russia Fisheries Research Institute, VNIRO and its regional branches: KamchatkaResearch Institute Fisheries for Fisheries and Oceanography, KamchatNIRO and Pacific Research Institute for Fisheries and Oceanography, TINRO-Center. SevvostRybvod.
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	Str. Stepnaya 5 Petropavlovsk-Kamchatsky, Kamchatsky region, Russian Federation Contact: Mr. Andrei Bokov andrei-bokov@bk.ru Kamber Co. Ltd. and Pymta Co. Ltd. 684200, Kamchatsky Krai, Sobolevskii district, v.Sobolevo, 7-1, Komsomolskaya Str. Contact: Larisa Grabar grabar_larisa@mail.ru

3.1.2 Final UoC(s)

The final Unit of Certification includes Pink Salmon and Chum Salmon. Coho and Sockeye salmon were initially considered for assessment but the client withdrew these units prior to scoring and reporting.. These are in addition to the certified UoCs within the overall VA-Delta fishery.

3.1.3 Total Allowable Catch and Catch Data

Table 2. TAC and Catch Data for Pink Salmon (Kamber-Pymta).

TAC	Year	NA[a]	Amount	--
UoA share of TAC	Year	NA[a]	Amount	--
UoC share of (UoA)	Year	2014-2017	Amount	40%
Total green weight catch by UoC	Year (most recent)	2018	Amount	33,849 mt
	Year (second most recent)	2017	Amount	1,089 mt

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

Table 3. TAC and Catch Data for Chum Salmon (Kamber-Pymta).

TAC	Year	NA[a]	Amount	--
UoA share of TAC	Year	NA[a]	Amount	--
UoC share of (UoA)	Year	2014-2017	Amount	40%
Total green weight catch by UoC	Year (most recent)	2018	Amount	655 mt
	Year (second most recent)	2017	Amount	426 mt

[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 or inseparable or practically inseparable (IPI) species.

3.2 Overview of the fishery

The fishery occurs in the Western part of Kamchatka Peninsula on the Sea of Okhotsk coast and the lower reaches of six coastal rivers, the Ozernaya, Koshegochek, Golygina, Opala, Pymta, Kol, Vorovskaya (Figure 1).

The region of the fishery is remote and largely undeveloped. Watersheds are in excellent condition and salmon habitat diverse and highly productive. The human population is concentrated in about 10 small communities. The largest towns, Ust-Bolsheretsk and Oktiabrsky, are located on the Bolshaya River. Two small towns are also located near the mouth of the Ozernaya River, Ozernovsky and Zaporozhie, each consist of about 2,500 residents. Two small towns are also located on the Vorovskaya river. No towns are located on the Pymta River. During the two-month fishing season, many people also come to the region from Petropavlovsk-Kamchatsky and from mainland Russia for seasonal work with the fishing companies. The local population has been declining recently due to limited economic opportunity in the region.

Road access to the fishery is limited in comparison with majority of other Kamchatka fisheries. There is a road connecting Petropavlovsk-Kamchatsky to the west Kamchatka coast at the Bolshaya River, the total distance is about 200 km. The Vorovskaya, Kol, Opala, Ozernaya md Pymta rivers are not located near main roads, although there is a road built for the natural gas pipeline near the middle section of the Kol River. Vehicle access to rivers north and south of the Bolshaya is made along the beach, conditions permitting. However, most travel between fishing rivers occurs by helicopter or boat.

Two fishing companies are included in the original assessment: Vityaz-Avto and Delta. Vityaz-Avto was founded in 1997 and grew quickly. The company has three branches in the western coast of Kamchatka in the towns of Ozernovsky, Oktiabrsky and Sobolevo. Delta has operated in the Ozernaya and Opala river areas of Kamchatka since 1998. The companies generally process and freeze all of their catch at their own fish processing factories. Fish processing plants are operated by the fishing companies near the mouths of the Ozernaya, Koshegochek and Opala Rivers near the areas where main fishing activities occur. These plants process the catch from sea trap nets and lower river fishing parcels. Local catches are delivered by boats to the processing plants. Most production by Vityaz-Avto is sold abroad to Japan and Canada. More than half of total production by Delta is exported to Asian countries.

This scope extension extends the certification to two additional fishing companies: Kamber and Pymta. The fish processing facility Kamber Co. Ltd is located on the Western coast of the Kamchatka Peninsula, coast of the Sea of Okhotsk, two kilometers south of the mouth of the Pymta River (Sobolevskii District, Kamchatsky Krai, the territory of the former settlement of Pymta). The fish processing plant for Pymta Co. Ltd is located on the Western coast of the Kamchatka Peninsula, coast of the Sea of Okhotsk, 1.6 km south of the mouth of the Pymta River (Sobolevskii District, Kamchatsky Krai the territory of the former settlement of Pymta). The distance to the nearest settlement is more than 70 km.

3.2.1 Historical development of the Fishery

Fishing is and has always been the primary occupation of people of western Kamchatka including indigenous peoples. Industrial salmon fisheries have operated in western Kamchatka at least since 1914 when a cannery began operation on the Ozernaya River. 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. In the early 1990s, the collapse of the Soviet Union led to a period of severe economic disruption. 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.

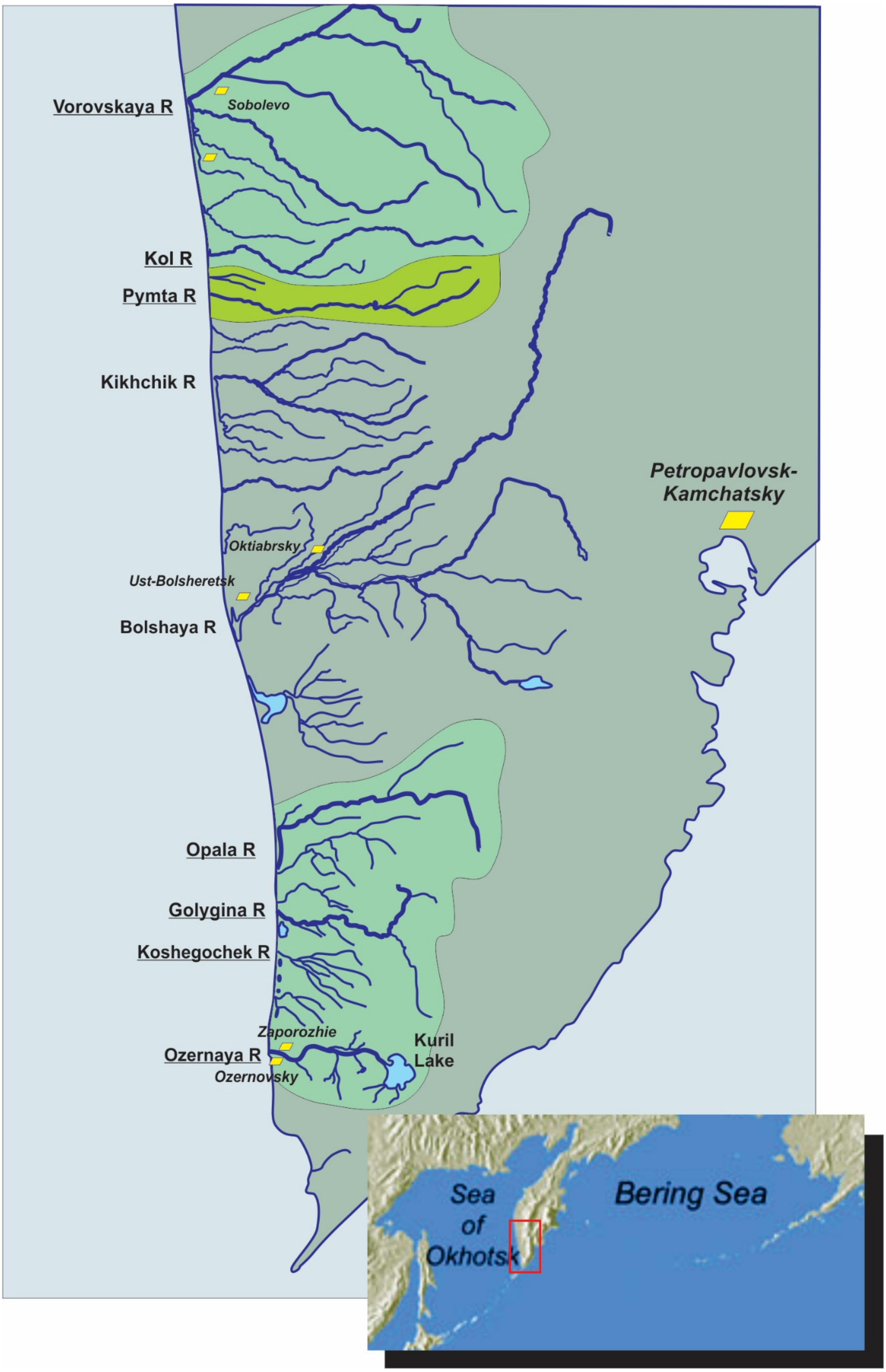


Figure 1. Western Kamchatka region of the fishery assessment. Names of rivers included in the Unit of Assessment are underlined.

3.2.2 Fishing Methods

The commercial salmon fishery in West Kamchatka is prosecuted with fixed trap nets in nearshore marine waters and beach seines in the lower reaches of some rivers. Gill nets are not included in the units of assessment.

Coastal trap nets typically consist of a mesh lead set perpendicular to shore to guide fish into one or more mesh wing-style traps where narrowing mesh fykes make it difficult for fish to exit. The mesh lead or "fence" is usually 1,100 -1,300 m in length and 11-15 m deep at low tide. The mesh size of the central net and the traps is being chosen to prevent fish from being gilled in the net cells. Traps are constructed of net mesh on a steel frame, typically have a wall height of 9 m and do not reach bottom. Coastal trap nets are effective because tidal exchange is relatively small and littoral areas are wide and gradually-sloped. Traps have proven to be especially efficient at capturing fish migrating in the coastal area. This type of fishing is passive and catch per unit effort is related to the intensity of the run strength. Coastal trap nets are operated from small boats. The catch is typically crowded 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.

Beach seines are long nets used to encircle and crowd fish toward shore where they can be captured. These seines are typically 200 m in length. Seines are fished in the shallow waters of the lower river where the current is relatively slow and the river is shallow. Seines are set from small skiffs and hauled from shore with vehicles and by hand.

3.2.3 Organization & User Rights

Management of fisheries in Kamchatka Krai of Far East Federal Region of the Russian Federation is based on fisheries zonesand subzones (Figure 2). The assessment fishery occurs in the Kamchatka-Kuril subzone of Sea of Okhotsk zone. The Kamchatka-Kuril fishery subzone includes three management units. The companies in this certification process have fishing parcels in two management units (Figure 2). The Opala River is included in the most southern management unit together with Ozernaya River. Golygina, Koshegochek, Iavinskaya Rivers and adjacent coastal areas. Vorovskaya, Kol and Pymta rivers are included in the other unit along with the Bolshaya and Kikhchik rivers.

Fishing parcels consisting of trap or seine sites are leased to fishing companies under a long-term lease arrangement. Fishing parcels were distributed for period 2008-2027. Only commercial fishing occurs in sea fishing parcels. River parcels may be allocated for commercial fishing, sport fishing or hatchery purposes. Vityaz-Avto leases 18 fishing parcels, 14 of which are in the sea, and four of which are in the Ozernaya, Koshebochek, Golygina and Kol rivers. Delta leases nine fishing parcels, seven of which are in the sea, and two of which are in the Ozernaya and Opala rivers. The Vityaz-Avto and Delta companies have fished on the Vorovskaya, Opala and Ozernaya rivers since 1998 and the Kol since 2004. The companies also participate in marine fisheries for white fish. Kamber Co. leases six fishing parcels, five in the sea and one in the Pymta River. Pymta Co. leases seven fishing parcels, 6 in the sea and 1 in the Pymta River.

Fishermen are hired by contract – they have 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 towns in western Kamchatka for located near towns.

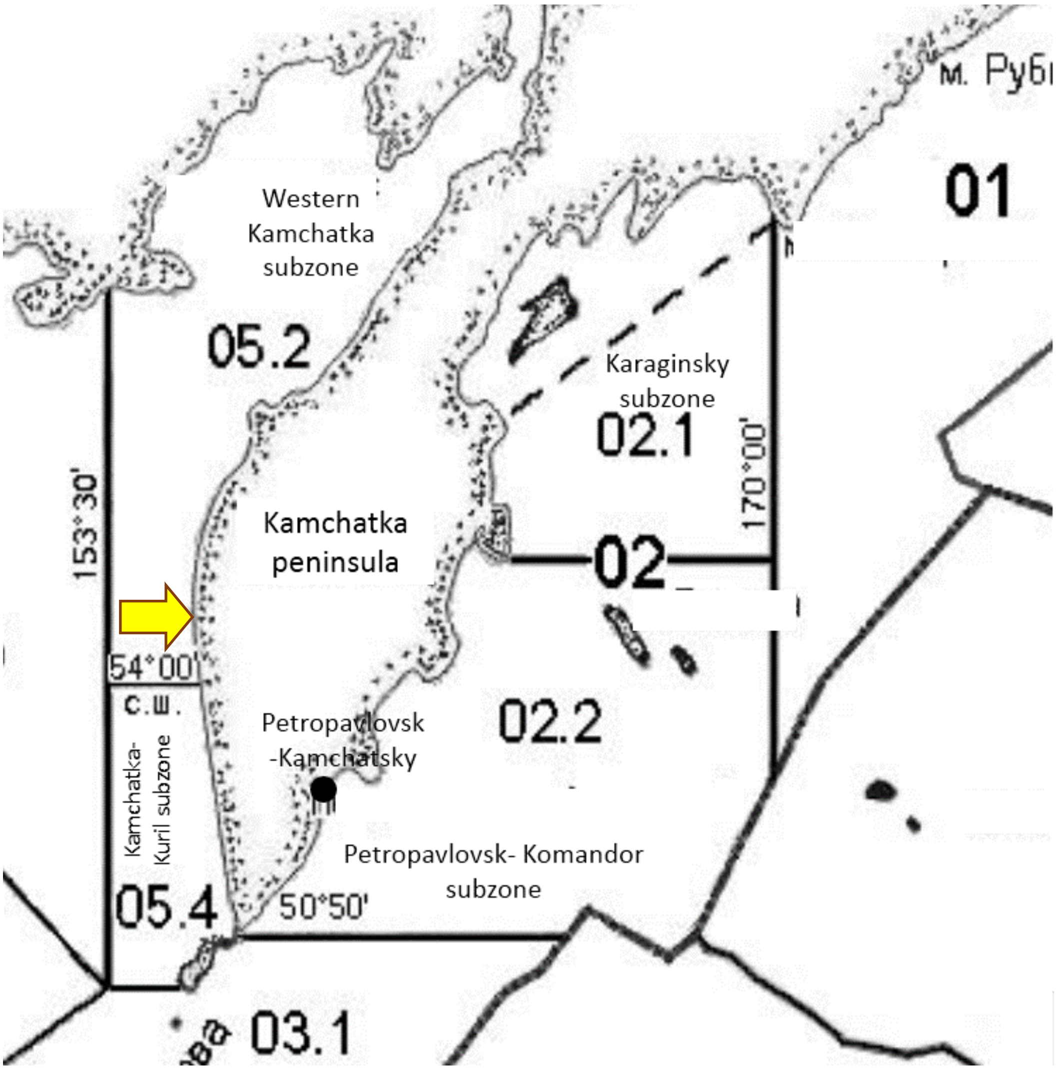


Figure 2. Administrative units for Kamchatka peninsula fishery management. Vorovskaya, Kol and Pymta rivers are included in subzone 05.2, and the other rivers are included in subzone 05.4. Yellow arrow indicates the Pymta River mouth.

3.2.4 Seasons

Commercial salmon fishing generally occurs from July until September. Fishing in the rivers generally begins around July 5-9. Fishing in sea nets generally begins around July 15-20. Salmon species return and are harvested in broadly overlapping distributions throughout this period (Figure 3). Fishing generally continues as long as fish abundance and weather permit. Sea nets are typically removed in September as the bulk of the salmon run is complete and autumn storms begin. Fishing may continue in river sites when fish are available.

The start of the commercial season is timed to avoid harvest of Chinook and Cherry Salmon which return from May until early or mid-July. Commercial Sockeye harvest typically begins in the second week of July. Maximum catches occur from mid-July until mid-August, and the latest industrial catches occur in late August to mid-September. Pink harvest typically begins around the third week of July. Maximum catches occur in the early-mid August. Catches are largely complete in even years by the beginning of September and in odd years from late August to mid-September. Chum harvest begins in mid- to late July with peak catches in early to mid-August. The latest catches generally occur in the early to mid-September. Coho harvest typically begins in mid- August with maximum catches in the early to mid-September, and catches until the beginning of October. The large majority of the Coho harvest in the commercial fishery occurs after the period of Sockeye, Pink and Chum catches. Fishing seasons may be modified based on fish abundance.

Table 4. List of fishing parcels permitted for use by fishing companies included in this Unit of Assessment. Parcels denoted with a * are rarely fished in practice.

Co.	Parcel	Water body	Latitude			Longitude			Length/ width (m)	Processing location
			Deg	min	sec	Deg	min	sec		
Vityaz-Avto	752	Ozernaya river	Low point - 1000 m from the mouth, top point - 1200 m from the mouth (south part of the island)						200/'--	Ozernaya
	189	Sea of Okhotsk	51	48	20	156	30	06	300/2000	Ozernaya and Koshegochek
	191	Sea of Okhotsk	51	46	10	156	30	10	300/2000	Ozernaya and Koshegochek
	197	Sea of Okhotsk	51	39	43	156	29	58	300/2000	Ozernaya
	203	Sea of Okhotsk	51	32	44	156	29	07	300/2000	Ozernaya
	204	Sea of Okhotsk	51	31	38	156	29	07	300/2000	Ozernaya
	746	Golygina river	Low point - 4000 m from the mouth, top point - 6200 m from the mouth (left shore)						2200/--	Ozernaya and Koshegochek
	747	Koshegochek river	Low point - 1000 m from the mouth, top point - 1500 m from the mouth (both shores)						500/--	Ozernaya and Koshegochek
	697	Kol river	Low point - 3000 m from the mouth, top point - 5000 m from the mouth (both shores)						2000/--	Kol
	90	Sea of Okhotsk	53	48	18	155	57	04	300/2000	Kol
	89	Sea of Okhotsk	53	49	22	155	56	49	300/2000	Kol
	*81	Sea of Okhotsk	54	03	11	155	52	29	300/2000	at sea (vessels)
	*80	Sea of Okhotsk	54	04	15	155	52	03	300/2000	at sea (vessels)
	*79	Sea of Okhotsk	54	05	18	155	51	41	300/2000	at sea (vessels)
	78	Sea of Okhotsk	54	06	22	155	51	17	300/2000	Ozernaya and Koshegochek
	77	Sea of Okhotsk	54	07	25	155	50	53	300/2000	Ozernaya and Koshegochek
	76	Sea of Okhotsk	54	08	29	155	50	29	300/2000	Ozernaya and Koshegochek
	*60	Sea of Okhotsk	54	23	55	155	44	51	300/2000	at sea (vessels)
Delta	755	Ozernaya river	Low point - 2000 m from the mouth, top point - 2400 m from the mouth (left shore)						400/--	Ozernaya
	740	Opala river	Low point - 1000 m from the river mouth, top point - 2000 m from the river mouth (both shores)						1000/--	Opala
	177	Sea of Okhotsk	52	03	43	156	28	40	300/2000	Opala
	178	Sea of Okhotsk	52	02	39	156	28	49	300/2000	Opala
	179	Sea of Okhotsk	52	01	34	156	28	56	300/2000	Opala
	180	Sea of Okhotsk	52	00	30	156	29	02	300/2000	Opala
	181	Sea of Okhotsk	51	59	25	156	29	08	300/2000	Opala
	*184	Sea of Okhotsk	51	54	49	156	29	31	300/2000	at sea (vessels)
	198	Sea of Okhotsk	51	37	13	156	29	53	300/2000	Ozernaya
Kamber	91	Sea of Okhotsk	53	46	42	155	57	26	300/2000	Pymta
	92	Sea of Okhotsk	53	45	37	155	57	41	300/2000	Pymta
	93	Sea of Okhotsk	53	44	33	155	57	57	300/2000	Pymta
	94	Sea of Okhotsk	53	42	23	155	58	35	300/2000	Pymta
	96	Sea of Okhotsk	53	40	46	155	58	55	300/2000	Pymta
	699	Pymta River	Low point - 2500 m from the river						100/--	Pymta

Co.	Parcel	Water body	Latitude			Longitude			Length/ width (m)	Processing location
			Deg	min	sec	Deg	min	sec		
			mouth, top point - 2600 m from the river mouth (both shores)							
Pymta	1124	Sea of Okhotsk	53	33	36	156	00	11	300/2000	Pymta
	1119	Sea of Okhotsk	54	27	00	155	43	51	300/2000	Pymta
	83	Sea of Okhotsk	54	01	04	155	53	16	300/2000	Pymta
	82	Sea of Okhotsk	54	02	08	155	52	52	300/2000	Pymta
	98	Sea of Okhotsk	53	38	37	155	59	21	300/2000	Pymta
	97	Sea of Okhotsk	53	39	42	155	59	09	300/2000	Pymta
	700	Pymta River	Low point - 3600 m from the river mouth, top point - 3750 m from the river mouth (both shores)						150/--	Pymta

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

Commercial salmon harvest data is available for western Kamchatka since the 1930s. Extensive catch records are kept by the commercial fisheries. Each fishing parcel has an individual log book that is maintained by the captain of that crew. Fishing companies compile and report numbers to the management systems. Numbers were historically tracked relative to fishery quota allocations and are currently the basis for landing tax assessments.

Annual salmon harvest in western Kamchatka commercial fisheries currently averages about 90,000 mt per year (Figure 4). Pink Salmon average about 60% of the even year harvest and 10% of the odd year harvest. Chum average about 20%, Sockeye about 30%, Coho about 5%.

Pink Salmon are caught primarily by sea nets in even years (Figure 5). During odd years, Pink Salmon harvest is distributed between sea and river sites. Chum Salmon catch is distributed between sea and river sites. Sockeye are harvested primarily in sea nets where the harvest included substantial numbers of the large Ozernaya run which migrates south along the coast. Coho Salmon are harvested mainly in the river. In even-numbered years 62% of total catch occurs in the sea areas, in odd-numbered— 37%.

Fishing in the area of the Pymta river for 2009-2018 was carried out by three companies. In 2009–2012, two companies worked in the region, since 2013 — three fishing-industry companies (Bugayev et al. 2019). The main share of the catch (52%) of Pacific salmon and char in this area is by "Kamber" LLC. Catch share by all companies in the area of the Pymta river in 2009–2018 averaged 6% of cumulative catch of all Pacific salmon and char in the Kamchatka-Kuril subzone.

In the area of the Pymta, harvest is predominately Pink Salmon (83%), followed by Chum (10%), Coho (7%) and Sockeye (1%).

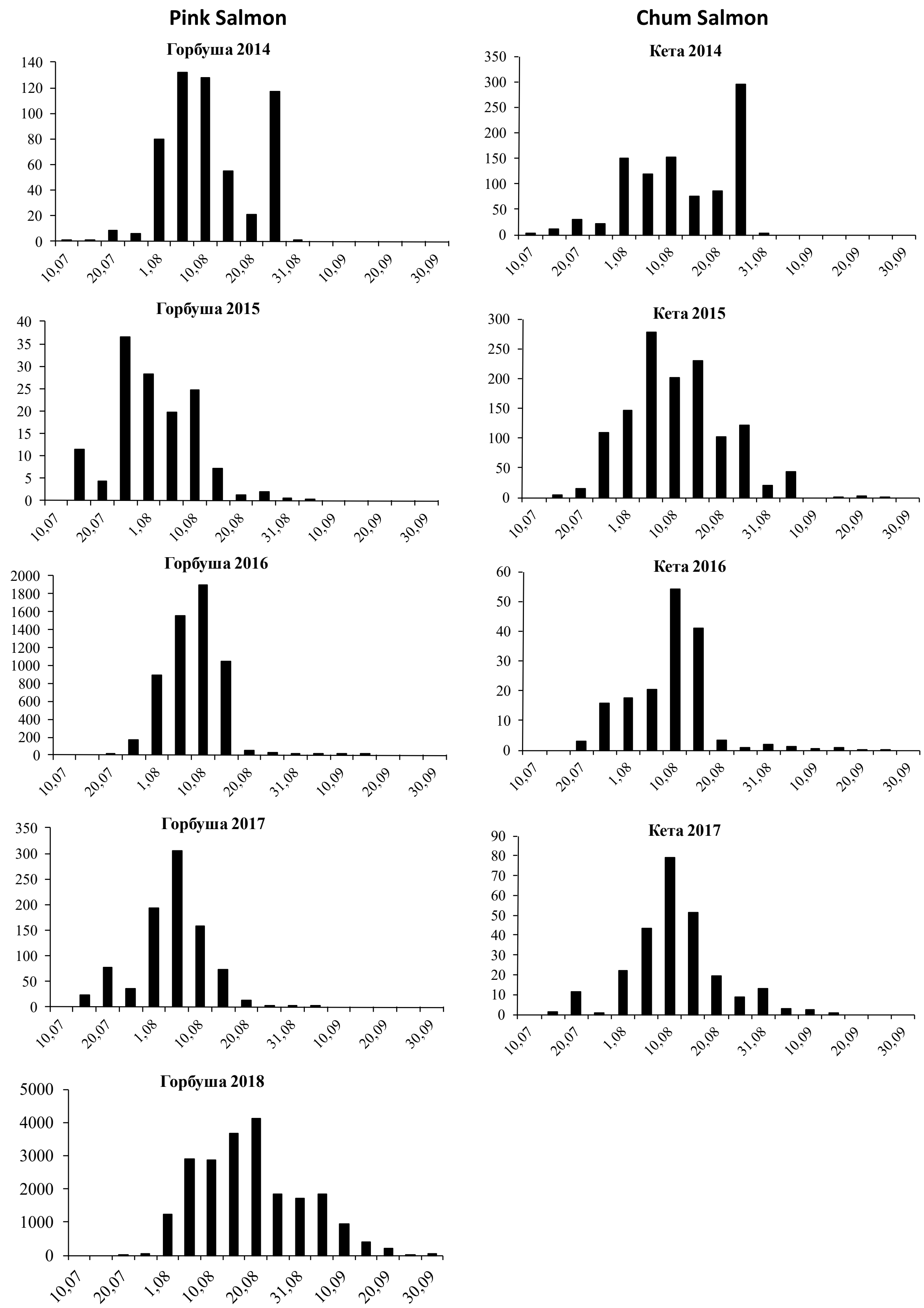


Figure 3. Salmon harvest (tonnes) in the Pymta River by five-day period.

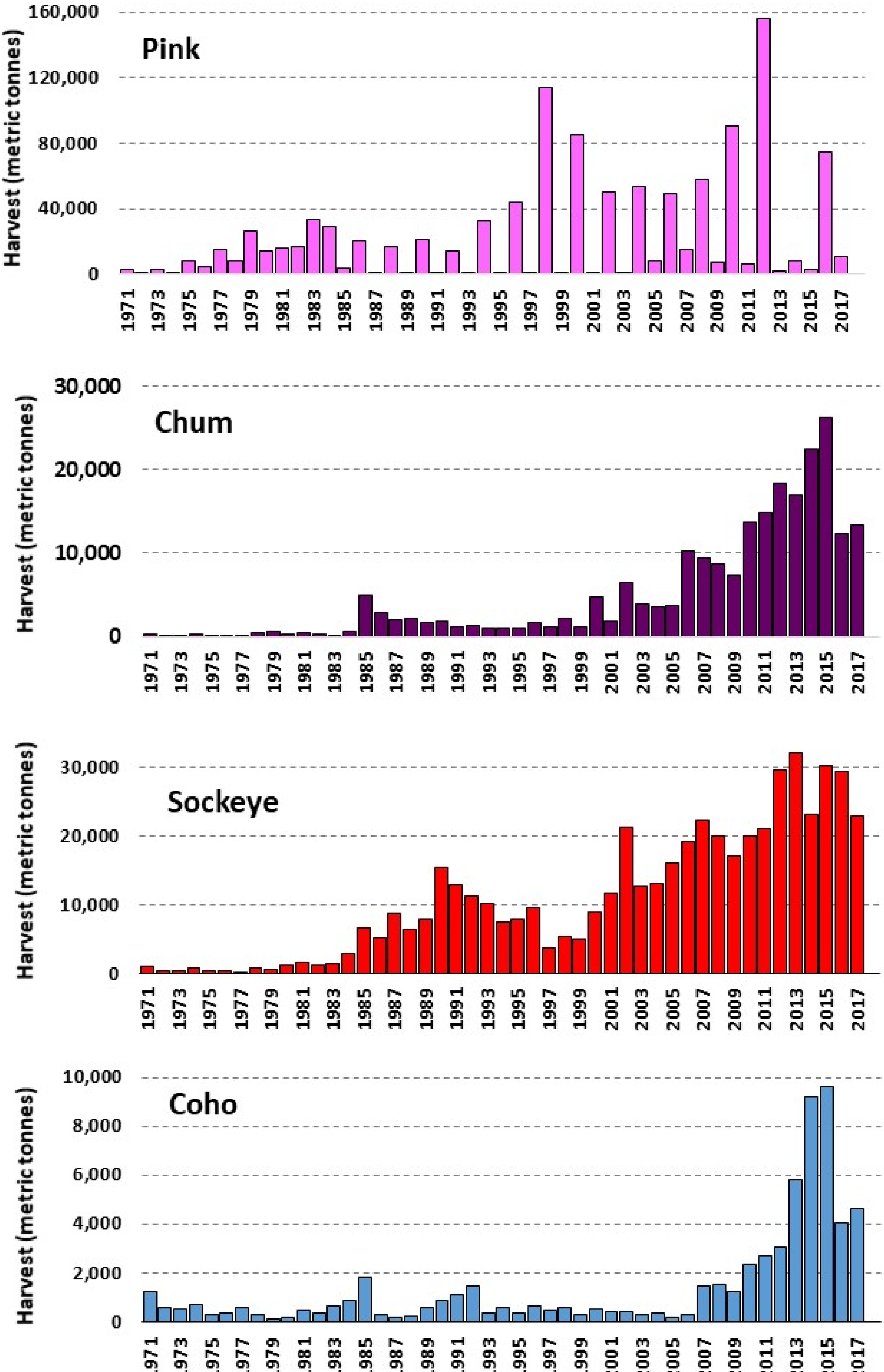


Figure 4. Total harvest (metric tonnes) of Pacific salmon in the Western Kamchatka area (North Pacific Anadromous Fish Commission).

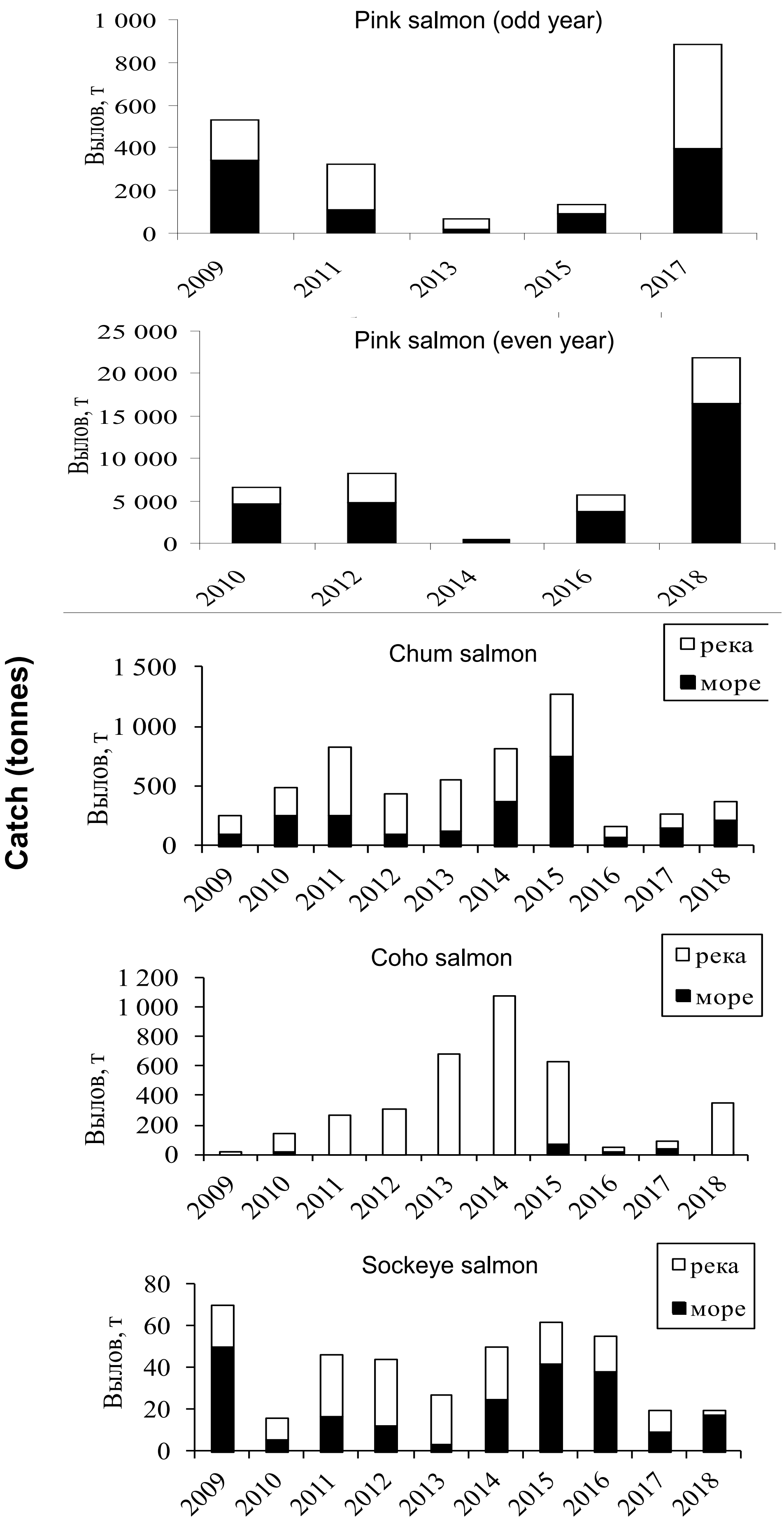


Figure 5. Pacific salmon catch dynamics by species in the Pymta river in 2009-2018 (□ River, ■ Sea).

Table 5. Annual harvest (tonnes) of salmon species by the Kamber and Pymta companies, 2009-2018.

Year	Pink	Chum	Sockeye	Coho	Total
2009	528	250	70	11	905
2010	8,596	803	42	123	9,783
2011	367	899	49	269	1,673
2012	12,367	542	37	301	13,396
2013	84	738	30	680	1,848
2014	718	1,511	86	1,279	4,899
2015	175	1,800	85	578	2,974
2016	7,716	294	100	99	8,327
2017	1,089	426	39	182	1,757
2018	33,849	655	26	575	37,531
Avg.	6,549	792	56	410	8,309

Sport Fishery

Sport fisheries exist for all salmon species but are primarily focused on Chinook and Coho Salmon. In the Russian practice, sport and amateur fishing can occur with sports gear (spinning or rod) or amateur fishing gear (various types of nets). Sports and amateur fishing is limited to designated fishing parcels some of which may be leased to fishing companies. There are two sport fishing parcels in the Vorokskaya River basin, four parcels on the Opala River, and one on the Kol River. The sport fishery on the Ozernaya River is not limited to a specific parcel.

Chinook Salmon support very popular sport fisheries in rivers throughout western Kamchatka. The sport fishery is now the primary harvester of Chinook Salmon in many rivers since closure of early commercial fishing seasons beginning in 2010. Harvest allocations are identified for Chinook sport fisheries. The demand for such quotas of king salmon is very high and exceeds the offered ones significantly. Catch and release fishing for Chinook is significant and this fishery attracts numerous foreign anglers. The Russian system does not specifically provide for catch and release sport fishing but this type of fishing allows repeated catch without loss for reproduction within allocated quotas.

Sport and/or amateur fisheries have occurred on the Vorovskaya and Ozernaya rivers since 1994. These sport fisheries have expanded to other species in subsequent years (although amateur net fishing was closed in the Ozernaya River after 2006). Licensed and lure sport fishing is carried out in the described area by “Kamber” LLC on the Pymta River, targeting coho salmon, chum salmon, spring salmon, red salmon, humpback salmon and char (Bugaev et al. 2019aa). Catches are very low in relation to the volume of commercial harvest.

Indigenous Fishery

All species of salmon are harvested for consumption by communities, families and individual representatives of indigenous peoples. 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. Personal limits of 50 kg per year are allocated for indigenous people. Native 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.

Indigenous fisheries in the unit of certification assessment occur in the Vorovskaya and Ozernaya Rivers. There is one traditional fishery parcel for indigenous peoples in the Vorokskaya River basin. Annual indigenous catch of combined salmon species typically averages about 16 t in the Vorovskaya and 90 t (90% Coho) in the Ozernaya. Subsistence fisheries do not occur on the Kol, Opala, Golygina Koshegochek or Pymta rivers due to remote locations. The largest indigenous fishery in the region occurs in the Bolshaya River, which is not in the unit of certification. Indigenous harvest in some rivers like the Bolshaya, has increased considerably in the last ten years, and currently comprises 9 to 10% of the total catch of Chum, Coho, and king salmon. The indigenous fishery is reportedly the source of some abuse as qualifications for permits are loose, individual harvest limits are difficult to enforce, and permits are sometimes illegally transferred to others to fish.

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 targets 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 is typically discarded. The research institute estimates that the combined Chum and Pink bycatch 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 is relatively stable in recent years, which makes it easier to account for harvest of Ozernaya Sockeye in marine drift net fisheries is estimated annually based on reported harvest and catch composition data. This task has been made much simpler by the current distribution of the drift fishery inside of the EEZ where it primarily harvests Asian Sockeye stocks of which the Ozernaya is the largest (Bugaev and Dubynin 2000). Drift net fisheries are currently estimated to account for less than 20% of the annual harvest of Ozernaya Sockeye with annual exploitation rates in all fisheries of approximately 67-88% (average 81%) since 2000. These values are likely to apply to other western Kamchatka Sockeye as well.

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.

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 at sea, at the mouths of spawning rivers and in large rivers, while criminal and everyday poaching are located in 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 work 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 three fold in a number of large river systems which are major contributors of commercial catch.

Since 2002 KamchatNIRO has conducted research on the scale of poaching in Kamchatka (Zaporozhets et al. 2007, 2008; Regionalnaia… 2008). Data have been published through 2006. 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 fishery (official catch data, amount of products produced 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 (Table 6, Figure 6). 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.

Illegal harvest was most significant in the Bolshaya River due to its accessibility by a developed road system. The dependence on road access on poaching was highlighted by a large reduction in the contribution of the Tolmacheva river to Bolshaya basin salmon production from 3.8% in 1987-1996 to 0.6% in 1997-2005 after a road was completed in 1996.

Poaching pressure on low-abundance species (Sockeye, Coho, Chinook) was typically much higher than on high-abundance (Pink and Chum). For instance, an estimated 50-60 poaching teams operated in the Bolshaya River between the river mouth and Ust-Bolsheretsk from mid-May to mid-June of 2006. These groups caught an estimated 500 mt or 230,000 individual spring Sockeye and

150 mt or 25,000 individual Chinook. Poaching rates were higher in years with lower salmon runs (243% of legal catch) than in years of higher salmon years in low-years (58% of legal catch).

Illegal harvest levels were reportedly much lower in other western Kamchatka rivers than the Bolshaya River due to difficulty of access. Transport of illegal harvest is not easy because of necessity to cross several rivers and police control posts along the main road. Several rivers north of the Bolshaya, including the Kikhchik and Kol, are crossed in the middle reach with a road serving the natural gas pipeline. This has provided access for small groups of poachers. However, the total amount of illegal harvest was estimated to be low based on normal sex ratios observed on spawning grounds. Illegal fishing in the Opala and Ozernaya areas is reported to be negligible because of inaccessibility, local peoples are primarily employed by the fishing companies, and fishing companies are heavily involved in fishing control activities. The Vorovskaya River supports small local communities but fishing parcels have been provided for local inhabitants to take salmon for personal consumption.

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 misreporting. Much of the illegal harvest occurred in the form of misreporting of one species as another to avoid species-specific quota limits.

Illegal harvest appears to have been considerably reduced since 2002-2006 because of 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. At the same time, social reasons for poaching continue to exist, particularly among the local populace of communities on the Bolshaya River.

Table 6. Illegal harvest of salmon in Kamchatka and in the Bolshaya River, 2002-2006 average (Regionalnaia… 2008).

		Pink	Chum	Sockeye	Coho	Chinook
Kamchatka	Amount (mt)	16,139	20,298	12,376	4,065	1,110
	% of legal catch	28%	201%	61%	376%	230%
Bolshaya R	Amount (mt)	1,510	3,393	2,484	402	498
	% of legal catch	22%	438%	484%	555%	2109%

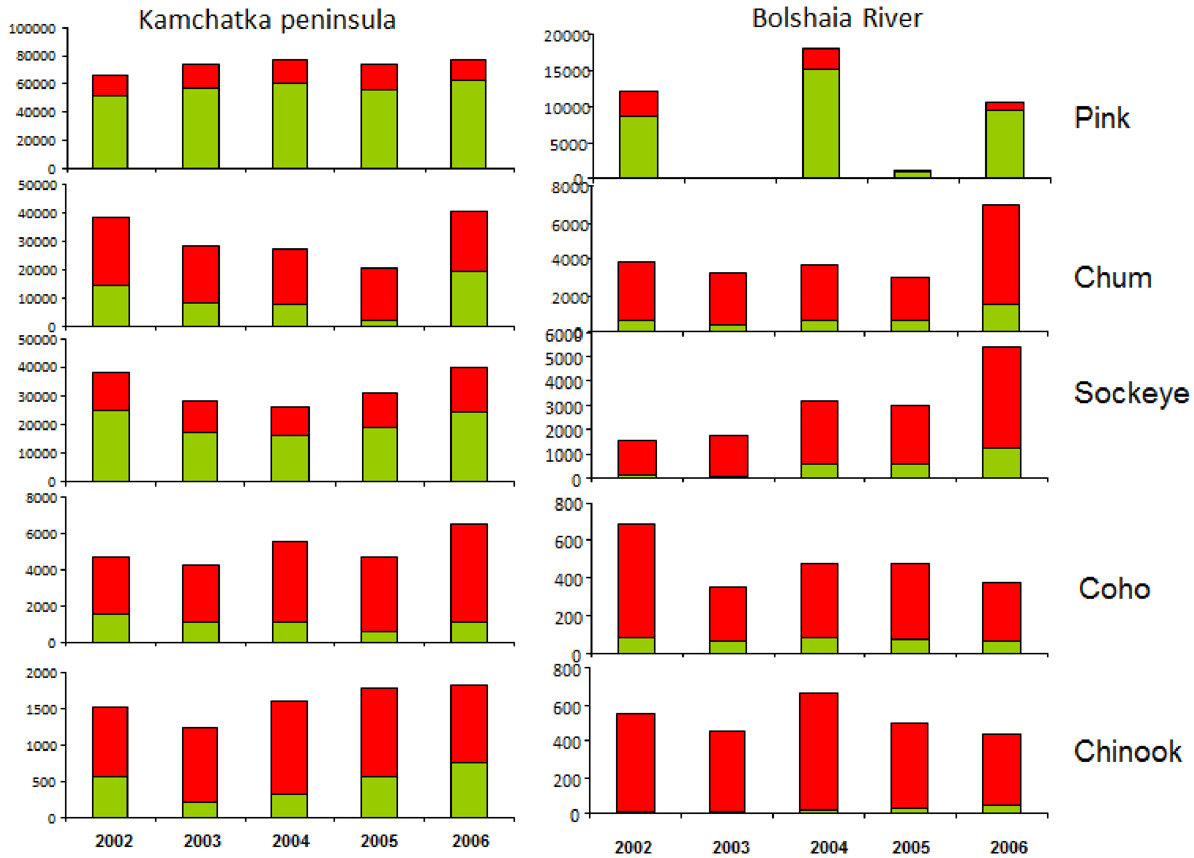


Figure 6. Legal (green) and illegal (red) landings, mt, of different species of Pacific salmon in Kamchatka peninsula and Bolshaya river 2002-2006, mt (Regionalnaia… 2008)

Reforms in the fishery management in 2008 have substantially reduced incentives for industrial poaching (Shevlyakov 2013). 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, 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.

KamchatNIRO estimates that illegal harvest has been substantially reduced from historical levels (Figure 7). In 2007-2009, an estimated illegal salmon harvest of 3-19 thousand tons from the

Bolshaya River accounted for 70 to 85% of the runs. By 2012, the total illegal catch of salmon, excluding Pink Salmon, dropped to 1-3 thousand tons. Illegal catch fell in 2012 to just 9% of the total Chum Salmon run and 14% of the total Sockeye run. Illegal harvest in other rivers is reportedly much less than in the Bolshaya due to limited access.

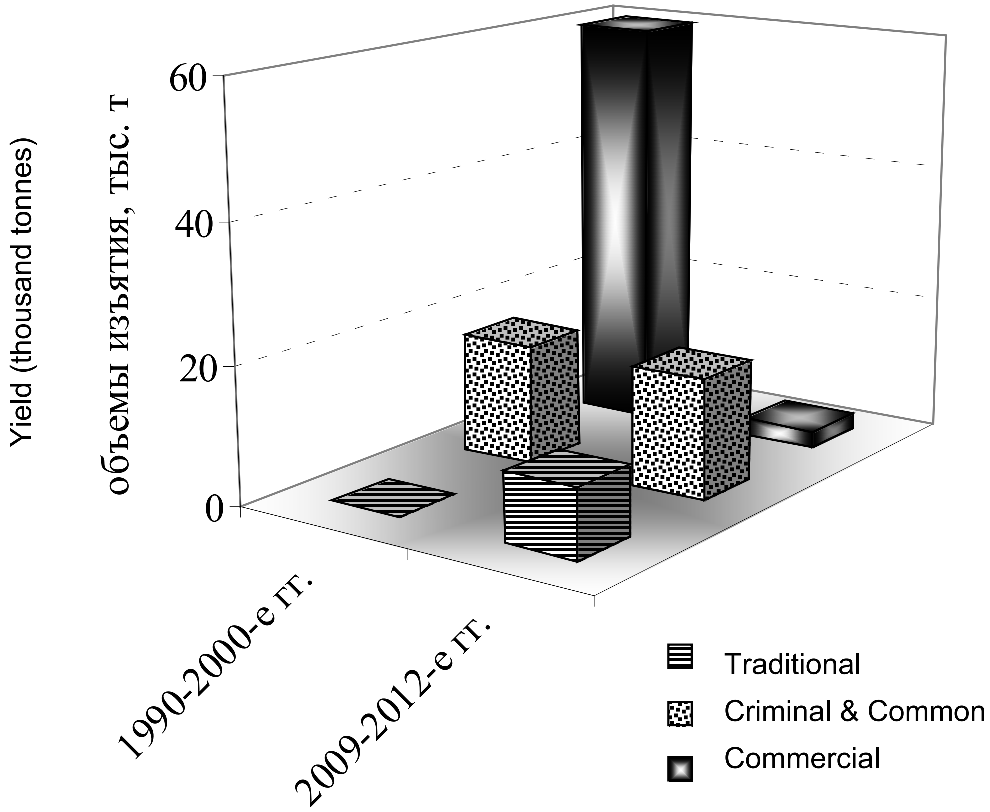


Figure 7. Dynamics of illegal harvest of Pacific salmon in the Kamchatka Region (Shevlyakov et al. 2016).

3.3 Principle One: Target Species Background

This assessment extends the Unit of Certification to Pymta River Pink and Chum Salmon. Sockeye and Coho Salmon are not included in the Unit of Certification for the Pymta River.

3.3.1 Pink Salmon

Distribution

Pink Salmon are the most abundant salmon species in western Kamchatka (Semko 1954). This species is found throughout the north Pacific, including streams of western Kamchatka south of 54° Northern Latitude. The largest populations in western Kamchatka occur in the Bolshaya, Vorovskaya, and Kikhchik rivers. Unit of certification rivers contribute approximately 30% of the regional return on average (Shevlyakov et al. 2016). The distribution of Pink Salmon in western Kamchatka Rivers changed from 1998 to 2006, generally shifting northward.

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 (Temnykh and Kurenkova 2006; Shuntov and Temnykh 2008a). 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. This species spawns throughout the Pymta River basin (Figure 8).

Life History

Pink Salmon return to western Kamchatka primarily in July and August, and spawning occurs in August and September. Spawning typically occurs in the lower and middle reaches of streams, rivers and sometimes the intertidal zone at the mouths of streams. After spawning all Pink Salmon die.

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 a few days in river.

In Western Kamchatka, 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 West Kamchatka rivers. All Pink Salmon spawn at the 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 become most abundant. In Western Kamchatka, a massive run of Pink Salmon in 1983 resulted in excessive spawning escapement that subsequently depressed odd-year runs (KamchatNIRO 2013). The even-year return now dominates.

Stock Structure

Run patterns in larger river systems suggest that the aggregate return includes a number of substocks. 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. 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; Zhivotovsky et al. 2008; Shpigalskaya et al. 2011). However, the available information on Pink Salmon genetic stock structure and straying patterns is not conclusive. It remains unclear whether historical genetic methods found no stock structure because none existed or because the available methods lacked sufficient power to identify differences. More recent genetic analyses of Pink Salmon using microsatellites have been similarly inconclusive.

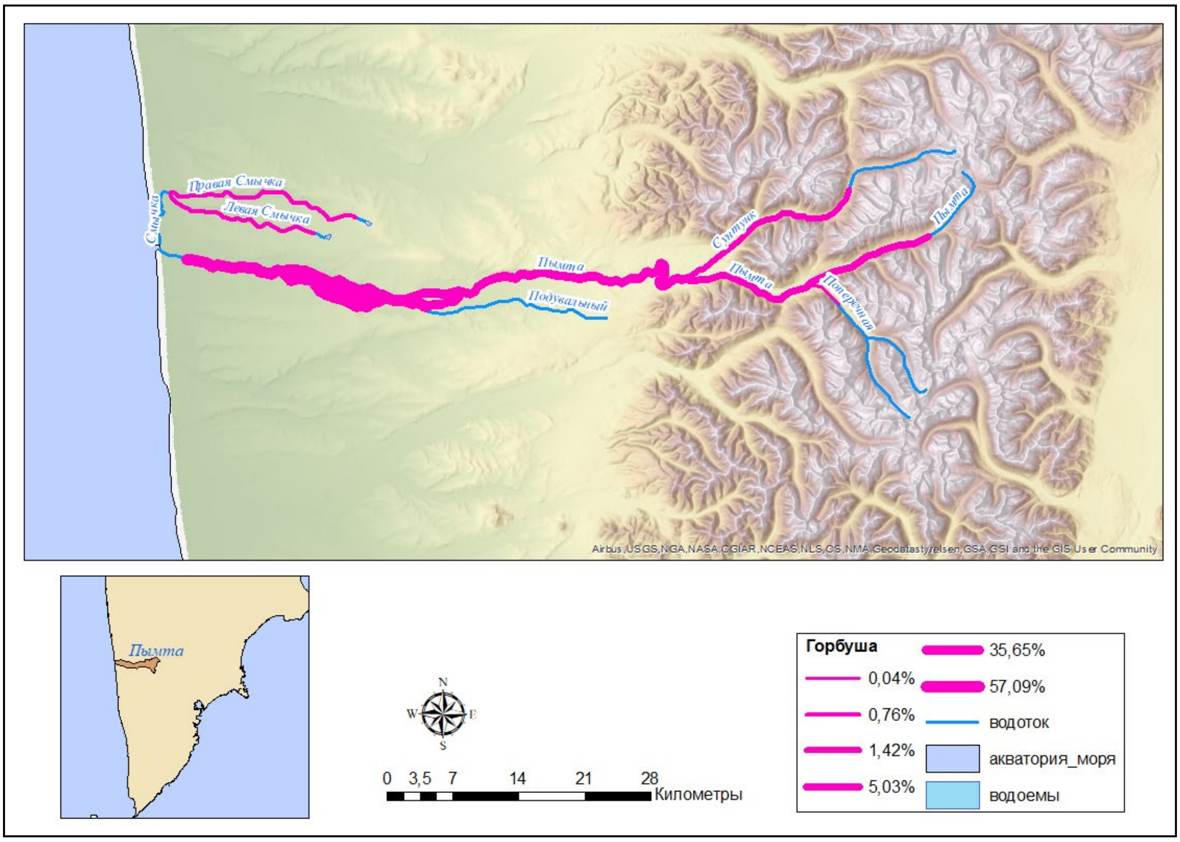


Figure 8. Distribution of spawning grounds of Pink Salmon in the Pymta Rivers (Bugaev et al. 2019aa). Thickness of the rose line reflects contribution of respective spawning grounds to the total capacity of spawning grounds.

Status

This species is currently at historical levels of high production throughout the western Pacific including the west Kamchatka rivers (Figure 9). 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. Directed fishing on Pink Salmon is limited to the even years. Pink Salmon harvest in odd years occurs incidental to harvest of other salmon species, primarily at fishing sites within the river. Total harvest in even years currently averaged approximately 100 million fish per year with annual exploitation rates of 40-80%.

Run sizes during odd years have been much lower than even years since 1983 when a very large spawning escapement resulted in a shift in cycle dominance from odd to even years. An abnormally high abundance of spawners in the west Kamchatka rivers in 1983 was believed to subsequently depress the odd-year cohort due to digging of the spawning grounds, excessive density of spawners therein and high mortality of the offspring at early stages of ontogenesis resulting from organic contamination of nests and spawning grounds (Shevlyakov et al. 2016). The odd-year cohort has begun to rebound somewhat with several significant runs since 2003.

Even-year numbers have decreased in the 2012-2014 cycle for unknown reasons (Shevlyakov et al. 2016). Spawning escapement was high in 2012 and produced a strong year-class of downstream migrants. Work on genetic identification of the west Kamchatka origin Pink Salmon in trawl catches during autumn in the Sea of Okhotsk showed a drop abundance as confirmed by a low run to the west Kamchatka coast in 2014. Numbers have subsequently rebounded with a large run in 2016 and a very large run in 2018.

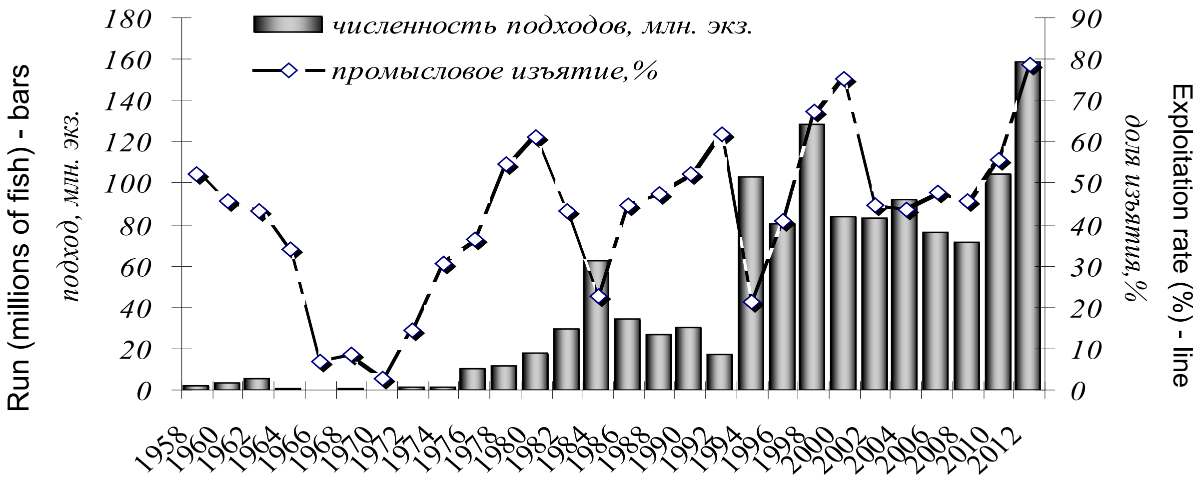


Figure 9. Dynamics of even-year commercial catch of Pink Salmon of Western Kamchatka (vertical bars = run size, left; line = exploitation rate, right).

Management

Spawner-recruitment analysis of the aggregate western Kamchatka return has estimated that maximum sustained yield (MSY) is produced by spawning escapements (Figure 10). Fisheries on the west coast of Kamchatka are managed to achieve region-wide escapement goals. Fisheries are regulated to ensure that significant escapements are distributed among individual rivers (Figure 11) but each river is not managed to achieve a river-specific goal as long as the aggregate goal is being achieved. Thus, some rivers are fished at higher rates and some at lower rates but MSY-based goals are generally achieved in aggregate. Recent work by KamchatNiro has developed river-specific reference points based on stock-recruitment analysis (Table 8). These reference points include buffers for uncertainty in stock assessment. Recent assessments indicate that spawningescapement goals are generally exceeded in the Pymta River during the dominant even-year run (Figure 12) and are distributed around escapement targets during the subdominant odd-year run (Figure 13).

Spawning escapement of Pink Salmon is estimated based on expansions of aerial counts in a series of index areas throughout western Kamchatka. These surveys estimate that millions of Pink Salmon spawn in western Kamchatka Rivers during dominant (even-numbered) years. Estimates are also made in subdominant (odd-numbered) years. However, Shevlyakov and Maslov (2011) reported that odd-year escapement estimates are subject to significant error and cannot be used as a prognostic parameter.

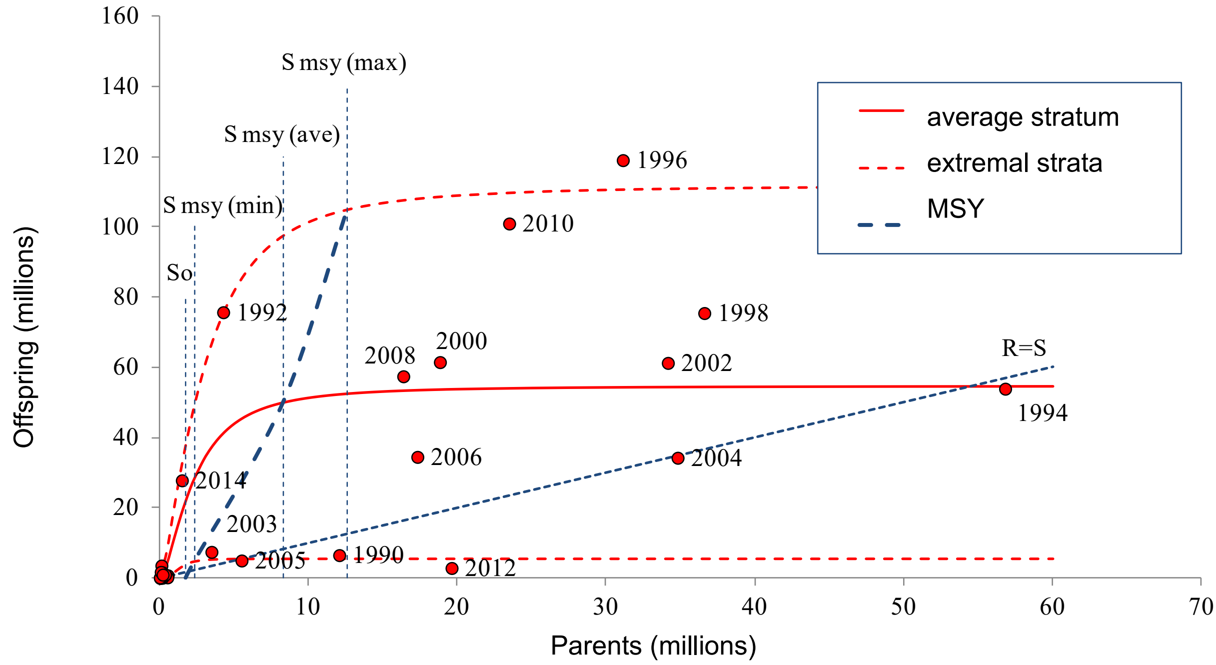


Figure 10. Spawner-recruit relationship for Western Kamchatka Pink Salmon (Bugaev et al. 2019a).

Table 7. Target and limit reference points for Western Kamchatka Pink Salmon (Bugaev et al. 2019a).

Model level	Boundary	Target	
	S lim	S MSY	S*MSY
For depressive generations (minimum stratum), million specimens	2,273	2,684	8,061
For productive generations (medium stratum), million specimens	2,684	8,061	12,585
For over productive generations (maximum stratum), million specimens	8,061	12,585	15,730

S_0 = spawner level S with maximum survival R/S.
S MSY = Spawers as maximum sustained 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).*
Slim = Limit reference point.

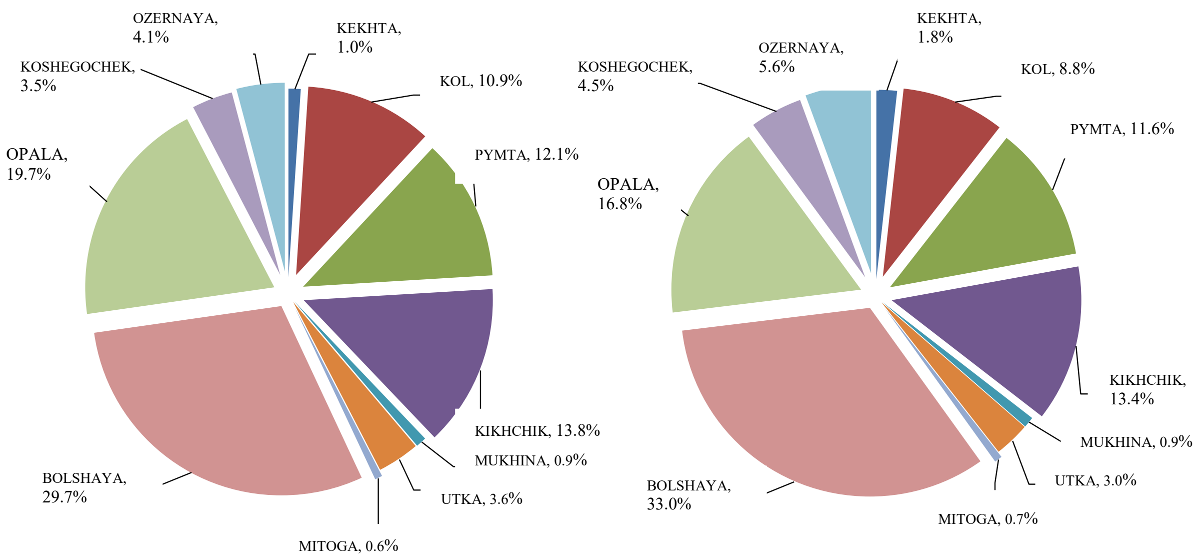


Figure 11. Shares of spawners (on the left) and descendants (on the right) of pink salmon of basic spawning clusters of the rivers of the South-West of Kamchatka (Bugaev et al. 2019a).

Table 8. Parameters of a general stock-recruitment model of pink salmon of the South-Western Kamchatka and the Pymta river. Estimation of pass level by MSY and connected herewith values (Bugaev et al. 2019a).

Models	Parameters, mln specimens			S shares	R shares	Smsy	Rmsy	MSY	Umsy
	a	b	So			Mln	mln	mln	
Minimum Stratum									
General	5.236	2.568	2.273	100%	100%	2.684	5.248	2.563	49%
Pymta	0.607	0.311	0.276	12.1%	11.6%	**0.326**	0.609	0.283	47%
Average Stratum									
General	54.634	4.675	2.273	100%	100%	8,061	50,215	42.154	84%
Pymta	6.336	0.567	0.276	12.1%	11.6%	**0.978**	5.824	4.846	83%
Maximum Stratum									
General	111.9	5.615	2.273	100%	100%	12.585	105.04	92.46	88%
Pymta	12.978	0.681	0.276	12.1%	11.6%	**1.526**	12.182	10.656	87%

a = limit of R replenishment with unlimited spawning stock S,
b = resonance damping coefficient, with effect the stronger the more difference between current S and resonance parameter S0,
S_0 = spawner level S with maximum survival R/S.
S share = percent of west Kamchatha spawners.
R share = percent of west Kamchatha recruits.
*S*MSY = precautionary estimate of spawning escapement at maximum sustainable yield (MSY) determined for the lower boundary of the confidential interval of model regression (α = 0.05).*
Umsy = exploitation rate at MSY.

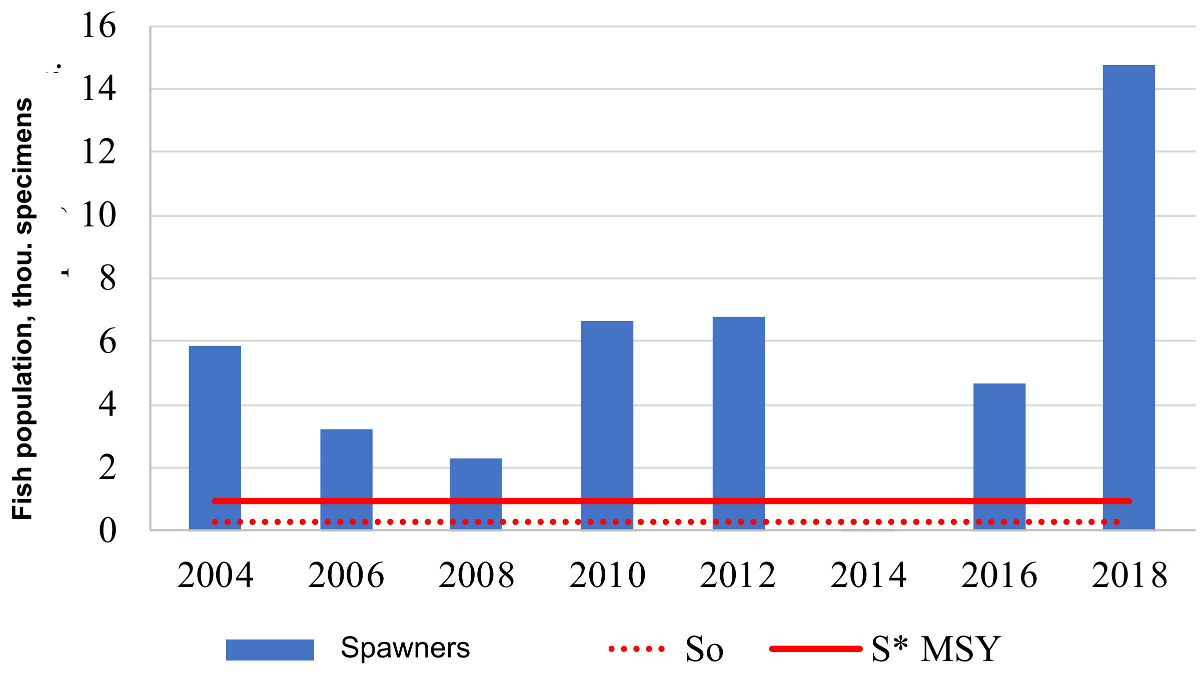


Figure 12. Spawning escapement dynamics of productive generation of Pink salmon to the Pymta river in 2004–2018 (Bugaev et al. 2019a).

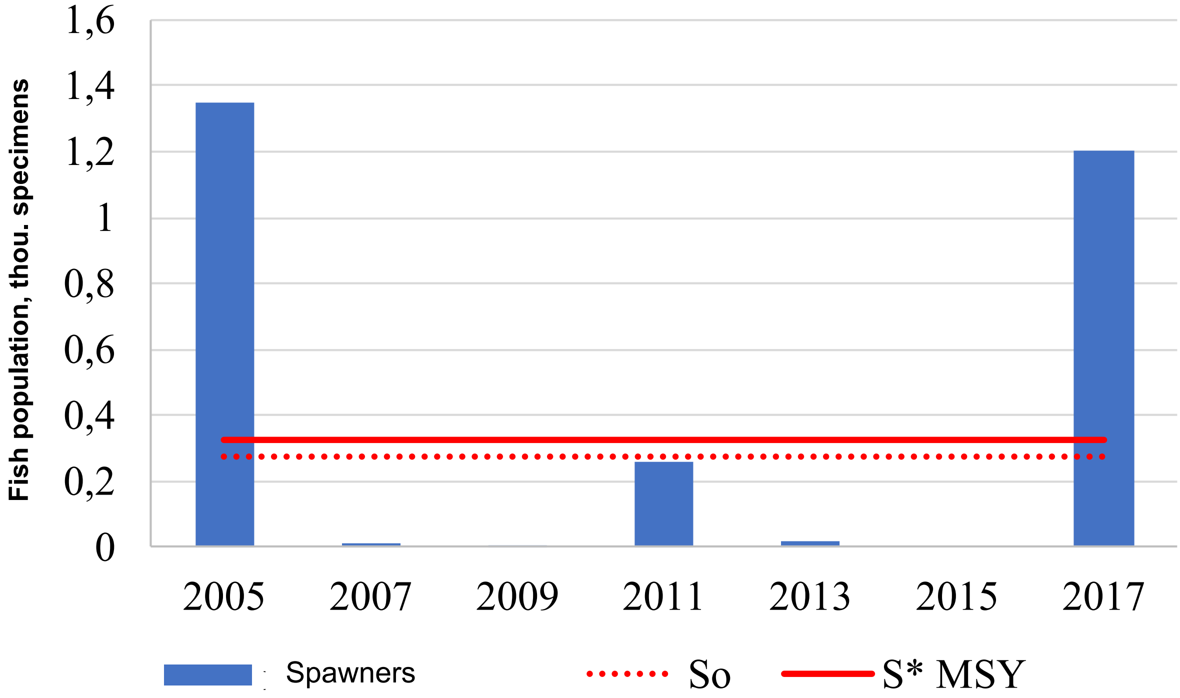


Figure 13. Spawning escapement dynamics of depressive generation of Pink salmon to the Pymta river in 2005–2017 (Bugaev et al. 2019a).

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 western Kamchatka streams. This species spawns throughout the Pymta River basin (Figure 14).

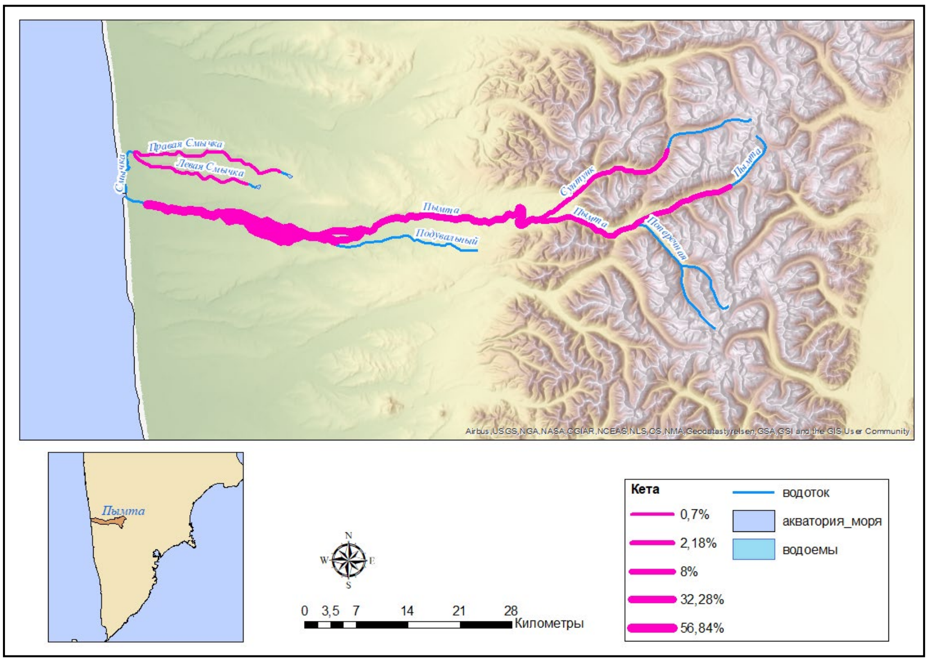


Figure 14. Distribution of spawning grounds of Chum Salmon in the Pymta rivers (Bugaev et al. 2019a). Thickness of the rose line reflects contribution of respective spawning grounds to the total capacity of spawning grounds.

Life History

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

Western Kamchatka Chum Salmon typically average about 3 to 4 kg in weight and 60 to 70 cm in length. Age of maturity is 2 to 6 years (primarily at 4 years of age). Age composition of Bolshaya Chum has varied over 70 years of records. Percentages of younger fish (2+ and 3+) increased from 1940-1960. The percentage of older fish (4+, 5+, 6+) has increased since the early 1970s. Older fish are typically more abundant in the early portion of the run and younger fish in the later portion of the run.

Fecundity typically ranges between 2,400 and 3,100 eggs. Eggs incubate over the winter before hatching in early spring. Juvenile Chum Salmon spend one-two months in the fresh water after hatching and then migrate to the sea soon after emergence in the spring.

Table 9. The age structure of some groups of Chum Salmon on the Western coast of Kamchatka.

Years	Age structure, %						Average age
	1+	2+	3+	4+	5+	6+	
Vorovskaya River							
1991–1995	–	0.6	37.6	54.3	7.5	–	3.69
1996–2000	–	0.7	47.1	43.7	8.5	–	3.60
2001–2005	–	0.9	50.5	43.9	4.7	+	3.52
2006–2010	–	1.1	42.4	49.1	7.2	0.2	3.63
2011–2013	0.1	1.0	22.0	63.3	13.4	0.2	3.90
Kol River							
2001–2005	–	0.1	48.5	41.9	9.5	–	3.61
2006–2010	–	1.1	22.7	55.6	20.6	–	3.96
2011–2013	–	3.1	14.6	50.0	32.3	–	4.11
Opala River							
2001–2005	–	1.1	55.0	39.0	4.9	–	3.48
2006–2010	–	0.9	49.9	38.3	10.9	–	3.59
2011–2013	–	2.3	26.7	62.9	8.1	–	3.77

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. The early run is significant in the Opala River.

Status

Chum Salmon returns and commercial harvest rates have steadily increased in western Kamchatka from very low levels observed in the 1970s (Figure 15). 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, exploitation rates have averaged 90% for an annual average harvest of 17,000 mt. The assessment team suspects that increases in run size and harvest since 2008 result from more accurate commercial catch reporting following the implementation of the "Olympic" management system.

Historical abundance of Chum Salmon has varied widely as evidenced by harvest numbers (Figure 15). Mortality of juvenile Chum Salmon in the Japanese drift net fishery in the open ocean explains much of the variation (KamchatNIRO 2013). High catches in Kamchatka during 1941-1950 coincide with the reduction and cessation of the drift fishery. Returns declined from 1960 - 1980 with the resumption of the drift fishery and climatic factors. Numbers rebounded beginning in the 1990s with regulation of the high seas drift net fishery and favorable ocean conditions for salmon throughout the north Pacific.

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

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

Figure 15. Dynamics of commercial catch of Chum Salmon of Western Kamchatka (vertical bars = run size, left; line = exploitation rate, right).

Management

Escapement objectives are identified for Chum Salmon based on historical production patterns although the spawner-recruit relationship is not as pronounced for Chum Salmon as for other species in western Kamchatka (Shevlyakov 2004). Maximum yield is estimated to be produced by an aggregate spawning escapement of 300,000 Chum (Figure 16). Based on the spawner-recruit analysis, the low boundary mark of Chum Salmon escapement for the whole the South-Western Kamchatka is set equal to 172 thousand specimens (parameter S0), and benchmark is within 300–373 thouand specimens (Bugaev et al. 2019a).

Fisheries on the west coast of Kamchatka are managed to achieve region-wide escapement goals. Fisheries are regulated to ensure that significant escapements are distributed among individual rivers but each river is not managed to achieve a river-specific goal as long as the aggregate goal is being achieved. 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).[1] Recent work by KamchatNiro has developed river-specific reference points based on stock-recruitment analysis (Table 10). Escapements are generally distributed above and below target values in the Pymta River.

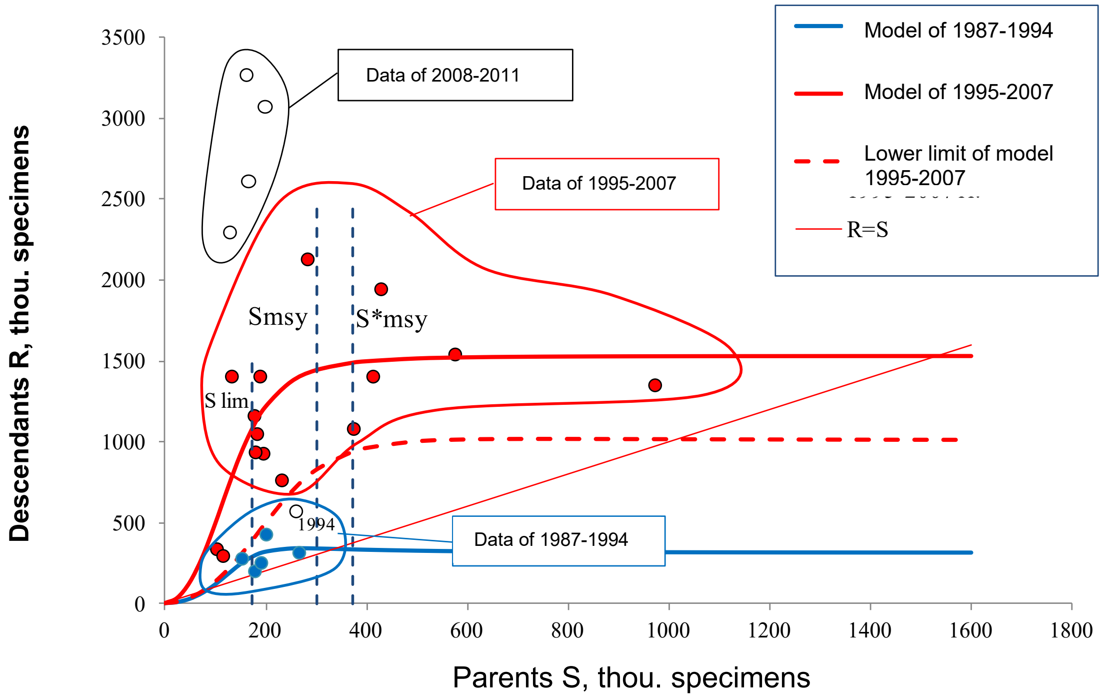


Figure 16. General model of Chum Salmon recruit dependence on spawners for the South-West of Kamchatka. Marker without filling means unused observations (Bugaev et al. 2019a).

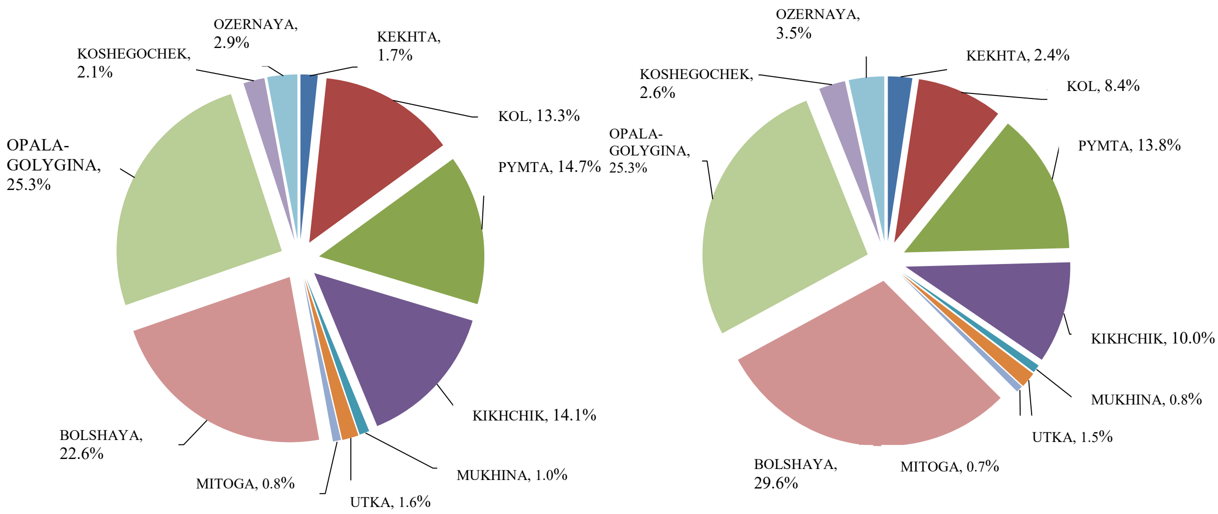


Figure 17. Shares of spawners (on the left) and descendants (on the right) of Chum Salmon of basic spawning streams and clusters of the South-West of Kamchatka (Bugaev et al. 2019a).

[1] KamchatNIRO reports that spawning escapement estimates are substantially underestimates salmon due to incomplete spawning surveys, particularly in recent years. As a result, exploitation rates derived from harvest and escapement numbers are substantial overestimates. For instance, rates of 100% are reported in years when no spawning escapement data is available due to a reduction in aerial survey funding. As a result, numbers reported for escapement in Table 16 should be considered indices rather than than absolute estimates.

Table 10. Escapement reference points (thousands of fish) for Chum Salmon in West Kamchatka Rivers (Bugaev et al. 2019a).

Models	Parameters, a	b	So	Shares S	Shares R	Smsy	Rmsy	MSY	Umsy
General	1534	246	**172**	100%	100%	**300**	1445	1145	79%
Pymta	211.2	36.1	**25.2**	14.7%	13.8%	**44.0**	198.9	154.9	78%

Table 11. Precautionary estimations of pass level by MSY and connected herewith values based on parameter uncertainty (lower limit *a*, and upper limits *b* and S_o were used)

Models	Parameter *a*	*b*	S_0	S^*_{MSY} thou.	R^*_{MSY} thou.	*MSY thou.	U^*_{MSY}
General	1008	364	67	**373**	733	360	49%
Pymta	138.7	53.4	40.6	**54.7**	129.1	74.4	58%

a = limit of R replenishment with unlimited spawning stock S,
b = resonance damping coefficient, with effect the stronger the more difference between current S and resonance parameter S0,
S_0 = spawner level S with maximum survival R/S (also designated as Slim boundary reference point).
S share = percent of west Kamchatha spawners.
R share = percent of west Kamchatha recruits.
S MSY = estimate of spawning escapement at maximum sustainable yield (MSY).
*S*MSY = precautionary estimate of spawning escapement at maximum sustainable yield (MSY) determined for the lower boundary of the confidential interval of model regression (α = 0.05).*
Umsy = exploitation rate at MSY.

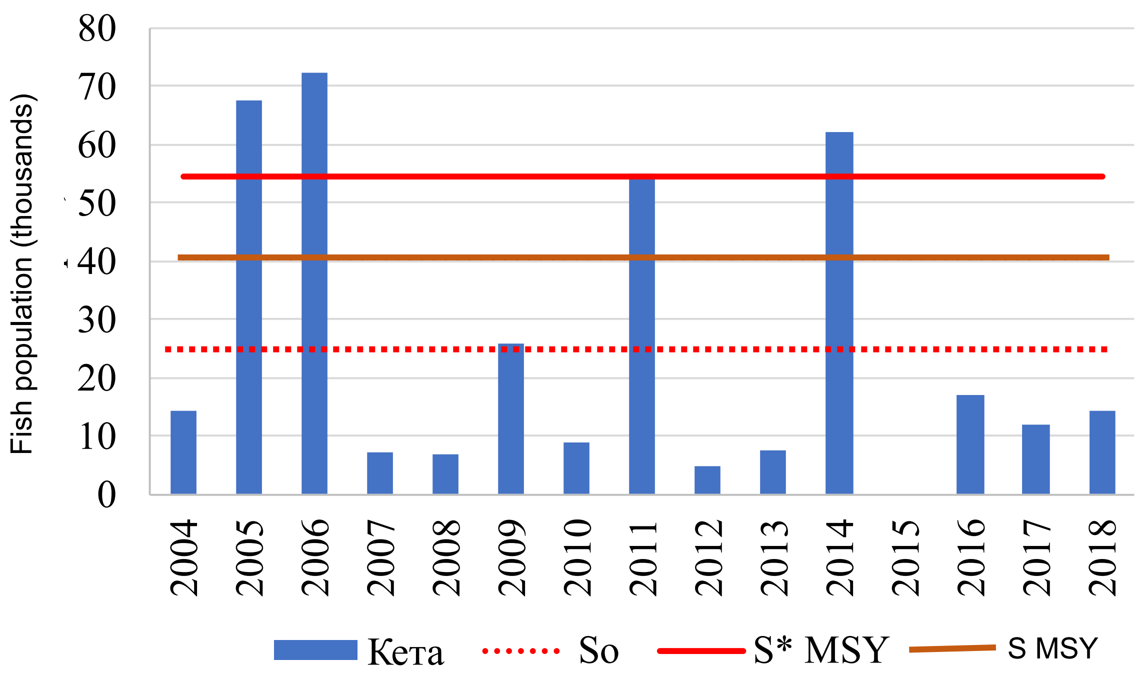


Figure 18. Spawning escapementof Chum Salmon to the Pymta river in 2004–2018 (Bugaev et al. 2019a).

3.3.3 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. 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.

Aerial surveys have been conducted since 1950 almost without interruption (Ostroumov, 1964). 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. 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 19). Current effort is allocated to high value index areas and flights are timed to allow counting of multiple species (Shevlyakov and Maslov 2012). Index areas were established by selecting the most representative areas in the comprehensive historical data set.

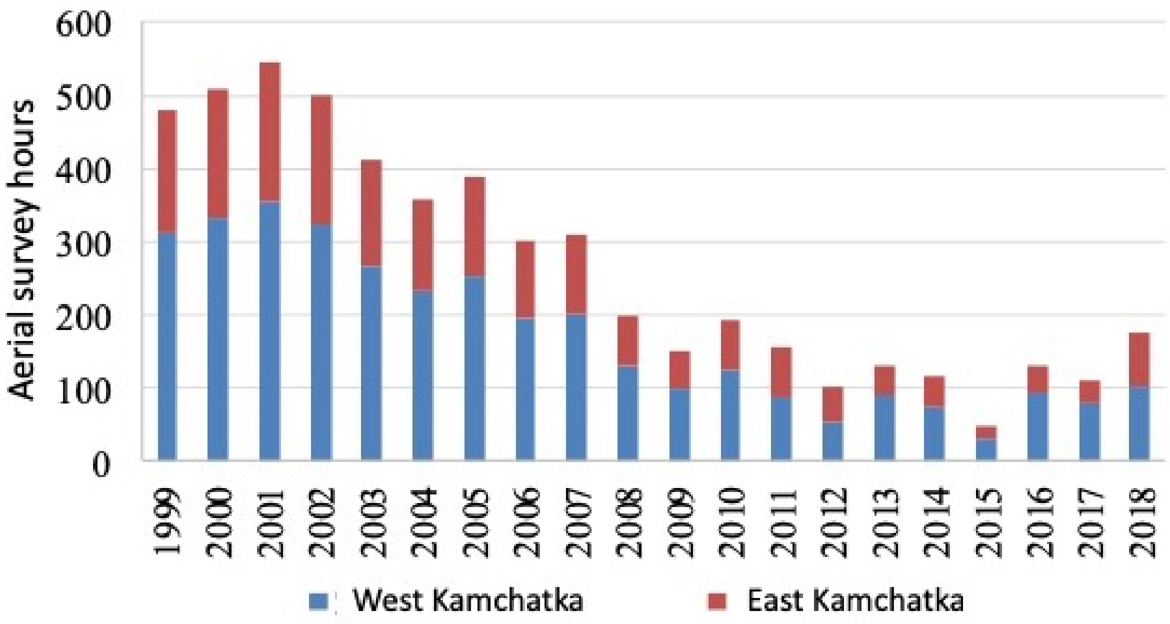


Figure 19. Annual aerial survey escapement monitoring effort (flight hours) conducted by KamchatNIRO, 1999-2018. Source: Bugaev et al. 2018a.

Counts from index areas are expanded to non-index areas based on formulae established from historical sampling data. For instance, Bolshaya is a reference river for the region that includes the Kikhchik, Mukhina, Khomutina, Utka, Mitoga and Bolshaya rivers. Recent aerial survey effort in western Kamchatka is summarized in Table 12. Bugaev et al. (2019) report that at present for the Pymta River, due to the lack of funding, aerial work in full is carried out only to count number of humpback and chum salmon. Number of red and coho salmon are irregular and often fragmented.

Figure 20. Index rivers for West Kamchatka Salmon by subzone (KamchatNIRO unpublished).

Table 12. Flight hours used for monitoring escapement of salmon in the target rivers (as planned and actual data) for 2018 in western Kamchatka.

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

		September			
Late form of chum salmon Coho salmon	Ozernaya Koshegochek Golygina Opala	End of september	6 h	- - - 08.10	3 h 10 min
	Kol, Vorovskaya	End of septermber – Beginning of october	6 h	11.10; 15.10	3 h 20 min
Total hours:			**48 h**	-	**29 h**

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

Remote methods include hydroacoustic methods, and photo and video recording are also being evaluated as an alternative for stock assessment. Similar equipment has long been used in eastern Kamchatka (Degtev et al. 2012) and Alaska. Hydroacoustic equipment was tested in the Kikhchik River in 2013 for Coho Salmon but effectiveness was limited due to an unseasonal flood.

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. 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 21). 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 consideration 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 (Slim + tα*σSo) where tα is Student's coefficient as a given level of probability belief (α = 0.05), σSo is standard deviation of parameter S0 estimate.

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

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

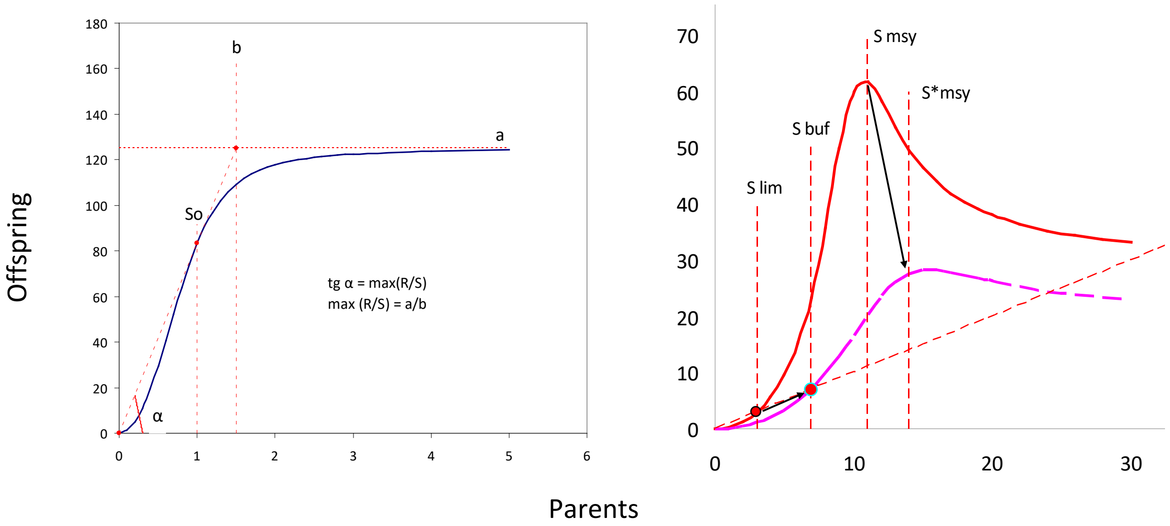


Figure 21. Depiction of boundary and buffer reference points (right) defined for West Kamchatka Chum Salmon stock-recruitment model (left).

Management Strategy

For management purposes, the Kamchatka peninsula coastal zone is subdivided into several management units (six in Western Kamchatka coast). 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 like the Bolshaya, passing days are managed by river zone because fishery is spread over a large area and fish need to transit the fishery. Area closures are staggered to provide passage. The freshwater fishing area is more concentrated in smaller systems like the Opala, so passing days are typically applied to the entire river. For instance, two passing days are typically closed per week on the Opala River where only three users are concentrated in the lower river. In the Ozernaya River, passing days are typically two days of no fishing followed by two days of fishing. The number of passing days may be reduced to avoid exceeding established escapement goals.

Areas and dates that sea nets can be fished are also regulated. Regulations may take the form of temporary closures where leads and traps are tied up so as to allow fish to pass or season-long closures where nets are removed. Sea nets are very effective and can take up to 90% of the catch if unregulated. The majority of sea nets are typically fished only during even years when the dominant cohort of Pink Salmon is returning.

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

Shevlyakov et al. (2016) report that the main document regulating salmon fishery for a certain year is a basic protocol that establishes conditions, regulation measures and harvesting restrictions for the current fishing season. Protocols following the basic one revise regulations based on current fishery conditions.

3.3.4 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 on rivers included in this assessment.

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 I in the Unit of Assessment but subject to management tools and measures intended to achieve stock management objectives reflected in either target or limit reference points. Primary harvested species addressed by this assessment include Coho Salmon, Sockeye Salmon, and Chinook salmon. Coho and Sockeye in the commercial catch are retained, processed and sold. Chinook are not subject to commercial fishing or sale but small numbers may occasionally be caught during early season fisheries in some rivers.

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” retained species if there is concern that the fishery is having a negative impact on the stock status or if the volume of the fishery is very large. All other species are identified as “not main.”

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

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

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

Sockeye Salmon

<u>Distribution</u>

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. The Ozernaya population dominates the west Kamchatka return. Significant Sockeye populations also occur in Western Kamchatka in the Bolshaya River system (including Lake Nachikinskoe) and the Palana River. Smaller populations also occur in a number of other systems throughout the region including lakes Golyginskoe and Kambalnoe, and the Kikhchik and in Opala Rivers (Figure 22). Small populations of Sockeye occur in the Vorovskaya. Kol and Pymta rivers. Some Sockeye hatchery production occurs in the Bolshaya River but these fish are estimated to contribute 5-6% of the total commercial catch in the Bolshaya based on scales pattern analysis (Bugaev et al. 2001; Bugaev 2011).

The marine period of western Kamchatka Sockeye has been studied quite well, primarily for Ozernaya population. After migrating to the sea, smolts spend 2-3 months in the Sea of Okhotsk near the river of origin and then migrate southeastwards into the western north Pacific and Bering Sea.

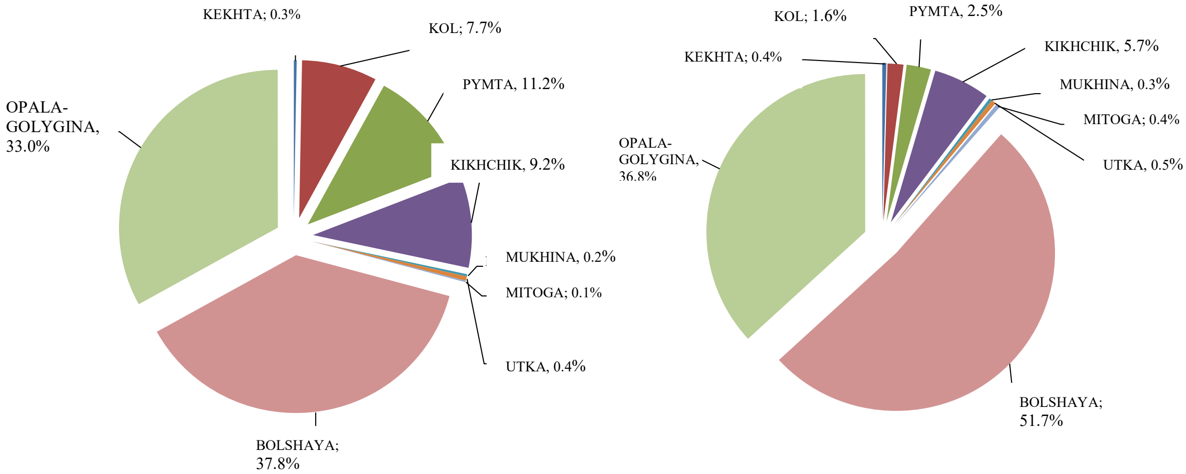


Figure 22. **Shares of spawners (on the left) and descendants (on the right) of basic spawning streams and clusters of the South-West of Kamchatka, not including the large Ozernaya stock (Bugaev et al. 2019a).**

<u>Life History</u>

Ozernaya and Bolshaya Sockeye have been studied extensively (Bugaev 1995; Bugaev et al. other, 2001, 2002). Sockeye typically average 2 to 3 kg and 55 to 60 cm in length. Adults typically return to spawn at 5 or 6 years of age but can spend 1 to 5 years at sea. Sockeye generally return to freshwater from early May to late August. Commercial quantities are generally available from late May to early August. Spawning may occur from July until January.

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). Sockeye Salmon production in small and medium river basins is low. Spawning may occur in lake tributaries, outlet streams or along the lake shore. Spawning of Ozernaya Sockeye occurs predominately in the littoral zone of Kuril Lake at depths of 3 m or less and also in the upstream part of Ozernaya River and in lake tributaries. In the Pymta River sockeye, appear to spawn in the river and associated sloughs (Figure 23).

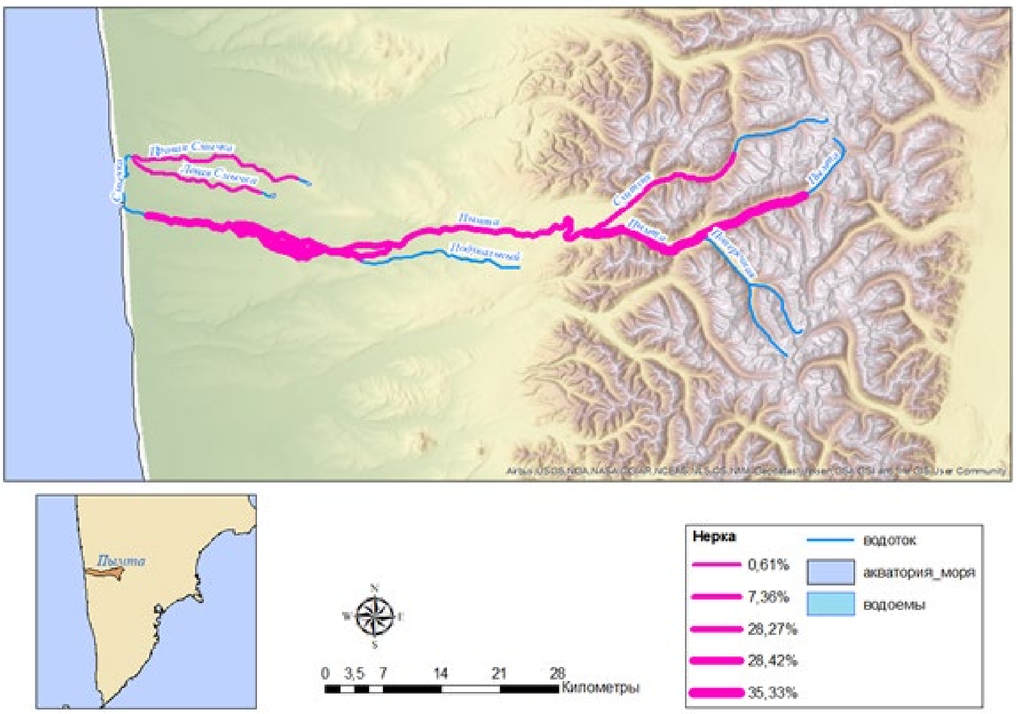


Figure 23. Distribution of spawning grounds of Sockeye Salmon in the Pymta River (Bugaev et al. 2019a). Thickness of the rose line reflects contribution of respective spawning grounds to the total capacity of spawning grounds.

Juvenile Sockeye typically rear in lakes where they feed on zooplankton. Sockeye smolts typically rear in freshwater for one to three years before undergoing a physiological transformation to smolts and migrating to the sea in June and July.

Stock Structure

Sockeye runs are generally comprised of populations returning to specific spawning and rearing areas. These populations are typically demographically and genetically distinct. Late run Sockeye are generally larger than early run Sockeye but age composition is often similar.

Two seasonal races of Sockeye are recognized in many areas of west Kamchatka. In the Ozernaya River, an early run returns primarily in June and early July to spawn in tributaries to Kuril Lake. A late run returns primarily in July and August to spawn in Kuril Lake and the Ozernaya River. The later part of the early run and the early portion of the late run overlap substantially in timing. The late run predominates in the Ozernaya systemaccounting for approximately 98%.

In the Bolshaya River, early (May-June) and late (July-August) returning portions of the run are believed to be primarily lake and stream spawners, respectively. Four isolated temporal groups are identified in the Bolshaya system: early and late runs of Lake Nachikinskoe, and late runs in the main tributaries of the rivers Bystraya and Plotnikova. The early run in Lake Nachikinskoe spawns in tributary streams while the late run spawns in littoral areas of the lake. Early Sockeye currently predominate (55%) in the Bolshaya River, although late Sockeye comprised 70-75% of the total run in the 1930s and 1940s. The Opala River Sockeye run also includes a significant early component.

Status

Sockeye abundance, as evidenced by Ozernaya numbers, is currently at record high levels (Figure 24). Returns to western Kamchatka streams have increased substantially since control 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.

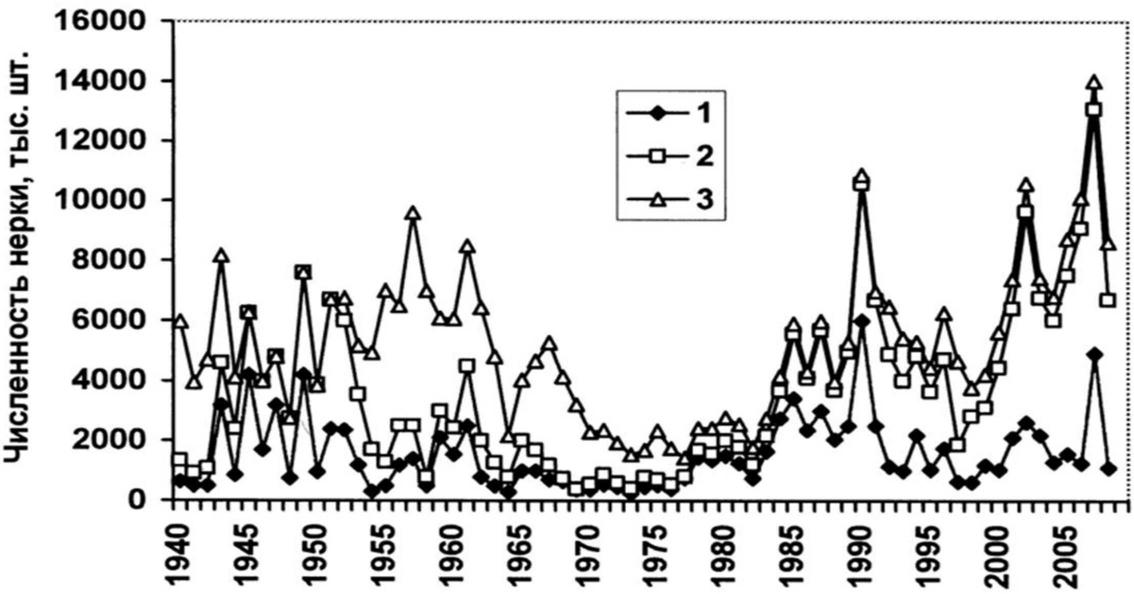


Figure 24. Ozernaya Sockeye abundance (millions) [y-axis], 1941-2010 (Dubynin et al. 2007; Antonov et al. 2007; Bugaev et al. 2009). 1=mature part of the stock, 2=fish approaching the shore, 3=spawners.

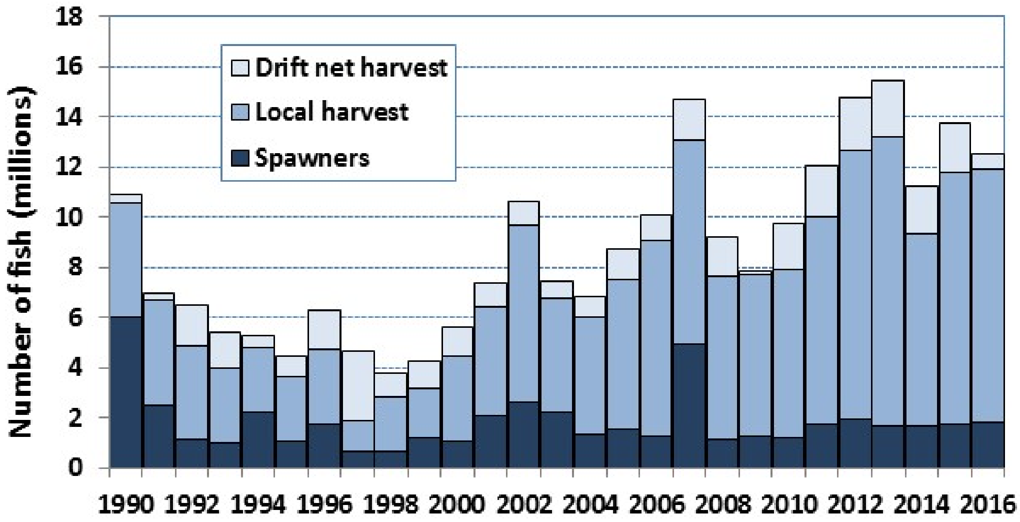


Figure 25. Abundance, harvest and escapement of Ozernaya Sockeye, 1990-2016.

The main commercial Sockeye Salmon fisheries in Western Kamchatka occur in the Ozernaya, Bolshaya and Palana Rivers. The Sockeye harvest is dominated by the Ozernaya stock. Recent 10-year annual harvest of Ozernaya Sockeye in terminal marine and river fisheries has averaged about 10 million fish per year (about 22 thousand metric tons). Another 1.7 million Sockeye were historically harvested per year in marine drift net fisheries in the Russian exclusive economic zone although this fishery was closed in 2015. Corresponding annual exploitation rates of Ozernaya Sockeye currently average about 84%. These rates equal or exceed the highest exploitation rates documented for any Pacific Sockeye population.

Outside of the Bolshaya and Ozernaya Rivers, most harvest of Sockeye in West Kamchatka occurs in marine waters (Shevlyakov et al. 2016). Sockeye typically migrate southward along the western Kamchatka coast where they may be intercepted in marine trap nets. As a result, Sockeye harvest along the coast south of the Bolshaya is dominated by large contributions of Ozernaya population. Ozernaya Sockeye are estimated to account for 50% of the coastal marine trapnet harvest near the Bolshaya River, 90% near the Opala, and almost 100% south of the Koshegochek Rivers.

Catches of Sockeye Salmon in and near most rivers are relatively incidental and small compared to those of Pink, Chum and Coho Salmon. It should also be noted that recent large increases in reported harvest may be in part due to the elimination of incentives for under-reporting of commercial harvest following management system changes in 2008.

Management

Escapement of Ozernaya Sockeye is estimated at a weir at the mouth of Kuril Lake. Escapements of Ozernaya Sockeye are managed to produce maximum sustained yield based on production curves fit to spawner-recruit data (Figure 26). Current escapement goals are 1 to 2.3 million Sockeye as counted at the weir (1.5-1.9 million optimum). Escapement goals for the period 1970-1994 were 2.5-3.5 million (3 million optimum). Escapement goals have been consistently met or exceeded since the goal was reduced in 1994.

Spawning escapement of other western Kamchatka Sockeye Salmon is estimated based on expansions of aerial counts in a series of index areas. Optimum escapement levels have been identified based on analyses of historical production and habitat availability. Recent work by KamchatNiro has developed river-specific reference points based on stock-recruitment analysis (Figure 27, Table 13).

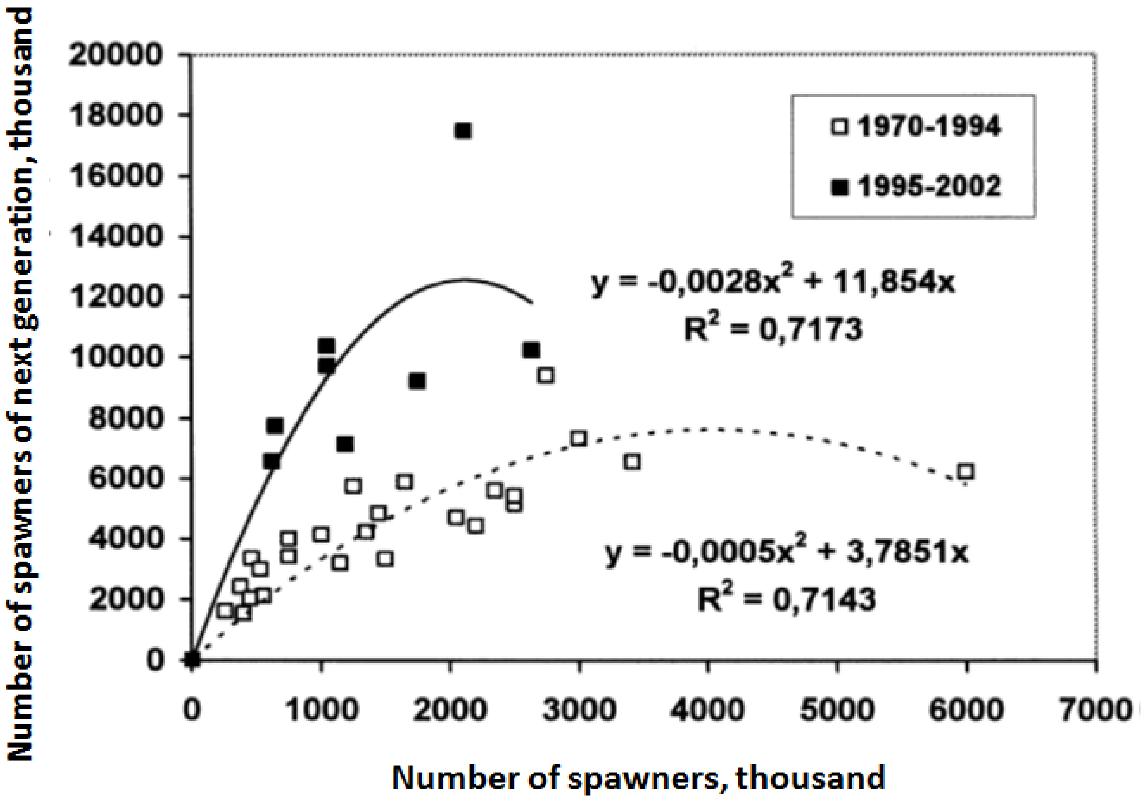


Figure 26. Spawner-recruit relationships for Ozernaya Sockeye (thousands of fish) (from Bugaev et al. 2009).

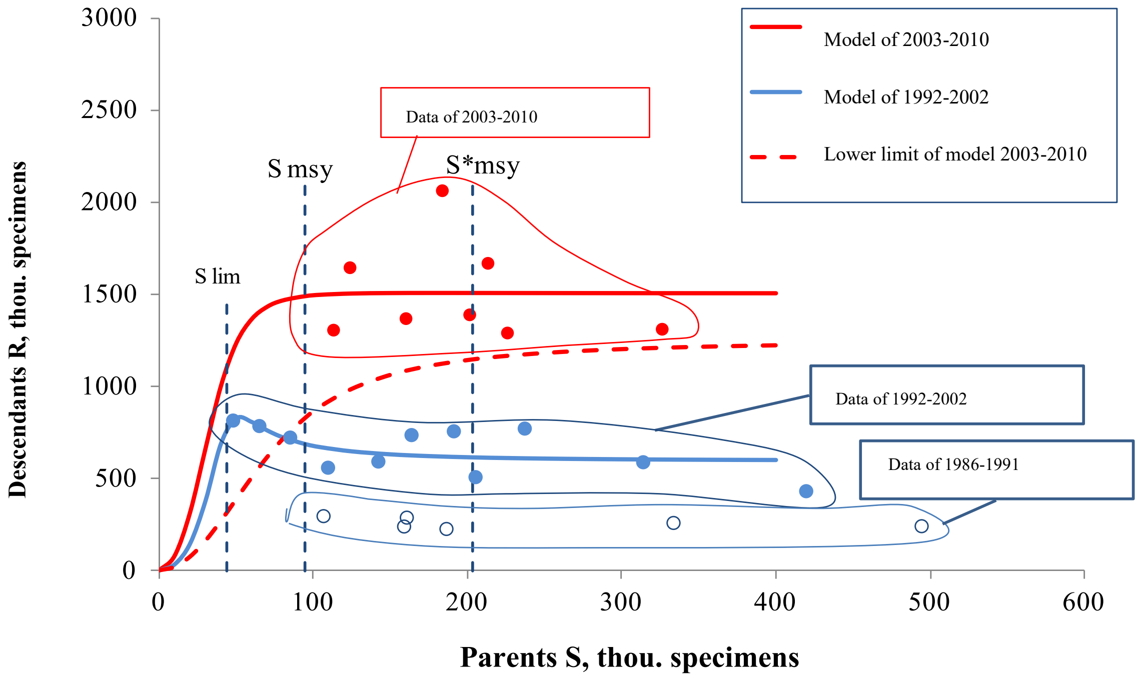


Figure 27. General model of recruit dependence on sockeye Salmon spawners of the South-Western Kamchatka (Bugaev et al. 2019a).

Table 13. Escapement reference points (thousands of fish) for Sockeye Salmon in west Kamchatka Rivers (Bugaev et al. 2019a).

Models	Parameters			Shares S	Shares R	S_{MSY}	R_{MSY}	MSY	U_{MSY}
	a	*b*	S_0						
General	1507	60	43	100%	100%	95	1492	1398	94%
Pymta	39.7	6.7	4.8	11.2%	2.6%	**10.6**	39.3	28.8	73%

a = limit of R replenishment with unlimited spawning stock S,
b = resonance damping coefficient, with effect the stronger the more difference between current S and resonance parameter S0,
S_0 = spawner level S with maximum survival R/S.
S share = percent of west Kamchatha spawners.
R share = percent of west Kamchatha recruits.
*S*MSY = precautionary estimate of spawning escapement at maximum sustainable yield (MSY) determined for the lower boundary of the confidential interval of model regression (α = 0.05).*
Umsy = exploitation rate at MSY.

Estimates of recent escapements in the Pymta generally fall below a range described by precautionary boundary (S_{buf}) and precautionary MSY (S^*_{msy}) reference points (Figure 28). Bugaev et al. (2019) report that fluctuations in spawner estimates also reflect a reduction in aerial survey effort. Against this background, when planning flights, a choice is made in favor surveying the most abundant species. Red salmon is relatively less abundantand its spawning migration period does not significantly overlap with the more-abundant Pink Salmon. Therefore, as a rule, the number of Sockeye can be significantly underestimated. The inability to demonstrate that Pymta River Sockeye runs are consistently exceeding limit reference points or fluctuating around the target range is the reasonfor not qualifying for certification. These issues are similar for other non-Ozernaya Sockeye in western Kamchatka.

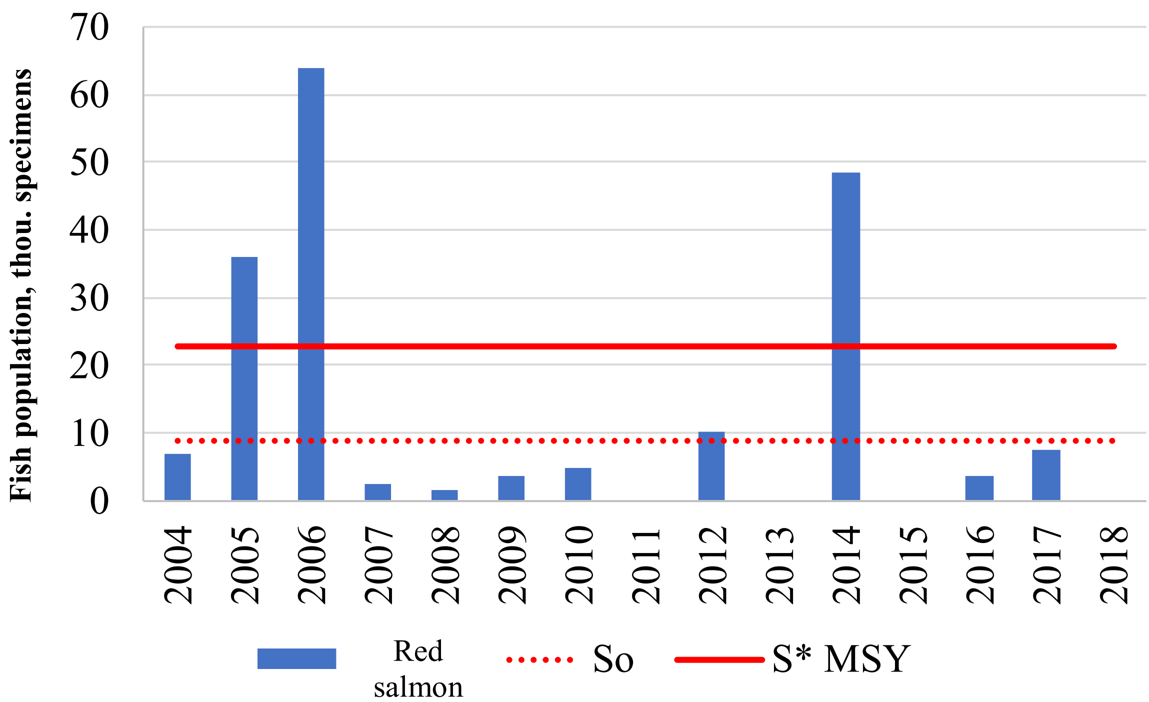


Figure 28. Spawning escapement dynamics of sockeye salmon to the Pymta river in 2004–2018 (Bugaev et al. 2019a).

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. Commercial quantities occur from Palana Village south to the Kambalnaya River. Significant populations in southwest Kamchatka occur in the Bolshaya River and in the rivers of the Central-West region including the Vorovskaya, Krutogorova, Pymta, Kol, and Kikhchik (Figure 29).

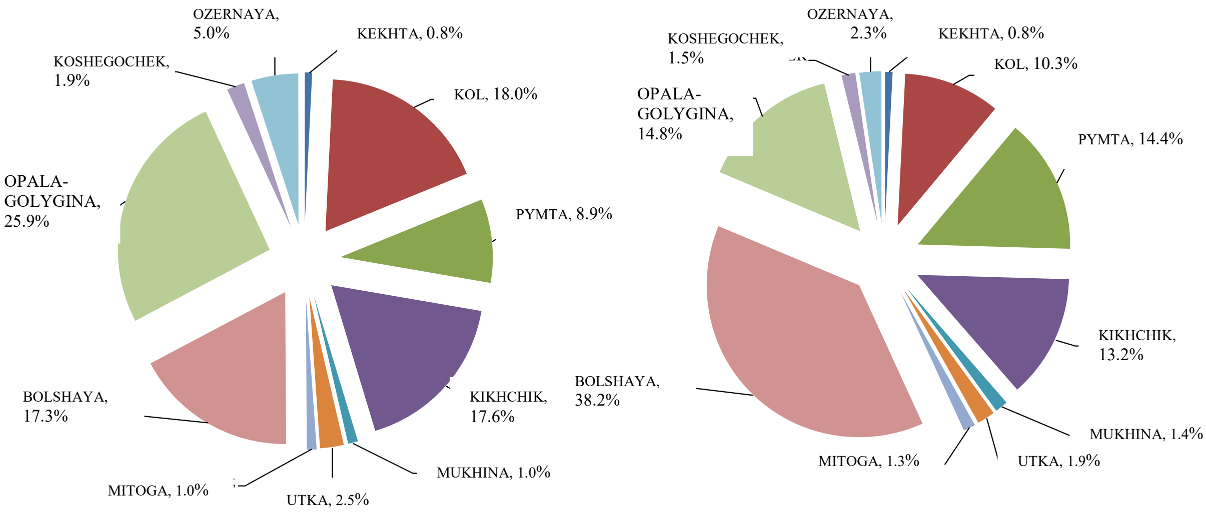


Figure 29. Determination of Coho Salmon parent and descendant percentage by clusters (Bugaev et al. 2019a).

The amount of Coho Salmon spawning habitat varies by river in Western Kamchatka. The Vorovskaya River is one of the largest rivers and accounts for about 8% of the total spawning grounds along the western coast. The Kol, Opala and Ozernaya Rivers contribute 5.0%, 3.3% and 1.7%, respectively of the Coho Salmon spawning habitat in Western Kamchatka (Shevlyakov et al. 2016). The greatest densities of spawners are found in groundwater upwelling areas where production potential is higher. Nearly 22% of the spawning habitat in the Kol River is in upwelling areas, compared to 19% in the Opala and 10% in the Vorovskaya River. The Ozernaya has the least amount of suitable Coho spawning habitat.

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. Spawning occurs throughout the Pymta River system (Figure 30).

Western Kamchatka Coho average 3.0 - 3.5 kg in size but may reach 5 to 7 kg. Adults typically return to spawn at 3 to 4 years of age after 1 year at sea. Juvenile Coho may rear in streams for one to three years before undergoing a physiological transformation to smolts and migrating to the sea. As with other species that have a protracted freshwater rearing period, Coho Salmon are characterized by a complex age structure that includes up to 8 different age-at-maturity groups. The commercial harvest is almost always comprised of age of 1.1+, 2.1+, 3.1+ fish that reared in freshwater 1 to 3 years and resided one year in the ocean. In some years, the spawning run may include a small number of fish that spent two years at sea (1.2+ 2.2+), and also a small number of “jacks” or “kaurkas” that return to freshwater the same year they out-migrate to sea (1.0, 2.0, 3.0). On average, the dominant age class in the Vorovskaya, Kol and Opala Rivers is age 2.1+ (i.e. most juveniles resided in the river for two years before outmigrating to the sea (Figure 31).

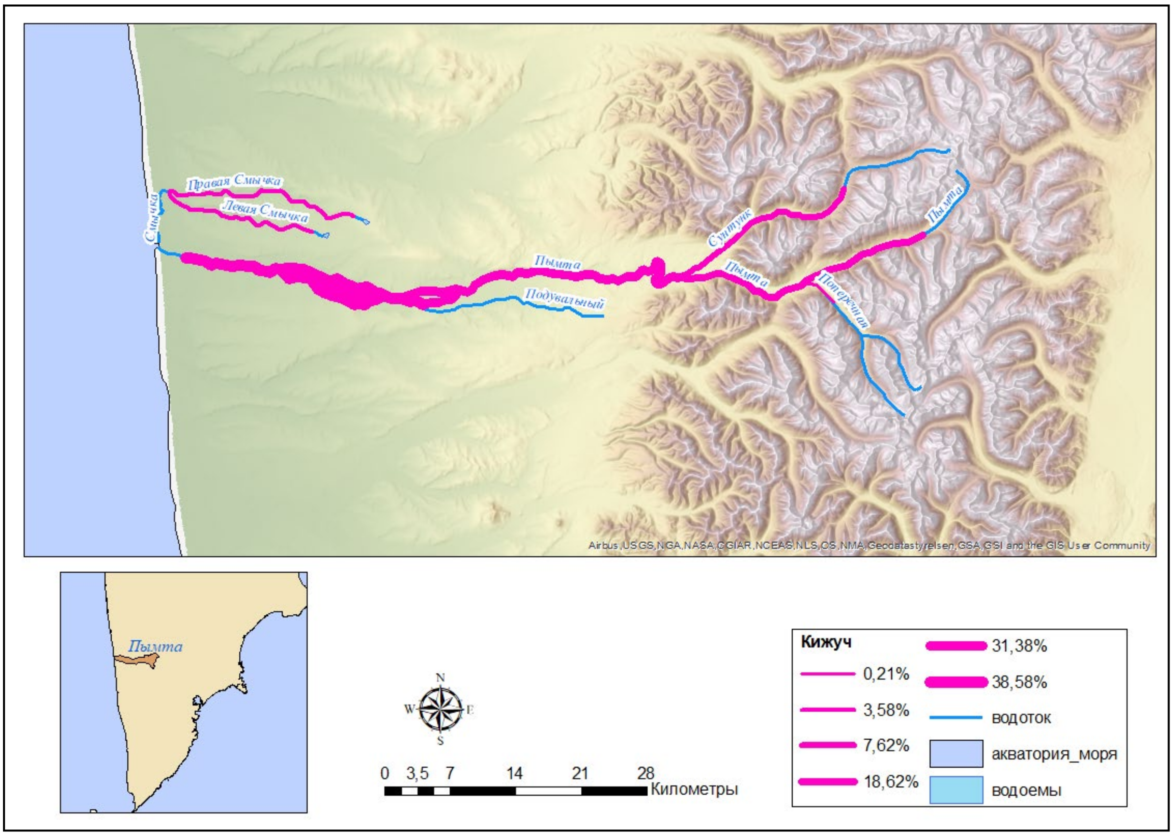


Figure 30. Distribution of spawning grounds of Coho Salmon in the Pymta River (Bugaev et al. 2019a). Thikness of the rose line reflects contribution of respective spawning grounds to the total capacity of spawning grounds.

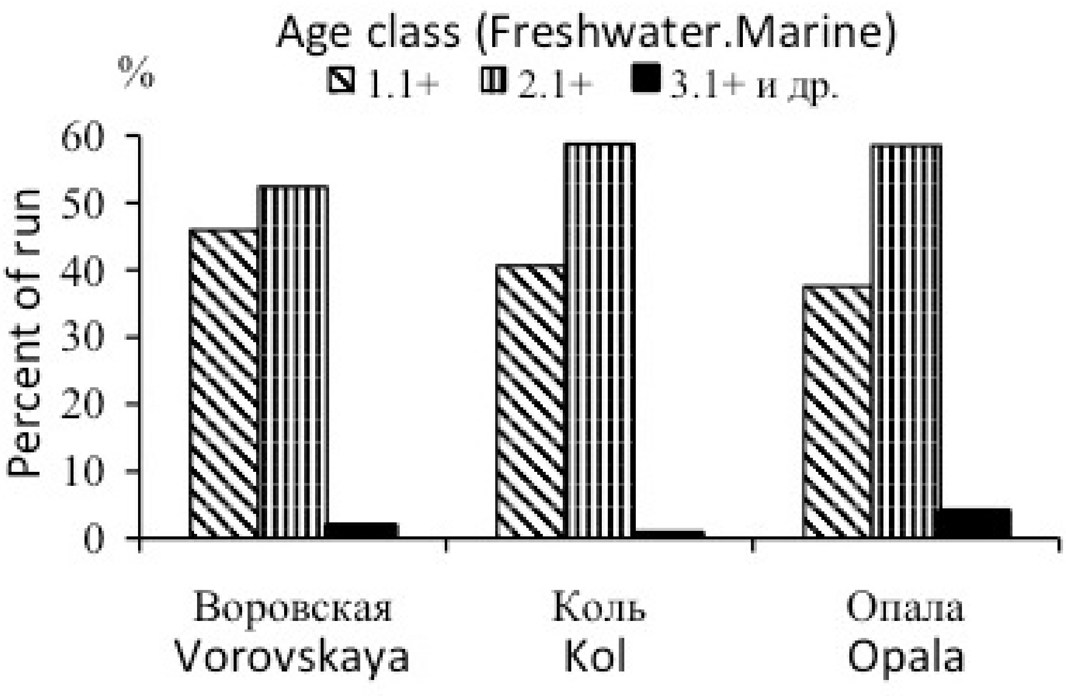


Figure 31. Coho Salmon age structure for some Western Kamchatka Rivers.

Stock Structure

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.

Status

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

Spawning escapement of Coho Salmon is estimated based on expansions of aerial counts in a series of index areas. Estimates are made for only the early portion of the run due to the protracted run timing of Coho and difficulty of conducting surveys later in the year. As a result, KamchatNIRO estimates that counts include only 50 to 70% of the total number.

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

Most Western Kamchatka Coho Salmon populations declined after 1992-1994 but have improved in recent years. There have been several cycles of growth and decline of Coho Salmon production historically (Zorbidi 2010). For example, one of the largest Coho Salmon fisheries in Western Kamchatka, the Vorovskaya River, had its highest catch in 1946 (1312 mt), followed by a period of decreased catches. Then the fishery rebounded in the 1960's to the mid 1980's when the annual catch often exceeded 100 mt, and ranged as high as 700 mt. Then the fishery steadily declined through the mid-2000s, ranging from 13.8 mt (1993) to 42.9 mt (2005). In 2010, the Vorovskaya fishery catch reached 312 mt (1.135 million fish). In 2013 the total catch in this river basin was 38.8 mt. However, the reason for the low catch was the late migration timing which resulted in an extended closure of the fishery.

In the 1970s and 1980s, run timing of Coho shifted approximately 15 days later in the rivers of the Western coast. Age composition also shifted with a decrease in the percentage of three-year-old fish (1.1+). Changes were attributed to a reduction in spawning escapement, conditions in wintering and feeding in the ocean, and poorly controlled fishing beyond the 200-mile zone. Beginning in the 1990s, run timing and age composition have returned to more normal levels.

Total runs of Coho Salmon appear to have been increasing in recent years (Figure 32), although stock assessment data is incomplete. However, most Coho Salmon spawn late in the season after aerial surveys have been conducted (Shevlyakov 2014) so escapements are likely under-estimated.

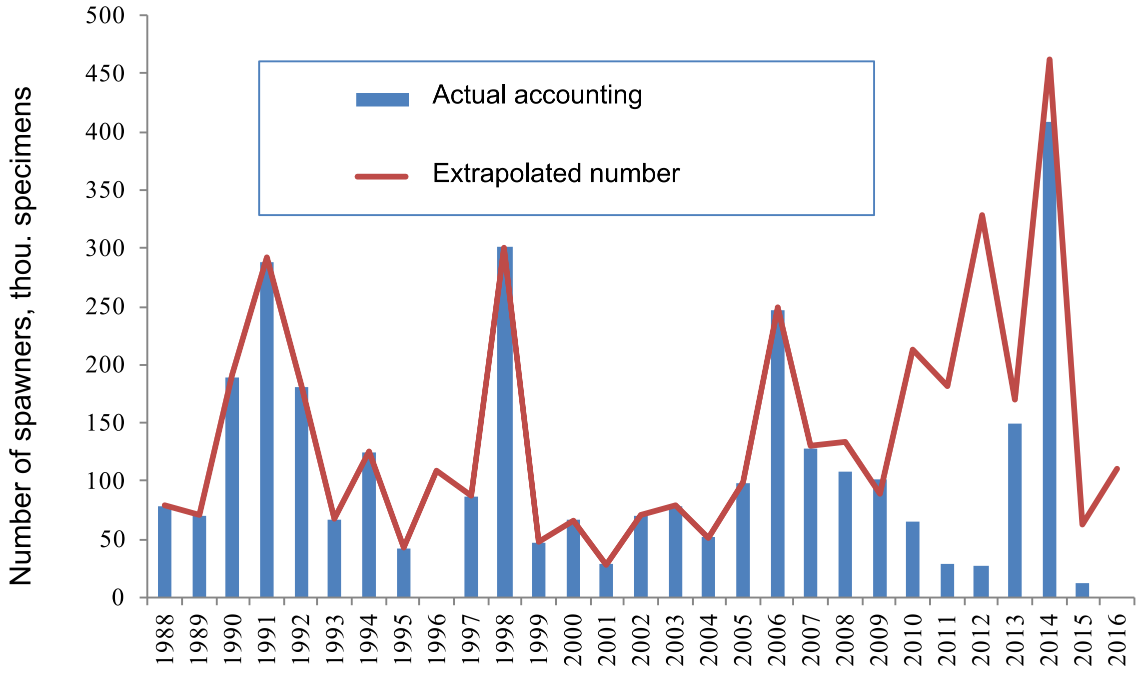


Figure 32. Actual and extrapolated number of Coho Salmon spawners on the South-West of Kamchatka (Bugaev et al. 2019a).

Management

Fisheries are regulated to ensure that significant escapements are distributed among individual rivers but each river is not managed to achieve a river-specific goal as long as the aggregate goal is being achieved. Spawner-recruitment analysis of the aggregate western Kamchatka return has estimated that maximum sustained yield (MSY) is produced by spawning escapements of approximately 178-223 thousand Coho Salmon (Bugaev et al. 2019a) with a low boundary benchmark of 84,000 (Figure 33).

Recent work by KamchatNiro has developed river-specific reference points based on stock-recruitment analysis (Table 14). However, spawning escapement of Coho Salmon is not consistently available for the Pymta River.

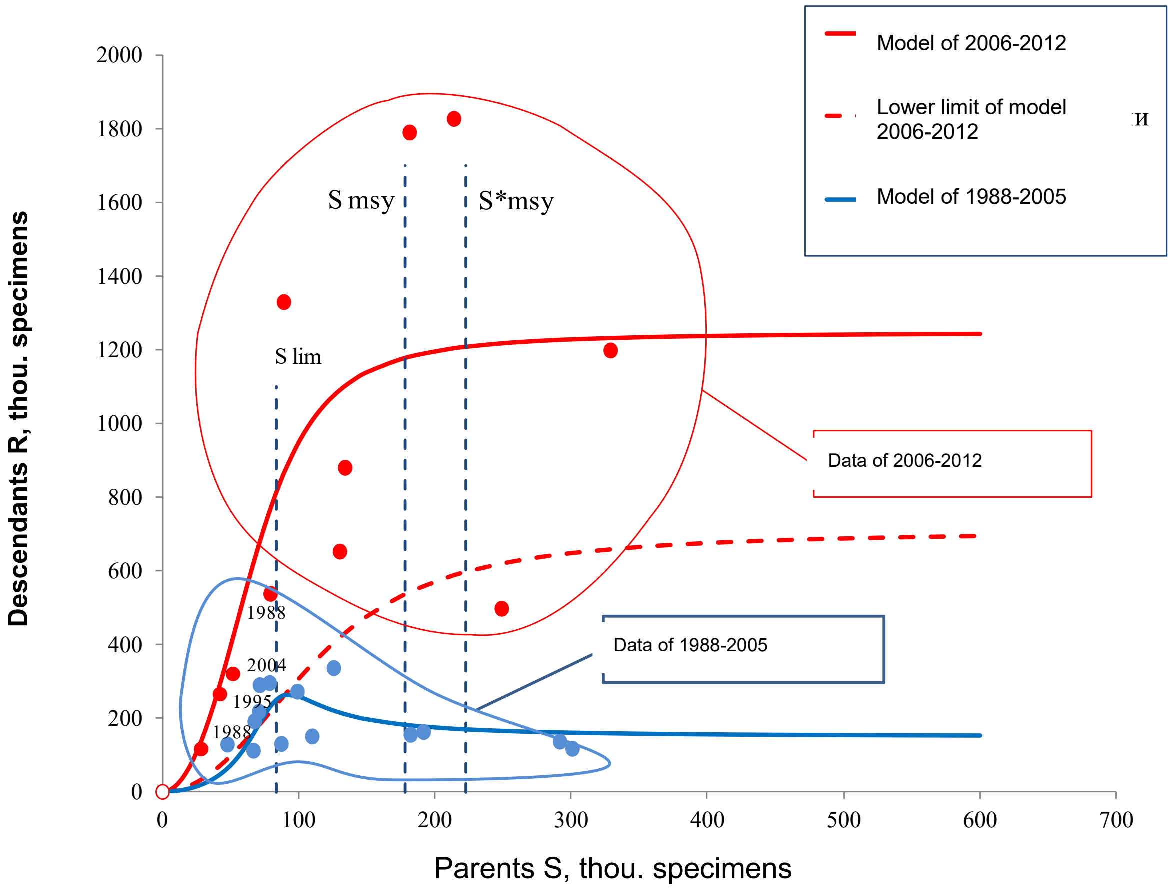


Figure 33. General model of Coho Salmon recruit dependence on spawners for the South-West of Kamchatka (Bugaev et al. 2019a).

Table 14. Escapement reference points (thousands of fish) for Coho Salmon in west Kamchatka Rivers (Bugaev et al. 2019a).

Models	Parameters,			Shares S	Shares R	S_{MSY}	R_{MSY}	MSY	U_{MSY}
	a	*b*	S_0						
General	1245	128	84	100%	100%	178	1176	998	85%
Pymta	179.2	11.4	7.5	8.9%	14.4%	15.9	169.2	153.4	91%

a = limit of R replenishment with unlimited spawning stock S,
b = resonance damping coefficient, with effect the stronger the more difference between current S and resonance parameter S0,
S_0 = spawner level S with maximum survival R/S (also designated as Slim boundary reference point).
S share = percent of west Kamchatha spawners.
R share = percent of west Kamchatha recruits.
*S*MSY = precautionary estimate of spawning escapement at maximum sustainable yield (MSY) determined for the lower boundary of the confidential interval of model regression (α = 0.05).*
Umsy = exploitation rate at MSY.

Information on Coho spawning escapement in the Pymta River is limited in recent years (Figure 34). Bugaev et al. (2019) reports that due to the lack of funding, monitoring of coho typically occurs in the form of joint counts with other types of salmon (red salmon, chum) which includes only the early and, more rarely, the average return time. As a rule, aerial surveys of work on coho salmon end in the first half of September less frequently at the end of September. Thus, the presented estimate of abundance does not fully reflect the real number of spawners into the river. The lack of reliable information on Coho spawning escapement in the Pymta River precludes meeting the Principle 1 standard.

Escapement of coho salmon spawners from 2004 till 2018 averaged 17 thou. specimens, that is a little lower than the calculated target benchmarks, based on precautionary approach (S*msy) of 19.8 thou. specimens. In 2013 and 2014 the number spawning was 53 and 36 thou. specimens, respectively. During these years, they managed to carry out the most complete accounting work. Abundance of coho salmon was estimated in the first part of September, which made it possible to take into account spawners at the stage of entering the river, when fish formed dense pre-spawning accumulations in the mainstream before distribution along the river system, and at the end of September, fish were recorded in the additional system of the river. Subsequently from 2015 to 2017 aerial surveys of coho salmon were not performed. In 2018, the counting can be considered valid, but due to the extraordinary number of Pink Salmon, the start of spawning migration of coho salmon into the river was shifted to a later date. Spawning escapement was relatively weak, and by mid-October about 16 thousand spawners were observed. Carrying out aerial surveys at a later date did not make sense, because during this period, optical properties of water are noticeably reduced, making it dark against the background of a land cover of snow, which significantly impedes airborne visual work.

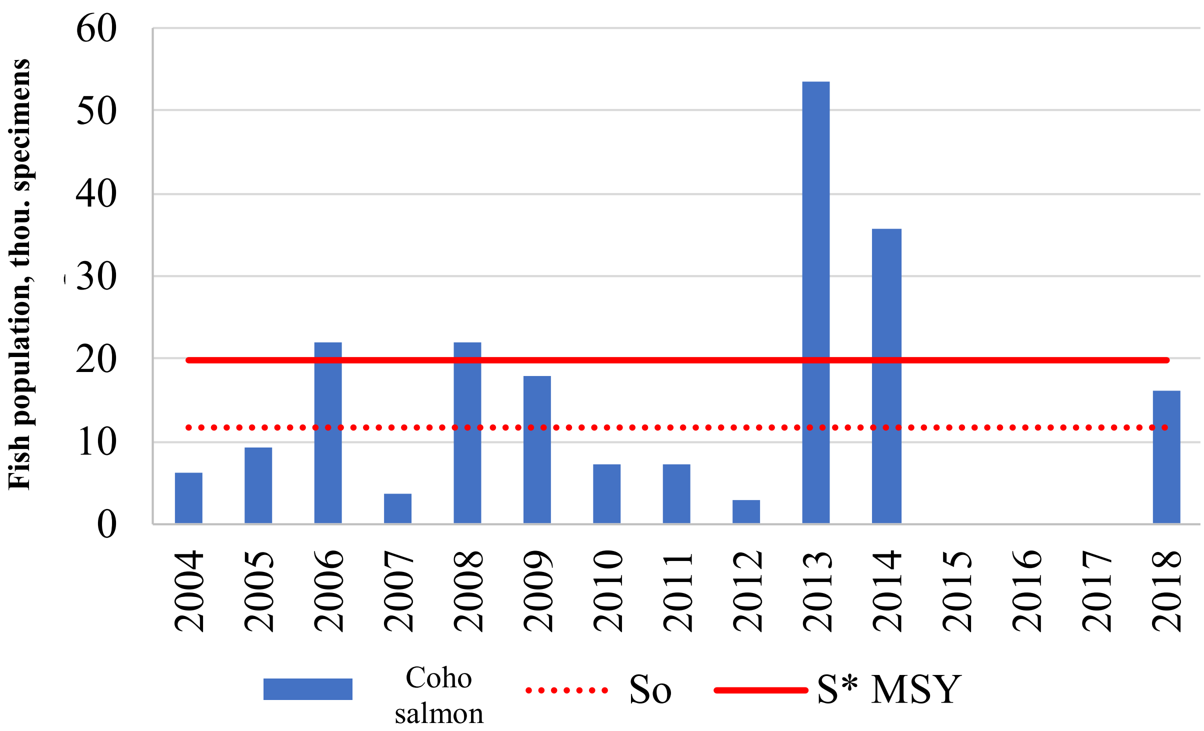


Figure 34. Spawning escapement dynamics of Coho Salmon to the Pymta river in 2004–2018 in relation to goals (Bugaev et al. 2019a).

Chinook Salmon

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. On the West coast of Kamchatka, Chinook Salmon may be found in the Palana, Tigil, Khairyuzovo, Icha, Oblukovina, Krutogorova, Bolshaya, Kolpakova, Vorovskaya, Kikhchik, and Opala rivers. Chinook are most abundant in the Bolshaya, Opala, Kolpakova, and Vorovskaya rivers. The Bolshaya River supports the largest population with about 60% on average west coast catch of Chinook in 1988-2010 caught in this river. Chinook Salmon habitat is very limited in the Ozernaya River and is insufficient to support a significant population.

Western Kamchatka Chinook typically average 6 – 10 kg in size but may reach 20 to 30 kg. Adults typically return to spawn at 3 to 5 years of age after 2 to 4 years at sea. Predominate ages are 1.3, 1.4 and 1.2. Age composition has shifted since the 1990s with fewer older fish (5+ 6+) in the run. Spawning occurs in large rivers and streams. Chinook return to freshwater in from May through July and spawn in July and August. Juvenile Chinook generally rear in streams for one year but some individuals may spend from a few months to three years before emigrating.

Substocks of Chinook Salmon have not been identified within western Kamchatka rivers. Average size is typically greater in the early portion of the run because the portion of females in catches is larger, and size-weight indicators of females are usually higher than males.

Chinook numbers have rebounded from low levels observed during the early 2000s. Chinook harvest peaked during the 1970s and then declined until the recent improvements. 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 (e.g. Bolshaya River). More conservative fishery management and reductions in illegal harvest have contributed to improvements.

Escapement of Chinook is assessed based on aerial surveys of representative spawning areas. Optimum spawning escapements have been identified based on historical production data. Rebounds in Chinook returns and reductions in harvest have restored escapement to optimum near-optimum levels in some rivers but not others. However, it should also be recognized that historical optimums may be difficult to achieve under conditions of reduced ocean productivity for Chinook.

Since 2010 commercial fishing for Chinook Salmon has been closed in the fishery area. Industrial fishing of king salmon was also significantly reduced in recent years prior to 2010, and in some years (2000, 2006, 2008) it was totally absent. Chinook run timing occurs prior to the beginning of current commercial fishing seasons which are established to minimize Chinook harvest. Even minimal occurrence of Chinook in the catches may result in closure of a fishing area. Chinook Salmon are currently reserved for sports and traditional fishing. The sport fishery is very popular. Allocations are small.

3.4.2 Secondary Species

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

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 (*Platichthysstellatus* sp.), smelt (*Osmerus* sp.), sculpins (*Cottus* sp.) and jellyfish (Blikshteyn 2011; Semanov et al. 2016). 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).

Trap nets 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.

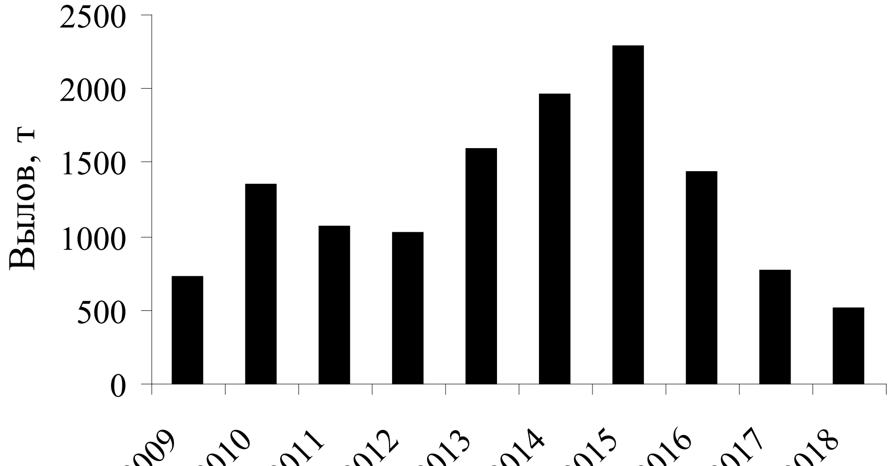
By-catch species delivered to the processing plants are sorted from the retained catch at the start of the processing lines. Amounts typically do not exceed 15 or 20 kg per delivery. Any non-commercial species delivered to the plants are generally processed for fish meal along with heads and guts of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

The following species of char are associated with this fishery: Dolly varden (*Salvelinus malma*) and white-spotted char (*S. leucomaensis*).[2] Arctic char *S. alpinus*is are present in other parts of Kamchatka but do not occur in rivers in the fishery area (Leman and Esin 2008). Char are widely distributed and abundant throughout the Kamchatka region. 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 3% of the total catch in any river on average (Shevlyakov et al. 2014). Harvest levels are established for char by the management system based on historical catch levels (Figure 35, Figure 36).

Masu Salmon occur in some southern Kamchatka streams which represent the northern distribution of their range. The Kikhchik, Bolshaya, and Opala rivers all support small populations of Masu Salmon. Masu (cherry) Salmon (*Oncorhynchus masou*) typically return to freshwater from March through May. Masu salmon abundance has increased substantially in recent years, apparently due to favorable environmental conditions (Shevlyakov et al. 2016). Due to their early run timing, Masu Salmon do not occur in the commercial fishery in significant numbers. Closure dates for Chinook also protect the Masu spawning migration.



[2] Russian common name for white-spotted char is kundzha.

Figure 35. Total char capture (tonnes) in the Kamchatka-Kuril subzone in 2009–2018.

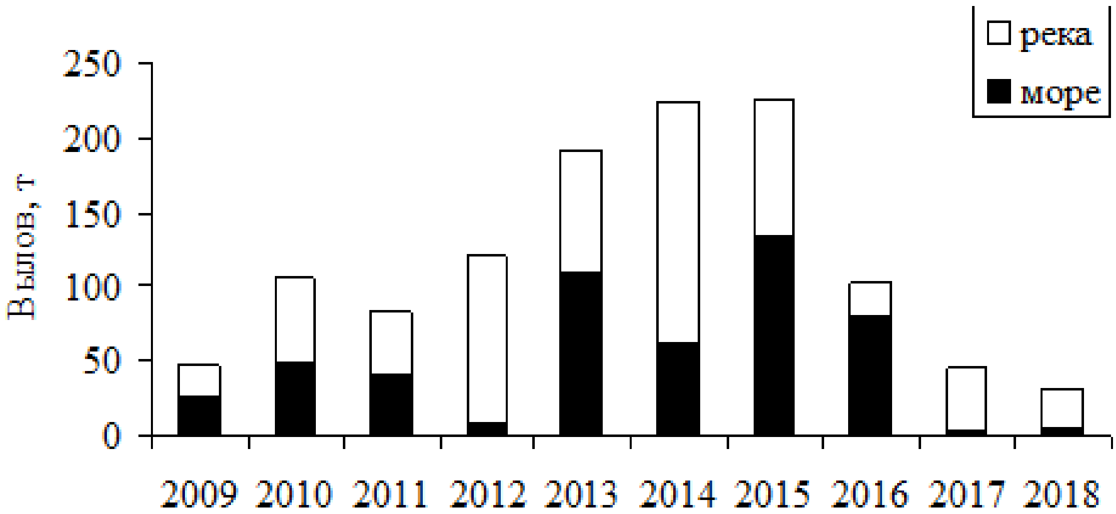


Figure 36. Total char capture (tonnes) in the area of Pymta in 2009–2018 (□ River, ■ Sea).

3.4.3 ETP Species

For the purposes of this assessment, endangered, threatened, or protected species are those that are recognized by national legislation, binding international agreements (e.g., CITES) to which jurisdictions controlling the fishery under assessment are party, or 'out-of scope' species (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE). In this case, national legislation provides for protection of ETP species identified in the Russian Federation *Red Data Book,* also known simply as the *Red Book*. The 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.

The only red-listed species present in this area are steelhead (*Oncorhynchus mykiss*) and Steller sea lion. 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.

Steelhead are a sea-run form of rainbow trout present in large rivers of Western Kamchatka. Catch of any Red listed species in Russia is prohibited and in case of catch, they must be immediately released. Steelhead are also largely protected from significant catch in the commercial salmon fishery by season dates. Run timing of adults in fall is outside the period of the fishery. Emigration timing of adults and juveniles is prior to beginning of the fishing season.

Information on population abundance of Kamchatka marine mammals is well documented in the scientific literature (Burkanov 1986, 1988; Lagerev 1988; Kosygin et al. 1986). The most numerous species in the Russian Far East is spotted seal or larga. 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 western Kamchatka year-round, but its distribution and number changes seasonally. 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. The possession of firearms on boats and shooting seals are prohibited by the companies in the assessment.

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 fisherman drive off seals from nets by making noise. While shooting seals is illegal, it was reportedly an occasional practice 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, white whales, sea eagles, and cormorants. There was no mention by government officials or fishing industry representatives of other sea mammals or sea birds captured or killed by the gears. The nature of the fixed trap net gear substantially reduces opportunities for encounters with marine mammals or birds. Beach seines do not normally encounter or affect marine mammals.

3.4.4 Habitats

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

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

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. Fish by-products from more remote processing sites (e.g. Kikhchik) are placed in special areas designated by the government administration.

[3] http://www.iucnredlist.org/details/8239/0

Beach travel by vehicle from some rivers for delivery of fish to processing facilities involves crossing of several rivers for which the government assesses fees to compensate for any related environmental damage. Fees are paid to SVTU and utilized by hatcheries.

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). 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 (Wilson et al. 1998). 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. Some dead fish drift to the sea, but the rest remain in the floodplains of the rivers, where within a year, 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. On the other hand, active fishery management might also help stabilize returns by avoiding excessively large escapements which can depress future returns under some conditions.

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; SCS 2011). 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.

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. 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. An extensive annual sampling program is also conducted to measure biological characteristics of the commercial salmon harvest in all three assessment rivers including length, weight, sex and age as indicators of ecosystem function.

3.5 Principle Three: Management System Background

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. Key agencies and activities of the management system are summarized below and described in detail in the West Kamchatka salmon fishery assessment (MRAG 2016). Principle 3 is in common between all West Kamchatka salmon fisheries.

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

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

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

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

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

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

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

Administrations of FAR. Meeting minutes and decisions are posted on the Territorial Administration website (http://www.terkamfish.ru).

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

4 EVALUATION PROCEDURE

4.1 Harmonised Fishery Assessment

Scores of this assessment were compared with those of the Vityaz-Avto Salmon and Narody Severa Salmon fisheries of West Kamchatka which are currently certified. The fisheries in this assessment and other in Kamchatka are subject to the same management system.

4.2 Previous assessments

This fishery was not subject to previous assessments.

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.

This expedited assessment addresses includes Pymta River pink (Oncorhynchus gorbuscha), Chum (O. keta), coho (O. kisutch), and Sockeye (O. nerka) salmon fisheries for potential addition to the currently valid VA-D Western Kamchatka salmon MSC certificate which includes pink, Chum, Sockeye, and (Kol River) coho as Principle 1 species. As the fishery is conducted using the same gears and in the same habitat areas as the certified VA-D fishery and under the same management system, the assessment only considers Pymta River salmon against Principle 1 of the MSC Standard, as the remaining components of the fishery will remain unchanged, as identified by a preliminary gap analysis

The currently certified VA-D western Kamchatka salmon fishery includes several rivers to the south of the Pymta river, and the currently certified Narody-Severa Bosheresk fishery includes rivers to the north of the Pymta river. This expedited scope extension will evaluate the Pymta River salmon fisheries against MSC Principle 1 using the modified salmon assessment tree contained within the VA-D fishery. Note these fisheries take place in coastal waters adjacent to the Pymta River rather than in river. So, although these specific fishing parcels have not been assessed against Principle 2, the habitat areas and types and fishing gears are identical to those which are certified under the VA-Delta and NS-B certificates, and the spatial scale is such that a P2 evaluation would have identical results to those already certified. The assessment of Principle 3 leading to the existing certification for the other salmon fishing areas is unchanged when considering the Pymta River for certification, as no aspects of the management will change.

4.4 Evaluation Processes and Techniques

4.1.1 Site Visits

The site visit was conducted remotely via teleconference on 4 February 2019 (3 February in US). The assessment team included Ray Beamesderfer, Dr. Dmitry Lajus, and Scott Marshall. The team met with the clients and the client’s consultant (ForSea Solutions). The client-companies, Kamber and

Pymta were represented by Kamber general director and deputy director. The current VA-D West Kamchatka Salmon certificate holders, were represented by the Vityaz-Avto general director and chief technologist. These attendees were at the Vityaz-Avto office, Petropavlotsk-Kamchatsky location. The MRAG assessment team and client consultant took the call on February 3, 2019 at their respective locations. Extensive meetings have previously been held with federal and state salmon scientific and management agencies, and key stakeholders during the certifications and annual audits of this fishery. The team also reviewed extensive written documentation provided by the client and the fishery management system. In addition, between 24 June and 6 July, 2019 the assessment team was on-site in Petrapovlovsk-Kamchatsky where it met again with representatives from Pymta and Kamber companies, and visited the fishing and processing locations at the former Pymta settlement.

Additional information was provided by the fishery client during the 3rd annual surveillance including two reports to address conditions of the the related Vityaz-Avto West Kamchatka certification (Bugaev et al. 2019a; Simonova 2019).

4.1.2 Consultations

The expedited scope extension was announced assessment 3 January 2019 with posting to the MSC website along with a gap analysis. The assessment team was announced at the same time. Prior to the remote site visit, a series of information needs were identified for completion of the assessment. The client subsequently contracted with the governmental fishery scientific agency (KamchatNiro) to provide this information. The team reviewed preliminary scores and conditions with the client and discussed a client action identified by the client.

Table 15. Teleconference attendees for 4 February 2019 remote site visit.

Name	Organization	Title	Email	Location
Roman Onofrychuk	Kamber Ltd	General Director	motobox5@rambler.ru	VA's Office, Petropavlovsk-Kamchatsky, Russia
Larisa Grabar	Kamber Ltd	Deputy Director, Ecologist (main contact)	grabar_larisa@mail.ru	VA's Office, Petropavlovsk-Kamchatsky, Russia
Aleks Ramanauskas	VA-Delta	General Director	dirik.va@gmail.co	VA's Office, Petropavlovsk-Kamchatsky, Russia
Andrei Bokov	VA-Delta	VA Deputy Director, Chief Technologist (main contact)	andrei-bokov@bk.ru	VA's Office, Petropavlovsk-Kamchatsky, Russia
Natalia Novikova	ForSea Solutions LLC	Founder and Director (Client consultant)	4SeaSolutions@gmail.com	Portland, OR
Randy Ericksen	ForSea Solutions and RP Ericksen Consulting	Fisheries Advisor (Client consultant)	rp.ericksen@outlook.com	Portland, OR
Dmitry Lajus	MRAG, St. Petersburg State University	Independent Consultant and MSC Assessment Team Member	dlajus@gmail.com	St. Petersburg, Russia
Ray Beamesderfer	MRAG, Fish Science Solutions	Sr. Fish Scientist and MSC Assessment Team Leader	beamer.fish@outlook.com	Portland, OR
Scott Marshall	MRAG	Independent Consultant and MSC Assessment Team Member	slmarshallfisheries@gmail.com	Eagle, ID

4.1.3 *Evaluation Techniques*

The scoring elements chosen were based on information on the catch as well as stakeholder concerns. The scoring meetings included an evaluation of the information available relative to the assessment tree that was developed for this fishery. Discussions within the team reached scoring conclusions by consensus.

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.

The MRAG Americas assessment team conferred to discuss the background information and the impact of that information on the scoring of each performance indicator. Through consensus, the team evaluated each scoring issue to determine which the fishery achieved, and agreed on a score.

The MRAG Americas assessment team followed the MSC CR that specified 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 as described in the MSC CR.

The list of Principle 2 species were as assigned to Primary, Secondary, or ETP in the existing VA-D certification.

The RBF was not used for this assessment.

Table 16. Scoring elements

Component	Scoring elements	Main/not main	Retained?	Data-deficient?
Principle 1	Pink Salmon[a]	--	Yes	No
Principle 1	Chum Salmon[a]	--	Yes	No
Principle 1	Coho Salmon (Kol River only)	--	Yes	No
Primary	Sockeye Salmon	Main	Yes	No
Primary	Coho salmon (except Kol River)	Main	Yes	No
Primary	Chinook Salmon [a]	Not Main	No	No
Secondary	Char	Not Main	Yes	No
Secondary	Masu Salmon	Not Main	No	No
Secondary	Miscellaneous marine species	Not Main	No	No
ETP	Steelhead	--	No	No
ETP	Steller sea lion		No	No
Habitat	Sandy bottom	Main	No	No

[a] *Ozernaya, Koshegochek, Golygina, Opala, Pymta, Kol, and Vorovskaya Rivers of the West Coast of Kamchatka*

5 TRACEABILITY

5.1 Eligibility Date

The eligibility date for product from the fishery to bear the MSC label is the date of release of the PCDR on July 30th, 2019, which is near the start of the fishing season. The fishing season actually began on July 11th, 2019, and MRAG Americas requested a variation from the MSC to allow the eligibility date to be pushed back to this date. However, the variation request was rejected on the basis that the request came too late. Hence the eligibility date remains July 30th, though it is the view of the certifier and assessment team that the sustainability assessment provided via this scope extension applies to the entire 2019 season. As the eligibility date is before the date of certification, we confirm that the traceability system as described below has also been in place since the beginning of the 2019 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. Transhipment does not occur.

Table 17. Points of landing for fishing parcels permitted for use by Kamber and Pymta companies. All points of landing are adjacent to shoreline fishing sites.

Co.	Parcel	Water body	Point of landing	Processing location
Kamber	91	Sea of Okhotsk	Ocean beach	Kamber Plant
	92	Sea of Okhotsk	Ocean beach	Kamber Plant
	93	Sea of Okhotsk	Ocean beach	Kamber Plant
	94	Sea of Okhotsk	Ocean beach	Kamber Plant
	96	Sea of Okhotsk	Ocean beach	Kamber Plant
	699	Pymta River	River shoreline	Kamber Plant
Pymta	1124	Ozernaya river	River shoreline	Pymta Plant
	1119	Opala river	River shoreline	Pymta Plant
	83	Sea of Okhotsk	Ocean beach	Pymta Plant
	82	Sea of Okhotsk	Ocean beach	Pymta Plant
	98	Sea of Okhotsk	Ocean beach	Pymta Plant
	97	Sea of Okhotsk	Ocean beach	Pymta Plant
	700	Pymta River	River shoreline	Pymta Plant

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.

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.

All salmon in this assessment are landed at Pymta fish processing plants or on coastal beaches for nearby fish traps in marine waters. Salmon are certified and independently tracked by fishing parcel (Table 17) which allows them to be distinguished from uncertified Sockeye catches that occur in other rivers and marine parcels in west Kamchatka. Certified catch is distinguished from ineligible catch of the same species based on fishing site. A similar situation exists for Kol River Coho salmon, which are certified while Coho Salmon from other sites are not. No Chinook salmon caught in the West Kamchatka fishery is certified.

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 18. 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	Gillnets are used at one up-river fishing parcel controlled by the companies in the unit of assessment. Gillnet fish must be delivered by special transport, that is easy to distinguish from fish transported from beach seines or trap nets. Record keeping is strong under the current management system, due to government monitoring and because fishermen get paid based on catch, and they compare records from the parcel with the factory records to assure full pay.
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)	Negligible risk – 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 sea and on land, points of landing, and sales at auction)	Negligible risk – all covered by chain of custody. All fish delivered from landing sites have documentation that shows date, location, volumes, species, and fishing operator. Since each operator has a commercial fishing permit that also identifies gear type, documentation of the different gear types and operators would prevent substitution at delivery.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	Negligible risk – chain of custody starts at delivery to the processing plant, with chain of custody documented in all subsequent processing steps
Risks of mixing between certified and non-certified catch during transhipment	Not present – No transhipment
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	Negligible. However MSC did request clarification about how different species of salmon that might be caught together due to overlapping run timings would be 'physically segregated' at all stages from the point of harvest to the start of CoC. We note here that there may be times when certified and non-certified salmon species are caught together, but these are very visually distinguishable, and there is no incentive or risk of substitution between removal of the fish from the trap or seine nets and deliverary up the beach to the processing facilities.

5.3 Eligibility to Enter Further Chains of Custody

Salmon produced by fishing companies in the client group with authorization to fish with nets within the fishing district landed from authorized parcels 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, whichever happens sooner. Members of the Client Group own the fish they catch, commencing at the point of fish catch. Fishing sites are leased and operated by the members of the Client Group, which also operate the processing plants. Documentation of the fish is sufficient such that chain of custody is not necessary for transport of wholly-owned fish from the point of catch to delivery at the processing plant. Should other companies share the certificate at some point in the future and sell fish to Kamber, Pymta or other company 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.

6 EVALUATION RESULTS

6.1 Principle Level Scores

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

6.2 Summary of PI Level Scores

Principle	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score pink	Score chum
One	1	Outcome	0.333	1.1.1	Stock status	0.5	0.167	80	80
				1.1.2	Stock rebuilding	0.5	0.167	85	85
		Management	0.333	1.2.1	Harvest strategy	0.25	0.083	85	85
				1.2.2	Harvest control rules & tools	0.25	0.083	80	80
				1.2.3	Information & monitoring	0.25	0.083	65	65
				1.2.4	Assessment of stock status	0.25	0.083	80	80
		Enhancement	0.333	1.3.1	Enhancement outcome	0.333	0.111	100	100
				1.3.2	Enhancement management	0.333	0.111	100	100
				1.3.3	Enhancement information	0.333	0.111	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	90	
				2.1.3	Information	0.333	0.067	70	
		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	90	
				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	100	
				3.1.2	Consultation, roles &	0.3	0.150	85	
				3.1.3	Long term objectives	0.3	0.150	80	
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	0.125	80	
				3.2.2	Decision making processes	0.25	0.125	75	
				3.2.3	Compliance & enforcement	0.25	0.125	80	
				3.2.4	Management performance	0.25	0.125	80	

6.3 Summary of Conditions

The fishery received seven conditions for performance indicators that scored less than 80. These conditions are in common with the Vityaz-Avto Delta West Kamchatka salmon certification.

Table 19. Summary of Conditions

Condition number	Condition	Performance Indicator
1	Provide sufficient information on wild spawning escapement for a representative range of wild Pink, Chum (and Kol Coho) populations in the unit of certification to support the harvest strategy and demonstrate that wild abundance is regularly monitored at a level of accuracy and coverage consistent with the harvest control rule.	1.2.3
2	Provide quantitative information on escapement of (non-Ozernaya) Sockeye and (non-Kol) Coho Salmon adequate to assess the impact of the UoA with respect to status.	2.1.3
3	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

6.5 Determination, Formal Conclusion and Agreement

On the basis of this assessment of the fisheries and following peer review, the Assessment Team recommends that the fisheries be certified. Following this Recommendation of the assessment team, review by stakeholders and peer-reviewers, and the completion of the objection period without objection, MRAG Americas has decided to certify this fishery as sustainable against the Marine Stewardshiop Council Fishery Standard.

6.6 Changes in the fishery prior to and since Pre-Assessment

Not applicable.

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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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG 60 – See SG80. SG80 – Quantitative data on long-term production trends and escapement provide strong evidence that Pink and Chum salmon throughout southwest Kamchatka including the Pymta River are highly likely above the point where recruitment would be impaired by the current commercial fishery. Run sizes and harvest have all increased or remained at high levels for both species since 2000. Current numbers are at historical levels of sustained abundance. In part, this is related to an extended period of favorable ocean conditions for these species throughout the northern Pacific. These stocks have also benefited by improvements in fishery management structures and enforcement which appear to have substantially reduced the illegal and unreported harvest which reduced spawning escapements. Freshwater habitat conditions in western Kamchatka, with few exceptions, are excellent for salmon production. Watersheds are virtually pristine and support tremendous diversity of aquatic systems including rivers, streams, lakes and wetlands which provide ideal conductions for salmon production. These conditions are conducive to high levels of salmon productivity and inherent resilience to harvest which in turn can sustain robust levels of fishery exploitation. Salmon fisheries in Southwest 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 these target reference points effectively provides an operational equivalent of a limit reference point in salmon management systems by effectively avoiding lower escapements to the extent that this is possible by regulating fisheries. Highly variable annual run sizes are characteristic of salmon. Thus, it is not always possible to meet optimum targets in every population and year. 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. Consistent high levels of Pink and Chum Salmon production over the last decade confirm that the management strategy based on target reference points has effectively maintained the reproductive capacity of the aggregate stock of each species. Fishing effort and strategies have been scaled based on historical information to ensure adequate spawning escapement during most years in most areas. Fishing effort may be scaled somewhat in-season based on annual stock assessments but the fishery is not intensively managed at a fine scale in order to maximize harvest in any given year. Given the demonstrated success of this approach it is not necessary to quantify river-specific escapement of every stock in		

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
		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 limitions in annual stock assessments which are addressed in PI 1.2.4. (Due to past reductions in aerial survey effort, data on spawning escapements in some rivers is lacking in some years and corresponding escapement are reported as low values by KamchatNIRO). This assessment reports results of recent estimates of spawning escapement relative to preliminary reference points identified by KamchatNIRO but these results are not the primary basis for scoring of the PI which places more emphasis on long turn abundance and harvest trends under current fishing intensity. However, KamchatNIRO reports that spawning escapements consistent with optimum production levels are regularly achieved and the range of escapement values for the most species tends to or exceeds the target reference points (Shevlyakov et al. 2016; Bugaev et al. 2019a). At the same time, fishery management intensity is scaled to the vast area of the region and the limitations of the available institutional resources for stock assessment and management. Stocks of each species are effectively managed as regional aggregates which is generally appropriate given the productivity of the habitat and the normal covariation among substocks resulting from shared freshwater and ocean productivity patterns. System-specific regulatory mechanisms are implemented based on local abundance and fishery dynamics. Potential improvements in population-specific management with population-specific escapement objectives are also being explored. SG100 – A high degree of certainty is precluded for the SMU because specific limit reference points have not been incorporated into management practice and not every population is fished at optimum levels in every year. A complex mixed species and stock fishery results from substantial overlap in run timing of salmon species, interannual variation in run sizes of different species, different fishing capacity and intensity in different systems, and a higher incidence of illegal, unaccounted, non-industrial fishing in some areas. The management system has developed a methodology for identifying precautionary limit reference points at a population scale for the UoA and it is expected that the applicability and utility of these reference points will be further evaluated in coming years.		
B	Stock status in relation to target reference point (TRP, e.g. target escapement goal or target harvest rate)			
	Guidepost		The SMU is at or fluctuating around its TRP.	There is a **high degree of certainty** that the SMU has been fluctuating around its TRP, or has been above its target reference point over recent years.
	Met?		Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	The SG80 standard is achieved. Under the current management system which was adopted in 2008, quantitative stock assessments indicate that aggregate stocks in the Unit of Assessment are generally fluctuating in the past decade around spawning escapements that were historically demonstrated to produce high sustained yields in conventional spawner stock-recruitment analyses. This conclusion is clearly reflected in species-specific stock-recruitment patterns (Figure 10, Figure 16). Production functions were generally based on regional aggregates by species. Spawning escapement goals were then derived		

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
	for specific river systems by apportioning aggregate values based on the relative sizes of the respective populations in each system. In aggregate, species are fished at levels consistent with high yields (and low probability of recruitment overfishing) but this may not always be the case for some populations. Salmon escapement goals are generally managed throughout the North Pacific based on production functions defined by stock-recruitment curves relating spawner numbers with adults produced in the next generation of return. Escapements greater than the habitat capacity will reduce productivity due to density-dependent regulating factors involving competition for limited space and food. Escapements substantially less than capacity reduce fishery yields. Maximum sustainable yield typically occurs somewhere between 50% and 100% of the habitat capacity where capacity is defined based on the point of maximum production in the stock recruitment curve (Ricker 1975). Stock-recruitment curves are utilized to derive escapement objectives for western Kamchatka salmon consistent with a biomass that produces high levels of sustained yields and high rates of replacement in the historical dataset. Spawning escapements were historically assessed each year relative the target values and in-season management are used to regulate fishing intensity in order to achieve spawning objectives. The SG 100 standard is not achieved because of uncertainty regarding stock status relative to TRPs due to the aggregate nature of the stock assessment to derive goals, reductions in annual assessments of spawning escapement due to recent funding constraints and differences in fishing intensity in different systems. However, objective values may not be met in every system and every year. It is unclear whether objectives maximize sustained yield.		
C	Status of component populations		
Guidepost			The **majority** of component populations in the SMU are within the range of expected variability
Met?			Pink – No Chum – No
Justification	While the majority of the component populations are within the range under the expected variability under the aggregate stock assessment approach, it cannot be concluded that target reference points provide a precautionary standard sufficient to meet the 100 scoring guidepost without explicit consideration of stock and system-specific escapement goals derived independently for each system. The management system has developed a methodology for identifying precautionary target reference points at a population scale for the UoA and it is expected that the applicability and utility of these reference points will be further evaluated in coming years.		
References	See Section 3.3.4 Management - Assessment Methods		

Stock Status relative to Reference Points

	Species	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)	Pink	S_0[4]	W Kamchatka: 2.3 million (depressive generations), 2.7 million (productive generations) Pymta R: 270,000	W Kamchatka: 90% exceedance in 1995-2007 Pymta R: 60% exceedance
	Chum		W Kamchatka: 172,000 Pymta R: 25,000	W Kamchatka: 80% exceedance in 1995-2007

[4] *S_0 spawner level S with maximum survival recruits per spawner (also defined as a boundary reference point S_{lim}).*

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
					Pymta R: 33% exceedance in 2004-2018
Reference point used in scoring stock relative to MSY (SIb)	Pink	S msy[5]	W Kamchatka: 2.7-8.0 million (depressive generations), 8.0 – 12.6 million (productive generations) Pymta R: >326,000 (depressive generations), >978,000 (productive generations		W Kamchatka: 70% achievement in 1995-2007 Pymta R: 40% achievement (depressive generations), 90% exceedance (productive generations)
	Chum		W Kamchatka: 300,000-373,000 Pymta R: 44,000-54,700		W Kamchatka: 40% acheivement in 1995-2007 Pymta R: 27% achievement in 2004-2018
OVERALL PERFORMANCE INDICATOR SCORE:					Pink – 80 Chum – 80
CONDITION NUMBER (if relevant):					--

[5] *Smsy is spawning escapement estimated to produce maximum sustainable yield in a salmon stock-recruitment production function. KamchatNIRO defined a target range bounded by Smsy and S*msy which is the lower boundary of the confidential interval of model regression (α = 0.05) for Smsy.*

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
a	**Rebuilding timeframes**			
	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 is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for SMU.
	Met?	Pink – Yes Chum – Yes		Pink – No Chum – No
	Justification	Scoring of PI 1.1.2 is required for scores less than 80 in PI 1.1.1. There is no information that any stock management unit is reduced. Reduced spawning escapement surveys have led to underestimates of abundance. Non-quantitative information suggests that Pink and Chum Salmon are currently fluctuating in a range that exceeds historical levels of abundance. A condition for PI 1.2.3 requiring increased information on abundance is expected to close the condition for PI 1.1.1, and demonstrate that the SMUs are at target levels.		
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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	There is no information that any stock management unit is reduced. Reduced spawning escapement surveys have led to underestimates of abundance, but the surveys are useful as an index. Non-quantitative information suggests that Pink and Chum Salmon are currently fluctuating in a range that exceeds historical levels of abundance. The passing day strategy and non-quantitative observations demonstrate implementation. A condition for PI 1.2.3 requiring increased information on abundance is expected to close the condition for PI 1.1.1, and demonstrate that the SMUs are at target levels.		
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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes
	Justification	Enhancement does not occur.		

<table>
<tr><td>PI 1.1.2</td><td colspan="2">Where the stock management unit (SMU) is reduced, there is evidence of stock rebuilding within a specified timeframe</td></tr>
<tr><td>References</td><td colspan="2">See sections 3.3.1 Pink Salmon, 3.3.2 Chum Salmon</td></tr>
<tr><td colspan="2">OVERALL PERFORMANCE INDICATOR SCORE:</td><td>85</td></tr>
<tr><td colspan="2">CONDITION NUMBER (if relevant):</td><td>--</td></tr>
</table>

Evaluation Table for PI 1.2.1 – Harvest strategy

<table>
<tr><td colspan="2">PI 1.2.1</td><td colspan="3">There is a robust and precautionary harvest strategy in place</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="4">a</td><td colspan="4">Harvest strategy design</td></tr>
<tr><td>Guidepost</td><td>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.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Pink – Yes
Chum – Yes</td><td>Pink – Yes
Chum – Yes</td><td>Pink – No
Chum – No</td></tr>
<tr><td>Justification</td><td colspan="3">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. The strategy involves establishing fishing seasons, scheduled passing days of no fishing to limit exploitation rates and distribute escapement throughout the season, 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. For instance, fishing areas, specific nets or dates may be closed to ensure escapement. Management occurs on a regional basis to ensure that spawning escapement is a primary priority of the management system.
SG100 – The SG100 standard is not met because the aggregate SMU-based strategy employed in Western Kamchatka may not meet population-specific objectives in every case (although it generally achieves goals at the SMU level).</td></tr>
<tr><td rowspan="4">b</td><td colspan="4">Harvest strategy evaluation</td></tr>
<tr><td>Guidepost</td><td>The harvest strategy is likely to work based on prior experience or plausible argument.</td><td>The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Pink – Yes
Chum – Yes</td><td>Pink – Yes
Chum – Yes</td><td>Pink – No
Chum – No</td></tr>
<tr><td>Justification</td><td colspan="3">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</td></tr>
</table>

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		distributed spawning escapements around established goals. 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	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Pink – Yes Chum – 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 make corresponding 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?			Pink – Yes Chum – Yes
	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.		
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.		
f	**Review of alternative measures**			
	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.

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Met?	Not applicable	Not applicable	Not applicable
	Justification	There is no unwanted catch of the target stock		
References		See Section 3.3.3. Management		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 85 Chum – 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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG60 – Generally understood control rules include season dates, establishing passing days, and time/area closures based on real time escapement monitoring data in conjunction with other indicators of run strength and timing based on harvest and biological composition of the harvest. Recent fishery actions are detailed in Section 3.3.4. Operation of the fishing gear is modified in response to whether escapement goals are being met. Harvest control rules are specifically defined in licenses issued for commercial fishery operation and in-season regulation changes adopted by an Anadromous Fish Commission as appropriate at the recommendation of scientific and fishery management authorities. In-season management has the effect of reducing exploitation rates at low abundance. SG80 – The SG80 is met because harvest control rules are in place that ensure the exploitation rate is reduced during years of low abundance. As a result, the SMU is generally fluctuating around escapement levels consistent with MSY (Bugaev et al. 2019a, 2018b). SG100 – The SG100 standard is not met because escapement objectives are not always met for stocks in some rivers and years.		
b	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide range** of uncertainties including the ecological role of the SMU, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG80 – The main uncertainty affecting HCRs is annual variability in run strength and run timing. HCR's appear to be generally effective in regulating exploitation rates under conditions of normal annual variability during the current period of high salmon productivity in West Kamchatka in a period of favorable marine conditions. High productivity makes these stocks extremely resilient and capable of sustaining high harvests and harvest rates. Production remains high even in the face of periodic low escapements		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		that sometimes occur among exploited salmon populations as a result of normal annual variability in returns and inexact forecast and assessment methods. SG100 - The SG100 standard is not met because evidence will be needed to demonstrate that harvest control rules are sufficiently robust to maintain appropriate levels of escapement in the event of a prolonged period of reduced ocean productivity. High harvests create an expectation for continuing high harvest and a fishery infrastructure consistent with supporting demands. Salmon productivity has been observed to increase and decrease in long term cycles related to periodic shifts in marine productivity patterns. These shifts can pose significant challenges to harvest control rules in the implementation of timely restrictions of fisheries consistent with reduced stock productivity. The risk is significant overfishing relative to yield potential.		
c	**HCRs evaluation**			
	Guidepost	There is **some evidence** that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence** indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – 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 has been revised to allow two passing days after every two fishing days to protect escapement for below average returns and harvesting has been suspended for the same reason during years of very poor runs (Shevlyakov et al. 2016). SG100 - It remains to be seen whether harvest control rules will be adequate to control exploitation during poor runs or extended periods of reduced salmon productivity.		
d	Maintenance of wild population components			
	Guidepost	It is **likely** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).	It is **highly likely**, that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).	There is a **high degree of certainty** that the HCRs and tools are consistent with maintaining the diversity and productivity of the wild component population(s).
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG60 – See SG80 SG80 – Diversity in salmon is represented among populations inhabiting different rivers within a species management unit and substocks returning to different areas within each river, often with different run timing (early vs. late for instance). Current harvest control rules maintain this diversity by managing to protect escapements in all rivers and across the duration of the run. Stock assessment data indicates this system is generally effective. SG100 – The SG 100 is not met because specific objectives for component populations and substocks are not explicitly incorporated in management.		
References		See Section 3.3.3 Management		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 80 Chum – 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?	Pink – Yes Chum – Yes	Pink – No Chum – No	Pink – No Chum – No
	Justification	SG60 - 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 on a regional and population-specific. SG80 - Concern for the sufficiency of information on spawning escapements for a representative range of component populations in the future is raised by the continuing reductions in aerial survey effort which is the basis for inseason and post season stock assessment, thereby not meeting SG80.		
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 available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Pink – Yes Chum – Yes	Pink – No Chum – No	Pink – No Chum – No
	Justification	SG60 - Detailed 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. SG80 - The SG80 standard is not met due to substantially reduced accuracy and precision of wild abundance estimates that will result from recent reductions in aerial survey efforts. Uncertainties in information required by the harvest control rule, especially including stock assessments, are generally understood but formal consideration of the effects of uncertainty on assessments and management have not been reported.		
c	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals	

PI 1.2.3		Relevant information is collected to support the harvest strategy		
			from the SMU.	
	Met?		Pink – Yes Chum – Yes	
	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. Illegal harvest remains a concern in areas with a significant local populace and reported abuses of the indigenous permitting system. This problem is most significant in rivers outside the UoC such as the Bolshaya due to its local population and road accessibility (the Bolshaya in not in the unit of assessment). 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.		
References		See section 3.3.3 Management		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 65 Chum – 65
CONDITION NUMBER (if relevant): **Condition 1. Provide sufficient information on wild spawning escapement for a representative range of wild Pink and Chum populations in the unit of certification to support the harvest strategy and demonstrate that wild abundance is regularly monitored at a level of accuracy and coverage consistent with the harvest control rule.**				

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?		Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG 80 - The assessment includes in-season estimation of harvest, catch per effort, biological characteristics, timing and distribution of harvest and returns, and spawning escapement. This in-season information is used in real time to guide harvest control rules designed to optimize harvest and ensure escapement sufficient to sustain future production. Spawning escapement is estimated for representative samples of stock management units for each species. SG100 – Not all major features of stock structure are fully addressed by the stock assessment. In many cases, assessments and management actions are based on aggregate rather than component stock considerations. For instance, production curves used to identify optimum escapement levels are historically based on data aggregated over multiple component stocks for a species.		
b	Assessment approach			
	Guidepost	The assessment estimates	The assessment estimates	The assessment estimates

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
	ost	stock status relative to generic reference points appropriate to salmon.	stock status relative to reference points that are appropriate to the SMU and can be estimated.	with a high level of confidence both stock status and reference points that are appropriate to the SMU and its wild component populations.
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG 60 - Stock status is estimated by species, river system, and sometimes major substock. These escapement estimates are evaluated relative to target spawner numbers for each system. Spawning escapement goals are historically established based on production functions for the aggregate return of western Kamchatka salmon by species apportioned by the relative size of the respective populations. The management system is exploring the development of goals based on population-specific analyses. SG80 - The SG80 standard is met based on information on stock status and reference points provided by KamchatNIRO (Bugaev et al. 2019a, 2019b). Recent stock assessment efforts have been expanded due to support and funding provided by the fishing companies. This follows a period of reduce stock assessment as government funding was curtailed. SG100 – This standard is not met because status and reference points of some wild componenet populations are inferred from index or aggregate stock information. Current assessments provide low resolution on major stock subcomponents and limited precision due to a reliance on peak escapement counts in selected index areas.		
c	Uncertainty in the assessment			
	Guidepost	The assessment **identifies major sources** of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG60 - The stock assessment has identified major sources of uncertainty including normal environmentally-driven variability in productivity, normal annual variability in run timing and distribution, and heterogeneity in productivity of major stock subcomponents. SG80 – Major uncertainties are taken into account in management. Harvest is controlled in-season based on real-time data on spawning escapement in aerial spawning ground surveys as well as numbers and characteristics of fish entering the fishery. In-season assessments allow fisheries to be regulated based on normal annual variability in productivity and run timing. Assessments incorporate spatial patterns which address heterogeneity in major stock subcomponents. The management system is also exploring the development of goals based on population-specific stock-recruitment analyses. These goals include explicit precautionary safety factors based on statistical analysis uncertainty in population-specific stock-recruitment relationships. SG100 - Stock status is not evaluated relative to reference points in a probabilistic way. Uncertainty in escapement estimates has not been quantified.		
d	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Pink – No Chum – No
	Justification	A rigorous exploration of alternative hypotheses and approaches has not been reported.		
e	Peer review of assessment			

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
	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?		Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG80 - The stock assessment is subject to extensive peer review within the management system. KamchatNIRO scientists regularly review and improve assessment methodologies and results which are subject to additional review by the regional scientific institute (VNiro). In-season assessment information receives extensive review as part of the annual management process overseen by the Anadromous Fish Commission. SG100 - External peer review is limited.		
f	Representativeness of indicator populations			
	Guidepost	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some scientific basis** for the indicators' selection.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, there is **some evidence of coherence** between the status of the indicator streams and the status of the other populations they represent within the management unit, including selection of indicator stocks with low productivity (i.e., those with a higher conservation risk) to match those of the representative SMU where applicable.	Where indicator stocks are used as the primary source of information for making management decisions on SMUs, the status of the indicator streams are **well correlated** with other populations they represent within the management unit, including stocks with lower productivity (i.e., those with a higher conservation risk).
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG60 – The stock assessment historically surveyed representative areas of most river systems for each salmon species. Index reaches were selected based on their representative nature based on analysis of a fuller complement of historical survey areas. SG80 – This guidepost is met based on recent information provided by KamchatNIRO (Bugaev et al. 2019b) on the coherence between the status of stocks in indicator streams and other populations they represent within the management unit as inferred from historical data. Conclusions are bolstered by recent increases in stock assessment funded by the fishing companies. SG100 – This guidepost is not met due to limited stock assessment in recent years of nonindex streams as a result of previous reductions in aerial survey efforts. Stock assessment has become increasingly reliant on indicator streams with the reduction in sampling rate but changing distribution pattern over time at different scales of abundance can confound interpretation of index samples. Reliance on index areas may not provide representative estimates for a full spectrum of strong and weak stock subcomponents within a system. Peak spawner counts from the most productive habitats may not be representative of the total stock under conditions of low productivity or declining returns. Further, escapement goals are generally based on production functions for aggregate stock and river populations of a species. Curves and goals thus represent an average stock and may be disproportionately driven by large strong stocks in the aggregate.		
g	Definition of Stock Management Units (SMUs)			
	Guidep	The majority of SMUs are defined with a clear	The SMUs are **well-defined** and include definitions of	There is an **unambiguous description** of each SMU

PI 1.2.4		There is an adequate assessment of the stock status of the SMU		
	ost	rationale for conservation, fishery management and stock assessment requirements.	the major populations with a clear rationale for conservation, fishery management and stock assessment requirements.	that may include the geographic location, run timing, migration patterns, and/or genetics of component populations with a clear rationale for conservation, fishery management and stock assessment requirements.
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – No Chum – No
	Justification	SG60 – See SG 80 SG80 - Stocks of west Kamchatka salmon are comprised of subcomponents including substocks (e. g., early and late runs), demographically-independent populations (e.g. species returning to home rivers or lakes), and with a spectrum of natural diversity expressed in run timing and spatial distribution. Stocks including major populations are well defined based on river system, run timing, and spawning distribution. Major substocks include five groups of Pink Salmon; summer and fall runs of Chum Salmon. Substocks can be distinguished over the course of the fishing season based on run timing, size and sex ratio. Assessments are made of the major component stocks and management and include considerations for each. SG100 - Descriptions and rationale for stock management are not unambiguous. Harvest and escapement of stock components are understood based on run timing and spatial distribution, respectively. Information is generally sufficient to estimate the significance of fishery harvest at the species and river system level but not at the substock level within a river system. Substock-specific estimates of harvest and escapement are limited.		
References		See section 3.3.3 for description of stock assessment methodology. See chapters 3.3.1 (Pink Salmon), 3.3.2 (Chum Salmon) for species specifics.		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 80 Chum – 80
CONDITION NUMBER (if relevant):				--

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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes
	Justification	No hatchery enhancement occurs in unit of certification systems.		
References		See Section 4		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 100 Chum – 100

PI 1.3.1	Enhancement activities do not negatively impact wild stock(s)
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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes
	Justification	No hatchery enhancement 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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes
	Justification	No hatchery enhancement of salmon occurs in unit of certification systems.		
References		See Section 3.3.4		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 100 Chum – 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.

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
	Met?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes
	Justification	No hatchery enhancement of salmon 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?	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes	Pink – Yes Chum – Yes
	Justification	No hatchery enhancement of salmon occurs in unit of certification systems.		
References		See Section 4		
OVERALL PERFORMANCE INDICATOR SCORE:				Pink – 100 Chum – 100
CONDITION NUMBER (if relevant):				--

APPENDIX 2 - CONDITIONS & CLIENT ACTION PLAN

Condition 1

Performance Indicator	**<u>1.2.3. Information and monitoring</u> - Relevant information is collected to support the harvest strategy**
Score	65 (all species)
Rationale	Concern for the sufficiency of information on spawning escapements for a representative range of component populations in the future is raised by the continuing reductions in aerial survey effort that is the basis for inseason and post season stock assessment, thereby not meeting SG80.
Condition	Condition 3. Provide sufficient information on wild spawning escapement for a representative range of wild Pink, Chum (and Kol Coho) populations in the unit of certification to support the harvest strategy and demonstrate that wild abundance is regularly monitored at a level of accuracy and coverage consistent with the harvest control rule.
Milestones	By the the 1st anniversary of certification for these UoCs, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: One alternative would be to implement systematic annual escapement surveys for all species in selected index streams and reaches.
Client action plan	The Client will support efforts to conduct escapement monitoring and report rannual results. Corresponding documentation will include the methodology (e.g. aerial surveys, weir counts, etc.), approximate time period (e.g. mid-August to early September), frequency (e.g. weekly surveys), streams/stream sections for each species, and fishery regulatory actions taken based on monitoring of abundance. Annual escapement data for the previous season will be provided during each audit.
Consultation on condition	Client will work with For Sea Solutions and KamchatNiro to develop and implement the plan. The plan will include agreement with KamchatNIRO to provide information.

Condition 2

Performance Indicator	**<u>2.1.3. Primary species information</u> - Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species**
Score	70
Rationale	Primary species include Coho Salmon (in rivers except for Kol where they are a P1 species), Sockeye Salmon (in rivers except for Ozernaya where they are subject to a separate certification), and Chinook salmon (all rivers). Assessments also include direct estimates of natural stock productivity on a regional and population-specific. Continuing reductions in aerial survey effort, which is the basis for inseason and post-season stock assessment, raise concern for the sufficiency of information on spawning escapements for a representative range of component populations in the future. The SG80 standard is not met due to reductions in the accuracy and precision of wild abundance estimates resulting from recent reductions in aerial survey efforts.
Condition	Condition 5. Provide quantitative information on escapement of (non-Ozernaya) Sockeye and (non-Kol) Coho Salmon adequate to assess the impact of the UoA with respect to status.
Milestones	By the third annual surveillance (for VA-Delta) scheduled in 2019, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: survey abundance and compare to goals (same info as in PI for other species.
Client action plan	Starting with the first surveillance audit, the Client will annually provide graphs comparing annual escapements of Coho and Sockeye compared to the relevant escapement targets, by species.
Consultation on condition	Client will work with KamchatNiro to provide the necessary information.

Condition 3

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 at the both management agencies such as AFC, SVTU and FAR, and also at Research Councils of fisheries institutes such as KamchatNIRO, TINRO-Center and VNIRO on a regular basis. However, information on run size, harvest by time and area, fishery management actions, and escapement is not typically reported outside the management system except in rare cases. Occasional publications of related information (e.g. Shevliakov 2013b) provide a historical perspective but are not sufficient to allow tracking action associated with findings and relevant recommendations.
Condition	Condition 6. Demonstrate that information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. Recommendation: The client report should include information used to make decisions plus the final outcome such as final spawning escapements and harvests in the watersheds, age of Chum and Coho Salmon.
Milestones	By the third annual surveillance scheduled (for VA and Delta) in 2019, the client must demonstrate that the condition has been met, at which time the fishery will rescore at least 80. Recommendation: Annual report to assessment team summarizing management actions and rationales based on fishery data. We will need to provide more guidance on what exactly we are looking for. Transparency.
Client action plan	Beginning with the first surveillance audit, the Client will provide annual reports documenting the rationale behind fishery management actions taken the previous fishing season affecting the unit of certification. In addition to reporting on Anadromous Fish Commission protocols establishing opening dates, initial passing days, modifications to passing days, season closures, etc., the report will provide rationale for the actions. For example, pre-season run forecasts, inseason catch/escapement information may have been used to set or modify passing days based on projected run strength. The report will include results of any independent observer program in place in this fishery regarding regulatory compliance.
Consultation on condition	Client will work with KamchatNiro to provide the necessary information.

APPENDIX 3 - PEER REVIEW REPORTS

The following tables contain the report from and team responses to the single peer review for this scope extension.

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	No	The scoring looks mostly reasonable based on criteria in the Scoring Issues and Scoring Guideposts. However, to fully meet MSC standards for P1, the report should more carefully define reference points and escapement rates specifically for the SMU; rather than for Western Kamchatka or the Pymta river. Moreover I challenge scores for 1.2.4(g) for Pink and Chum salmon. Although the assessment did not score Principles 2 and 3; I recommend scoring PI 2.1.1 to reconsider the low stock status of Sockeye in the Pymta River.	The SMU includes rivers on the southwestern coast of Kamchatka between the Ozernaya and the Vorovskaya which includes the Pymta Rver. Information provided by KamchatNIRO has demonstrated salmon status to be broadly synchronous. Abundance by species is assessed annually based in index stocks which have been determined by KamchatNIRO to be representative – additional information on coherence among populations (Bugaev et al. 2019b) has been provided to the assessment team and corresponding references have been added to this report. Sockeye, including those returning to the Pymta River, are already subject to a condition for PI 2.1.3. The Pymta river does not support a significant population of Sockeye due to the lack of suitable rearing lakes.
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes	The Scope Extension includes seven Conditions taken without change from the original (2016) assessment. The Scope Extension covers only Principle 1 and refers to Conditions 1 - 4. I suggest scoring Principle 2.1.1 covered by Condition 5. Conditions could be strengthened by including more precise limit and target reference points for the SMU; although these also may be addressed in Client Action Plans. With this caveat, the Conditions are appropriately written to achieve SG80 scores by the fourth anniversary of certification for Conditions 1 - 4 and the third anniversary for Condition 5.	The scope extension now includes 3 conditions following closure of 4 conditions from the original assessment during the 2019 surveillance of the fishery. The draft assessment was revised to reference corresponding information which was the basis of these closures. Condition 1 continues to call for reporting of information annual spawning escapement information relative to reference points.
Is the client action plan clear and sufficient to close the conditions raised? [Reference FCR v2.0, 7.11.2-7.11.3 and sub-clauses]	No	The Scope Extension includes Client Action Plans in corresponding Condition summaries. To add needed detail and credible milestones, Client Action Plans for Conditions 1,2,4 and 5 should clearly define limit and target reference points for the SMU and timelines meet them. Otherwise, it will be difficult and controversial to measure progress.	Target and limit reference points are documented by species in Chapter 3.3 of the report

Enhanced fisheries only: Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	Yes	The fishery has no enhancement activities.	No response required
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	This is a good report prepared by competent and experienced assessors. The Scope Extension builds on a 2016 assessment and the Pymta river stocks fit into the existing SMU. I agree with most scores and rationales and the assessment presents reasonable background material to support them. However, I recognize three inadequacies in the presented information. First, the status of Russian reference points remains ambiguous as the report presents multiple measures for MSY, limits and targets, precautionary buffers, optimum escapement rates and point of impaired recruitment. Second, the assessment does not present adeauate data explicitly for the SMU; rather infers it from Western Kamchatka and the Pymta river. And third, I suggest the report clarify the status of Sockeye salmon as a primary main species in P2. Please see additional comments below that address these three issues (see con't 1-3)	See previous comments
General Comments (con't 1)	N/A	**SMU and geographic scale** Guidance in FCR 2.0, SC 2.1.2 and "Section 3.1 Unit(s) of Assessment (UoA) and Scope of Certification Sought" define the SMU. From this guidance, the extended SMU includes P1 and P2 stocks from populations in the original six rivers plus those from the added Pymta. To score Pink and Chum salmon stock status in P1, assessors should use reference points and escapement rates for the seven river SMU. But the report does not explicitly provide these data. Rather, it presents comparable information for Western Kamchatka at the regional scale and for Pymta river at the population-level, river scale. While these data allow meaningful inferences, they may not adequately describe stock status for the extended seven river SMU. Also,without catch composition data for the SMU, they do not allow verification of primary main species status representing more than 5% of the SMU harvest. The report could provide more relevant information and better justify scores if it presented data at the SMU level rather than inferred it from Western Kamchatka or the Pymta River. The	See previous comments

		assessment could present escapement data and population-specific reference points for all seven rivers in the SMU, similar to Table 17 in the original (2016) report; then combine and summarize information for the entire SMU. Regardless, the report should carefully define geographic scales when presenting information and distinguish SMU data from comparable information for Western Kamchatka and Pymta river. And it should clarify inferences made from regional-scale and river-scale data. In this way it can more accurately assess the impact of extending Pymta stocks to the original SMU.	
General Comments (con't 2)	N/A	**Reference points** Significant ambiguity results from the report's description of Russian fishery management reference points. For example: "Formal limit reference points are not used in management of salmon in Russia." (p. 36). "A high degree of certainty is precluded for the SMU because specific limit reference points have not been incorporated into management practice..." (p.72). "In this system, target reference points based on maximum yields function as operational equivalents of limit reference points" (p. 36). "Management for optimum spawning escapement levels … provides an operational equivalent of a limit reference point in salmon management systems." (p. 71). "Productivity functions have been estimated and optimum spawning levels have been identified relative to the point where recruitment would be impaired…" Despite these disqualifiers, the assessment describes various reference points with dubious management jurisdiction. To avoid confusion, the report should present a simple, concise paragraph defining specific limit and target reference points used to score P1 and P2. It should explain how S(o), S(lim), S(buf), S(MSY), and S*(MSY), relate to these limit and target reference points and define optimum spawning levels and point of recruitment impairment. Do managers use these reference points? If not, what else do they use? If the assessment cannot define clear and consistent reference points in the context of Russian fishery management, it should explain why not. Without clear and consistent definitions, the report does not adequately present all available information at	The fishery manages for salmon escapement levels which have historically been demonstrated to sustain consistently high yields. Historical stock assessment data was used to establishing fishing levels consistent with these escapement levels. Fishing levels are defined primarily by the number of authorized fishing parcels and numbers of passing days designed to ensure adequate spawning escapement distributed throughout the spawning season. , passing days are adjusted accordingly with velocity of salmon upstream migration to ensure that salmon that escaped the gear in the sea and estuary will approach spawning grounds. Aerial surveys are conducted in-season to assess run strength and timing. Fishing locations and passing days may be adjusted in-season based on salmon abundance in order to protect spawning escapement. Results of the aerial surveys are only partly used for in-season management because of a significant time difference between appearance of fish in the coastal zone where they are fished and their arrival at the spawning grounds. An extended period of record high salmon returns throughout west Kamchatka has demonstrated the effectiveness of this system. Stock assessment has long been based on aerial surveys of index areas defined by area and stock. Extensive surveys were conducted over the years and used to identify fish distribution, establish coherence among populations and quantify the relationships among index and other areas. Subsequent

		the SMU scale.	government funding cuts have reduced aerial survey intensity, but in recent years funding from the fishing companies, often as a condition of MSC certifications, has bolstered stock assessment efforts. Since the early 2010s, the Federal Scientific Agency for Fisheries, KamchatNiro, has been developing species and river specific reference points based on analysis of stock-assessment information. These include limit and target reference points as described in the report. These reference points are presented for each species conceptually and numerically (see, for instance Fig. 10 and Table 7 of the report). The analytical model has been significantly improved during recent years (compare Figures 26 and 27 of the report). KamchatNIRO is also reporting estimates of spawning escapement relative to these reference values – this information demonstrates that spawning escapements are generally fluctuating around target values and consistently exceed low values defined as limit reference points. KamchatNIRO is exploring the efficacy of these species and river-specific values in salmon management. As this approach is being refined, salmon continue to be effectively managed based on the well-established system of index stock assessment relative to historical levels demonstrated to sustain and harvest controls designed to broadly limit fishing effort and maintain spawning escapements consistent with continuing high production.
General comments (con't 3)	N/A	**P2 primary main species** The Scope Extension assessment does not score Principle 2 or Principle 3. The original gap analysis concludes that scores for these PIs do not change from the original (2016) assessment. This is a reasonable assumption, except possibly for PI 2.1.1 where the assessment should more carefully consider: a) how the addition of Pymta river stocks to the SMU affects primary main species status for Sockeye and Coho; and 2) whether low harvests and poor stock status for Pymta river Sockeye affect SMU-level scores for 2.1.1 (a). Therefore, I recommend that the assessment team: • verify that Sockeye and Coho represent > 5% of the catch	Low abundance of sockeye in the Pymta River reflects a lack of suitable habitat in the form of juvenile rearing lakes rather than a “poor” stock status. Low numbers reported in some years generally reflect limited stock assessment information available for this stock in some years – sockeye stock assessment effort is typically focused on the more significant populations. Section 3.4.1 of the report present information on both Pymta River and western Kamchatka sockeye. Harvest by the Kamber and Pymta fishing companies subject of this assessment is found in Section 3.2.5. Current harvests of other fishing companies included

		from the SMU. A simple solution would provide a catch composition by species table for the seven river SMU; • score PI 2.1.1. for SMU Sockeye; and • update PI 2.1.3 to provide current and relevant information about Pymta Sockeye and Coho stocks in the SMU.	in this unit of certification may be found in annual surveillance reports. Both sockeye and coho are considered a main species because they regularly exceed 5% of the catch – this conclusion is not changed by the inclusion of the Pymta River to this certification unit.

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification	CAB Response	Response Code
1.1.1	No (no score change expected)	Yes	Yes	Scoring agreed. It is highly likely that Pink salmon stocks in the SMU are above the LRP; but not fluctuating around the TRP. Recent assessments indicate that spawning escapement goals are generally exceeded in the Pymta River (Figure 12) and (Figure 13). So the 70 score looks good. However, two issues compromise presented information. First, the report does not present data at the SMU level, but rather for Western Kamchatka and/or the Pymta river scales to justify scores. This may be appropriate for the scope and scale of the fishery; however it seems that available data could be better summarized and synthesized for the seven rivers in the SMU. Moreover, the assessment should be able to define reference points and measure escapement rates at the SMU scale. Secondly, the assessment should clearly define limit and target reference points. Figure 10 defines reference points for S(o) and three levels of MSY for Western Kamchatka Pink salmon. Table 7 presents S(lim), S(MSY) and S*(MSY) for Pymta river stocks. Figures 12 and 13 show escapement rates relative to S(o) and S*(MSY). What are Pink salmon reference points for the SMU? Does limit = So = S(lim)? What is S(buf)? Does target = S(MSY) or S*(MSY)? Table 7 appears mislabeled as data apparently refer to Western Kamchatka stock; not Pymta river fish. Table 13 appears mislabeled as y-axis units should be consistent with those in Table 12 (thousands, not millions) Text in PI 1.1.1 (a) and (b) should define the limit and target reference points, respectively, used to score the fishery and more precisely define "relevant escapement targets" in Condition 1.	The SMU includes rivers on the southwestern coast of Kamchatka between the Ozernaya and the Vorovskaya including which includes the Pymta Rver. Information provided by KamchatNIRO has demonstrated salmon status to be broadly synchronous. Abundance by species is assessed annually based in index stocks which have been determined by KamchatNIRO to be representative – additional information on coherence among populations (Bugaev et al. 2019b) has been provided to the assessment team and corresponding references have been added to this report. Scientific definitions of reference points are found in section 3.3.3. Stock and population specific reference points were clarified in the PI 1.1.1 scoring table. So does equal S(lim). Target is a range defined by S(MSY) and S*(MSY). Label corrected Units are thousands The scoring rationale was revised to clarify that the recently-developed quantitative reference points inform scoring but are not the sole basis.	Accepted (no score change)

1.1.1	No (no score change expected)	Yes	Yes	Scoring agreed. However, similar to Pink salmon, Chum information could be strengthened by defining consistent reference points and presenting escapement data at the SMU level. Table 10. shows escapement reference points for S(o) and S(MSY) in Western Kamchatka and Pymta river. Figure 18 shows Pymta river escapement data relative to S(o) and S*(MSY). These data appear inconsistent since S(o) = 25.2 thousand in Table 10 and S(o) = about 41 thousand in Figure 18. Please check and clarify SMU limit reference point used to score 1.1.1 (a) Text states: "…for the subject populations the escapement value did not go below the limit reference point…" (Shevlyakov et al. 2016). Which limit reference point? For which area? Not consistent with Pymta river data shown in Figure 18 that show numerous escapement levels below S(0) and S*(MSY). Please clarify. Text states: "Recent work by KamchatNiro has developed river-specific reference points based on stock-recruitment analysis (Table 10). Escapements are generally distributed above and below target values in the Pymta River." (p. 17). However, Figure 18 may not support this conclusion as it shows escapement levels below S(o) in 10 of the last 15 years. Considering weak Chum stocks in the Pymta river, the assessment should provide SMU-level information to justify the SG80 score for Chum in PI 1.1.1 (a). Moreover, the assessment should clearly define limit and target reference points used to score PI 1.1.1 (a) and (b) and more precisely define "relevant escapement targets" in Condition 1.	Target and limit reference points are documented by species in Chapter 3.3 of the report. Figure labels were in error and have been corrected. Additional tables were added showing confidence bound upon which S*MSY value and alternative So are based on. Text has been updated for current information, Additional explanation was provided. Low values for the Pymta River reflect inconsistent stock assessment for that river. Stock assessment data and harvest for the region indicate that escapement continue to sustain high production.	Accepted (no score change)
1.1.2	Yes	Yes	NA	Scoring agreed. Scoring of PI 1.1.2 is only required for scores less than 80 in PI 1.1.1. There is no information that any Pink Salmon stock management unit is reduced;	None required	Accepted (no score change)

1.1.2	Yes	Yes	NA	Scoring agreed. Scoring of PI 1.1.2 is only required for scores less than 80 in PI 1.1.1. There is no current information to show that the Chum stock management unit is reduced.	None required	Accepted (no score change)
1.2.1	No (no score change expected)	Yes	NA	Scoring agreed for Pink and Chum; but a few questions regarding information to justify scores. Text in 1.2.1 (a) states "Management occurs on a river by river basis with meeting escapement targets as a primary priority of the management system." And: “Fishery times and areas are designed and regulated specifically to fill the available natural spawning areas and to achieve corresponding escapement objectives.” What are the escapement targets for the seven river SMU? Same as the target reference points? Do managers consider habitat as a reference point? What are the limit and target reference points used to score the fishery? Also: “The SG100 standard is not met because the aggregate SMU-based strategy employed in Western Kamchatka may not meet population-specific objectives in every case (although it generally achieves goals at the SMU level).” What does this mean? Do you consider Western Kamchatka as the SMU?	Rationale was revised to clarify that management is conducted based on a regional assessments of escapement which are broadly correlated among specific rivers. The stock management unit is defined as southwest Kamchatka including the rivers addressed by this assessment.	Accepted (no score change)
1.2.2	No (no score change expected)	Yes	Yes	Scoring agreed for Pink and Chum. HCRs may not keep stocks near MSY in all rivers for all years. However, here a few questions to address gaps in presented information. Text in 1.2.2(a) states: "The SG80 is not met because it is not clear that escapement levels consistent with MSY are consistently met for stocks in some rivers and years." What escapement levels are consistent with MSY? S(MSY)? S*(MSY). What is limit reference point used to score 1.2.2 (a) and (b) at SG80? What are the limit and target reference goals required in Condition 2 (b)? 1.2.2 (b) text: “Uncertainties in population-specific escapement goals are recognized with the development of precautionary escapement reference points but these	See previous explanation of reference points and their applications	Accepted (no score change)

				reference points have not yet been fully incorporated into annual management." Does this refer to S(buf) and S*MSY)? Please clarify precautionary and target reference points and their relevance to management. Client Action Plan in Condition 2 needs to more precisely define limit and target reference points and escapement goals.		
1.2.3	No (no score change expected)	Yes	Yes	Scoring agreed. However, a suggestion to improve relevant information to support the harvest strategy. 1.2.3 (a) SG 80 requires "Sufficient relevant information related to SMU structure, SMU production, fleet composition and other data is available to support the harvest strategy." The extended SMU includes seven rivers: the Ozernaya, Koshegochek, Golygina, Opala, Kol, Vorovskaya and Pymta. Following FCR guidance GSC2.7.1: "If the SMU is composed of multiple populations, then the establishment of reference points may be defined as an aggregate for the components." In this context, the assessment should consider aggregate reference points for the SMU. But the Scope Extension assessment does not summarize and/or synthesize SMU-level information. Rather, it presents regional scale information for Western Kamchatka and river-scale information for the Pymta. While these data allow inference and extrapolations about the SMU-level data, the report does not explicitly present aggregate SMU data for escapements, reference points and catch composition by species. Based on available population-specific information for each river, the assessment should be able to present escapements and reference points for the aggregate seven river SMU. Otherwise, please provide explanations to justify the use of data at other geographic scales.	The stock assessment evaluates status based on index surveys of selected rivers which have been shown to be broadly correlated among rivers throughout the region based on historical data. River-specific values are then inferred from historical distribution information.	Accepted (no score change)
1.2.4	No (non-material score reduction expected)	No (non-material score reduction expected)	Yes	Scoring agreed for Pink and Chum, except for 1.2.4 (g) where evidence does not support SG80 score. Condition 4 OK with a lttle more detail. SG60 scores result from uncertainties related to disaggregation of Western Kamchatka stocks and extrapolation from indicator streams. However, I am confused about how management uses population-specific, river-scale stock assessments and how the report defines the SMU. Consider: Text in 1.2.4 (b): "Spawning escapement goals are	See previous explanations	Not accepted (no score change)

				historically established based on production functions for the aggregate return of western Kamchatka salmon by species apportioned by the relative size of the respective populations. The management system is exploring the development of goals based on population-specific analyses.” And Text in 1.2.4 (c): “The management system is also exploring the development of goals based on population-specific stock-recruitment analyses. These goals include explicit precautionary safety factors based on statistical analysis uncertainty in population-specific stock-recruitment relationships.” Questions: Do managers use population specific stock-recruitment relationships at the river scale or do they only explore them? Background information presents river-specific reference points based on stock-recruitment analysis in Table 7 for Pink and Table 10 for Chum salmon. And the original (2016) report presents comparable data for the other six rivers in the SMU. Do managers use these numbers for stock assessments? Or do they use aggregate production functions based on habitat? Or something else? It seems to be a management system in transition. Please clarify. 1.2.4 (g). Definition of Stock Management Units (SMUs). Because it does not clearly define the SMU, the evidence does not support the SG80 score. Section 3.1.1 defines the UoA / SMU as a seven river complex. But the report does not present data for this SMU. Rather it presents data for Western Kamchataka and the Pymta river and infers and extrapolates for the SMU. Justification text states: “SG80 - Stocks of west Kamchatka salmon are comprised of subcomponents ... with a spectrum of natural diversity expressed in run timing and spatial distribution.“ This statement provides a good description of regional sub-stocks, but it does not explicitely define the seven river SMU relevant to these sub-stocks. And it implies west Kamchatka as the SMU. Text should clearly define the SMU as the seven-river complex that includes the Ozernaya, Koshegochek, Golygina, Opala,		

				Kol, Vorovskaya and Pymta rivers and distinguish it from other SMUs in Western Kamchatka. Moreover, it should present stock assessment data for the aggregatev SMU and show how the Scope Extension to include Pymta river affects stock status for the entire SMU and subsequent scores in PI and P2. "Condition 4. Estimate stock status of Pink and Chum Salmon of the unit of certification relative to reference points that are appropriate to the SMU…". What are the reference points appropriate for the SMU? Need to more precisely define escapement goals relative to limit and target reference points.		

APPENDIX 4 - STAKEHOLDER SUBMISSIONS

Stakeholder submissions were received during the consultation period from the MSC Supply Chain Team, and Natalia Novikova from ForSea Solutions. These comments and team/CAB responses are given in the tables below:

Table 20. MSC Technical Oversight comments and CAB responses

PageRef	Grade	Requirement/ Version	OversightDescription	CABComment
61	Guidance	FCR-7.6.1.2 v2.0	On MSC website, the PCDR publication date is actually 30th July, not 25th July. Please correct this. Further, eligibility date is set before the fishery's certification, please confirm if the traceability system described here has been put in place and effectively, to ensure segregation from “non-certified” (before Target Eligible date, TED), “eligible” (after TED but still under assessment) and “certified” (post-certification)?	Thank you, the eligibility date has been corrected to be the date of PCDR publication, and we have added text to the report to confirm what you have suggested needs confirming.
63	Guidance	FCR_7.12.1.1 v2.0	In section 3.2.4 of the report, non-UoC salmon species run in the same season as UoC species. Please clarify if UoC and non-UoC harvests take place at the same time? If so, how are different species physically segregated at all stages from the point of harvest to the start of CoC?	Yes, there is some overlap in the run timings of different salmon species. It is possible in rare cases of mixed species hauls that different species are not "physically segregated" before the start of CoC. However, they are very visually distinguishable, and CoC starts upon delivery to the processing plant, which means that the only activity the fishery is doing is emptying trap nets or beach seines and hauling their contents up the beach to the plant. When they are delivered to the plant, if there are any mixes of species, they are separated at that point. The higher valu e species are those caught in smaller numbers in this river (coho, sockeye, chinook), and there is no economic incentive to subsititue these for pink or chum even when the latter two are MSC certified.
63	Guidance	FCR_7.12.1.4 v2.0	The use of risk “not present” in Table 18 may not be true, since mitigation measures were described especially for rows 3 &	Thank you, corrected.

			5 so perhaps "minimum/negligible" risk may be more appropriate?	
62	Guidance	FCR-7.19.4.2 v2.0	It is unclear if table 17 lists the points of landing for use by Vityaz-Avto and Delta, Kamber and Pymta, or all four? The table and its title aren't consistent. Please clarify.	The table has been clarified as suggested.

Table 21. Stakeholder comments from ForSea Solutions and CAB responses

General comments	Evidence or references	CAB response to stakeholder input	CAB Response Code
General comments on the assessment. Stakeholders should note that input is most useful for assessment teams when attributed to an MSC Performance Indicator or Principle, and provided with objective evidence and references in support of any claims or claimed errors of fact.	Objective evidence or references should be provided in support of any claims or claimed errors of fact.	CABs should respond in this column. CAB responses should include details of where different changes have been made in the report (which section #, table etc).	The CAB shall assign a response code to each row completed by the stakeholder.
In regards to the Request for variation to the MSC Certification Requirement v2.1 FCP-7.8.1.1 for VA-Delta Kamchatka salmon fisheries, we would like to request the most compelling evidence to why the Variation Request submitted by MRAG Americas on 8/13/2019 to allow "A change in the eligibility date of product from the 30th July to 11th July (allowing 19 additional days of eligibility)" was denied by MSC on 8/21/19. We'd like this Variation Request to be granted to the Pymta river salmon fishery as it makes sense to move the eligibility date to July 11 as the fishing season began on July 11. Moreover, it doesn't affect their fishery sustainability.	We'd like to reiterate the necessity of granting additional 19 days of eligibility and, therefore to change the Eligibility Date from July 30, 2019 to July 11, 2019, i.e. to the beginning of the 2019 fishing season. This looks like a pure formality and more like a procedural error since there is no evidence that this change will undermine the sustainability of the client-fishery nor will it comprimize the integrity of the MSC assessment process. MSC's rationale for its denial of this Variation Request doesn't provide the compelling evidence that could make the public believe to why this Variation Request cannot be granted. MSC argues, and we quote "Changes to the assessment report need to be made earlier to allow for peer review and stakeholder consultation steps." However, in this case stakeholders are allowed to agree or disagree with the changes to the assessment report. Also, if and necessary MSC could request additional time for stakeholder input by extending the public comment period. Furthermore, MSC provides an additional opportunity for peer review and stakeholder input during the objections period after the Final Draft Report is published, specifically "Stakeholders that can prove that the CAB didn't follow procedures and as a result prevented or impaired [one's] participation during the assessment process." It is worth noting to the public that the Pymta river salmon fishery assessment as the scope extension is joining the existing valid certificate for VA-Delta Kamchatka salmon fishery which has been successfully certified since 2012. Additionally, the 2 new client-companies, Kamber and Pymta successfully completed the chain of custody onsite audit of their processing facilities before the start of the 2019 season on July 1-2. As a result, the CoC certificates for both companies were issued on August 15, 2019.	The CAB and assessment team agree with the reasoning provided by the stakeholder to move the eligibility date to July 11. We have attempted to explain to the MSC staff who rejected the variation request how we do not agree that the request was made retrospectively, making arguements similar to those presented here. However, MSC maintains that since the request to change the date came after the publication of the PCDR, it was too late, and they would not change their decision to reject the request. Therefore we cannot move the eligibility date to earlier than the publication date of the PCDR (July 30th, 2019). We could continue to argue this position with MSC but in the interest of avoiding further delays in the process, we have given up. Therefore the eligibility date remains as July 30th, 2019, however we agree that the sustainablity assessment contained in this report applies to the entire 2019 season such that catches from July 11-July 29 are no less sustainable according to the MSC standard than later 2019 catches.	Accepted (no score change)

APPENDIX 5 - SURVEILLANCE FREQUENCY (DRAFT PENDING SUCCESSFUL CERTIFICATION DECISION)

Table 22. Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1	Same as VA-Delta W. Kamchatka Salmon, Year 4	June/July 2020	Previous year's fishery information will be available and precedes current year fishery and aligns with other Kamchatka salmon fishery surveillance cycles

Table 23. Fishery Surveillance Program

Surveillance Level	Year 1
Level 5	On-site surveillance audit & re-certification site visit

Общество с ограниченной ответственностью

«Камбер»

ОГРН 1024101222617

ИНН/КПП 4108003808/410701001

Юридический адрес: 684200, Камчатский край, с. Соболево, ул. Комсомольская, д.7, кв.1

Р/сч 40702810600100002240 в АКБ АО «Муниципальный Камчатпрофитбанк»

г. Петропавловск-Камчатский

БИК 043002717 Кор/сч 30101810100000000717

ОКПО 47447369, ОКВЭД 10.20, 03.11

Тел/факс (415–2) 218-000;

Исх. № 148 от 19.09.2019

Amanda Stern-Pirlot
MRAG Americas, Inc.
8950 Martin Luther King Jr. St. N., Suite 202
St. Petersburg FL 33702

September, 2019

Re: MSC scope extension of the VA-Delta Kamchatka salmon fishery to include Pymta river in lieu of full assessment

Dear Ms. Stern-Pirlot,

On behalf of **Kamber LLC and Pymta LLC**, I am happy to formally accept the Public Certification Report for the Pymta River salmon fishery as scope extension to the VA-Delta Kamchatka salmon fisheries. We have read the Final MSC Report and agree with the certification decision.

We would like to thank you and your hard-working team for the effort and knowledge you have put into the assessment of our fisheries.

Best regards,

Roman Onofrychuk,

General Director,
Kamber LLC