Final Report and Determination
NE Sakhalin Island Pink Salmon Fishery
Nogliki & Smirnykh Districts

MRAG Americas, Inc.

15 May 2012

CLIENT DETAILS:
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Document template tracking no.: **MRAG-MSC-7a-v3**

MSC reference standards:
MSC Accreditation Manual Version 5
MSC Fisheries Certification Methodology (FCM) Version 6
Fishery Assessment Methodology Version (FAM) Version 2.1
MSC Chain of Custody Certification Methodology (CoC CM) Version 7
MSC TAB Directives (All)
MSC Policy Advisories (All)

Project Code:	RU1090_ MF
Issue ref:	Northeast Sakhalin Pink Salmon – Final Report and Determination
Date of issue:	15 May 2012
Prepared by:	RB, VT, RT
Checked/Approved by:	RJT

Contents

1 INTRODUCTION

This report sets out the draft results of the assessment of the Northeast Sakhalin and Aniva Bay pink salmon Fishery carried out by MRAG Americas, Inc. against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing. The purpose of this report is to provide background information, evaluation of the fishery, and justification for scoring the performance indicators provided by the MSC in the generic assessment tree of the Fishery Assessment Methodology v2.1. MRAG conducted no primary research as part of this assessment, and relied on existing information to conduct the analysis. The report intends to clearly set out key issues for consideration during annual surveillance audits and for subsequent recertification.

The record of document amendments is provided in Table 1.

Table 1. Document Amendment Record

Version	Start	End	Description
Client Draft	March 2010	Sept 2011	Client draft – to client; FAM v2.1 version
Peer Review Draft	Sept 2011	Nov 2011	Peer review draft – to peer reviewers; FAM v2.1 version
Public Comment Draft	Feb 2012	March 2012	PCDR – for public review; FAM v2.1 version
Final Report & Determination	May 2012	May 2012	Final Report
Certification Report			

The MSC Guidelines to Certifiers specify that the unit of certification is "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock) and management framework."

Unit of Certification

The fishery assessed for MSC certification is defined as:

Species:	Pink salmon (*Oncorhynchus gorbuscha*)
Geographical Area:	Northwest Pacific, Russian Far East, Sakhalin Island
Harvest method:	Coastal trap net
Stock:	NE Sakhalin (Nogliki District)
Management System:	Anadromous Fish Commission, Federal Fishery Agency, Regional division of the Federal Fishery Agency (Sakhalin-Kuril territorial governance, SKTU) Agency of Fisheries of the Sakhalin Oblast, Sakhalin Research Institute for Fisheries and Oceanography (SakhNIRO), State Marine Inspection, SakhRybvod: a combination of federal and state management
Client group:	Sakhalin Salmon Initiative Center, Sakhalin Regional Fisheries Association and companies with certificate sharing agreements

List of Client Group Companies:

OOO[1] Lovets,
OOO "Tamara",
OOO "Dagi",
OOO "Okhotskoe more",
IP "Khryanin",
OOO "Irida"

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Client group:	Sakhalin Salmon Initiative Center, Sakhalin Regional Fisheries Association and companies with certificate sharing agreements

List of Client Group Companies:

OOO "Plavnik"
OOO "Sadko"

2 SUMMARY

This report provides details of the MSC assessment process for the Northeast Sakhalin pink salmon Set Net and Trap Net Fishery. The assessment process began in November 2010 and has reached the public comment stage in March 2012. The fishery occurs in the Russian Far East, along the east coast of Sakhalin Island in the Nogliki and Smirnykh districts. The assessment covers all companies fishing in the two regions, but the certificate would apply to the companies that have agreed to a certificate sharing arrangement with the Sakhalin Salmon Initiative Center and the Sakhalin Regional Fisheries Association. The companies use primarily trap nets to fish for pink salmon.

A rigorous assessment of the wide-ranging MSC Principles and Criteria was undertaken by the assessment team and detailed and fully referenced scoring rationale is provided in the assessment tree provided in Section 6 of this report. Peer reviews of the assessment are presented in Appendices 1 and 2.

[1] *Obschestvo s Ogranichennoi Otvetstvennostiu, i.e. Society (or Unit) with Limited Responsibility.*

On completion of the assessment and scoring process, the assessment team concluded that the pink salmon fisheries in the Nogliki and Smirnykh districts could be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

2.1 Summary of the evaluation results

Principle 1

Review of stock status and reference points demonstrates that the wild stocks are above the point where recruitment would be impaired, that they fluctuate around target reference points, and that management system has implemented appropriate reference points that maintain the stocks and substocks at appropriate levels consistent with maintaining diversity and reproductive capacity. The stocks do not require rebuilding.

The management system has implemented a strong harvest strategy responsive to the state of the wild stock and designed to achieve stock management objectives reflected in the target and limit reference points. The harvest strategy is periodically reviewed and improved as necessary. Harvest control rules ensure appropriate exploitation rates and account for uncertainty. However, the team had concerns with the use of river mouth weirs in rivers where escapement objectives are not met; that the management system has not adequately articulated a variable exploitation rate strategy, and that the escapement target of 2 fish/m^2 has not been completely justified.

The management system collects good information for stock structure, stock productivity, fleet composition and most other data is available to support the harvest strategy. However, estimates of the removal numbers of illegal catch are not available that would allow understanding of the scale of illegal harvest relative to legal harvest.

The management system monitors stock abundance and fishery removals consistent with and supportive of the harvest control rule at a region wide level. However, information is not sufficient to estimate the significance of fishery harvests on population-level stock components which represent the diversity of the pink salmon stock within the northeast region.

The stock is well-defined, and the assessment is appropriate for the stock and for the harvest control rule and is peer reviewed. However, escapement data are limited for several of the larger pink salmon producing systems in the region and it is unclear whether the monitored systems are representative of the diversity and status of the larger systems which account for a significant portion of the harvest.

Enhancement activities do not appear to have significant negative impacts on the local adaptation, reproductive performance and productivity of wild stocks, as hatchery-origin spawners occur in a small proportion of the natural spawning populations/locations and they represent a small proportion of the total natural spawning escapement for individual spawning populations. Enhancement activities are not used as a stock rebuilding strategy.

The management system has implemented a strategy that will protect wild stocks from significant detrimental impacts of enhancement, based on achieving spawning goals for natural spawning escapement. Available information shows a low contribution of enhanced fish to the

stock. Estimates of the impacts of enhancement activities on the aggregate wild stock status, productivity and diversity occur at a level appropriate to the limited scale of hatchery production in this region.

Overall Score for Principle 1: 80.7

Principle 2

Only chum salmon is considered a main non-target species in the fishery harvest according to MSC definitions (e.g. > 5% of the catch by weight), and while not within biological limits, a partial strategy is in place for rebuilding the stock; additionally, the pink salmon fishery minimally overlaps with the fall chum fishery, but has a higher overlap with the summer chum run, such that the pink fishery would not hinder recovery. However, monitoring of retained species is not conducted in sufficient detail to assess ongoing mortalities to other significant retained species (e.g. cherry salmon, coho salmon, char) such that increasing risk levels can be detected.

No main bycatch species occur. A sampling program conducted in 2010 demonstrated minimal bycatch. Overfished crab occur in the catch, but regulations prohibit retention. The use of fish traps and seines, which allow live releases, is an effective strategy to minimize bycatch mortality. The companies have committed to ongoing monitoring at a level to evaluate changes in risk to bycatch species.

Endangered taimen and sturgeon may interact with the fishing nets. Fishing activities comply with national legislation and appear to not hinder recovery of the endangered stocks. The strategy entails live release from the trap and seine net gears, which provides a high potential for survival. However, quantitative data do not allow for assessment of changes in risk to the species.

Traps and beach seines have low likelihood of causing adverse habitat impacts. Fixed locations and limited numbers of trap and beach seine sites further restrict the habitat impacts. Choice of these gears constitutes the strategy for minimizing impacts. These gears operate most effectively on smooth bottoms with little relief; sites are selected to assure bottom types with these characteristics, which maintain a low risk. Minimal hatchery operations preclude adverse impacts.

The fishery and enhancement activities are highly unlikely to disrupt the productivity and diversity of the ecosystem, including the production of wild salmon stocks. A harvest strategy that includes spawning escapement targets that factor in ecosystem needs and monitoring and research restrains serious impacts on the ecosystem. Ongoing monitoring and research provide sufficient information to track changes in risk to the ecosystem from the fishery.

Overall Score for Principle 2: 80.7

Principle 3

Russia has established a comprehensive management system for salmon fisheries in the Russian Far East, including research and management agencies that lead to effective synthesis

of information for management purposes. Rights of indigenous peoples are explicitly recognized.

The Anadromous Fisheries Commission forms the basis for consultation, as the Commission has members from various stakeholder groups and makes decisions in public and posts decision online.

Laws and regulations provide explicit goals and objective with respect to protecting spawning escapement; the laws and regulations provide broad goals for the environment. Hatchery objectives are clearly specified in authorizing plans, but no objectives for wild stock management or precautionary approach to hatcheries were noted.

A new policy allowing companies to lease fishing sites for 20 years provides incentives for measures to protect their resources, develop educational programs to prevent poaching and protect the environment; Few incentives for additional hatcheries in the NE Sakhalin currently exist.

The NE Sakhalin fishery objectives include spawning escapements intended to provide for maximum sustained yield and long term objectives for fishery sustainability reflected in management regulation. However, short and long term objectives do not always provide clear measurable standards with respect to ecosystem, sensitive species such as taimen, and hatchery effects on wild stocks.

The Anadromous Fish Commission provides for a highly effective decision making process that involves a wide range of stakeholders in a transparent manner. The Commission use best available information from SakhNIRO and SakhRybVod in a precautionary manner, discusses a wide range of issues, makes decisions in public, and reports decisions to all stakeholders.

Federal agencies and fishing companies have taken steps to reduce illegal fishing in the region; however, continuing problems with illegal harvest call into question the adequacy of enforcement of relevant management measures, strategies and/or rules in providing comprehensive controls. Sanctions appear effective in substantially reducing mis-reporting or illegal catch by licensed companies, but less so for other illegal fishing. No systematic non-compliance by fishing companies occurs.

While the management system reportedly has a research plan with a strategic approach to research and reliable and timely information, the team has not received a copy of the plan, so it remains unclear where all questions related to MSC principles 1 and 2 are addressed, particularly with respect to ecosystem effects, ETP species, and hatchery impacts. Research results are published in the scientific literature, but research plans and internal reports may not be widely disseminated or publically available.

The Federal Fishery Agency interacts with various agencies at the federal level while controlling its territorial departments and provides oversight of departments under its jurisdiction. The FAR evaluates the management system through its responsibility for defining the rules and the

areas of fisheries and for preparation of federal-level and agency-level reports on the fishing industry.

Overall Score for Principle 3: 81.3

2.2 Previous assessments and harmonization with other MSC assessments

No assessment of pink salmon in the eastern region of Sakhalin Island has occurred previously. No harmonization is required.

3 BACKGROUND

3.1 Authors/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:

Mr. Ray Beamesderfer, M.Sc. – Senior Fish Scientist, Cramer Fish Services
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 previously worked for the Oregon Department of Fish and Wildlife on salmon research, management and policy analysis. He currently works as a consulting fish scientist on a variety of projects in fishery management, biological assessment, and conservation/recovery planning with an emphasis on Pacific salmon. 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. Mr. Beamesderfer has served on fishery assessment teams for salmon fisheries in Alaska and Russia.

Dr. Vladimir Tabunkof, a retired fishery scientist, has worked throughout Sakhalin and the Russian Far East. He has experience in monitoring wild salmon populations, management of sustainable salmon fisheries, establishing salmon protected areas, planning for and evaluation of salmon hatcheries, and knowledge of salmon-dependent ecosystems. He has worked for a Russian fishermen's association, as a private consultant, and as director of SakhTINRO. He has attained a Docent of Hydrobiology, awarded in 1981 by Highest Attestation Commission of the Ministry of Education USSR; a Ph. D. in Biology awarded in 1974 by Zoological Institute of Academy of Science of USSR, St. Petersburg; and the equivalent of Master of Science in Zoology, Kazan State University, 1965.

Dr. Robert J. Trumble joined MRAG Americas in 2000 as a senior research scientist and became Vice President in 2005. He has wide-ranging experience in marine fish science and management, fishery habitat protection, and oceanography. Dr. Trumble serves as Certification Manager for MRAG and serves as lead assessor for this assessment. He has overseen all MRAG pre-assessments and full assessments. He has received MSC training on three occasions, including the Risk-based Framework, and has led an RBF assessment on three occasions. Previously, he served as Senior Biologist of the International Pacific Halibut Commission in Seattle, Washington, in various research and management positions at the Washington Department of Fisheries, and with the US Naval Oceanographic Office. Dr. Trumble has extensive experience working with government agencies, commercial and recreational fisheries groups, Indian tribes, and national and international advisory groups. He received appointments to the Scientific and Statistical Committees of the South Atlantic Fishery Management Council and the Pacific Fishery Management Council, the Groundfish Management Team of the North Pacific Fishery Management Council, the affiliate faculty of Fisheries at the University of Washington, and the Advisory Committee of the Washington Sea Grant Program. Dr. Trumble received a Ph.D. in Fisheries from the College of Fisheries, University of Washington.

3.2 Peer Reviewers

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

Dr. Chet Chaffee is an expert on the scientific and policy issue surrounding sustainability and certifications. He has a distinguished and varied professional history that includes work for the National Marine Fisheries Service, Executive Vice President for Scientific Certification Systems, Inc., CA., Partner with Boustead Consulting & Assoc. USA, and as Vice President for FirstCarbon Solutions Inc., Dr. Chaffee has conducted more than 30 MSC pre-assessment projects worldwide covering more than 400 fisheries, including the Dungeness Crab Fisheries, US Albacore Fishery, and the US and Canadian Halibut fisheries. Dr. Chaffee also has significant experience in conducting a variety of full assessments, from some of the largest and most complicated fisheries assessed and certified under the MSC program (Alaska salmon, British Columbia salmon, Bering Sea and Aleutian Islands Pollock (one of the largest commercial fisheries in the world), and Gulf of Alaska Pollock to small community-based fisheries such as Mexico's Baja spiny lobster fishery and Australia's Lakes and Coorong fishery. Among the fisheries assessed by Dr. Chaffee are pelagic net fisheries (pollock, sardines), bottom trawl fisheries (Chilean hake and Australian Mackerel icefish), and line fisheries (Pacific cod, US halibut, Canadian halibut, and US sablefish), as well as estuarine fisheries. Dr. Chaffee has most recently led an assessment team that assessed the first salmon fisheries in Russia (Iturup Island pink and chum fisheries) and is currently engaged on reviewing fishery assessment processes and outcomes.

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

3.3 Field Inspections

Inspections of the fishery and consultations with the client and various stakeholders were conducted to obtain information on the nature of the fishing, and the nature and relationship of management entities. A meeting with the client in August, 2010 explained the details of the assessment and set up client-consultant contact approach. In February 2011, the assessment team met in and around Yuzhno-Sakhalinsk for a visit with the fishery and for consultations

with stakeholders. The team met with the clients, with the client's consultant, with federal and state salmon scientific and management agencies, and a stakeholder group to discuss scientific aspects of the fishery and to discuss and obtain information on Principles 1, 2, and 3. The team received relevant references, data, and personal communication used in writing the report. The team used this information to assure that all key topics received specific analysis in the assessment report; the stakeholder meetings assured that the team had a clear understanding of the issues of importance to stakeholders.

A summary of the site visit discussions follows:

13 February 2011

Dr. Dmitry Lajus, consultant to clients

- Fishing operations
- Fishing seasons
- Processing procedures

14 February 2011

Sergei Didenko, client

- Escapement
- In-season management
- Management system
- Indigenous fishing
- Hatchery marking

Anatoly Semenchenko, Scientist for the SSI

- Fishery monitoring and habitat conservation
- Taimen biology and fishery impacts
- Red-listed species

15 February 2011

Sergei Didenko, client

- Migration patterns
- Catch trends
- Control rivers
- Interception of Sea of Japan pink salmon
- Hatcheries

Pavel Kolotushkin & Dimitry Boginsky – Regional Fisheries Agency (hotel)

- Fishery agencies responsibilities
- Subsistence and indigenous fishing
- Fishing sites, fishing seasons
- Anadromous Fisheries Commission procedures and public participation opportunities

Sergey Makeyev – Sakryvod Ichthyologist

- Taimen biology and fishery impacts
- Management priorities and escapement goals
- Run timing/sex ratio changes in season

16 February 2011

Dmitry Lisitsyn – Sakhalin Environment Watch

- Concerns about impacts of illegal fishing and impacts on assessments
- Concerns for taimen and impacts of fishing
- Uncertain and out of date assessments of spawning capacity
- Concern for Red Book species

Alexander Kalushnoy & Sergei Goncharuk - SKTU

- Fishery monitoring and enforcement
- Changes in management system
- Fishery forecasts

Vladimir Samarskiy – Sakryvod head

- Hatchery production and policies
- Scientific responsibilities
- Stock differentiation/homing/straying
- Bycatch monitoring

17 February 2011

Sergei Didenko

- Review data gaps

Andrei Sukhotin – Nogliki Fishing Company & Vladimir Smirnov – Smirnykh Fishing Company

- Discussion of fishing operations
- Reduction of illegal fishing
- Concern for blocking rivers to prevent overspawning

18 February 2011

Team meeting to conduct preliminary scoring

The list of individuals who attended meetings during consultations or the site visit is provided in Table 2.

Table 2 Participants at meetings during the field inspections.

	Name	Affiliation	Date	Issues	Location
1	Sergei Didenko	SSI Center	15-17 Feb	All	Yuzhno
2	Sergei Siyanov	SRFA			Yuzhno
3	Julie Kupechatov	WSC	15-17 Feb	All	Yuzhno
4	Randy Erickson	WSC	15-17 Feb	All	Yuzhno
5	Dmitry Lajus	Client consultant	14-17 Feb	All	Yuzhno

6	Anatoly Semenchenko	SSI Center	14 Feb	Fishery monitoring, taimen	Yuzhno
7	Pavel Kolotushkin	FAR	15 Feb	Management	Yuzhno
8	Dimitry Boginsky	FAR	15 Feb	Management	Yuzhno
9	Sergey Makeyev	Sakryvod	15 Feb	Taimen, management, biology	Aniva Bay
10	Dmitry Lisitsyn	Sakhalin Environment Watch	16 Feb	ETP, enforcement	Yuzhno
11	Vladimir Samarskiy –	Sakryvod	16 Feb	Science, management,	Yuzhno
12	Andrei Sukhotin	Nogliki	17 Feb	Fishery operations, enforcement, traceability	Yuzhno
13	Vladimir Smirnov	Smirnykh	17 Feb	Fishery operations, enforcement, traceability	Yuzhno

3.4 Supplemental consultation

The decision to separate the NE Sakhalin portion of the assessment from the Aniva Bay portion took several months and delayed the completion of this NE Sakhalin assessment. As a result, a required additional 30 day public consultation period went into effect from 7 December 2011 to 6 January 2012. No public comments were received during this period.

The Client and Certification Body conducted considerable consultation with government agencies, NGOs, and industry representatives prior to the start of the supplemental consultation, so did not expect further comments. However, the client provided updated information.

4 FISHERY DESCRIPTION

Salmon fishing has been an important occupation of the local population since Sakhalin Island was colonized many thousand years ago. Pink and chum salmon are currently harvested in large commercial fisheries surrounding most of the island. Much smaller recreational and personal use fisheries are concentrated around population centers. Subsistence fisheries by indigenous peoples are very small and most significant in the northwestern portion of the Island. Indigenous fisheries also occur in the northeastern region including the Nogliki District.

4.1 Area description

Sakhalin Island is located of the eastern Coast of Russia in the Okhotsk Sea. The island is approximately 948 km long, 25 to 170 km wide, with a total area of 72,500 km^2. Nearly two-thirds of the island is mountainous with maximum elevations of 1,600 m. The climate is cold with average temperatures at Aniva district on the southern end of the island of -12.5°C in January and 15.7°C in July. The natural vegetation is largely coniferous forest. There are approximately 1,200 streams on the island.

About 600,000 people currently live on the island but the population has been declining since the beginning of the 1990s due to emigration to other parts of Russia. Most of the population is concentrated in the southern portion of the Island. Northern areas are either rural or undeveloped. The administrative center is city of Yuzhno-Sakhalinsk. The majority of population is Russians. Oil and gas production is by far the most important local industry. Fishing, however, occupies an important role in the local economy, comprising about 14% of gross product of the region. Forest and coal industries were historically significant but have declined significantly due to the economy and political crisis of the 1990s.

Administratively, this area falls within the Sakhalin Oblast of Far East Federal Region of the Russian Federation, and in terms of fisheries subdivision includes Eastern Sakhalin Subzone and Western Sakhalin Subzone. The Kuril Islands are also included in Sakhalin District and are very close to this area in terms of management (all governmental organizations cover both Sakhalin Island and Kuril Islands). The Sakhalin Oblast includes 17 local administrative units (District).

Sakhalin Island salmon fisheries are subdivided for management purposes into areas based on salmon biology: 1) Aniva Bay, 2) Southeastern coast, 3) Terpenie Bay, 4) Northeastern coast, 4) Northwestern coast, 5) Southwestern coast. This assessment considers the fisheries in the Smirnykh District of the Northeastern coast and the Nogliki District of the northeastern Coast (Figure 1).

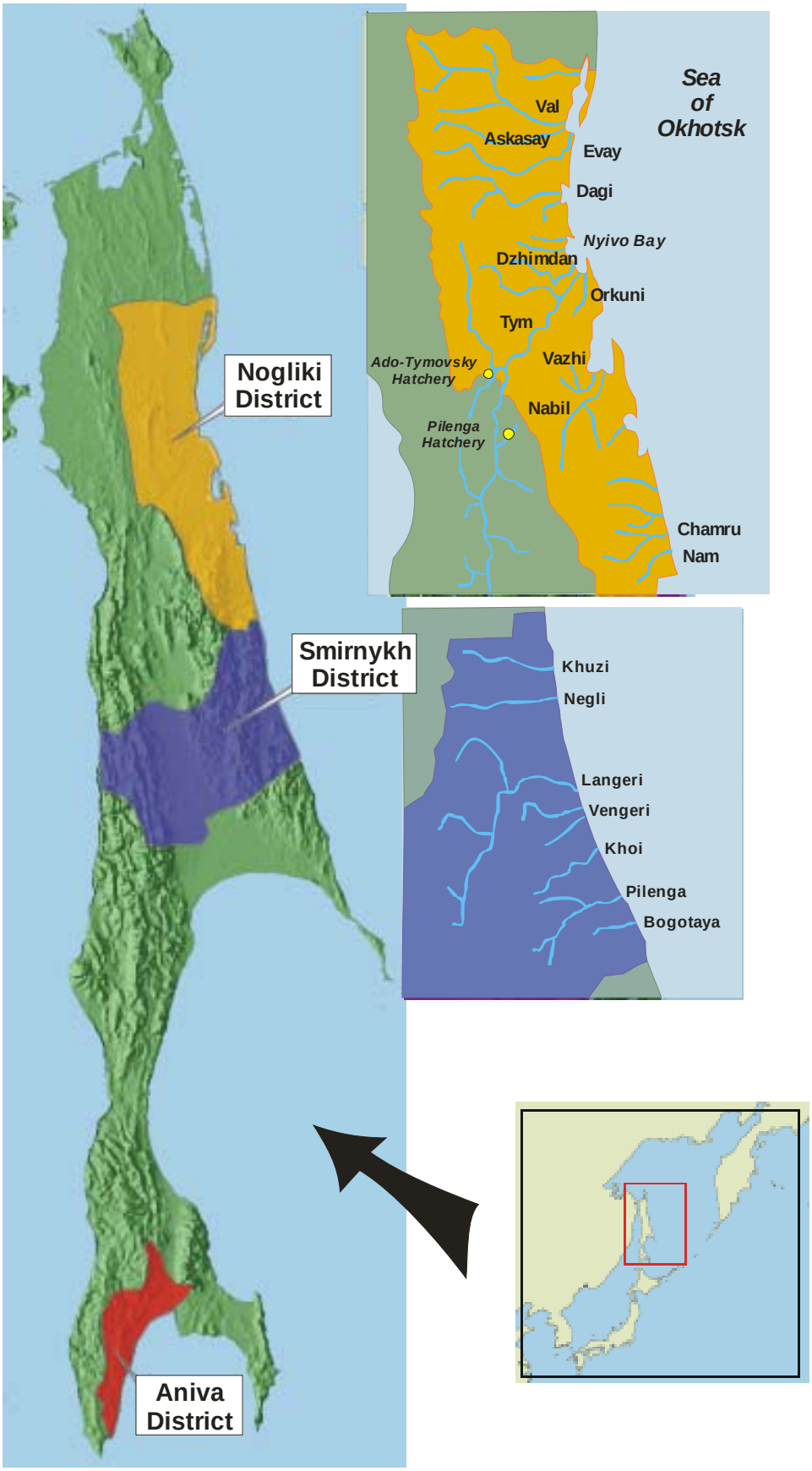

Figure 1. Sakhalin Island fishing areas addressed by this assessment.

Figure 2. Vengeri River mouth in the Smirnykh district on the east coast of Sakhalin Island. (D. Lajus, photo, August 2009)

The Smirnykh district is located in mid Island north of Terpenie Bay. This administrative district extends across the island from the east to west coast but only the eastern portion bordering 100 km of the Sea of Okhotsk is included in this assessment. The coastline of this district is relatively remote and undeveloped with only one significant road in and out. The road provides access from the mountainous interior to the only significant town on this coast – Pogranichnoe which is located at the mouth of the Langeri River. The Langeri is the largest river in this area, extending 108 km in length. Approximately 10 significant rivers are found in this area including the Pilenga, Bogataya, Langeri, Kostina, Khoi, Vengeri, and Khuzi. These systems are typically 30 to 60 km in length.

The Nogliki district includes a 200 km section of the northeast coast bordering the Sea of Okhotsk. The area is lightly populated but most of the major rivers and streams are crossed by the road system. The mountains generally lie inland from the coast, river valleys are swamped and several rivers flow into lagoon-type bays (Kaev and Geraschenko 2008). Many of the commercial fishing nets of this region are located inside these bays including Nivskii Bay where several of the companies in this certification operate. The district contains about 20 large rivers and streams. The 330 km Tym is one of the two largest rivers on the island (the other being the Poronai River which flows into Terpenie Bay). Other large rivers in the Nogliki district include the Nabil, Dagi, and Dzhimdan, Val, Askasay, and Evay – each is 60-100 km in length.

4.2 Fishing Method

4.2.1 Gear

Commercial salmon fisheries have been conducted since the beginning of the 20th century primarily in nearshore coastal waters of Sakhalin Island using trap nets. The large majority of the current commercial harvest continues to be taken with coastal trap nets. Commercial fisheries are also conducted with fishing weirs in some rivers. Beach seines and floating gillnets are also occasionally used. The effects of all four commercial fishery gear types, coastal trap nets, river fishing weirs, beach seines, and floating gillnets, are considered in this assessment. However, only fish from coastal trapnets operated by the fishing companies participating in certificate sharing with the clients are authorized for sale under the MSC logo.[2] Fish counting weirs are also operated in some rivers by the management system to regulate escapement but it is illegal to use fish counting weirs for commercial fishing under the current regulations.

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 10 m high. Several, usually 3 or fewer, traps are attached to the central lead. The mesh size of the central net and the traps is being chosen to prevent fish from being stuck in the net cells. By regulation, coastal trap nets are fished no closer than 2 km apart with leads extending not more than 2 km from shore. Nets sites must be no closer than 1 km from the mouth of the spawning stream. Most fish traps are fixed in place. However, drifting trap nets are fished in a few locations including Nyivo Bay in the Nogliki District. Coastal trap nets are effective because tidal exchange is relatively small and littoral areas are wide and gradually-sloped. This type of fishing is passive and catch per unit effort (e.g. fish per net day) is related to the intensity of the run strength.

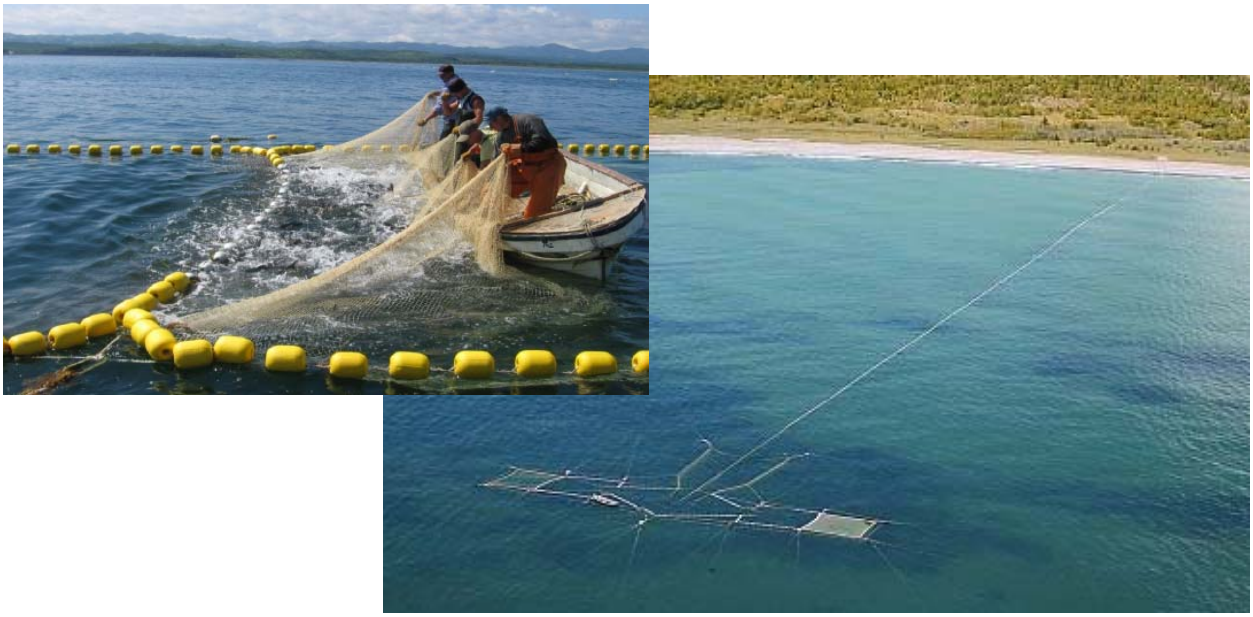

Figure 3. Photos of fixed coastal trap net and operation (Wild Salmon Center, photo).

[2] *Coastal trap nets, seines, and river fishing weirs operated by other companies in the region are not included in the certification.*

Figure 4. Fishing weir at the mouth of Aniva Bay's Tarany River. (D. Lajus, photo)

Coastal trap nets are operated from small open skiffs. Catch is typically crowded from traps and dip netted into the boats for transport a short distance to shore where they are off-loaded by crane or hand at the beach. Depending on the site, fish processing may occur nearby or catch might be transported by truck to processing plants elsewhere in the area.

In years and areas of very large returns, fishing weirs are also operated in the mouths of rivers in order to regulate spawning densities and to access harvestable surpluses. This practice is an exception to the regular practice of excluding fish traps from areas within 1 km of river mouths. River mouth fishing areas may be opened in years of large runs in order to avoid escapements exceeding the habitat capacity. Rivers might also be temporarily closed off with nets or weirs in some years when environmental conditions are poor for spawning due to warm temperatures and low stream flows. In extreme cases, large spawning escapements have resulted in fish die-offs, apparently as a result of oxygen depletion. For instance, mortality of hundreds of thousands of pink salmon was observed in Aniva streams in 1991 when little fishing occurred due to economic upheavals associated with changes in the soviet government.

River mouth fisheries are widely implemented in the Aniva District. Past practice has been to open these fisheries after 70% of spawning escapement goal has been achieved, typically for 3-5 days at the end of the season. This fishing method more commonly occurs in systems where returns are enhanced by hatchery production. These traps typically block the entire stream channel potentially catching all target and non-target species migrating upstream. This practice was historically uncommon in the Nogliki and Smirnykh districts – many of the larger rivers in northeast Sakhalin are not conducive to closure of their mouths with fishing weirs. However, use of river mouth fisheries in northeastern areas has reportedly been growing in recent years.

The government has recently expanded the use of in-river fishing weirs to avoid "overescapement." The management system has recently announced plans to expand the use of in-river fishing weirs in non-hatchery streams in Aniva Bay and Northeast Sakhalin. This fishery practice is highly controversial among Sakhalin fishers because of concerns for impacts on spawning escapement, impacts to recreational fishing and other anadromous species such as char and taimen, and because different companies might obtain permits and benefit at the expense of other companies licensed to operate nearby.

4.2.2 Seasons

The pink salmon fishery typically operates in Smirnykh and Nogliki districts from early/mid July through the first week of September, typically ending on September 5. This period coincides with the peak migration timing of the Okhotsk pink salmon stock endemic to these areas. Earlier closures may occur based on run size. For instance, the chum fishery was entirely closed on 2010. However, low run sizes do not always trigger closures, as was the case for pink salmon in 2010.

Southern and southwest Sakhalin area fisheries also historically operated during May-June to harvest an early run Sea of Japan pink salmon stock that returns to southern portions of Sakhalin Island including Aniva Bay and the Nevelsk District of the southwest coast. Aniva Bay commercial salmon fisheries are currently closed during the May-June period of return of the Japan Sea pink stock.

Commercial fisheries are also conducted in some areas and years to target a fall run of chum salmon which returns primarily in September and early October.[3]

4.2.3 Organization

The commercial salmon fishery is conducted by fishing companies. Each company operates one or more fishing sites. Potentially, there are 738 fishing sites (e.g. locations where stationary nets can be used) on Sakhalin Island. Not all may be operated in every year. For instance, 462 and 343 fishing sites were operated region-wide in 2003 and 2004, respectively (Rukhlov 2007). Fishery workers are employed by the companies. The work force includes both temporary and long term employees. Salary is typically dependent on the amount of fish caught.

Fishing sites are currently leased from the government for a 20 year period. The current licensing system has only recently been established and remains somewhat uncertain as the regulatory system has only recently begun to stabilize following a long period of transformative changes following the end of the Soviet Union in the early 1990s (Tabunkov et al. 2009).

There are about 300 private fishing companies and entrepreneurs fishing pink salmon on Sakhalin. Companies may or may not process their own fish. Approximately, 60 have their own fish processing. Fish processing is quite developed in the Sakhalin region, especially in the south of the island where there are number of modern fish-processing factories using imported equipment. Some processing plants handle several companies. Most processing involves head

[3] *The chum fishery is not included in this assessment although impacts of the pink salmon commercial fishery on chum salmon are considered under Principle 2.*

and gut removal or canning for the local market. Some companies are also doing secondary processing such as filleting. The fishery typically employs about 12,000 seasonal and permanent workers – more or less depending on the level of fish harvest. Fishermen are employees of the companies and their salary depends on the numbers of fish caught.

In the region, the overwhelming majority of companies are united in associations for the purposes of information exchange, cooperation and coordination with the management system. Fishing associations consist, as a rule, of all companies in a district (e.g. Aniva Bay). Each of 15 Sakhalin Island districts has an association of fishing companies. Some of these associations are active, but some are not. There are also all-island associations such as Sakhalin Regional Fisheries Association.

A total of 8 fishing companies have certificate sharing agreements to participate if the units of certification are certified and are addressed by this assessment report (Table 3). In the Smirnykh region, participants represent 20% (2 of 10) of the companies, and 23% of the average harvest. In the Nogliki region, participants represent 43% (6 of 14) of the companies and 33% of the average harvest.

Table 3. Numbers of fishing sites and fishery enterprises operating in Sakhalin Island fishery areas and numbers subject to this certification assessment.

	Companies		Average pink harvest (mt)[a]	
Area	**Total**	**Participating**	**Total**	**Participating**
Smirnykh	10	2	3,235	745
Nogliki	14	6	2,172	716
Totals	***24***	***8***	***5,407***	***1,461***

[a] *Years 2001-2010*

4.3 Harvested Species –Pink Salmon

4.3.1 Description

Pink salmon are the most abundant of the Pacific salmon and are found throughout the north Pacific Rim from Japan to the U.S. Pacific Coast as far south as the state of Oregon (Heard 1991; Augerot and Foley 2005). Most pacific salmon are anadromous, meaning they spend a portion of their life cycle in marine waters before returning to freshwater to spawn. Pink salmon are the smallest of the Pacific salmon. Sakhalin pink salmon typically average about 1.5 to 2 kg and 50-60 cm.

The spawning migration of pink salmon on Sakhalin Island occurs from late May through early October. This species typically spawns in small to moderate-sized streams within a few miles of the sea or in the intertidal zone at the mouths of streams. 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. All pink salmon die after spawning.

Embryonic development takes several months. After hatching, fry spend several weeks in the nest before emerging from the gravel in late winter or spring to migrate downstream into salt water, typically during hours of darkness. Extensive research has been conducted on biology, ecology and habitats conditions (hydrology, forage base) of the early marine life period of juvenile salmon in the coastal waters off Sakhalin Island (Kolomeytsev 2009; Temnykh et al. 2010). Fry remain in coastal waters for several weeks or months before migrating to open sea. Temnykh et al. (2010) reported that juvenile pink and chum salmon from Aniva Bay (south-eastern Sakhalin) stay for a long time (to 1.5-2.5 months) in a coastal zone after their appearing in sea waters. Following entry into salt water, the juveniles move along the beaches in dense schools near the surface, feeding on plankton, larval fishes, and occasional insects. By fall juvenile pink salmon begin moving into the ocean feeding grounds. Juveniles' migration from a shore to the open waters of the bay takes place independently of the dates when specimens enter sea waters (Temnykh et al. 2010). This migration is brief and usually happens in the first half of July. As a rule, by the third week of July, all juvenile pink and chum salmon leave the bay area. Then they concentrate along southeastern Sakhalin and stay there up to the end of July (although some differences may occur between early and middle pink runs).

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. Pink salmon from Sakhalin Island range into ocean waters of the Japan, Okhotsk, and Bering seas. It is the deep-water part of the Okhotsk Sea that is the major feeding ground of juvenile salmon within the Russian EEZ - Despite the great role as a feeding ground of large-size Pacific salmon during summer-autumn period, western Bering Sea has a low foraging importance for juveniles (Temnykh and Kurenkova 2006; Shuntov and Temnykh 2008a).

Pink salmon mature at two years of age which means that odd-year and even-year populations are essentially unrelated. A strong odd-year or even-year cycle will generally predominate, although in some streams both odd- and even-year pink salmon are about equally abundant. Occasionally cycle dominance will shift, and the previously-weak cycle will become more abundant. Odd-year returns dominate the pink return of Sakhalin Island (Smirnov 2006).

4.3.2 Stock Structure

Within a species, salmon runs often consist of different components returning at different times to different areas, sometimes even within the same river system. Each run component is adapted to take advantage of specific conditions found at a particular time and place. That is the case with Sakhalin pink salmon which include partially-overlapping early, middle, and late run components (Figure 5). Pink salmon return to all regions of Sakhalin island but not all runs are found in every region.

Run timing patterns may vary slightly from year to year depending on hydrological conditions in the ocean and freshwater. Sex ratio has proven to be a particularly useful indicator of the timing of different components of the pink salmon run for fishery monitoring and management purposes (Figure 5). The early portion of the run is predominately males and the male proportion declines over the course of the run. An increase in the male percentage during the season indicates the onset of successive stocks.

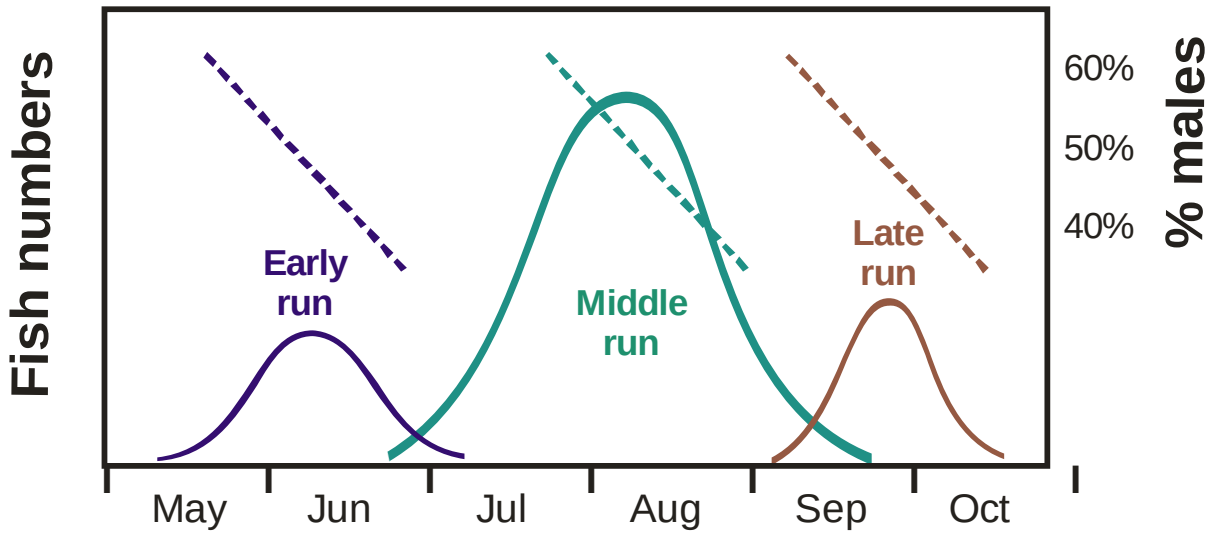

Figure 5. Run timing of pink salmon on Sakhalin Island (S. Makeev, pers. comm.).

The early pink salmon run typically returns between late May and early July. This run spawns in the upper reaches of larger stream systems of the eastern and western coasts of southern Sahkalin, including Nevelskii, Aniva, and Terpenie areas. The ocean distribution of the early run is in the Sea of Japan, south of Sakhalin. The typical return migration pattern is north from the Japan Sea into the Tatarskiy Strait, then southwest along the Sakhalin coast. Thus, return timing is slightly earlier in SW Sakhalin (May) than in Aniva Bay (June). The Sea of Japan pink salmon stock is harvested primarily in SW coastal areas with some historic harvest in Aniva Bay. Average size of early pink salmon is typically smaller than later runs due to their earlier return from ocean feeding areas.

The middle run predominates the pink salmon return throughout most of the island, including the Aniva, Smirnykh and Nogliki districts addressed in this assessment. Juveniles of this stock migrate from Sakhalin into either the Okhotsk and Bering Seas. The oceanic run may mix with the Sea of Japan fish in the southern parts of the island but is the only significant run returning to other parts of the Island. Return timing to nearshore coastal waters typically begins around July 10, with a peak during the first 10 days of August, and completion by September 10-15. This run generally spawns in lower to middle reaches of small streams to large rivers. The middle run supports the large majority of the Sakhalin commercial fishery pink salmon harvest.

A fall run of pink salmon returns to spawn in tidal and intertidal areas of streams of many areas including Aniva Bay. This run generally begins in mid-September and returns until mid November (or sometimes even December). The late run is clearly a different stock than the middle run – males are typically larger than females, which is the reverse of the middle run. This late fall run is not targeted in significant numbers by the commercial fishery which typically closes on September 5 prior to the arrival of the late run. However, the late run is harvested in the commercial fishery for chum salmon which typically begins in September.[4]

[4] *The fishing season for chum begins after the fishing season for Pink is over. In different areas it is carried out at different times. Decisions regarding the commencement date of the commercial fishing season for chum and*

Differentiation of pink salmon into seasonal races is considered as the first level of population structure of this species, which is more important than geographical differentiation in the Sakhalin region (Gritsenko 2002). Early, middle and late runs of pink salmon are believed to be genetically different (V. Samarskiy, pers. comm.). However, genetic differences among populations of the same run are unclear. Genetic analyses of pink salmon stock structure have generally identified broad geographical patterns but little or no difference among local populations of the same run component in any given region. No major differences were observed among local populations in 5 loci analyzed by Glubokovskiy and Zhivotovsky (1986) or among 76 loci from broadly-distributed populations on Sakhalin analyzed by Matsak (Claire et al. 2001). Genetic differences appear to be less in Asian pink salmon than in North American pink salmon (Zhivotovsky, as referenced in MSC 2009).

Based on ecological, morphological and genetic data, Sakhalin pink salmon are believed to intermix within each of six regions with little or no mixing among the regions (Kaev 2008). Natural straying among local populations of pink salmon is more significant than in other salmon species (Sharp et al. 1994; Zhivotovsky et al. 2008). For instance, chum salmon are generally believed to home more specifically to their natal streams. Pink salmon are believed by the Sakhalin management system to imprint but for many fish the homing instinct is thought to be established on the coastal shoreline rather than the natal river.[5] The period of ontogenesis between fry emergence and the beginning of active feeding is considered a key period for imprinting and homing. The belief is that salmon remember their birthplace at the point of smoltification, requiring approximately a 10 day acclimation interval. Many rivers, particularly in the Aniva area, are 20 km or less in length and pink salmon migrate at emergence, requiring only 2-3 days to reach the ocean. As a result, the majority of the young enter the ocean in the yolk sac stage. Therefore, a significant portion of the homing instinct is believed to be established in nearshore marine waters such that fish return to a general area but not necessarily a specific river. The exception is for larger systems and upstream spawning stocks such as the pink salmon early run that can better imprint to their natal stream due to longer migration distance and residence time and freshwater. Previous tagging studies during the 1960s and 1970s showed that pink salmon do form local populations and seasonal forms.

Fish generally return to the same group of rivers (for instance inflowing to the same bay) but not necessarily exactly to the same river. On Sakhalin, it is accepted that they mix within each of six parts of the island, but not between these parts. Populations returning to the four large rivers (Tym, Poronai, Liutoga, and Naiba) are the exception. These are considered independent populations by the management system due to a very strong homing instinct to these rivers (Gritsenko 2002) which provide sufficient length and freshwater residence for local imprinting. The remaining rivers are considered to support demographically inter-dependent sub populations.

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which locations (areas) that fishing is allowed are made by the Anadromous Fishing Commission of the Sakhalin region based on information submitted by SakhNIRO and Sakhrybvod. Over the past few years, with the beginning of the mass run of wild chum, fishing for all Pacific salmon is closed - except in areas of enhanced production, where hatchery chum are caught.

[5] *This belief has not been specifically validated with empirical information from marked fish or genetic data.*

Temporal and spatial differences among pink salmon runs generally appear to limit the incidence of mixed stock or run harvest in the nearshore Sakhalin commercial fisheries. One exception is that Sea of Japan pinks typically migrate southward along the west shore of Sakhalin where they might be subject to interception in a number of fishing areas prior to return to Aniva Bay. A second exception is the NW region where both Sakhalin and Amur River (mainland) stocks may be harvested. Kaev (2006) reported that significant numbers of Kamchatka pinks may have entered some Sakhalin fisheries in some years. Tagging data of pink salmon during the 1980s and 1990s also showed significant numbers of Iturup Island fish being intercepted off Sakhalin Island.

4.3.3 Status

Assessment

Escapement monitoring data for some Sakhalin salmon populations exists since 1957. Catch and research data well before this, at least since 1880s. Annual spawning escapement is currently estimated in index rivers throughout the Island. Numbers are visually estimated with either with foot or aerial surveys as is standard practice for salmon monitoring systems. Index streams include both wild and hatchery systems and streams of various sizes.

Monitored systems include officially-designated "control rivers" and other systems that produce significant salmon runs. The control rivers were formalized in the 1970s and 1980s to provide the official long-term estimates of salmon status and trends in each of six salmon management areas on the island. Control rivers were also initially selected to provide test and control streams for monitoring the effects of forestry practices. Control rivers are typically wild index streams and account for about half of the significant spawning streams. Monitoring is shared by SakhRybvod and SakhNIRO.[6] The SakhNIRO continuously monitors escapement and downstream migration of juveniles in the 3 control rivers (Kura River in the Aniva Bay and Dudinka River and Poronai River in Eastern Sakhalin). SakhRybvod monitors 18 control rivers, where it operates Control and Monitoring Stations (KNS). In addition, SakhRybVod monitors rivers where state-owned hatcheries are located (11 hatcheries, including 1 on Tym River, north-eastern Sakhalin; 4 on the rivers of eastern Sakhalin eastern and southern Sakhalin; 2 on the Taranai River and Liutoga River in the Aniva Bay; 4 on the rivers of south-western Sakhalin). In the Aniva Bay the counting of pink salmon on the spawning grounds is carried out on 16 rivers. On the north-eastern Sakhalin the counting is performed in all major rivers (rivers Tym, Dagi, Nabil, Langeri, Melkaia, Pilenga, Khoi, Aksakay, Val, and Piltun). Escapement is monitored using walk through and aerial surveys.

While accounting of spawners on the spawning grounds, SakhNIRO and SakhRybvod generally consider the optimal density of filling spawning grounds to be two pink salmon spawners per 1 square meter although there are exceptions.[7] This density was calculated in 1960s and still

[6] *The Rybatskaya River on Iturup is also monitored as an officially-designated control stream by SakhNIRO.*

[7] *Sakhalinrybvod and the scientists of SakhNIRO claim that is not always advisable to adhere to these rules: 2 spawners per square meter in places of a depressive state of salmon stocks (as in western Sakhalin where these numbers can't be achieved except for the key rivers with hatcheries on them), and where a need for regulation arises from bad hydrological conditions (otherwise the river can be permanently lost as a result of a mass death of salmon prior to spawning). The use of fish counting weirs in rivers to regulate the escapement of salmon to the*

applies. Counting the number of spawning fish is conducted in large and small streams, where control sites are being selected to represent typical for the area spawning grounds. On the rivers up to 50 km long, the control sites are being selected each 1- 1.5 km, while rivers with length more than 50 km the distance between control sites is 2-2.5 km. The length of the sites has to be at least 20 meters, and water surface area at least 200 square meters. Additionally, the number of fish spawning outside the spawning areas (e.g. in pits, stretches and rapids), and the number of dead spawners which have died both before and after spawning is being counted along the streams.

Control areas spawning grounds are established at 3-4 sites in upper, middle and lower sections of the river in order to determine the egg density in gravel beds and survival of pink salmon eggs, some. Counting the pink salmon juvenile migrating downstream is implemented using subsampling of a portion of the river discharge (Taranetz 1939). Results of this method are comparable with the results of complete census sampling of pink Salmon and chum juvenile in the rivers of south-eastern Sakhalin (Volovik 1967) and Iturup Island (Kaev 1989) and in the river Chook Nose Creek, British Columbia (Hanter 1959).

In addition to the designated control systems, spawning escapement is monitored in many other streams to support in-season fishery management. This monitoring has confirmed that control rivers are effective indices of patterns in adjacent streams. Escapements are typically consistent in adjacent systems – when one is full the other is also full. Differences might become more substantially in rivers farther removed from each other. Status assessments for management purposes also consider a number of other indicators including size, age, and sex structure; downstream migration of juveniles in spring; aerial assessment of pre-spawning near-mouth concentrations; and ocean drift netting of fish migrating from nursery areas to spawning grounds. Assessments include all salmon species although not every species is assessed at the same rigor. For instance, assessments of cherry salmon are much more limited than those of pink salmon. Productivity and effects biological conditions are assessed each year and utilized for preseason run forecasts used to guide fishery planning.

The management system has inventoried the amount of spawning habitat available for each salmon species in streams throughout the Island. This data is the basis for spawning escapement goals derived from habitat amount and target spawning densities established at 2 fish per square meter. Habitat availability and escapement goals are periodically reassessed is specific areas as information indicates that historical estimates were outdated. The quality of the historical numbers is generally related to the accessibility of the area and the significance of the associated fisheries. Thus, recent reassessments in the Aniva area have provided estimates similar to historic numbers. However, recent assessments in some historically-remote areas have resulted in substantial changes in estimated fish production capacity. For instance, a 2008 reassessment of the Negli River in the Smirnykh District found ten times more spawning habitat

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spawning grounds has always been made on the basis of recommendations submitted by SakhNIRO and Sakhrybvod; and optimum density was not always the key concern. There have been cases of the decision being made to limit the number of spawners going to the spawning grounds as a result of bad conditions in the river: high water temperature, extremely low oxygen content in water, low water consumption, etc. that would potentially cause a mass death event.

than the previous estimates originating in the 1960s. Similarly, a 2009 assessment of the Langeri River by the Smirnykh fishing association estimated the spawning grounds to be substantially larger than previously determined. No recent assessments have been occurred in the Nogliki District.

Regional Trends

There are approximately 1,200 streams on Sakhalin Island. Approximately 140 systems support significant pink salmon production of at least 10,000 m^2 of available spawning habitat. Several hundred additional streams provide smaller amounts of pink salmon spawning habitat. Stream use and habitat quality might vary from year to year based on environmental conditions (e.g. less in warm, dry years).

Pink salmon occur in all areas of Sakhalin but most of the natural production occurs in the Terpenie Bay, northeast coast, and southwest coast regions (Figure 6). Hatchery production of pink salmon is most significant in the Aniva Bay and southeast regions where the largest commercial fisheries also occur. Aggregate pink salmon returns are generally strong throughout Sakhalin Island and have generally increased since 1990 relative to the preceding 20 years (Figure 7). Pink salmon abundance is currently at high levels throughout the north Pacific rim due to favorable ocean conditions (Jaenicke et al. 1998; Klyashtorin and Rukhlov 1998; Radchenko 1998; Kaev et al. 2007; Irvine et al. 2009). The strong aggregate pink salmon return to Sakhalin consists primarily of the middle run that uses the Okhotsk and Bering seas.

Annual variation in run size is considerable. Odd year returns are typically two or three times greater than even year returns. Annual variation is also high within dominant and subdominant brood cycles. Juvenile to adult survival may vary tenfold or more from year to year (Figure 7). This variability has been attributed more to variable climate-oceanographic conditions than abundance of juveniles at downstream migration (Kaev and Rudnev 2007, Kaev et al. 2007). Juvenile production from freshwater does vary in response to environmental conditions. Numbers are typically less in years following warm, dry conditions which occur in perhaps 1 of every 8 or 10 years on average. A higher incidence of these years was observed in the 1980s. Debate continues regarding the existence and importance of density-dependent processes operating in the ocean environment and the role hatcheries play in these processes (Kaev 2011). However, some data on density dependence exist. For instance, Gritsenko (2002) reports negative relationship between return rate and number of catadromous migrants in the Eastern Sakhalin, as well as Ricker-type dependence between number of spawners and the number of juvenile migrants.

Anthropogenic impacts on fish habitat have been relatively low in the less-developed northern portions of the Island. Impacts have been significant in many areas of the more-developed south. Anthropogenic pressure includes such activities as haymaking, pasturing cattle, plowing fields, oil production including pipeline construction and associated erosion, timber cutting, industrial and everyday life sewage, cattle breading farms, and water diversion. Since last 10-15 years, however, the situation in general improved due to economic decline. However, significant habitat impacts are ongoing, as evidenced by dredging for a natural gas terminal in Aniva Bay. In the northern part of the Island, it is likely that the stocks are underexploited because of difficulties of organization of fishery due to absence of infrastructure.

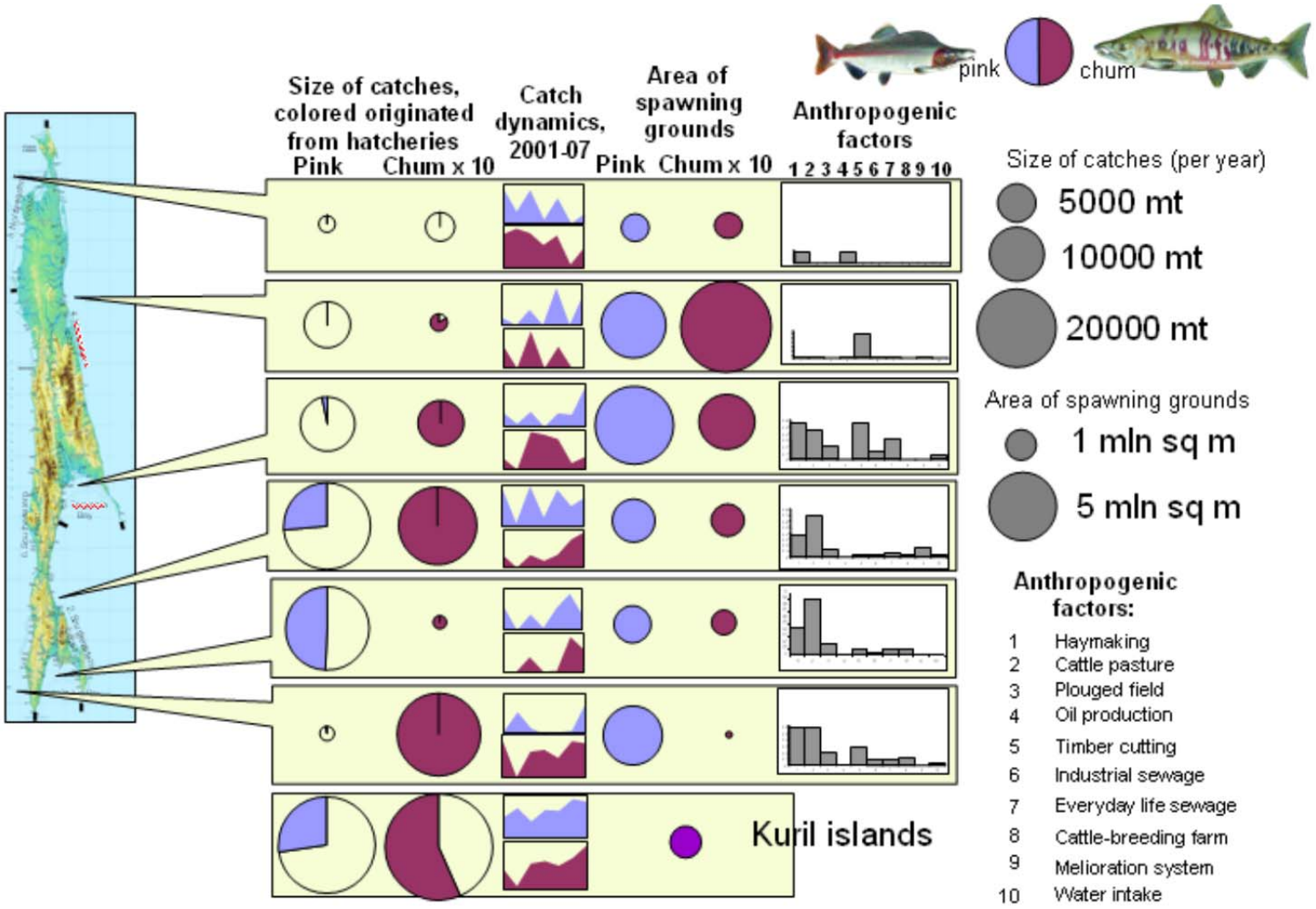

Figure 6. Distribution of spawning areas and catches for wild and hatchery Pacific salmon on Sakhalin Island, 2001-2007 (based on data from Sakhalin Region Department of Fisheries).

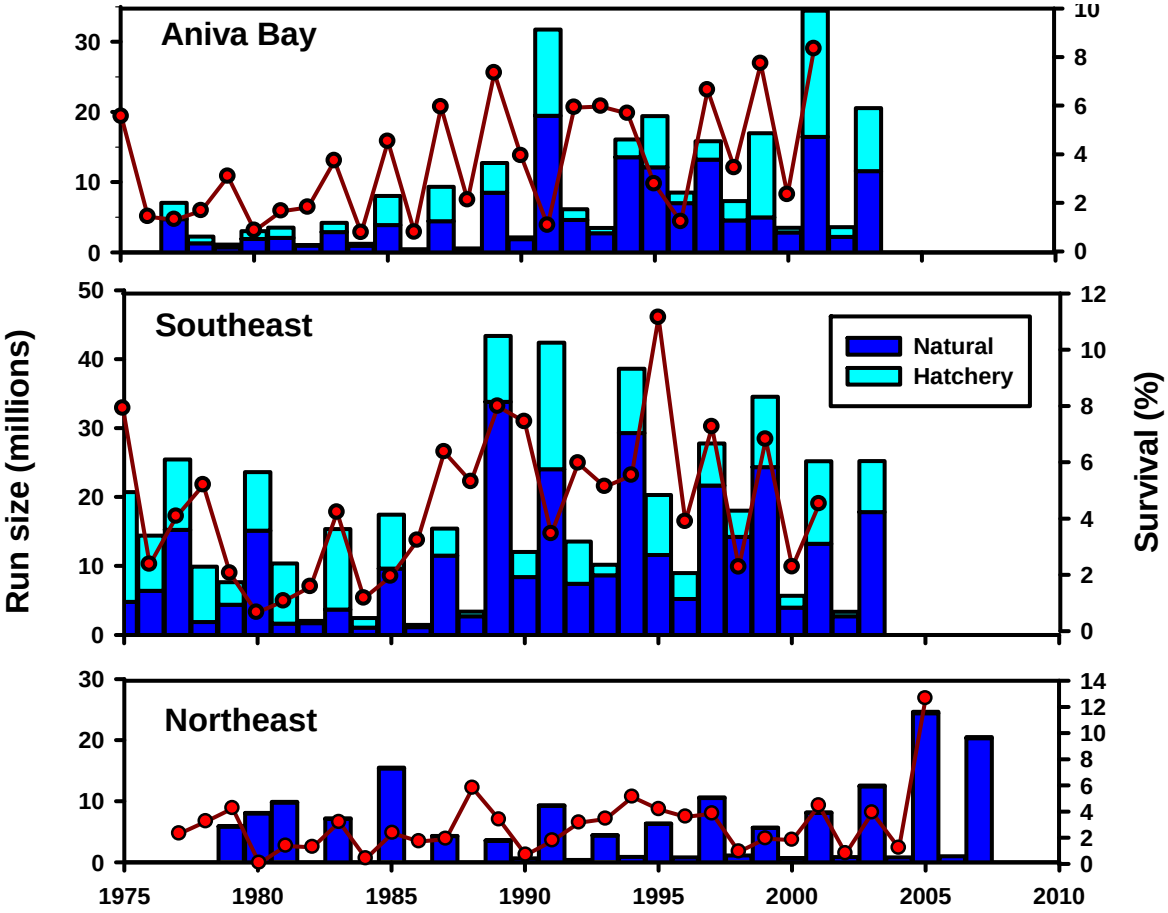

Figure 7. Annual run size (bars) and juvenile-to-adult survival (lines) of hatchery and wild pink salmon in regions of Sakhalin Island (Kaev et al. 2004; Kaev and Geraschenko 2008).

The early run Sea-of-Japan stock of pink salmon returning to southern Sakhalin streams is depressed. The depletion of this stock has been attributed to the combined impacts of a number of factors including historical overfishing, illegal harvest, habitat degradation, and changes in climatic conditions.

Significant numbers of the early run were historically harvested on the west coast in May and June during the 1980s. In former years, the early run also played a significant role in Aniva and Terpenie Bay fisheries. However, commercial fisheries targeting the early run are now significantly restricted in order to protect this run. Early fisheries in the western straight are regularly closed in order to protect the early pink run. Relatively few of the early run are harvested in current Aniva commercial fisheries which begin on July 10. This run does not occur in the northeast Sakhalin streams or fisheries. Marine exploitation rates were previously significant in Japanese and Korean fisheries operating in the Sea of Japan. Significant illegal harvest for caviar has also been reported in freshwater spawning areas including those of Aniva District. Spawning habitat has been negatively impacted by historical timber harvest and practices. Climate changes affecting temperature and rainfall patterns may also have contributed to reduced productivity.

Recent data indicates that the Sea of Japan pink stock has begun to recover (Kaev, 2008). Research catches have shown an increasing trend (Kaev, 2008). A large return was observed in

2010. Southwest region fisheries harvested 2,000 t of early pinks and escapement goals for this run were exceeded in many area streams.

Northeast Region – Smirnykh District & Nogliki District

Pink salmon spawn in at least 107 rivers along the northeast coast of Sakhalin Island (Kaev and Geraschenko 2008). Pink salmon become generally less abundant in northern portions of the coast while chum salmon abundance generally increases. Northeast region systems contain an estimated 6 million m^2 of spawning habitat suitable for pink salmon. Habitat availability was estimated by the regional scientific agency based on expert judgment of habitat suitability for spawning and observed utilization patterns.

Spawning escapement is counted annually in the northeast region from rivers Dagi (Nogliki), Bogataya (Smirnykh), and Melkaya (Poronaisk) – these systems contain about 36% of the total spawning habitat. Surveys are made in 30 additional rivers in some years. Numbers of wild fry migrants are also estimated in the Dagi and Melkaya rivers. Fry production numbers are available from each hatchery. Adult and juvenile numbers are extrapolated to other systems based on habitat availability estimates. These data are the basis for total escapement and production estimates summarized in Table 4.

Total productive capacity of northeast region streams is approximately 12 million pink salmon based on assumed spawning densities at capacity of 2 fish/m^2 identified by the management system. This estimate of productive capacity is consistent with stock-recruitment patterns observed in aggregate return data for northeast region streams in the dominant odd-year brood cycle, where capacity is defined as a spawning abundance above which production falls below replacement levels (Figure 8). Stock-recruitment patterns are obviously much different for the subdominant even-year brood cycle.

Estimates of total escapement in area streams are not available because only a portion is consistently surveyed. Escapement in surveyed streams has averaged 5.7 and 1.0 million pink salmon in odd and even years respectively for the period of record (1977-2005). Trends in estimated returns have been relative stable or increasing in recent years (Table 4). Kaev (2011) reported significant increases in pink salmon returns in Northeaster Sakhalin over the last 30 years.

In the Nogliki District, escapement data were available to the assessment team for 10 systems for many or most years since 2001 (Table 5). Escapements averaged 6% and 144% of capacity-based benchmarks in even and odd years, respectively. Benchmarks were met or exceeded in 50% of odd years but none of the even years (as is typical of pink salmon with an odd-even cycle dominance pattern). Escapements exceeded 50% of the benchmark values in 79% of odd years and 0% of even years.

In the Smirnykh District, escapement data were available to the assessment team for 7 systems for many or most years since 2001 (Table 5). The most complete data were available for the Bogataya, Khoi and Pilenga systems. Escapements averaged 70% and 99% of capacity-based benchmarks in even and odd years, respectively. Benchmarks were met or exceeded in 43% of odd years but none of the even years. Escapements exceeded 50% of the benchmark values in all years for which data were available.

Table 4. Fishery and escapement numbers of pink salmon (millions) in the northeast coast of Sakhalin Island including Smirnykh, Nogliki and adjacent areas (Kaev and Geraschenko 2008). Escapement numbers are available from a variable subset of all spawning rivers.

Brood Year	Adults			Expl. Rate[a]	Juveniles (downstream migration)				Produc-tion	Sur-vival
	Run	Catch	Escape		Wild	Hatchery	Total	% Hat.		
Год	Подход, всего	Поймано	Пропуск на нерест	Степень эксплу-атации	Дикой молоди	Заводской молоди	Всего молоди	Доля заводских	Про-дукция	Выжива-емость
1977			5.34		256.75				5.90	2.3%
1978			1.65		250.36				8.08	3.2%
1979	5.90	2.40	3.50	41%	233.48				9.88	4.2%
1980	8.08	1.47	6.61	18%	436.02				0.27	0.1%
1981	9.88	0.96	8.92	10%	529.99				7.18	1.4%
1982	0.27	0.19	0.08	70%	10.07				0.13	1.3%
1983	7.18	1.12	6.06	16%	487.56				15.52	3.2%
1984	0.13	0.00	0.13	1%	22.05				0.09	0.4%
1985	15.52	3.97	11.55	26%	185.75				4.34	2.3%
1986	0.09	0.00	0.09	0%	6.79				0.12	1.7%
1987	4.34	1.27	3.07	29%	190.11				3.59	1.9%
1988	0.12	0.00	0.12	0%	11.00				0.64	5.8%
1989	3.59	0.33	3.26	9%	276.56				9.32	3.4%
1990	0.64	0.18	0.45	29%	56.94				0.39	0.7%
1991	9.32	3.63	5.69	39%	252.44	0.55	252.99	0.2%	4.46	1.8%
1992	0.39	0.03	0.36	9%	28.61				0.90	3.1%
1993	4.46	1.26	3.20	28%	185.17				6.36	3.4%
1994	0.90	0.11	0.79	13%	15.69				0.80	5.1%
1995	6.36	1.08	5.28	17%	255.04				10.61	4.2%
1996	0.80	0.10	0.70	13%	31.62				1.13	3.6%
1997	10.61	2.13	8.48	20%	148.58				5.68	3.8%
1998	1.13	0.05	1.08	5%	70.99				0.65	0.9%
1999	5.68	2.19	3.49	39%	424.67				8.16	1.9%
2000	0.65	0.07	0.58	11%	47.96				0.87	1.8%
2001	8.16	3.53	4.63	43%	282.61				12.55	4.4%
2002	0.87	0.06	0.81	7%	104.13				0.82	0.8%
2003	12.55	6.83	5.71	54%	630.71	2.85	633.56	0.4%	24.65	3.9%
2004	0.82	0.19	0.62	23%	83.43				1.00	1.2%
2005	24.65	16.99	7.65	69%	162.31				20.50	12.6%
2006	1.50	0.41	1.09	27%					8.6	
2007	20.50	14.56	5.94	71%	181.50	0.70	182.2	0.38%	20.30	11.2%
2008	8.6	1.13	0.49	94%	609.10	0.42	609.5	0.06%	1.26	0.2%
2009	20.30	18.14	2.16	89%	361.50	0.00	361.5	0.00%	20.58	5.7%
2010	1.26	0.58	0.68	46%	294.50	2.20	296.7	0.07%		
2011	20.58	17.43	3.15	85%		0.00		0.00%		
All years										
Avg.	6.54	3.10	3.24	32%	215.88	0.96	389.41	0.27%	6.52	3.2%
Even	1.64	0.29	0.96	23%	129.95	1.31	453.11	0.41%	1.61	2.0%
Odd	11.15	5.75	5.39	40%	296.75	0.82	357.56	0.21%	11.15	4.2%
Avg.	7.31	4.12	2.87	38%	211.37	0.96	389.41	0.27%	7.51	3.71%
Even	1.60	0.27	0.70	25%	134.30	1.31	453.11	0.41%	1.64	1.94%
Odd	13.02	7.98	5.04	50%	288.45	0.82	357.56	0.21%	13.39	5.30%

[a] *Proportion of annual fish run harvested in the fishery.*

Pink salmon are propagated at one of the two hatcheries in the Nogliki District (Pilenga on the Tym River) and historically contributed a negligible fraction (<1%) of the total estimated juvenile production. Hatchery production in this region is primarily focused on chum rather than pink salmon. However, the Pilenga hatchery has developed a potentially significant pink salmon production program, with releases as high as 2.2 million fish in 2010 (from 2009 returns). This program is currently releasing fish primarily from dominant odd-year component of the northeast Sakhalin pink salmon brood cycle. No releases were made in 2012. No hatcheries are present in the Smirnykh District.

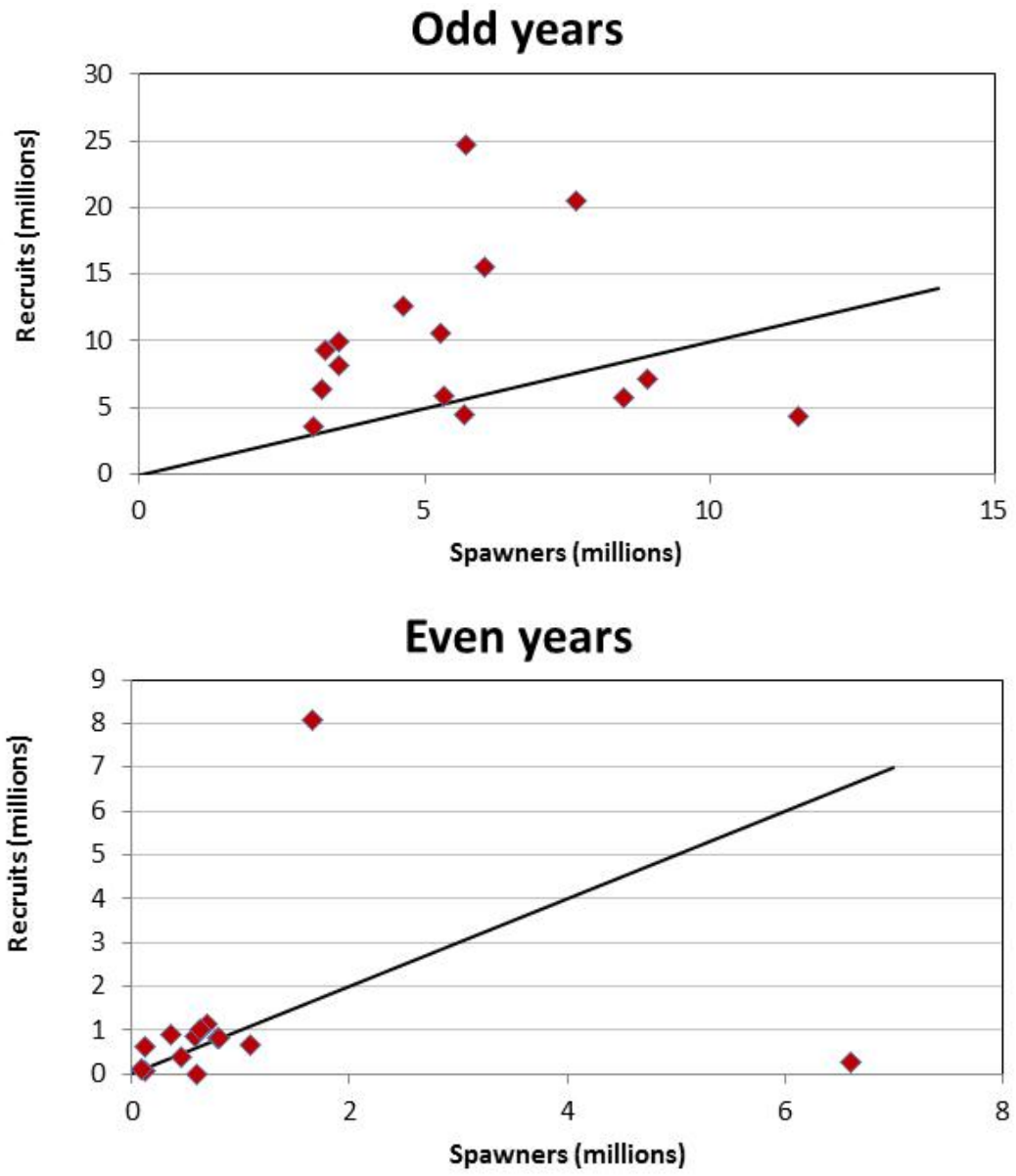

Figure 8. Plots of spawning escapement and corresponding recruitment (total run two years following each brood year) for pink salmon data for the northeast coast of Sakhalin Island including Smirnykh, Nogliki and adjacent areas (Kaev and Geraschenko 2008). Lines shows replacement levels where spawners produce equal numbers of recruits – the distribution of points relative to replacement is indicative of population productivity and capacity.

Table 5. Pink salmon spawning habitat amount and escapement for northeast Sakhalin areas.

River name		Loca-	Length	Area	Spawning escapement (thousands) Пропуск на нерестилища										
(Russian)	(English)	tion	(km)	(10^3 m^2)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Аскасай	Askasay	Nogliki			--	--	--	--	--	--	--	--	--	--	--
Б.Вени	b. Veni	Nogliki	40.0	20.2	7.7	--	16.5	1.3	21.4	4.0	25.3	--	8.2	0.6	31.27
Баури	Bauri	Nogliki	15.6	12.9	--	--	--	--	--	--	--	--	--	--	--
Чамгу	Chamgu	Nogliki	48	274.2	--	--	568.5	--	538.9	--	543.8	--	504.3	49.4	568.52
Даги	Dagi	Nogliki	98.0	323.0	477.0	25.6	217.5	21.6	554.0	22.6	380.7	22.4	38.0	26.8	31.58
Джиндан	Dzhimdan	Nogliki	68.0	53.5	26.7		16.7		67.4			0.4	11.6	1.1	16.73
Эвай	Evay	Nogliki			--	--	--	--	--	--	--	--	--	--	--
Ясынге	Iasynge	Nogliki			106.6	--	49.2	1.8	146.7	5.2	96.3	--	124.3	8.6	73.10
Конги	Kongi	Nogliki	29.0	20.0	140.0	--	156.3		144.1	0.424	222.4	--	130.9	11.5	137,50
Набиль	Nabil	Nogliki	101.0	372.0	337.7	--	253.4	21.2	632.2	--	479.8	--	245.5	4.1	565.00
Нампи	Nampi	Nogliki	36.0	200.0	2,800.0	--	500.0	--	460.0	--	232.0	--	--	44.0	420.00
Оркуньи	Orkuni	Nogliki	33.0	20.0	--	--	--	--	--	--	--	--	--	--	--
Пильгни	Pilgni	Nogliki	42	108.4	160.0	--	239.5	--	228.6	14.2	224.2	--	179.3	20.7	226.30
Томи	Tomi	Nogliki	40.0	240.4	--	--	13.8	--	30.3	0.7	41.1	--	--	0.8	--
Тымь	Tym	Nogliki	330.0	1828	--	--	--	--	--	--	--	--	--	--	--
Вал	Val	Nogliki			--	--	--	--	--	--	--	--	--	--	--
Вази	Vazhi	Nogliki	40.0	19.5	--	--	--	--	--	--	--	--	--	--	--
Б. Хузи	B. Khuzi	Smirnykh	29.0	5.0	8.0	--	7.8	--	--	--	10.7	--	14.0	--	55.80
Березовая	Berezhovaya	Smirnykh	--	--	--	--	--	--	--	--	--	--	--	--	2.90
Богатая	Bogotaya	Smirnykh	47.0	234.8	535.3	--	547.1	--	--	598.7	512.4	312.4	495.4	328.7	164.43
Хой	Khoi	Smirnykh	41.0	23	23.7	22.4	51.1	--	--	--	40.7		50.2	26.2	46.46
Холодный	Kholodny	Smirnykh	--	--	--	--	--	--	--	--	--	--	--	--	29.32
Костина	Kostina	Smirnykh	--	--	--	--	--	--	--	--	--	--	--	--	2.60
Лангери	Langery	Smirnykh	101.0	260	--	--	--	--	--	--	473.4	--	--	--	480.00
М.Хузи	Malaia Khuzi	Smirnykh	32.0	15	51.7	--	--	--	--	--	24.0	--	40.0	--	18.73
Пиленга	Pilenga	Smirnykh	49.0	148	223.0	--	238.3	--	--	299.0	367.7	158.9	323.2	158.4	280.00
Пурш-Пурш	Pursh-Pursh	Smirnykh	30.0	25	--	--	--	--	--	--	--	--	--	--	--
Венгери	Vengeri	Smirnykh	35.0	20	--	--	--	--	--	--	--	--	--	--	--

4.4 Harvest

4.4.1 Commercial fishery

Commercial salmon fisheries in the Russian Pacific have a long history, with official harvests documented since 1876. Harvest of pink salmon in combined Russian commercial fisheries is currently at or above record historical levels (Figure 9). Catches increased following the 1977 regime shift in ocean conditions which provided very favorable conditions for salmon survival throughout the North Pacific (Irvine et al. 2009). High levels of hatchery production have also contributed to continuing high catch levels.[8] Catches have remained relatively stable since the 1990's with no indication of decline (Irvine et al. 2009).

The Sakhalin salmon fishery accounts for approximately 40% of total Pacific salmon production in Russia since the 1970s. Year-to-year fluctuations in harvest are very high – salmon catch on Sakhalin has ranged from 50 to 250 mt from 2001-2010 (Figure 10). Pink salmon comprise over 90% of the Sakhalin salmon harvest followed by chum (7%), sockeye (1%), coho (<1%), Chinook (<1%), and Cherry (<1%).

The majority of the salmon harvest on Sakhalin currently occurs in the southern (Korsakovskii and Aniva districts) and southwestern (Korsakovskii, Dolinskii, Makarovskii, and Poronaiskii districts) portions of the island where people and hatchery production are both concentrated (Figure 10). The distribution of salmon harvest among districts has varied considerably over the years. Fisheries developed earliest on the southern part of the island. These fisheries continued to expand as an extensive hatchery system was developed. Southwestern parts of the island almost lost its pink salmon fishery due to the decline of Sea of Japan pink salmon in the last 20-30 years. Fisheries in the northern portions of the island have grown since the 1990s although they still comprise a small portion of the total harvest.

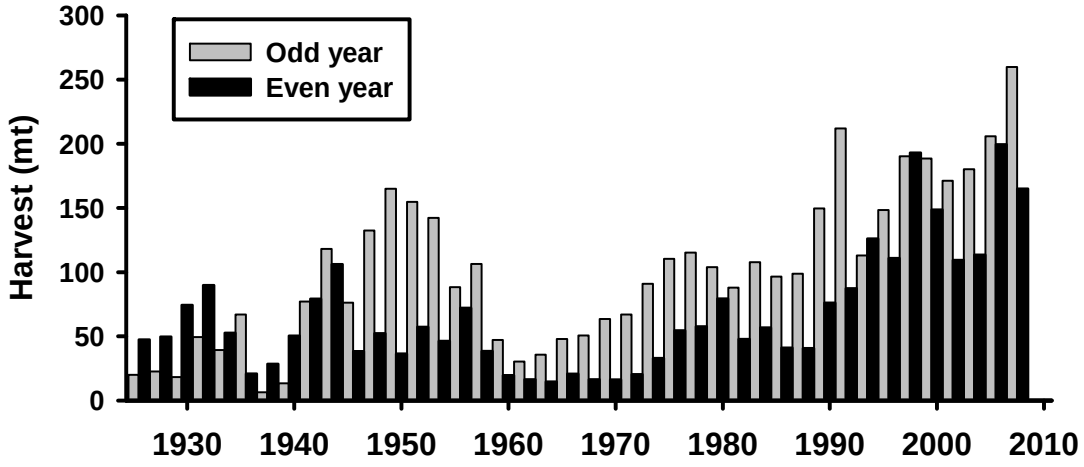

Figure 9. Annual catches of pink salmon in Russian commercial fisheries (Irvine et al. 2009).

[8] *High exploitation commonly associated with increased productivity and hatchery enhancement can be an important consideration in fishery sustainability. Northeastern Sakhalin fisheries were evaluated in this assessment based on information specific to this region which include limited hatchery production and relatively moderate exploitation rates in relation to other Russian Pacific salmon fisheries for pink salmon.*

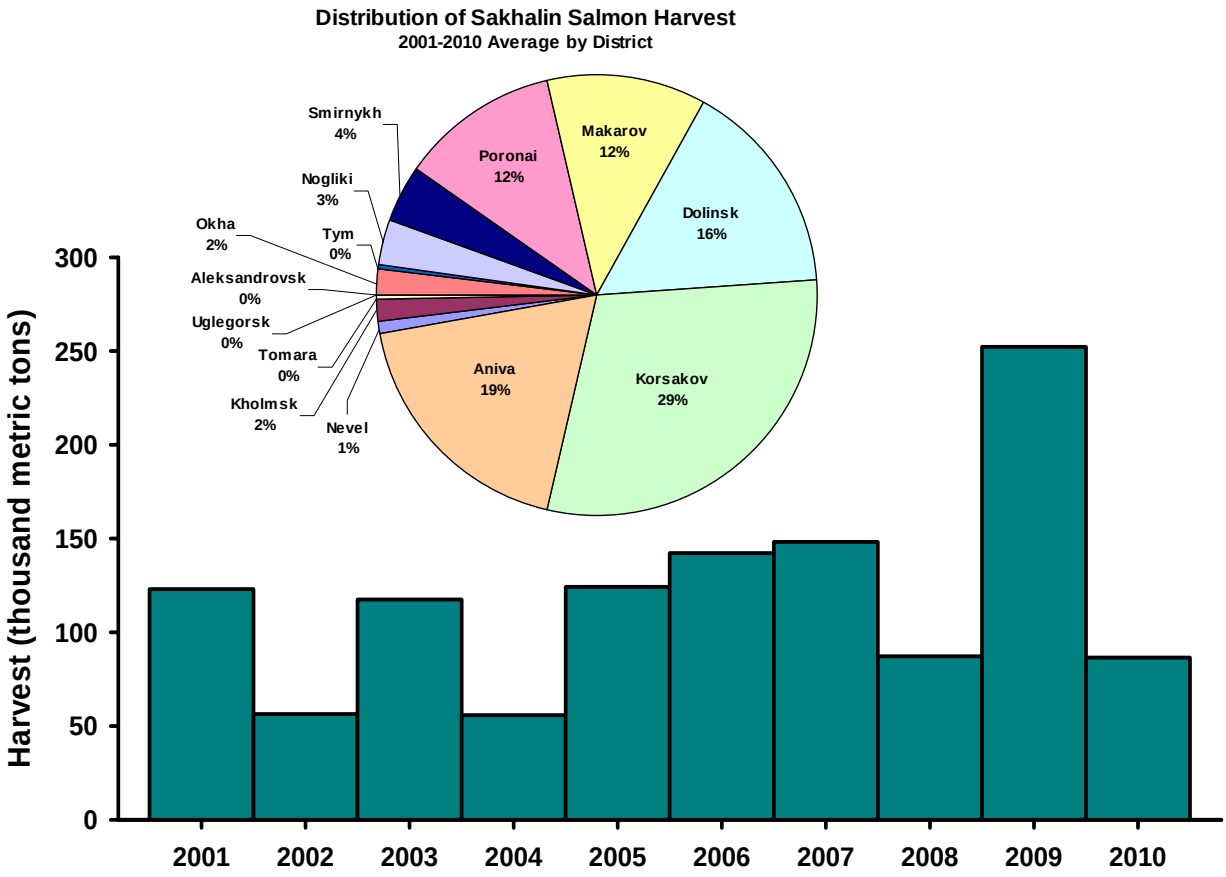

Figure 10. Recent harvests in Sakhalin Island commercial salmon fisheries (all salmon species combined).

Smirnykh and Nogliki salmon harvest averaged 3,434.2 and 2,716.2 mt from 2001-2010 respectively, with pink salmon comprising 94,2% and 80,0% of the total (Table 6). Odd-year harvests are many-fold times greater than even-year harvests on average. Pink salmon harvests have grown steadily on the northeastern coast since the 1990s with record harvests observed in odd-year runs since 2005 (Table 4, Table 6). Average annual exploitation rates of northeastern pink salmon are 42% in odd-years and 17% in even-years since 1990, based on data Kaev and Geraschenko (2008). These rates are similar to (even years) or slightly greater than (odd-years) the longer term average.

Figure 11. Pink salmon harvest being offloaded for processing. (photo by V. Smirnov)

Table 6. Commercial fishery harvest by district and species (metric tonnes).

	Aniva		Smirnykh		Nogliki	
	Pink	**Chum**	**Pink**	**Chum**	**Pink**	**Chum**
2001	20,721.90	-	1,020.80	-	2,434.10	-
2002	596.52	-		-	0.35	-
2003	17,295.50	-	3,827.85	-	1,558.64	-
2004	47.55	-	-	-		-
2005	17,565.77	-	7,072.30	-	5,061.41	-
2006		-	-	-		-
2007	10,494.00	-	6,318.00	-	4,753.00	-
2008	8,090.80	127.00	561.00	-	572.10	164.80
2009	38,924.27	177.83	13,199.20	1,130.34	6,987.41	3195.55
2010	3,872.09	68.62	346.44	865.55	351.50	2083.00
2011	1,494.84	0.04[a]	10,982.57	499.60[a]	9,936.30	713.00[a]
Average	11,910.32	93.3725	5,416.02	831.83	3,517.20	1539.09
Odd-yr	17,749.38	88.94	7,070.12	814.97	5,121.81	1,954.28
Even-yr	*2,521.39*	*39.12*	*181.49*	*173.11*	*184.79*	*449.56*

[a] *Chum data for 2011 represent catch of chum salmon caught during the pink salmon fishery. No chum target fishery occurred.*

4.4.2 Sport & Indigenous fisheries

Harvest of salmon on Sakhalin Island, including pink salmon, occurs in both recreational and indigenous fisheries although these fisheries are both quite limited in scope. Indigenous people can use gillnets in rivers. Sport fishing is primarily by hook and line. Gillnets are used also in sport fishing in the sea.

Recreational fisheries most commonly occur in the populated southern portion of the island. These fisheries are conducted for recreational and personal use purposes. Participation is licensed by the government and anglers fishing in commercial fishing areas are also regulated by the fishing companies to which those areas are licensed.

Local indigenous peoples are allowed to harvest up to a specified allocation for personal use. This allocation was long established at 100 kg per person (although the limit was largely unregulated). Sales are not allowed but sometimes occur. Time and area restrictions in this fishery are quite liberal. The number of indigenous people on the island is quite small. Most of the indigenous population and fishery occurs in the northern portions of the island.

4.4.3 Illegal, unregulated and unreported fishing

Illegal, unregulated and unreported (IUU) fishing has been reported to be a significant problem in salmon fisheries throughout the Russian Pacific. Illegal harvest of salmon is endemic throughout Sakhalin Island due to the low standard of living and the potential for substantial gain. Illegal fishing can include: 1) un- or under-reported harvest by companies that are licensed to also fish legally; and 2) poaching, which is performed by persons and teams who have no permit at all.

Underreporting can occur when fishing companies catch more fish than they have been allocated quota, when catch exceeds limits for non-target species, or when companies seek to avoid payment of landing taxes. More valuable species might also be misreported as a different species (e.g. chum salmon recorded as pink salmon). Historical problems in catch accounting were exacerbated by the quota-based management system which was in place through 2007. Quota-related problems were complex. Counter-incentives also existed to officially report higher catches. First, quota was allocated based on previous catches and so was lost or reduced when lower harvest was reported. Second, quota allocation by itself also had financial value as it could be used as collateral to secure bank loans. The incidence of under and over-reported harvest was historically suspected to be greatest in the northern parts of the Island where enforcement efforts were spread thin.

The incidence of underreporting has reportedly been substantially reduced by changes to the quota allocation system which have eliminated many related incentives. The quota is no longer severely limited and is treated as a commodity. Additional quota can be readily obtained as needed and the fishery is now regulated primarily by time and area restriction rather than by quota. Strict regulations exist for collecting fish weights at landing and at the processing plants and there are substantial incentives for accurate accounting and significant penalties for violations. Fish are weighed at landing with catch receipts issued to fishermen who are paid by the volume of their catch. Fish are weighed upon delivery to the plants and then again after processing. All companies keep records of time and amount of fish caught in their fisheries

journals. Fisheries inspection monitors catch records and compares caviar volumes to the catch landing reports. It is reported to be a very serious infraction if a company is caught with illegal caviar. Fines are costly and reportedly cannot even be avoided "with payment of bribes." At the same time, a number of processing companies that don't harvest fish themselves have reportedly been founded based on illegal harvest.

While quota-related incentives have been largely eliminated by the new system, other illegal fishing activities have not. These potentially include illegal placement of gear (closed periods or areas, spacing and river proximity violations, outside permitted area, additional gear, etc.). Recent information on provided by an independent evaluation of commercial gear placement using satellite imagery has identified significant numbers of violations in nets extending beyond legal length, nets fishing outside concession areas, nets not set perpendicular to shore, and nets placed too close to a river mouth.[9] The current approach also puts a high burden on the management system to provide in-season management responses, including time and area closures, if escapement goals are not being met.

Poaching for Pacific salmon for personal use or for illegal sales is common in all areas of the Russian Far East (Doronova and Spiridonov 2008; Clarke et al. 2009). The amount of poaching ebbs and flow with economic conditions. Harvesting salmon for roe is traditional for local people living near salmon rivers and occurred even in Soviet time. This activity was most common in 1990s because hard economic conditions provided incentives for people to earn money by this criminal activity; weak enforcement by government because of lack of funds and people; and corruption. Incentives for illegal harvest were significant during this period. A person could work for several weeks and live on the proceeds for a year. Probably, roe is an important source of income for some local people.

Illegal harvest can be very significant in freshwater. Poachers use gillnets and seines on the main rivers, and block smaller streams with wire mesh to catch the fish. Mostly, this fishing targets females on spawning grounds or adjacent parts of rivers to obtain roe. Roe can be salted and buried for retrieval later in the fall when enforcement activities on and around spawning grounds are ended. Carcasses of fish (both females and males) are left by poachers throughout the area in the water or onshore. Chum salmon in greater extent than pink salmon are used by poachers for meat in addition to roe. Roe and flesh are sold on the black market.

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[9] *Unpublished information collected by a local nongovernmental organization, Sakhalin Environment Watch. These findings were widely reported in the regional and national press. The Sakhalin Regional Fisheries Agency reports that the faulty installation of net traps takes place almost every year. It usually stirs up an argument for the adjoining companies and is reviewed according to the defined administrative procedure by the delegated authorities that implement control and supervision. These violations don't have an effect on the biological resources, as these fishing companies are fishing legally and according to the allocated quotas that were approved for the area and according to the forecasted size of catch. After the "Sakhalin Environmental Watch" addressed this to the Commission, the State Marine Inspection examined the facts about the excess of central lengths. Half of the time, when it was recorded that the edge was beyond the allowed length, there wasn't a net attached to the central wing. This is not a violation according to the Federal Fishery Agency (FAR). As for the cases where actual violations were identified, instructions were provided and the violations have been eliminated.*

The level of illegal harvest is exceedingly difficult to estimate and no formal estimates have been reported by the Sakhalin fishery management system. Anecdotal information seems to suggest that poaching may be as much as 20%-25% of total overall catch. According to the federal enforcement agency, the scale of all-island poaching is "hundreds if not thousands tons of roe." If 1000 mt is a correct approximation, then overall salmon poaching in Sakhalin comprises around 25,000 mt, which is about 1/4 - 1/5 of total catch based on the coefficient of transformation from roe to fish wet weight (e.g. 2-4% for pink and 7%for chum). This scale of illegal harvest is similar to estimates for the Kamchatka region, where organization of fisheries is similar to that in Sakhalin. Illegal harvest in Kamchatka has been inferred to be approximately 10-20% of the legal harvest based on several methods (Regional concept of reduction of illegal salmon fishing in Kamchatka region. 2008. Expert version submitted for public discussion. Under supervising of Maksimiv S.V. and Leman V.N. Izdatelstvo VNIRO). http://www.fishkamchatka.ru/proon/koncbsb.pdf?PHPSESSID=548dad8556e8a6641c864535a32198f5

Some attempts have been made to estimate the scale of illegal harvest in some areas by counting the number of poaching camps along the river banks and making an approximate assessment of their production. Poachers often work in the same place several days or even weeks and these locations are equipped with simple living facilities and tools for processing fish and roe. Prior to 2001 when a fishing company assumed more active control and enforcement on the river Langeri in the Smirnykh District, about 10 active poaching fishing sites were each estimated to obtain about 6 mt of roe in a large run year for a total illegal 60 mt of roe in this river.[10] In the Smirnykh district, 80-100 mt of illegal caviar is believed to have been processed in at least one year by a suspected buyer. In the Nogliki district, one fishing company estimates illegal caviar production of at least 50 mt per year as a minimum estimate. However, similar assessments have not been undertaken in other areas.

The level of illegal activity might also be inferred from enforcement activities although enforcement agencies have not been formally canvassed for an official assessment. Some data on number of officially cited poachers are available from the territorial administration (fisheries inspection). But in some extent, numbers might be confounded by corruption. Fisheries inspection officially cite "small," individual poachers, which contribute only a little to the overall poaching harvest. However, large organized criminal enterprises may not be officially caught, at least in the past, because of special agreements. Most prosecutions are by local municipalities.

The incidence of this illegal harvest in different portions of the island is open to speculation. On the one hand, opportunities are likely greater in the more remote northern portions of the island where enforcement were historically less active and job prospects were lower than in southern part of Sakhalin. On the other hand, many more people are present in the southern areas where access and transportation are more convenient. The Aniva district reports the highest number of violators. As a rule, they work in small groups of 2-4 with organizers supplying logistics. Aniva and Yuzhno-Sakhalinsk residents are involved. A high incidence of poaching has also been reported in the Smirnykh district – this area along with Aniva has the

[10] The Langeri River is the largest system in the Smirnykh District and one of the few in that district with direct road access.

largest enforcement offices. Illegal harvest in the Nogliki District is reportedly less than in other areas due to its remote location.

It is generally believed that poaching levels have been declining since the mid-2000s due to increased economic stability, more effective monitoring and enforcement activities by the government, and more active involvement by the fishing companies which have vested interest in reducing illegal harvest. However, rural poverty is still severe and provides a continuing incentive for illegal harvest of salmon for personal use or sales.

The fishing companies have realized that the government cannot handle the illegal fishing problem alone. Companies currently hire additional people from security companies to bolster the government enforcement presence. While company personnel do not have enforcement authorities, their monitoring activities and joint efforts with government authorities appear to provide and effective deterrent. For instance, in 2001 when the Plavnik fishing company assumed control of a fishery in the Smirnykh District, 32 people were required for protection patrols of the Langeri River. With the effectiveness of this effort, only 12 people were required by 2007. Jobs are also offered to former poacher to bring them out of that life style. In recent years, salaries of poachers and legal fishers in the northeast region are about the same which has substantially reduced the economic attraction of poaching. Incentives for poaching have also been reduced by changes in fishery management. Prior to 2004, northeastern coastal commercial fisheries were typically closed or severely restricted during the weak even-run years which led to substantial illegal activity. Trap net fisheries have been consistently open in all years since 2004 which has reduced the incentive for illegal/unaccounted harvest that occurred in the closed years.

While illegal harvest has declined in recent years, there is concern that the incidence of organized criminal poaching has increased. One problem of organizations trying to protect against poaching is to avoid corruption which is manifested here in protection of poachers from the side of enforcement teams due to unofficial payments.

The effects of illegal harvest on the sustainability of salmon are unclear but may not be a sustainability issue as long as significant levels of spawning escapement are consistently achieved. Even if illegal harvest is not accurately measured, poaching would result in a decrease of legal catch, but would not affect reproductive capacity of population as long as monitoring of the spawning grounds shows that sufficient density of spawning occurs. Fish that are illegally taken could have otherwise ended up in the legal harvest. However, this requires effective “real time” management. In some areas of Sakhalin, poaching has caused serious depletion of salmon spawning escapement, while in other areas monitoring suggests that escapement regularly reaches escapement goals. For the primary run of oceanic pink salmon, continuing high catches would appear to suggest that poaching has not had a significant impact to the biological productivity. However, for the early-timed Sea of Japan pink salmon stock, poaching in spawning areas in the southern portion of the Island is clearly implicated as a contributor to their decline.

4.4.4 Other fisheries in vicinity

Sakhalin salmon are subject to some harvest by Russian and Japanese fisheries on the high seas. 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. These fisheries primarily target sockeye. By-catch of pink, chum, and cherry salmon taken in high seas drift nets is typically discarded. The combined chum and pink bycatch is reportedly significant in some years. High season harvests of Sakhalin salmon are not directly accounted for by the management system but are reflected in marine survival rates estimated for local stocks. Pressure of ocean driftnet fishing is stable in recent years, which makes it easier to account it for.

Sakhalin Island fisheries in terms of resource interact with South Kuril Island fisheries because this area is on the migration routes from wintering areas to spawning grounds. Due to this, part of salmon spawning in the Sakhalin rivers are caught in the Kuril Islands.

Significant harvest of mainland stocks of pink and chum salmon destined for the Amur River stationary nets occurs primarily in the NW Sakhalin region. This fishery has been restricted in recent years, due to heavy decline of Amur salmon.

4.5 Enhancement

4.5.1 Objectives

Extensive hatchery production of salmon on Sakhalin Island is intended to provide stable fisheries in the region by protection against unpredictable fluctuations of environmental factors (e.g. sudden decrease of temperature in coastal areas in season of downstream migration of fry). Hatchery objectives are to provide raw material for commercial production.

4.5.2 Facilities

A total of 27 hatcheries are operated on Sakhalin Island (Figure 12, Table 7). The majority of them are located in the more developed southern part of the island. Eleven of the current facilities are operated by the government, three are rented by private companies from the government, and 13 are privately owned and operated. Hatcheries are typically located on small rivers or tributaries to larger rivers.

Salmon enhancement programs have a long history on Sakhalin Island. A number of hatcheries were built and operated by the Japanese during the period from 1907 to 1945 when the southern part of Sakhalin Island (to the south from 50th latitude) was under control of Japan. The first Japanese hatchery was built in 1912. Nine of these continue to be operating. The first Soviet hatchery, which continues to function, was built up in 1919. The Russian authorities are in the midst of implementing a substantial increase in hatchery production capabilities. Several facilities including the Tarani Hatchery have been upgraded by reconstruction in recent years. According to the Federal Target Program "Improving the efficient use and development of the resource potential of the fishing industry in 2009-2013", 5 new hatcheries are planned to be built and 15 more reconstructed, 7 of which are planned to increase the capacity of the hatchery.

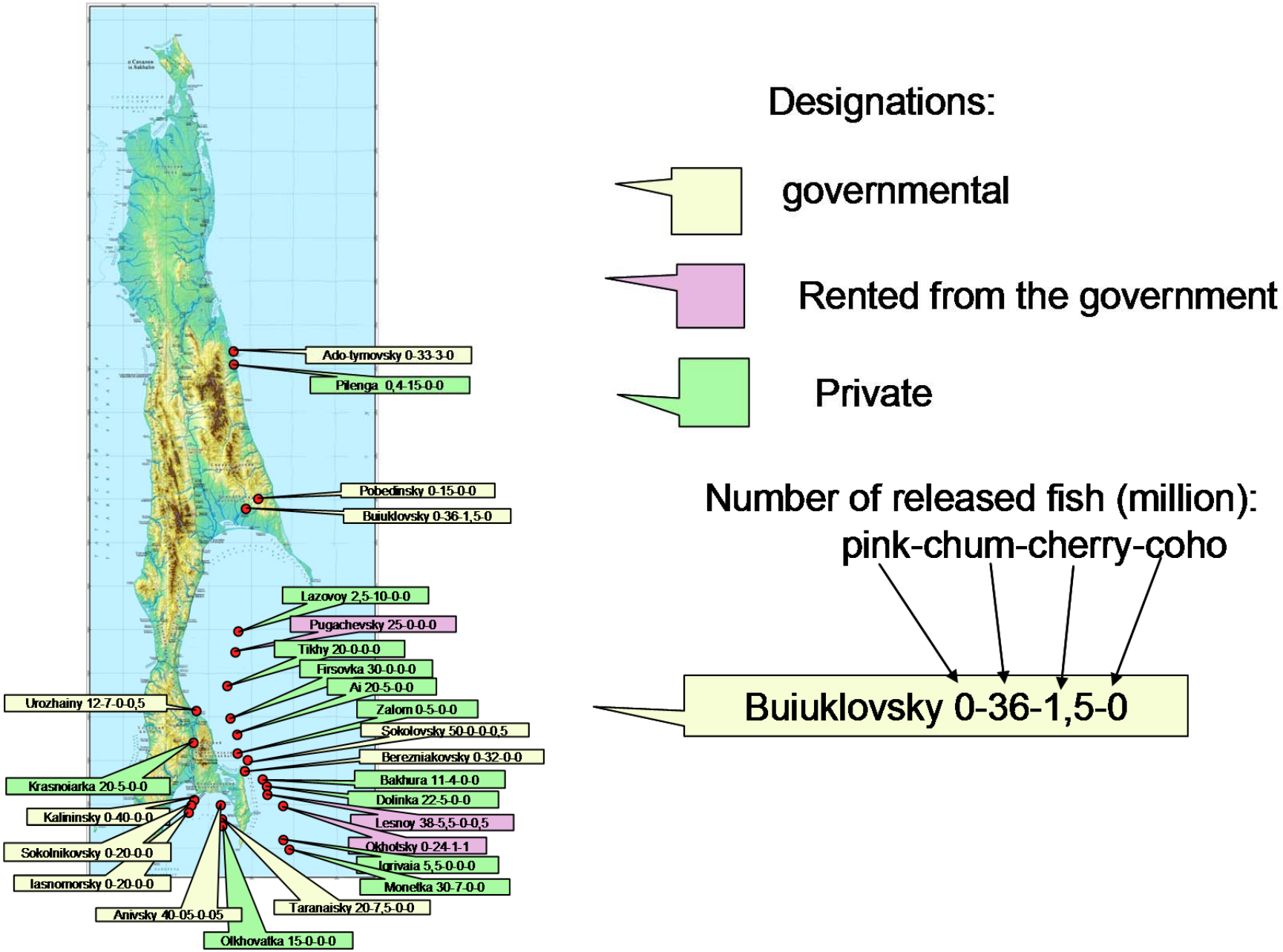

Figure 12. Distribution of salmon hatcheries of Sakhalin Island.

Table 7. Locations, names, and production capacity of Sakhalin Island salmon hatcheries.

Area	Administrative District	Hatchery	Ownership	Year established	River of release	Production capacity (million eggs)			
						Pink	Chum	Coho	Cherry
Aniva Bay	Aniva	Anivsky	*SakhRybvod*	1939	Liutoga	40	0.5		0.5
Aniva Bay	Aniva	Taranaisky	*SakhRybvod*	1923	Taranai	20	7.5		
Aniva Bay	Aniva	Olkhovatka	*Private*	2005	Olkhovatka	15			
Aniva Bay	Korsakovsky	Monetka	*Private*	1991	Ostrovka, Chirkovka	30	7		
Aniva Bay	Korsakovsky	Igrivaia	*Private*	2002	Igrivaia	5.5			
					Subtotal	*110.5*	*15*	*0*	*0.5*
NE	Nogliksky	Ado-Tymovsky	*SakhRybvod*	1919	Tym	0	33	3	
NE	Nogliksky	Pilenga	*Private*	1989	Pilenga (Tym)	8.3	15		
					Subtotal	*8.3*	*48*	*3*	*0*
SE	Dolinsky	Sokolovsky	*SakhRybvod*	1924	Naiba	50			0.5
SE	Dolinsky	Berezniakovsky	*SakhRybvod*	1924	Naiba	0	32		
SE	Dolinsky	Zalom	*Private*	1992	Zalom (Naiba)		5		
SE	Dolinsky	Ai	*Private*	2005	Ai	20	5		
SE	Dolinsky	FIrsovka	*Private*	2006	Firsovka	30			
SE	Dolinsky	Manui	*Private*	2007	Manui				
SE	Korsakovsky	Bakhura	*Private*	1997	Bakhura	11	4		
SE	Korsakovsky	Dolinka	*Private*	1998	Dolinka	22	5		
SE	Makarovsky	Tikhaia	*Private*	2005	Tikhaia	20			
					Subtotal	*153*	*51*	*0*	*0.5*
SW	Kholmsky	Kalininsky	*SakhRybvod*	1925	Kalinka	0	40		
SW	Kholmsky	Krasnoiarka	*Private*	2005	Karasnoiarka	20	5		
SW	Korsakovsky	Okhotsky	*Private*	1933	Urarnitsa (Tunaicha lake)	0	24	1	1
SW	Korsakovsky	Lesnoy	*Private*	1940	Ochepukha	38	5.5		0.5
SW	Nevelsky	Iasnimorsky	*SakhRybvod*	1925	Iasnomorka	0	20		
SW	Nevelsky	Sokolnikovsky	*SakhRybvod*	1912	Zavetinka	0	20		
SW	Tomarinsky	Urozhainy	*SakhRybvod*	1956	Chernaia	12	7		0.5
					Subtotal	*70*	*121.5*	*1*	*2*
Terpenia Bay	Makarovsky	Pugachevsky	*Private*	1924	Pugachevka	25			
Terpenia Bay	Makarovsky	Lazovoy	*Private*	2000	lazovaia	2.5	10		
Terpenia Bay	Poronaisky	Pobedinsky	*SakhRybvod*	1929	Poronai	0	15		
Terpenia Bay	Poronaisky	Buiyklovsky	*SakhRybvod*	1924	Poronai	0	36	1.5	
					Subtotal	*27.5*	*61*	*1.5*	*0*
					Total	***360.4***	***296.5***	***5.5***	***3***

Table 8. Hatcheries current under development or construction in the Sakhalin region.

River	District
1. Manui	Dolinsky
2. Firsovka	Dollinsky
3. Nitui	Makarovsky
4. Kirpichnaya	Dolinsky
5. Malaya Podlesnaya	Dolinsky
6. Bolshaya Podlesnaya	Dolinsky
7. Val	Nogliky
8. Kashtanovka	Dolinsky
9. Ostromysovka	Dolinsky
10. Lesogorka	Uglegorsky
11. Mramornaya	Korsakovsky
12. Pionerka	Kholmsky
13. Kostroma	Kholmsky
14. Sima	Korsakovsky
15. Goryanka	Makarovsky
16. Gastellovka	Poronaisky
17. Udobnyi Brook	Kurilsky
18. Belyi Brook	Kurilsky
19. Privolnyi	Kurilsky
20. Lovushka Brook	Kurilsky
21. Sopochnoye Lake	Kurilsky
22. Lebedinoye Lake	Kurilsky
23. Dudinka	Dolinsky
24. Aidar	Dolinsky
25. Beregovaya	Dolinsky
26. Baklanovka	Dolinsky

Table 9. Other Sakhalin river basins identified for future development of hatcheries.

River	District	Capacity
Starica	Tomarinsky	10 million (Pink)
Sheshkevich	Korsakovsky	18 million (Pink)
Novinka	Korsakovsky	13 million (Pink)
Vavai	Korsakovsky	18 million (Pink)
Yelnaya (Right feeder of the Poronay River)	Smirnykhovsky	27 million (Pink) 10 million (Chum)
Neznakomaya (Right feeder of the Tym River)	Tymovsky	9 million (Chum)
The feeder of Kuybushevsky Lake	Kurilsky	1 million (Pink) 5 million (Chum)
Saratovka	Kurilsky	10 million (Pink)
Filatova	Yuzhno-Kurilsky	15 million (Pink) 10 million (Chum)

4.5.3 Production

The combined production capacity of all Sakhalin hatcheries is 676.5 million of which 55% is pink salmon and 44% is chum salmon (Table 7). Small numbers of coho (5.5 million) and cherry salmon (3 million) are produced. Actual annual production is typically somewhat less than the hatchery capacity. Sakhalin programs account for about 80% of all hatchery production in the Russian Far East (Zaporozhets 2006). Russian hatchery production was about 13% of total Pacific salmon hatchery production in 2004. By way of comparison, Japanese and Alaskan production accounted for about 40% and 30%, respective of the total (Smirnov et al. 2006). Hatchery production of salmon has increased significantly over the last several decades (Mahnken et al. 1998).

Five hatcheries are operated on Aniva Bay streams – three of these are in the west Aniva Bay area addressed by this certification assessment. Aniva production is primarily dedicated to pink salmon (90% of the total). Production is almost entirely of the middle run ocean-type pink salmon. One hatchery produces early run pink salmon but this program has been relatively unsuccessful due, it is believed, to biological conditions in the Sea of Japan. Natural production of chum is relatively small in southern Sakhalin regions - the smaller rivers and streams in the southern region did not historically produce large numbers of chum salmon. Hatcheries account for approximately 33% of the pink salmon harvest and over 90% of the chum salmon harvest in the Aniva region (Kaev et al. 2004; unpublished data for chum).[11]

Two hatcheries are in the Nogliki region on tributary streams to larger rivers. No hatcheries are operated in the Smirynkh region. Chum salmon account for 80% of the total hatchery production in the Northeast Region. Hatcheries account for less than 0.1% of the pink salmon harvest and less than 20% of the chum salmon harvest in the northeast region (Kaev and Geraschenko 2008; unpublished data for chum). Chum salmon hatcheries have been reported to take the majority of the return for broodstock in some areas (Kaev 2011), although chum salmon are not in the certification unit.

Hatchery production is also significant in the Southeast, Southwest and Terpenia Bay regions of Sakhalin. Pink salmon dominate the majority of the SE and Terpenia hatchery production while SW hatcheries are heavily invested in chum salmon production.

Hatchery returns for pink salmon typically average 4-11% (adults per fry released). This includes only fish caught in the 2 km zone in the vicinity of the hatchery so actual fry to adult survival may be higher. Production from one hatchery of about 20 million pink salmon fry is generally considered to be equivalent to the wild production from one river with approximately 120,000 m^2 of habitat.

[11] *Estimates are inferred from hatchery and wild juvenile production estimates assuming similar survival of hatchery and wild fish but have not been verified with hatchery mark data.*

Table 10. Number (millions) of salmon released in hatcheries of the West Aniva, Smirnykh, and Nogliki regions of Sakhalin Island.

Species	Region	Hatchery	2007	2008	2009	2010	2011
Pink	Aniva	Anivsky	38.8	37.7	38.3		
		Taranaisky	11.9	23.6	23.7		
		Olkhovatka	16.1	15.0	7.3		
		Total	*66.8*	*76.3*	*69.3*		
		% marked					
	Nogliki	Ado-Tymovsky	0	0	0	0	0
		Pilenga	0	0.425	0	2.2	0
		Total	*0*	*0.425*	*0*	*2.2*	*0*
		% marked	--	*0*	--	*0*	--
Chum	Aniva	Anivsky		0.5	0.9		
		Taranaisky	17.3	16.4	16.0		
		Olkhovatka	0	0	0		
		Total	*17.3*	*16.9*	*16.9*		
		% marked					
	Nogliki	Ado-Tymovsky	24.9	26.1	26.0	26.723	26.966
		Pilenga	1,027	8,199	9,944	2.222	1.019
		Total	*24.9*	*26.5*	*26.0*	*28.945*	*27.985*
		% marked				*0*	*0*

Limited numbers of coho and cherry salmon are also produced.

4.5.4 Practices

Hatcheries throughout the region generally work according to similar protocols based on accepted practice and governmental requirements. Broodstock are typically collected with fish traps at weirs operated on streams adjacent to the hatchery facility. Weirs are operated by all three hatcheries in the West Aniva region and by the two hatcheries in the Nogliki District. Hatchery broodstock include a mixture of hatchery-origin, natural-origin and naturally produced offspring of hatchery fish since fish origin cannot be distinguished except by run timing. Hatcheries collect pink salmon eggs in both even and odd run years. If too few fish return to a hatchery in the low years, some programs may bring in fish from other rivers. Federal programs are allowed to bring in brood from other rivers but private hatcheries are not. However, most pink salmon programs obtain sufficient numbers of local broodstock to meet their production objectives.[12]

Broodstock are selected randomly without respect to size or other features. Broodstock are collected and held in maturation ponds. Depending on the location of the hatchery relative to the spawning grounds, fish collected in different portions of the run may mature at different times. Each lot might include different proportions of fish maturing at the same time (such that some fish collect early in the run might actually mature and be spawned with fish collected later in the run). Minimum effective population sizes for broodstock of 1,000 have been

[12] *Historical hatchery practices reportedly removed a large portion of the wild escapement of some populations (e.g. Naiba River chum salmon) which contributed to significant declines in natural production (Kaev 2011).*

established for both pink and chum salmon based on genetic-based guidelines. Mating protocols involve a 10x10 matrix (eggs and milt from 10 females and 10 males mixed in a container at fertilization). Collections are typically made over a 3-week period which is similar to the natural spawning period. Hatchery guidelines direct that eggs are collected throughout the duration of the run. However, in practice, broodstock are more often collected near the end of the run because of holding mortality of early runners which need to be kept till spawning. Pre-spawning mortality can be very high in warm water under high densities. As a result, the ratio of hatchery-origin spawners typically increases towards end of spawning migration.

Pink salmon are typically incubated in the same temperatures as they would encounter in the wild. Hatchery water sources for pink salmon incubation and rearing are typically surface water. Past experience has demonstrated poor survival of pink salmon reared on well water. Fish are incubated in cohorts reflecting stage of maturation. Sizes at release and release timing are similar to the wild. Juveniles are typically released over about a three week period based on age. Under some situations fry might be fed for up to two weeks – this occurs primarily when river and nearshore temperatures are colder than normal.

Chum salmon may be reared using surface and/or well water sources depending on the facility. At some hatcheries such as Taranaisky in Aniva Bay, hatchery water temperatures are managed for later release timing. Chum survival following release varies depending on local environmental conditions in the spring. Chum may be fed from April through June prior to release to improve survival.

Significant health problems appear to be uncommon in Sakhalin hatcheries – large scale die-offs have not been reported. Small scale infections of fungus (*Saprolegenia*) or protists (*Trichodina*) sometimes occur and are treated with formalin. Programs are also experimenting with hydrogen peroxide as a prophylactic treatment.

Operations at the Taranaisky Hatchery in Aniva Bay are fairly typical of government-run programs on Sakhalin. The hatchery is located 10 km upstream from the mouth of the Taranai River, which is approximately 57 km in length. It was built in 1923 by the Japanese Administration and transferred to the USSR in 1946. The hatchery was extensively remodeled in 2006 following a large flood. The original Japanese program was dedicated to chum production. Chum populations declined in the region around 1945 concurrent with the development of local industry and agriculture. Program was switched to pink production due to the need for less water. Chum production was discontinued in the 1970s before starting up again in 1999. The program currently produces more chum than pink salmon. Production is currently 17.7 million pink and 20 million chum eggs.

Broodstock are collected at a weir at the hatchery. Egg collection of pink salmon occurs over approximately 18 days beginning in mid-September. Broodstock collection is according to a formula of 25%, 50%, 25% from early, middle, and late portions of the run. Egg collection of chum salmon typically occurs in October. At the end of the pink run, chums are intermingled which necessitates a lot of fish sorting.

The current chum program was initiated using eggs brought in from two other local hatcheries. Since the initial start-up, the program has relied on local returns with no additional chum eggs brought in from other sources. This program now regularly provides chum eggs for other hatchery facilities. From 2006-2010, 67 million eggs have been donated. In 2010, million eggs were donated and 21 million were kept – 300 t of chum are typically harvested for broodstock and surplus sales.

Broodstock collected at the weir are sampled for biological data. Hatchery personnel reported that sport fishing and illegal harvest in the local river downstream from the hatchery are not measured but are believed to affect the local population structure. Weir catches are heavily skewed to males throughout the season which leads them to believe that there is significant selective harvest targeting females downstream. Weir operations also significantly affect the number and diversity of salmon passing into upstream spawning areas. For instance, weir operations have been correlated with a decline in cherry salmon escapement although the nature of the effect has not been identified.

4.5.5 Regulation

Operations of hatcheries on Sakhalin Island are regulated by SakhRybvod, which also operates the government facilities. This agency provides recommendations for fry release of existing hatcheries and building of new ones. Based on these recommendations, the administration issues a State Order which determines number of fry for each hatchery in each government and private facility. Hatcheries also receive permits to catch particular amounts of broodstock. By law, the hatcheries themselves cannot fish commercially because they are not given fishing locations, but owners of hatcheries can receive quota for fishing depending on amount of fish the hatchery release. In at least one year the Commission for Anadromous Fish and SKTU departed from standing practice and provided hatcheries with quota for fishing (using 40% of reserved TAC) – decision was very hotly discussed in local mass media and opposed by licensed fishermen, and probably will be considered in the court.

New hatcheries have been developed on Sakhalin as recently as 2007 and there are currently Federal Russian Union plans with funds allocated to new hatchery construction. According to the Concept of Regional Program “Development of Fisheries Industry of Sakhalinskaya Oblast for period 2009-2011” accepted in 2008, there are plans for further development of hatcheries in the region. On the federal level, plans for development of artificial reproduction of aquatic biological resources are considered among important tasks for development of fisheries industry (Concept of development of fisheries industry of Russian Federation for period till 2020, accepted 21 July 2008).

The management system previously provided incentives for private hatchery development but these have been much reduced under current regulations. Current private hatcheries were developed at a time when adjacent fishing parcels were also granted to the hatcheries. Previously, there was strong incentive to build hatcheries because of the opportunity to obtain a valuable increase in the fishing quota in adjacent parcels based on the hatchery justification. Operators were able to benefit from both hatchery and wild production. The government also previously paid private hatcheries a fee for their fish (fish are owned by the Federal government, they are not private property). Since law changes in 2009, there is no longer the

parcel-based incentive for additional hatchery development. Application must also be made to the scientific institute, often with a specific plan or proposal. The review process is costly and not to be undertaken lightly.

Consideration of new hatcheries is based on biological justification documents including species, numbers, biological equipment, and architectural designs. These are initially prepared by SakhNIRO or VNIRO. For instance, a Kuril Islands plan identifies a determination by VNIRO that local rearing capacity is 400 million juvenile pink salmon. A tender/auction is opened to accept bids. VNIRO conducts an assessment to identify suitable locations. The government funds the research determining the suitability of a hatchery location regardless of whether it is private or governmental. Previously rivers protected from hatcheries were identified by a list – it is unclear whether this list is still applicable in the current system. This will be a critical issue in the future sustainability of wild populations in the face of expanded hatchery production, particularly if new facilities are sited on rivers that are currently

4.5.6 Evaluations

The significance of hatchery risks to wild fish is a subject of growing debate within the Russian management system and scientific community but the subject remains controversial. There is general consensus that competition with hatchery fish can affect wild fish in some nearshore ocean areas due to limitations in the carrying capacity of the ocean ecosystem. Significant questions and disagreements exist regarding: 1) differences in survivorship between hatchery and wild salmon at sea; 2) the significance of specific selection and thus in genetic changes in population which may accumulate in generations; 3) the magnitude and effect of straying by hatchery and naturally-produced salmon; and 4) the impact of high exploitations rates for hatchery-enhanced runs on wild populations.

Hatchery rearing clearly increases survivorship in the freshwater phase of the life cycle. The hatchery is estimated to increase net survival of pink salmon by approximately ten-fold relative to the wild. Thus, one female typically produces about 1,500 juveniles in the hatchery relative to about 150 juveniles in the wild. Post release survival is also increased in some areas by increasing fish size at release by incubation and early rearing at warmer temperatures and feeding for one to two weeks (pink salmon) or months (chum salmon) prior to release. However, differences in ocean survival of hatchery and wild fish are unclear. Current assessments of survival and productivity typically assume similar rates for hatchery and wild fish (Kaev et al. 2004; Kaev and Geraschenko 2008).

The management system generally believes that artificial selection in the hatchery is limited by the short period of the life cycle spent in the hatchery and practices intended to emulate natural conditions. Geneticists working in the management system have also concluded that high natural stray rates of pink salmon help buffer wild populations from significant hatchery effects (although high stray rates would also increase hatchery influences on more distant wild populations as well). Recent research published in the scientific literature reported no significant differences in genetic diversity of pink salmon due to hatchery practices (unpublished data). Indicators found no departure from Hardy-Weinberg equilibrium as would be expected if there was strong hatchery selection. However, some practices including prolonged fry rearing and release at larger sizes than wild fry of the same age might increase

the prospect of hatchery selection. In addition, there are rumored cases where initial hatchery returns are sold and broodstock are selected from the latter part of the run.

Comprehensive assessments of hatchery straying have not been completed. A fin marking study of pink salmon during the 1970s generally indicated a high incidence of straying among systems. However, the accuracy of results was controversial because of false reporting – results were biased by rewards provided for the return of marked fish (fishers did their own clipping) Beginning in the 1990s, chum were thermally marked in SE Sakhalin hatchery programs but sampling of natural spawning areas appears to have been very limited.

A thermal marking program was initiated in Sakhalin hatcheries in 2008 to better distinguish hatchery and wild salmon in the harvest and on the spawning grounds. Marking started in 2008 at a small scale. Efforts were expanded in 2009 and 2010 to include all government hatcheries. Currently, 70-90% of the pink and chum salmon production at government-run hatcheries is otolith marked. Private hatcheries are not currently marking their production. The marking program is overseen by SakhNIRO laboratory and implemented with the assistance of four lab specialists in SakhRybvod.

Marking protocols have proven relatively easy to implement. For instance, at the Taranaisky hatchery pink are marked in the egg stage using the "dry method." Chum are marked in the alevin stage using the "wet method." Chum marking simply involves opening and closing a series of valves to regulate water source – chum salmon typically exhibit a strong behavioral reaction to associated temperature changes. Pink salmon marking is a little more time consuming because this species is incubated and reared entirely under ambient river temperature conditions.

Sample collection and analysis to read otoliths has proven to be much more difficult and time consuming. Adult sampling for otoliths began in 2010 but results are not yet available outside of the management system (as of May 2011). Otolith samples have been collected from the harvest, river mouth fisheries, and at hatcheries. Samples appear to have been collected primarily from hatchery systems for the purpose of assessing hatchery contributions to harvest. Otolith samples are not currently being collected on the spawning grounds – this purpose is believed to be served by the river mouth samples. The otolith sampling program is currently supported by the resources of the management system in their own interest. Sampling of wild rivers would require additional resources that are not currently available.

4.6 Ecosystem Elements

4.6.1 Retained Species

Other species retained in the Sakhalin pink salmon fishery primarily include other species of salmon including chum, cherry, Chinook, and coho. Small numbers of flatfish and char might also be retained (Table 11). No data on char, coho and flatfish are available from official statistics because these species are not used commercially and are only used for personal consumption. Of these, only chum salmon typically account for more than 5% of the harvest by weight[13] with a large portion of that occurring in dedicated chum fisheries after the pink salmon fishery time frame. No other species constitutes 20% or more of the total harvest.

Current regulations limit harvest of non-target species to no more than 49% of the total. This replaces a historical limitation of 2% which was difficult to monitor and enforce. This change has proven to be popular with the fishers because they are now allowed to legally sell non-target species as long as they obtain the proper permits. The accuracy of catch reporting has been reported to have improved substantially as a result of the new regulation.

Table 11. Data on other retained species captured in one of two trap nets operated in the northeast region by Vladimir Smirnov's fishery from July 15 to August 24, 2011.

Species	Number
Dolly Varden (*Salvelinus malma*)	2,226
Starry flounder (*Platichthys stellatus*)	260
Whitespotted char (*Salvelinus leucomaenis*)	93
Cherry salmon *(Oncorhynchus masu)*	2
Chum salmon *(Oncorhynchus keta)*	1
Coho salmon (*Oncorhynchus kisutch*)	0

Chum salmon (Oncorhynchus keta)

Chum salmon were historically produced in large streams and rivers throughout Sakhalin Island but suitable habitats are most abundant in the Northeastern and Terpenie Bay regions. Chum runs are depressed in all areas, in part due to a high incidence of illegal harvest. Chum runs in the more populated southern portion of the island are particularly depleted. Large chum hatchery programs are operated many regions including Aniva and Nogliki district (Table 7). The large majority of the Sakhalin harvest of chum salmon is of hatchery fish (Figure 6). No hatcheries are operated in the northwest region but fisheries there intercept mainland chum salmon from the Amur River which are also depleted.

Sakhalin Chum salmon include summer and fall races (Groot and Margolis 1991; Zhivotovsky 2010). Sakhalin populations are primarily fall late-run fish which return from September and October. The onset of the fall chum run typically overlaps with the tail end of the pink salmon run in late September and early October. Summer early-run populations spawning in July and

[13] *Species that comprise 5% or more of the total catch by weight are classified under MSC guidance as "main" retained species.*

August predominate in more northerly regions of Kamchatka and the Okhotsk coast but co-occur with the fall run in some large rivers including the Tym and Poronai on Sakhalin and the Amur on the Okhotsk coast. The summer run typically spawns in streams with subsurface stream flow, whereas the fall run spawns in streams with ground water upwelling. Chum salmon, like pink salmon, emigrate from freshwater soon after emerging from the gravel in spring. However, chum salmon return from the ocean in overlapping cohorts after 2 to 4 years in the ocean. Chum salmon possess more pronounced homing and fish return for spawning in the river or even tributary where they were born. As a result, distinct genetic differences are found among populations in different rivers.

Cherry salmon (Oncorhynchus masu)

Cherry salmon spawn in the upper portions of large river systems and were historically produced in many Sakhalin systems including the Tym, Poronoi and Taranai rivers as well as several other southern streams. Adults typically return to freshwater from March through May at three or four years of age and spend the summer in freshwater before moving to headwaters to spawn in September and October (Groot and Margolis 1991). Adults feed actively while in freshwater. Juveniles typically rear in freshwater for one year before smoltification and seaward migration in the spring and early summer. Ocean distribution is primarily in the Sea of Japan.

Runs are considerably depleted and may have been nearly eliminated in some systems. Little data exists on actual numbers in Sakhalin streams and this species is not subject to active fishery management. Limited data suggests a declining trend in numbers. Cherry salmon are listed as a species of concern by Russian authorities for Khabarovsk and Kamchatka, but not in Sakhalin. Illegal and sport fishing in freshwater are primarily responsible for the widespread depletion of this species in Sakhalin systems. Run timing is prior to the current pink salmon commercial fishery time frame although cherry salmon would have been subject to historical fisheries focused on the early pink run.

Limited enhancement programs are currently operated for cherry salmon in the Aniva, Southeast, and Southwest regions of Sakhalin Island (Table 7). Enhancement is primarily focused on preservation of wild populations in the face of continued recreational and illegal harvest pressure.

Other salmon

Small numbers of coho (*O. kisutch*), Chinook (*O. tshawytscha*), and sockeye salmon (*O. nerka*) are harvested in Sakhalin salmon fisheries. In aggregate, these species comprise less than 1% of the salmon harvest in any Sakhalin region. Chinook and sockeye do not spawn in Sakhalin Island rivers and may be represented in fisheries statistics only because it is provided (in this particular case) for entire administrative area which includes Sakhalin Island and Kuril Islands. Small coho salmon populations have been reported in several Sakhalin systems including the Tym and Naiba rivers (Groot and Margolis 1991). This represents the southern-most distribution of coho salmon in Asia. Wild populations on Sakhalin are generally regarded as depleted. Limited enhancement programs are currently operated for coho salmon in the Northeast, Terpenie, and Southwest regions (Table 7). Coho typically return to Sakhalin streams in late summer and fall.

Other species

Char are widely distributed and common throughout the Sakhalin region, but generally more abundant in the north and northwest. There are two or three (depending on taxonomical preferences) species of char associated with this fishery: *Salvelinus alpines, S. leucomaensis, S. malma*. Char are subject to some sport fishing and limited commercial harvest. These species are not actively managed and no concerns for status have been identified. Flatfish are similarly abundant in Sakhalin waters and not highly exploited. Crabs are prohibited from retention due to historical overfishing. Numbers are depleted but recovering. Small numbers are regularly caught in the traps and some may be illegally kept by fishermen at a small scale.

4.6.2 By-catch

The design of the traps keeps the entire catch of pink salmon and all by-catch species alive until it gets loaded into boats for delivery to a shore base. By-catch is either returned to the sea alive or used for commercial purposes or personal consumption. Some bycatch is sorted when the trap catch is manually loaded into the boats but the large volume of salmon catch often makes it difficult to sort small amounts of by-catch. Sorting of bycatch and retained species is very different in periods of large and small catches of pink. When pink catches are large, most sorting takes place in the processing plant. While pink catches are small, bycatch and retained species are sorted at the time when nets are pulled out of water.

By-catch comprises a very small portion of the harvest in the trap net fishery. A recent bycatch assessment program reported that common bycatch species include char, flatfish, far eastern dace, sculpins, codfish, smelt, and crab. The numbers of any given species fall well below the MSC standards of 5% to 20% used to distinguish main or target species. Among bycatch species listed above only sculpin and little flatfish are all discarded. Char and crabs (except small ones) are actually retained. Other species are partly discarded and partly retained depending on situation (availability of fish for personal consumption). At least some of the discards of hardier species, such as flatfish and sculpins, are likely to survive because the fish traps are a relatively benign capture method.

Table 12. Summary of 2010 bycatch monitoring results by species (catch in number per net day).

Region		**Aniva[1]**	**Aniva[2]**	**Aniva[3]**	**Nogliki[4]**	**Smirnykh[5]**	**Smirnykh[6]**
Number of days of observations		**2**	**36**	**12**	**75**	**16**	**45**
Dates		**7/20&25**	**7/6-8/21**	**6/20-8/10**	**7/10-9/14**	**7/26-8/15**	**7/25-9/10**
Number of setnets checked per day		**2.0**	**2.0**	**2.0**	**2.0**	**5.9**	**3.2**
Catch of pink, kg per day, average		ND	ND	ND	856.6	1507.3	1335.3
Chum salmon	*Oncorhynchus keta*	-	-	-	178.7	12.5	49.8
Cherry salmon	*Oncorhynchus masu*	2.5					
Arctic char	*Salvelinus alpinus*				1.1	43.8	34.2
Dolly varden	*Salvelinus malma*						0.1
White-spotted char	*Salvelinus leucomaensis*				0.5	0.4	20.1
Starry flounder (20-35 cm)	*Platichthys stellatus*		4.1	0.8	1.4	3.9	2.4
Starry flounder small (<20 cm)	*Platichthys stellatus*				2.3	0.9	0.7
Far Eastern smooth flounder	*Liopsetta pinnifasciata*				2.3		
Far-Eastern dace	*Leuciscus brandti*	2.0	6.6	3.1	0.1	0.1	0.1
Plain sculpin	*Myoxocephalus jaok*				1.6	2.0	2.1
Creat sculpin	*Myoxocephalus polyacanthocephalus*						0.2
Belligerent sculpin	*Megalocottus platycephalus*	1.5	2.8	0.7	2.3		
Pacific herring	*Clupea pallasi*		3.1		0.7	0.3	0.2
Notched-fin eelpout	*Zoarces elongates*				0.9		
Saffron cod	*Eleginus gracilis*		1.9		0.1	0.1	0.2
Pacific rainbow smelt	*Osmerus dentex*				0.2		
Pacific mackerel	*Scomber japonicas*			0.1			
Whitespotted greenling	*Hexagrammos stelleri*				0.1	0.1	
Alaska Pollock	*Theragra chalcogramma*	75.0				0.1	
Capelin	*Mallotus villosus*						0.0
Sturgeon poacher	*Podothecus sp (Agonidae)*					0.2	0.0
Tubenose poacher	*Pallasina sp (Agonidae)*						0.1
Red king crab	*Paralithodes camtschaticus*					0.1	0.6
Blue king crab	*Paralithodes platypus*						0.0
Horsehair crab	*Erimacrus isenbeckii*					0.7	0.3
Magister Armhook Squid	*Berryteuthis magister*			0.1			

[1] *Company: Kompas plius*
[2] *Company: Priboi-treid*
[3] *Company: Taranai*
[4] *Company: Lovets*
[5] *Company: Plavnik (Khusa set net)*
[6] *Company: Plavnik (Langeri set net)*

Figure 13. Typical bycatch including flatfish, far eastern dace, and sculpins.

4.6.3 ETP Species

For the purposes of this assessment, endangered, threatened, or protected species are those that are recognized by national legislation and/or binding international agreements (e.g., CITES) to which jurisdictions controlling the fishery under assessment are party. Protected species occasionally intercepted by the Sakhalin pink salmon commercial fishery include Sakhalin taimen, and two species of sturgeon. Harbor seals are also listed in the Red Book of Russia and therefore receive protections by law.

The Russian government maintains a Red Book, based in part on the Red Book of the International Union for Protection of Nature and Natural Resources (IUCN)[14], 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. For instance, according to the Article # 65 of the "Law on protection of natural environment" flora and fauna species entered into the Red Book shall be prohibited from economic activities. Activities leading to declining abundance of such flora and fauna species and to deterioration of their habitats are prohibited. Article 24 of the Federal Law on fauna reads as follows: "Activities, which can lead to death, abundance reduction or deterioration of habitats of the Red Books' fauna species, are not allowed."

[14] *The MSC does not recognize IUCN because it is voluntary. If a country adopts IUCN recommendations in legislation, that species becomes ETP. If a country adopts IUCN in regulation, that species is bycatch.*

In pursuance of the Russian Federation Government's Decree of February 19, 1996, "On the Red Book of the Russian Federation," the list of fauna species to be entered into the Red Book of the Russian Federation was established by the special ordinance # 569 of December 19, 1997 issued by the Russian Federation Committee on Environmental Protection. Upon the recommendation of the Commission on rear and endangered animals, plants and mushrooms, as many as 415 fauna species, needing special protection, were entered into the list.

Simultaneously with the development of legislative base and formation of the Russian Federation Red Book, a process of creation of regional Red Books was underway. On March 16, 1999, a Sakhalin Region law "On Red Books of the Sakhalin Region" came into effect. To this end, a Commission on protection of the rare and endangered animals, plants and mushroom species was founded incorporating research scientists and specialists from the state environmental agencies. Upon the recommendation of the Commission, the State Ecological Committee of the Sakhalin Region prepared the list of fauna species to be entered into the Red Book of the Sakhalin Region, which was approved by the Regional's Governor Ordinance # 230 of May 29, 2000. As many as 18 mammal species, 105 bird species, 4 reptilian species, 7 fish species, 10 insect species, 18 mollusk species and 6 crustacean species are entered into the Red Book of Sakhalin Region. These numbers include all the fauna species entered into the International Red Book, Red Book of the Russian Federation, the species found on the territory of the Sakhalin Region, the species rare for the far-Eastern Area, and also newly identified species the range and abundance of which are not known.

Sakhalin Taimen (Hucho perryi)

Sakhalin taimen are entered as a category 3 species in the 2000 Red Book for the Sakhalin Region of the Russian Federation. Category 3 is defined as (a local endemic species characterized by dwindling abundance and in need of protection). Sakhalin taimen are also entered as a category 2 species in the Red Book of Russia.[15] In 2006, the IUCN listed Sakhalin taimen as critically endangered (Rand 2006). This designation represents the highest potential risk of global extinction to the species. The assessment indicated that the range-wide population has dropped in size to less than 5% of historic levels based on declining catches in pink salmon fishery bycatch data from Sakhalin Island (Figure 14).[16] Similar declines in harvest and catch rates were reported since the 1970s by Safronov and Makeev (2000). Fukushima et al. (2011) estimated that many or most Sakhalin taimen populations are extinct or endangered throughout their historical range on Sakhalin Island, the Russian Far East, and northern Japan surrounding the Sea of Japan.

[15] Following the end of the Soviet Union, and regional Red books started to appear independently beginning in the late 1980s in order to provide more immediate protection of number of species and forms of plants and animals which may be not rear in the entire country, but rear in particular regions, and also due to quickly growing independence of local authorities in this period, and their willing to solve their problems themselves. Because of this, status of the same species in regional and all-Russia red books can be different.

[16] It should be noted that a very low percentage occurrence in the bycatch can pose a significant impact for ETP species particularly where the target species harvest is large.

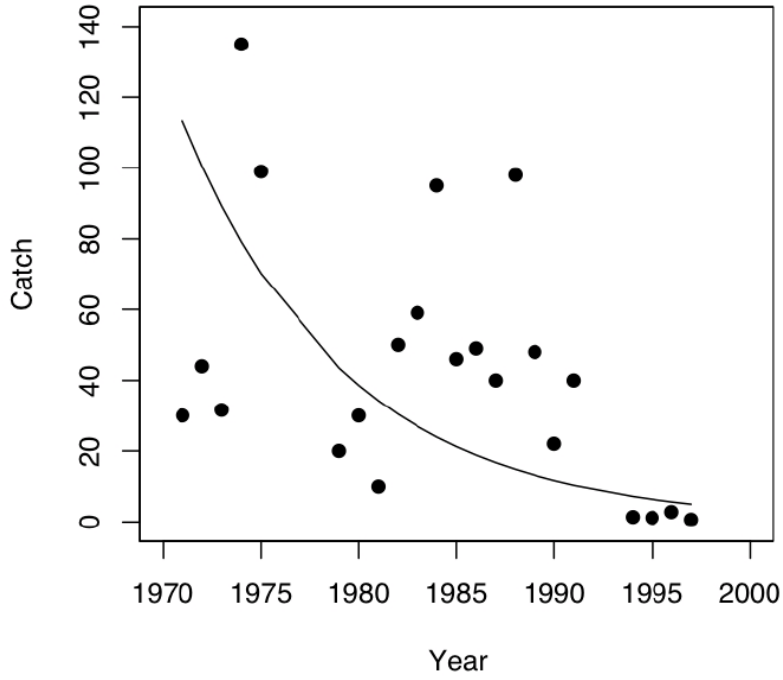

Figure 14. Bycatch time series data (in 100 kg landed biomass) for Sakhalin Taimen in northern Sakhalin Island (Rand 2006). Although specific data on directed harvest of pink salmon was not reported by Rand (2006), harvest of pink salmon in this region has been generally stable or increasing throughout this period.

Overfishing by various sectors (commercial, recreational, and illegal take) and habitat development have been identified as significant threats to this species (Safronov and Makeev 2000; Rand 2006). Unregulated sportfishing and illegal harvest in freshwater is believed to be a primary factor in their decline in Sakhalin streams. There are unconfirmed reports that taimen are highly valued as traditional meal among the local people at New Years. Mature taimen are also targeted for their eggs. Commercial fishing for pink and chum salmon has also been identified as significant factor in the taimen decline (Zolotukin et al. 2000). Taimen were historically targeted by commercial fisheries in some regions. Currently, taimen are sometimes retained by commercial fishermen who consider them to be a high value fish. However, taimen are currently required by law to be released alive and penalties for violation are significant.

Taimen are a large migratory fish that can reach 2 m and 60 kg in size (Safronov and Makeev 2000). Both freshwater and anadromous life histories are exhibited. Taimen inhabit near-shore areas and freshwater systems of the northern Sea of Japan and southern Sea of Okhotsk and including in rivers of Primoriye, Sakhalin, the southern Kurils, Hokkaido, and northern Honshu. Typical habitats are near-shore marine waters, low gradient coastal rivers, estuaries, and large brackish estuarine lakes or lagoons. Fukushima et al. (2011) found that Sakhalin taimen populations are more likely to persist if they are present in rivers with wetlands and lagoons. Juveniles as large as 9-20 cm typically feed on insects but fish dominate the diet of larger taimen.

Taimen spawn from late April through early June at the peak of high water (Safronov and Makeev 2000). Spawning areas are thought to include the middle and lower reaches in small rivers and in the upper reaches of large rivers although the spawning grounds on Sakhalin have not been documented in the scientific literature. Taimen often enter

freshwater in late November to overwinter in deep-water river, estuary or lake areas. In spring, adults might migrate from rivers into the sea for a short period of time before returning into rivers to spawn. Spawning behavior and habitat are typical of salmon. The species is iteroparous and sexual maturity is typically reached at 6 to 10 years of age at sizes of up to 90 cm and 6 kg (Safronov and Makeev 2000; Rand 2006). Males typically mature at age 7-9 years and a body weight of 1800-2100 g (Voronova, pers. comm.). Females mature later typically at the age of 9-10 years. Adults can reach ages of 16 or greater (Safronov and Makeev 2000).

Juveniles spend 2 to 7 years in freshwater. They often rear year-round in lagoons with brackish water and estuarine lakes. They are often found throughout the lower and middle reaches of rivers from May to October but typically migrate around November into lakes and cut-off meanders to overwinter. Juveniles typically migrate to the sea at sizes of 10-50 cm and subsequent rearing takes place in the inshore waters. Taimen do not make migrations over long distances or far out into the sea. It is unclear if rivers with indigenous taimen stocks interchange with rivers with no taimen.

Taimen abundance is greater in northern than in southern regions of Sakhalin Island (Semenchenko and Zolotukhin, 2011). The Northeast region supports some of the largest populations on the Island in the Piltun, Val, Aksakai and Dagi rivers. There is historical commercial data on Taimen harvest for the Dagi River from the period prior to red listing. Significant numbers of taxmen occur in Nyivo Bay in the Nogliki District. Taimen numbers are drastically depleted in the Aniva region. Taimen populations are reportedly present in the Burnaitsa River (Southern peninsula) and the Onatska to the west – this system was previously protected as a nature reserve but this status was lost in the early 1990s. A viable population might also exist in the Mogachi River in west Aniva Bay. The main areas of taimen reproduction in the Aniva Bay are Tunaycha Lake and the rivers of the Crilion peninsula.

Taimen are occasionally caught in Sakhalin commercial fisheries for pink salmon. However, spawning migrations of taimen are substantially earlier than the period of the pink salmon fishery. Significant numbers may occur in local rivers but move directly to the sea and do not appear subject to high harvest rates in current pink salmon fisheries. However, Taimen are susceptible to incidental harvest in commercial salmon fisheries during their nearshore marine feeding period which occurs from June to mid-September. In the northeast region, catches are thought to average approximately one to two fish per stationary net per year although no taimen were observed in the 2010 bycatch monitoring program. The Northeast Region fishery reportedly attempts to release them alive where possible. Catches in southern Sakhalin pink salmon fisheries are reportedly rare due to the low abundance of the local stocks.

The problems with the restoration of taimen population abundance in the Aniva Bay are apparently linked to targeted sport fishing and poaching and the environmental conditions. Unlike other species of salmon, taimen have a long life cycle and late sexual maturation. Therefore, when decrease of its population occurs for whatever reason, the restoration of the population takes a long time. The feasibility of taimen aquaculture has been periodically explored by several hatcheries in the Sakhalin region (Safronov and Makeev 2000) and a culture program is currently under development in Aniva District hatcheries.

Sturgeon

Two protected sturgeon species, green or Sakhalin (*Acipenser mediroistris*) and Kaluga (*Huso dauricus*) are occasionally caught in Sakhalin commercial fisheries for pink salmon. Sturgeon species are included by the Convention for International Trade of Endangered Species (CITES). Both are also listed by on the IUCN red list: Sakhalin sturgeon is categorized as near threatened and Kaluga as Critically Endangered. These are anadromous species which enter large rivers to spawn and range widely in nearshore marine waters. Green sturgeon were native to western Sakhalin and the Khabarovsk region but have been widely depleted or extirpated. This species reportedly occurred in the Tym River. Kaluga sturgeon originating from the Amur River on the mainland are occasionally observed in Sakhalin fisheries. This population has been depleted by overfishing dating as far back as the late 1800s. In 1880, the Aniva Bay commercial fishery for sturgeon reported harvest of 80 fish. Current incidence of sturgeon in Sakhalin fisheries is very low. In the central part of NE Sakhalin usual catch of Kaluga is reported as one specimen per stationary net per season. Retention is illegal and sturgeon captured in traps are typically released alive, although fish are sometimes tangled in net wings or walls.

Marine Mammals

Marine mammals including whales and seals are common throughout the area but there were no reports of marine mammals suffering from the gears in spite of several direct inquiries. Harp seals frequently associate with the nets while hunting, but they easily avoid entanglement. Seals are often found in large numbers near the traps during harvesting. They leap freely over the ropes into the traps and back out. Thus, nets and traps do not pose any threat to their lives. However, seals often leave lots of injured and bitten fish in the traps, which reduces its marketability. Seals are protected by regulation. Special licenses are required for harvest with quotas distributed to indigenous people. Harassment of seals by fishermen has not been documented.

4.6.4 Habitat Conditions

Habitat conditions for salmon vary across Sakhalin Island ranging from very significant impacts in developed southern areas of the island to practically nil in undeveloped northern areas. Historical habitat impacts were much more severe than current levels and decreases in anthropogenic impacts have reportedly led to measurable improvements in salmon production in many areas. Extensive agricultural dairy grazing previously occurred in many river valleys but cattle farming is now only 10% of historical levels. As many as 12 paper plants historically operated on the island. Until the 1960s, rivers were used to float logs to the mills. With the economic collapse, timber production is now only a fraction of historical levels. Large numbers of coal mines historical produced waste that washed into the rivers. All mines are currently closed. Large forest fires in the late 1970s and 1980s, primarily in the NE region, caused significant watershed damage and erosion problems. Fires might have been caused by vehicles used in oil and gas exploration. Since that time, habitat has improved considerably.

Oil and gas development is currently one of the most significant economic activities in the Sakhalin region with the potential to impact salmon habitat. Pipeline crossings of rivers are one concern for salmon habitat. Crossings may be underground or suspended. Poor quality above-ground crossings pose significant risk to water quality in the event of an accident.[17]

[17] *Data on fish communities is collected by Sakhalin Energy Company in rivers along the pipeline route.*

Habitat activities are regulated by the government. The Federal government also has an economic development plan for the region.

Fishing activities do not appear to have a significant impact on habitat. Any effects of trap construction or operation are localized and temporary. The traps are anchored to the sea bottom by the jute or synthetic sand bags weighing 50-70 kg. Such a passive fishing gear has almost no negative impact on the ecosystem. Hatchery development can have localized impacts due primarily to construction. Hatchery weirs can also have direct habitat impacts or alter accessibility to upstream habitats.

4.6.5 Ecosystems

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

Marine-derived nutrients from salmon carcasses can have a significant impact on freshwater communities as well as those communities in the freshwater to terrestrial interface (Wilson et al. 1998). The flux of salmon biomass entering fresh water from the ocean can be massive (Gende et al. 2002). Removal of salmon that would otherwise can affect food and productivity of freshwater ecosystems either directly by reducing prey availability to species like bears and eagles, or indirectly by reducing delivery of marine derived nutrients that feed the food chain. The relationships between salmon play and the population dynamics of their terrestrial predators has been well documented (Gende et al. 2002). It has been reported that these nutrients also form a base for rich development of zooplankton in coastal area, which serves a food for young salmon just after downstream migration. 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.[18] Enhancement with hatcheries can substantially increase salmon numbers in certain times and areas although hatchery contributions to Sakhalin pink salmon runs remain uncertain (Kaev 2011).

Enhancement of Pacific salmon across the Pacific Rim since the 1970s has resulted in very large abundance in the North Pacific Ocean (Mahnken et al. 1998; Irvine et al. 2009; Ruggerone et al. 2010). There is some evidence that high salmon abundances in the ocean might adversely affect wild salmon through competition (Peterman 1991). Ocean growth of pink salmon inversely correlated to their own abundance and survival of chum, Chinook, and sockeye appears to be reduced in years of high pink salmon abundance (Ruggerone et al. 2003, Ruggerone and Goetz 2004, Ruggerone and Nielsen 2004, Ruggerone et al. 2005; Ruggerone et al. 2010). There is growing concern that the ocean carrying capacity of pink and chum salmon has been globally reached.

It is clear that salmon influence the food webs in the North Pacific although the effect varies widely between systems and is dependent on many factors like timing, scale and alternative nutrient sources, etc. (Naydenko 2009; SCS 2011). In addition, like most large marine

[18] *The significance of effects of large escapements remains a subject of considerable debate among fish scientists.*

ecosystems, resolving interactions strengths among food web constituents is made difficult by limited data and confounding effects of environmental forcing (Essington 2009). Ecosystem models that have been developed for the Eastern Bering Sea, Aleutian Islands and the Gulf of Alaska (Gaichas and Francis 2008, Aydin et al. 2008) do not suggest a critical or unique role of salmon in respect to the structure of the food web in the ocean. Gaichas and Francis (2008) used network theory to identify potentially key species in the Gulf of Alaska food web on the basis of high connectivity and four species were identified as (Pacific cod, Pacific halibut, walleye pollock and arrowtooth flounder) as highly connected species.

Extensive research has been conducted by the Russian Scientific Institutes on (1) Juvenile Anadromous Stocks in Ocean Ecosystems; (2) Anadromous Stocks in the Bering Sea Ecosystem (BASIS); and (3) Anadromous Stocks in the Western Subarctic Gyre and Gulf of Alaska Ecosystems (Temnykh et al. 2010. This work also involved substantial monitoring and research of related ecosystem components including food web composition, production and dynamics. Based on this work, the Russian management system has generally concluded that there is no capacity limitation based on oceanographic data which indicates that pink salmon utilize only 20% of the plankton in the ocean. (Shuntov and Temnykh 2004; Shuntov et al. 2010).

4.7 Management System

4.7.1 Management Structure

Management of Sakhalin is administered by Federal and Regional governmental agencies. Sakhalin Island is the subject of the Russian Federation and is under the direction and control of the Government of the Russian Federation. Fisheries of the Russian Federation are managed and controlled by Fisheries Agency of the Russian Federation, which located in Moscow and also represented by a local office on Sakhalin. Operational management of all activities on the island is performed by the Governor of the Sakhalin Region.

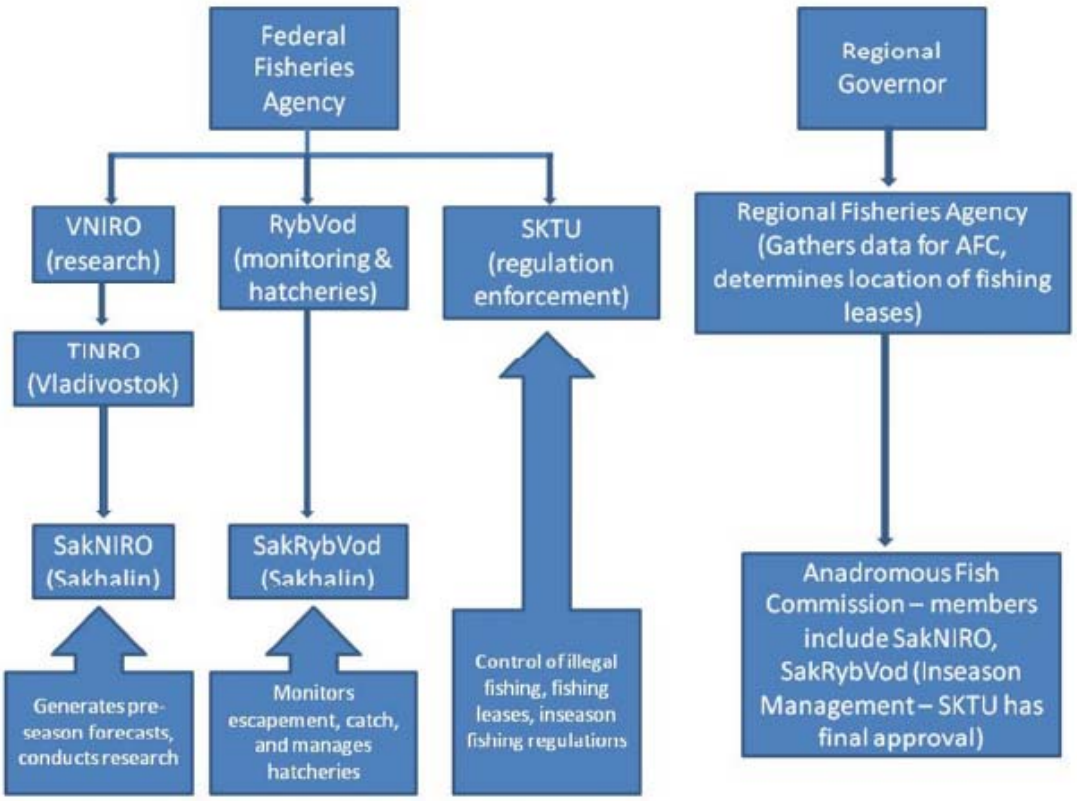

Figure 15. Organization of Federal and Regional salmon fishery management structure of Sakhalin Island (source: Wild Salmon Center, Portland, Oregon).

Federal Fishery Agency

Federal Fishery Agency (*Федеральное агентство по рыболовству or Federal'noe Agentstvo po Rybolovstvu*, FAR) is an executive authority of Russian Federation, established by the Presidential Decree No. 724 issued 05.12.2008, by converting the pre-existing Russian Federation State Committee for Fisheries. The President issued the Decree No. 863 on 12.30.2008, which established that FAR reports directly to the Government of Russian Federation. RF Government Decree of 06.11.2008 No. 444 approved the current Regulations governing the FARs operations.

FAR interacts with various agencies at the federal level while controlling its territorial departments. It is responsible for oversight of departments under its jurisdiction, which define the rules and the annual Total Allowable Catches (TAC), as well as define the areas of fisheries. In the current system, TACs do not apply to salmon fisheries. Also FAR conducts communication and coordination with foreign government agencies, international committees and international organizations on issues of fisheries, policy and technical programs related to the application of innovative technologies in the fisheries complex, and prepares federal-level and agency-level reports on the fishing industry.

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

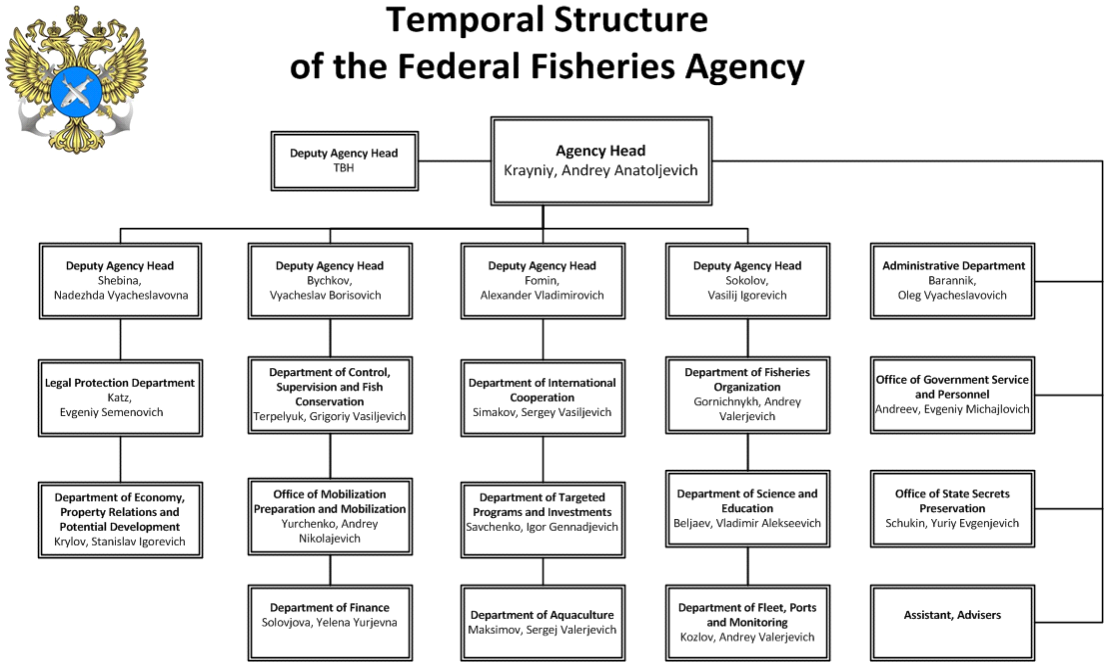

Figure 16. Organization of the Federal Fisheries Agency.

Sakhalin-Kuril Territorial Administration of FAR (SKTU)

FAR has territorial departments in all regions of Russian Federation, which have been created in order to accelerate the implementation of many of the functions of the FAR on the level of Russian Federation subjects. SKTU is the local management and enforcement arm of FAR located in Yuzhno-Sakhalinsk. SKTU 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. SKTU posts all approved management decision of AFC on its website.

Federal Research Institutes (VNIRO, TINRO-center, SakhNIRO)

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

Studying of the Pacific aquatic biological resources is performed by such scientific research institutes as: TINRO-center (Vladivostok) with branches in Khabarovsk and Anadyr; Magadan-NIRO (Magadan); KamchatNIRO (Petropavlovsk on Kamchatka) and SakhNIRO (Yuzhno-Sakhalinsk). Studying of aquatic biological resources of the Arctic, northern Atlantic Ocean, Baltic Sea and Atlantic Ocean and that of Black, Azov and Caspian seas and studying of aquatic biological resources of internal freshwater bodies is performed by other territorial institutions. SakhNIRO conducts research of marine and freshwater resources in the Sakhalin-Kuril region to monitor the status of commercial species, including salmon, and preparing annual forecasts of commercial species and the proposal on the volume of their potential catch. Each October SakhNIRO issues forecast for expected catch of salmon for the next season. Forecast is developed based on the filling the spawning grounds, the slope of juveniles from natural spawning in the sea and the release of juveniles from hatcheries. These data are collected by both SakhNIRO and SakhRybvod.

Annual forecasts by SakhNIRO of potential catch are sent to TINRO-Centre (Vladivostok) where it is approved in the special Salmon Scientific Council and then to VNIRO (Moscow), which examines and approves the forecast on the Scientific Council. Following the adoption of the forecast VNIRO sends it to the FAR for approval. Approval forecast is the basis for the organization of fishing in the region. Upon the request of fishing companies and SakhRybvod, the SakhNIRO also develops technical and biological rationale for salmon hatcheries construction.

SakhRybvod

SakhRybvod is directly managed by the Federal Fisheries Agency. SakhRybVod collects in-season information on catch and escapement, and controls hatchery permitting and management in the Sakhalin oblast (including the Kuril Islands). SakhRybVod operates a number of hatcheries on Sakhalin including two in Aniva Bay and one on the Tym River

(Nogliki Region). The structure SakhRybVod includes ichthyologic service and Control and Monitoring Stations (KNS) located on the main rivers in each administrative district of Sakhalin. Total staff of Ichthyologic service is 125 people. SakRybVod monitors escapement and juvenile outmigration on most of the streams which include both hatchery and non-hatchery systems of Sakhalin region.

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

Rosprirodnadzor is the Federal agency responsible for enforcement and control. It also reviews and approves aquatic biological resources TAC on the annual basis. Review is conducted by a Commission of Experts, made up of scientists in all fields of science from different research institutes and independent experts. Before 2008 Rosprirodnadzor's reviews considered prediction of Pacific salmon runs and appropriate justifications and proposals and identifies quantities of salmon required for escapement, hatchery requirements, scientific harvesting, international harvest (per treaties signed by Russia), and commercial harvest in the inshore zone. A 2008 order of Rosrybolovstvo removed salmon from the TAC species and the responsibility for setting annual catch of salmon was removed from the supervision of Rosprirodnadzor. Apart from organization of the Commission of Expert's work, Rosprirodnadzor is also responsible for State supervision of usage and protection of water bodies, wildlife and their habitats, federal level wildlife preserves, and environmental protection status.

Federal Agency for Veterinary and Phytosanitary Supervision (Rosselkhoznadzor)

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

Public Council for FAR

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

Far East Scientific Commercial Fisheries Council (FESFC)

FESFC is an independent council made up of representative of the Federal Fisheries Agency, scientific research institutes, non-profit commercial associations of commercial fisheries, minority peoples of the North and Russian Far East and the union of the pool of professional fishers. The personnel composition of the FESFC is approved by order of FAR based on the recommendations of the Russian Federation territorial subject. However, half of its members must be either from scientific or similar preservation of fish or natural resources agencies. The council has the authority to engage other competent authorities, interested

parties (or stakeholders) as needed, upon approval of a vote of its members. Meetings are held in Vladivostok at least twice a year. The FESFC meetings can be attended by any interested party, where they may express their opinions and participate in the discussions. Central to the responsibilities of the FESFC is the compilation of scientific information concerning the management of marine bio-resources in the Russian Far East for submission to the Federal Fisheries Agency for final approval. In addition, it reviews and submits its recommendations on fisheries regulations, construction of fish hatcheries and the recommendations for the distribution of quota among its subjects.

Regional Governance

The current management system is regulated according to the federal law "On Fishery and Conservation of Aquatic Biological Resources" which was amended in 2008 to reflect changes regarding fishery of anadromous fish in inland waters of Russian Federation and territorial seas of Russian Federation (Article 291 of the Federal Low of December 20 2004 № 166-FZ). This law gave the government the authority to assign fishery sections to individual lease holders for up to 20 years, and salmon fisheries management was entrusted to the regional executive authorities. This regulation replaced the previous system which was based on Total Allowable Catch allocations and centralized fishery management decisions through Moscow with a much more responsive and effective regional system. The current system is widely viewed as an improvement for fisheries management as it can react more quickly to changes in run strength. In addition, fishing companies no longer have an incentive to under-report their catch since they are not limited to a quota.

Sakhalin Fisheries Agency (SFA)

Under the new management system, the regional government has the responsibility for in-season management of fisheries (although SKTU has final approval). The SFA is responsible for establishing the Commission on the Regulation of harvesting (catch) Anadromous Fishes (AFC) and providing information on the fishery (such as catch and escapement data collected by SakhNIRO and SakhRybvod).

Commission on the Regulation of Harvesting Anadromous Fishes (AFC)

The AFC has the 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 was established by regional authorities in 2008 to implement management changes identified in new federal regulation. The AFC is chaired by the regional governor and consists of government, industry and interested stakeholders. These include representatives from Federal executive bodies, including the federal security and environment protection authorities, as well as representatives of the regional government, federal, public associations, consolidations of legal entities (associations and unions), and scientific organizations. The list of members of AFCs is suggested by the Governor and approved by the Territorial Administration of FAR (SKTU). Upon the request of companies, the AFCs distribute the annual quotas among the users. The total amount of the quotas is authorized by FAR and accounts for the number of salmon required for filling in the spawning areas and broodstock hatcheries, as well as quotas for sport fishing and harvest by the indigenous population. The AFC meets regularly and makes in season fishery management decisions. Based on the reports about filling of the spawning grounds (prepared and submitted by SakhNIRO and SakhRybvod), the AFC makes operational decisions on the time and duration of fishing by either closing fishing in spawning grounds in case of insufficient filling or by increasing the quotas in order to harvest excessive spawners from the mouths of rivers to avoid overflow of spawning

grounds. The AFCs' decisions are made through discussions and consultations with stakeholders. All meetings are open to the public. All decisions of AFCs on fisheries management are subject to final approval by Territorial Administrations of FAR. Meeting minutes and decisions are posted on the Territorial Administration website.

4.7.2 Preseason Management

Forecasting the run of pink salmon to the coasts of Sakhalin Island is based on multi-year statistics of commercial catches, data on filling of spawning grounds, survival of eggs in the spawning mounds, the total number of downstream migration of wild juveniles and number of juveniles released from hatcheries. The forecast is derived using a simple linear regression and does not consider carrying capacity of the ocean. The accuracy of the forecast is +/- 20% for Sakhalin Island but only +/- 100% for individual regions on Sakhalin (especially within south-eastern Sakhalin and Aniva Bay).

SakhNIRO sends the annual forecast to the TINRO-center; the later then summarizes the forecasts from all regional NIROs. Forecasts are discussed on the Far East Salmon Council (FESC), which was created within the TINRO-center with the goal of coordinating the research and forecasting of salmon in the Far Eastern basin. FESC decides on the final value of the forecast of predicted catch and sends the forecast to VNIRO. There the forecast passes through the expert review and gets adopted by the Scientific Council, after which VNIRO sends it to FAR for approval. On the basis of this forecast FAR approves the expected annual catch for Sakhalin and Kuril fishing areas. The pre-season forecast is used primarily for planning purposes and possibly to establish quotas for some non-commercial fisheries.

During fishing season, FAR value of annual expected catch may be adjusted by AFC based on real-time data on the number of the pink salmon approaching the fishing areas. In order to assist in this adjustment, SakhNIRO monitors the dynamics of catches and biological indicators of pink salmon in the main areas of operation and the reproduction of the species. The monitoring results are used for developing operational guidelines on pink salmon fishing.

Additionally, TINRO-center conducts annual counting of salmon fingerlings in the open sea using total trawling method and counting of feeding salmon in the winter areas on the high seas and in the ways of anadromous migrations. The results of these studies are also used for operational adjustments of the expected catch of pink salmon.

Prior to 2008, Salmon fisheries were carried out based on TACs, which was offered by the regional NIRO. Proposals of the regional NIROs were approved by Scientific Council of VNIRO and were examined by the inter-agency Commission of Rosprirodnadzor. After the examination, the TACs were being approved by the order of Rosrybolovstvo and sent to the Government of Russian Federation. The RF Government was affirming the orders of Rosrybolovstvo of TAC by its Decrees, at which moment the TACs became effective. Then Rosrybolovstvo was distributing the TACs to the subjects of the Russian Federation. The TACs represented the basis for conducting fishing in all subjects of the RF. In each subject of RF, the regional Departments of fisheries, in conjunction with Territorial Administrations of Rosrybolovstvo, Territorial Administrations of Rybvod, NIRO and representatives of the Fishermen Associations were distributing the TACs among the users of resources. The proposed distribution of TACs was sent to Rosrybolovstvo for approval. The quotas for each company were being determined based on historical data (the average yield for the previous 3 years). In case the return of salmon was observed to be higher than the approved TACs values, the process of increasing the quotas and TACs for individual fishing

companies was the same as the original approval and required a long time. The resulting increase of the quotas and TACs were often carried out after the end of the harvest season, which resulted in spawning areas being overwhelmed by spawners and the catch was under-reported by the fishing companies. In 2008, the TAC system for the salmon fishery was canceled.

4.7.3 In-season Process

At the beginning of the year the fishing companies submit pink salmon catch applications to SKTU. Each company purchases a permit based on the number of salmon they want to catch (fee is roughly 3 rubles per kg of fish caught). A company can purchase another permit once the first one is filled.

Each coastal trap is served by a crew of fishermen. The crew leaders report directly to the company's Directors. Each crew keeps fishing log according to the template specified by the FAR. This log records:

- coordinates of trap;
- daily catch (in metric tons);
- species composition and by-catch;
- return of by-catch or its use.

Each crew submits information on the catch volumes and species composition to SKTU and SFA daily which is then summarized for reporting to the AFC.

The AFC opens and closes fishery times and areas based on harvest and escapement relative to expectations and objectives. In cases the run of pink salmon is lower than forecasted, in order to provide escapement to the spawning areas, the entrances into the traps are being blocked and the central net is being lifted and attached to the top rope. In cases of high abundance of pink salmon there may appear a risk of spawning grounds overflow which leads to suffocation in rivers. In such cases (based on recommendations of SakhNIRO and SakhRybvod) AFC may decide to block the rivers' mouths with weirs or trap nets. Weirs or trap nets are installed at the moment when spawning ground fill rate reaches 60-70%. After that, based on recommendations of ichthyologists of SakhRybvod), AFC selects days when the fish are allowed to pass to the spawning grounds in order to fully fill them.

A similar regulatory system of filling of spawning grounds exists on the rivers where the hatcheries are located. At the beginning of the run on such rivers the fish is allowed to pass to the spawning grounds in upper streams of the river (reaching 25% of the total escapement goal). The middle of the run fills the spawning grounds in the middle stream (50% of the escapement goal) and at the end of run the downstream spawning grounds are being filled (25% of the escapement goals). The excess fish is being removed at eggs collecting locations (which use it for hatcheries) or at river mouth weirs or traps. However, most fishermen do not approve of such a system for regulating passage of fish to the spawning grounds and often suggest abandoning it.

In the most years of low abundance of pink salmon (even years) river mouth weirs or traps are not installed, and the filling of spawning grounds to the degree possible given the low run is carried out establishing closing days for fishing or by closing the fihsery entirely. Thus, in 2008 due to low levels of returning pink salmon, the pink fishery was closed in the Smirnykh District. However, in 2010 river mouth weirs or traps were installed despite it being an even (low abundance) year.

Regulatory actions adopted in 2011 by the Anadromous Fish Commission regarding pink salmon fishery in Smirnykh and Nogliki districts included:

21 April: Set up time of beginning of fishing season for salmon fishing in the NE Sakhalin: pink – 11 Jul, chum – 11 Aug, coho – 11 Aug.

31 May, 15 June: Determination of locations for trap nets for fishing of anadromous fish(just a confirmation of what has been done in 2008 for 20 years).

31 May: list of catch size of Pacific salmon (by species) according to applications

15 July: listing of "Plavnik" among companies having permits for sport fishing (pink – 5 mt)

26 August: listing of "Plavnik" among companies having permits for sport fishing (chum – 4 mt)

2 August: allocation of additional quota of Pacific salmon permitted for commercial fishing for "Rybak" (2000 mt of pink).

12 August: allocation of additional quota of Pacific salmon permitted for commercial fishing for Tamara (300 mt of pink).

8 September: allocation of additional amounts of Pacific salmon permitted for commercial fishing for Lovets (25 mt of coho).

8 September: to stop fishing for Pacific salmon on the base rivers of hatcheries by means of elevating of wings of trap nets and closing openings of traps from 00:00 12 September to 22 September 2012.

16 September: to close fishing for Pacific salmon in the NE Sakhalin from Elizaveta cape to Terpenia cape from 00:00 19 September 2012 (excluding fishing parcel 65-13-44). To lift up wings of the trap nets and to close openings of traps from 00:00 19 Sept 2012

4.7.4 Enforcement

SKTU controls the compliance with the law and rules of fishing. SKTU contains the department of state control, supervision and protection of aquatic resources and habitats. The department consists of 18 fish protection inspector squads, which are located in every administrative region of Sakhalinskaya Oblast. The total staff of the department is 100 inspectors. Being this number is not enough to ensure comprehensive monitoring, SKTU often asks police, prosecutors of Environmental Prosecutor's office, private security agencies, fishermen and freelancers to assist. During the harvest of pink salmon, the anti-poaching brigades, led by the inspectors, carry out regular daily and nightly rounds on majority of spawning rivers in order to prevent poaching. Due to the poor standard of living, roe stripping is commonplace along many spawning streams. SKTU acknowledges that organized criminal poaching likely exists on Sakhalin but does not believe that it is a significant problem. Most people we talked to thought that poaching was declining but still a significant problem. In 2010 alone, the SKTU inspectors have issued fines in the amount of 4,278.7 thousand rubles, have imposed penalties for settlement of identified loss in the amount of 7,809.83 thousand rubles, confiscated 29 vehicles and sent 119 cases to the investigating agencies. Expert evaluations of scale of poaching were referred to above.

Fishing companies are also engaged in anti-poaching activities on the rivers flowing into the sea in their fishing areas and fund anti-poaching brigades. In some municipalities, including Aniva, Smirnykh and Nogliki districts, Salmon Watershed Public Councils (SPC) have been established. These councils are consultative agencies to the district executive authority.

SPCs are funded by noncommercial organization “Sakhalin Salmon Initiative,” the oil company “Sakhalin Energy” and Wild Salmon Center (Portland, Oregon, USA). SPCs are closely cooperating with representatives of the Police’s Office, Environmental Prosecutor’s Office, Sakhalin Fisheries Agency and SKTU. The main activities of the SPCs are aimed at preventing poaching. SPCs form anti-poaching brigades that inspect the spawning rivers around-the-clock. In 2010 these groups made 360 anti-poaching raids, destroyed several poaching bases, 75 poaching nets, one salmon eggs collection station, and a few underground workshops for processing caviar. The raids led to 1 criminal case and 8 misdemeanor cases in the Smirnykh region. There were issued 152 protocols violations of fishing rules in the Aniva region.

4.7.5 Protected, Endangered, or Threatened Species

The Ministry of Natural Resources is responsible for managing sensitive species. Oversight is provided by various commissions which also collect scientific data. Guidance is provided in the form of recommendations. (Listing Authority: Ministry of Nature of Russia, Commission for Rare and Endangered Animals, Plants, and Fungi).

4.7.6 Environmental Protection

Protection of the salmon habitat is achieved through observance of the current laws of the Russian Federation. Any type of utilization either of natural resources directly or that impacts them indirectly, including fisheries, water and timber utilization, construction, etc., must be evaluated as to the extent of impact on the environment. The evaluation itself is performed by an expert commission having state ecological expertise, and the main federal agency responsible for conducting the state ecological expert review is the Ministry for Natural Resources of the Russian Federation. In addition, activity related to natural utilization that has already been permitted is regulated to the extent to which it impacts the environment by a series of standards documents at the federal, departmental and local levels. For the protection of fish habitat within the area of its competence, responsibility is borne by the Federal Natural Utilization Oversight Service (Rosprirodnadzor), the Federal Ecological, Technological and Atomic Oversight Service (Rostekhnadzor), the Agency of Fisheries of Russian Federation, and local governments of the territorial subjects of the Russian Federation.

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

Decisions adopted must conform to the laws and standards of the Russian Federation and the Sakhalin Oblast.

The main indicator of success with respect to actions aimed at protecting fish (salmon) habitat is the record size of the harvests of pacific salmon in the Sakhalin Oblast over the past 8 years.

4.7.7 Research plan

Until mid-1990's the studies of salmon in the Far East Russian Federation were performed according to the complex target program "Salmon," which was controlled by the Committee on Fisheries of Russian Federation (Federal Agency for Fishery). This program was designed for every 5 years starting with mid-1980s. Studies in second half of 1990s were performed according to 5-year programs, which took into account the basin and partly the ecosystem approaches. In 2005, the TINRO-center with the participation of regional NIROs, developed "**The concept of the Far East basin program for the complex study of Pacific Salmon for period 2006-2010"** [6]**,** which was approved by Rosrybolovstvo (now is FAR). In accordance with this concept TINRO-center developed the **"Far East basin program for complex study of Pacific Salmon for period 2007-2012"** [6]**.** According to the political course of FAR on the centralization of fisheries research in 2009, VNIRO has developed the departmental comprehensive target research program for fisheries of Russian Federation for 2010-2014 named **"Scientific support and monitoring of conservation of reproduction and rational using of resources of fisheries base"**. Within that program the **"Far East basin program of complex study of Pacific Salmon for period 2010-2014"** [6] was adopted in which the succession of approach and research directions was preserved. In accordance with this program, the TINRO-center develops its annual program of complex research of Pacific Salmon; and regional institutes, including SakhNIRO, develop their own annual research salmon programs. All annual programs are approved by FAR.

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

At the end of the year, the results of these programs are discussed in the East Salmon Council at TINRO-center and published in the annual edition of The Bulletin of the Implementation of the "Concept of the Far East basin program for the complex study of Pacific Salmon".[7] A total of 5 bulletins for the period 2006-2010 have been published. Funding for all the programs is provided by FAR from the federal budget.

Several companies (for example, OOO Plavnik) are also funding research on the state of spawning grounds of rivers located within their fishing areas.

4.7.8 International Management

Russia is party to the Convention for the Conservation of Anadromous Fish Stocks in the North Pacific Ocean, and a member of the North Pacific Anadromous Fish Commission. The Commission promotes the conservation of anadromous fish in the Convention area, which includes the waters of the North Pacific Ocean and its adjacent seas north of 33 degrees

latitude and beyond the 200 mile zones of the coastal states. The Commission requires member states to:

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

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

5 EVALUATION PROCEDURE

5.1 Assessment Criteria – Performance Indicators & Scoring Guideposts

This is a summary of revisions to the MSC Fishery Assessment Methodology's (FAM) Default Assessment Tree for use in the full assessment of the Northeast Sakhalin Island and Aniva Bay trap net pink salmon fishery, based primarily on the Default Assessment tree prepared by Scientific Certification Systems (SCS) for the Annette Island Reserve (AIR) salmon fishery assessment. Following public comment, we have made clarification revisions to the draft assessment tree previously posted.

Previous salmon fishery assessments in Alaska, Canada, and Russia were based on a common set of performance indicators and guideposts developed for application to salmon of MSC principles and criteria for sustainable fishing. The MSC has subsequently released a revised FAM to provide a standardized framework for fishery assessment. SCS used review and discussions among the MSC Technical Advisory Board (TAB) and salmon certification teams to clarify the application of the revised FAM to salmon and to reconcile the new guidance with previous assessment methodologies. In particular, the unique aspects of salmon fishery assessments required more specific treatment of enhancement by hatcheries. Modifications by the SCS assessment team included: a) clarification of the wild stock focus of the assessment, b) addition of P1 performance indicators specific to salmon enhancement, and c) clarification of target and non-target stock definitions. These modifications were consistent with direction from the MSC Technical Advisory Board (e.g. TAB D001 v2 regarding enhanced fisheries). Revisions to the default assessment tree were intended to provide consistency with the original salmon-specific assessment tree and are based on results of a 2010 workshop convened by MSC to provide guidance to the TAB for the development of a Fisheries Assessment Methodology for salmon.

The AIR assessment treated all salmon stocks harvested on the AIR as target stocks, because 1) the fishery intercepted significant numbers of fish originating in other areas and 2) Annette Island supported only a subcomponent of the stock for several species (part of a complex regional metapopulation structure). However, the Aniva Bay-NE Sakhalin assessment will consider the target stocks as those pink stocks that originate in the terminal area of the fishery, as the fisheries occur in and adjacent to the rivers of origin.

Like many salmon fisheries, enhancement activities are a key aspect of the fishery in some areas of Sakhalin Island, although the NE Sakhalin region does not have hatcheries for pink salmon. The MSC has provided specific directives (TAB D001 v2) for scope application for enhanced fisheries and further, recommended specific components of enhancement activities that warrant a need for additional or revised PIs. The intent of directive is to enable certain types of enhanced fisheries to be eligible for certification against the MSC standard while maintaining the focus on the sustainability of the wild fish stock. Therefore we defined the fishery assessment to include both the fishery and its enhancement activities broadly. Additional indicators were added to Principle I to explicitly address enhancement – these indicators were organized by outcome, management, and information components to match the organization of other Principle I indicators1. Principle II and III indicators and guideposts were also revised to clarify applicability of enhancement. In addition, indicators and guideposts in P1 were clarified to specifically identify the wild stocks as the focus of the assessment (as distinguished from enhanced stocks). Pacific salmon are fished as stock complexes (multiple stock and sub-stocks in different environments). According to the MSC (FAM v2), a practical management approach may require that the target levels of biomass for some individual stocks within the complex be different from those usually applied to a

single species (i.e. a level consistent with BMSY or some surrogate or measure with similar intent). In these situations the overall target reference points should aim to be consistent with the intent of the performance indicator, and maintain the high productivity of the stock complex.

Stock complexes of salmon typically include a mixture of local and non-local stocks of the same species. The unit of certification will include the fisheries in the Nogliki and Smirnykh districts. The intent is that all salmon stocks harvested in that fishery will be certified to carry the logo as long as all performance indicators are met and non-target stocks meet the requirements of TAB Directive 30 for inseparable and practicably inseparable stocks.

For the purposes of this assessment, all pink salmon caught in the subject district are considered to be target stocks. This includes local salmon stocks that are produced naturally or in hatcheries.

The MRAG team concurs with the modification prepared by SCS Assessment Team for existing performance indicators of the Default Assessment Tree as contained in the MSC Fisheries Assessment Methodology v.21. This Assessment tree was slightly modified by the MRAG Assessment Team to clarify specific interpretations to some indicators and guidepost Including the basis for concluding that enhancement activities do not have significant negative impacts on the wild stock (which requires that hatchery origin spawner occur in a small proportion of the natural spawning populations/locations and that they represent a small fraction of the total natural spawning escapement). Changes to the FAM v2.1 and the rationale for the changes can be found at http://www.msc.org/track-a-fishery/in-assessment/pacific/sakhalin-island-and-aniva-bay-pink-salmon/assessment-downloads-1/10.02.2011-Sakhalin_Island_Pink_Salmon_Modified_Assessment_Tree_Final.pdf.

The intent of all salmon assessment trees with respect to salmon enhancement has been the same. That is to ensure that the wild stock is not subject to significant negative effects related to hatchery enhancement which might impair the sustainability of the fishery. The standard of proof regarding enhancement impacts on wild salmon has clearly evolved over the course of salmon assessments. Where the Alaska and Iturup were evaluated based on general scientific agreement within the management system and the existence of some scientific basis for this belief, evaluation of Sakhalin pink salmon enhancement requires evidence that hatchery fish spawners are a small fraction in a significant portion of the natural spawning populations/locations. In part, this higher standard results from the incorporation of specific outcome-driven indicators in the default MSC assessment tree. The previous salmon criteria primarily asked whether information was available to support a conclusion – it did not require a specific judgment regarding the likelihood of a no- or low-impact outcome. The more specific guidance represented in the current assessment tree also represents a recognition by salmon fishery assessment teams of the need for more specific benchmarks by which to evaluate the likelihood of enhancement effects. Previous scoring guideposts were more subjective and difficult to interpret and apply with consistency from fishery to fishery. New information available subsequent to assessments in several areas has also identified a consistent pattern of underestimation of the potential for hatchery effects relative to assessments under the original salmon standard which heavily weighted the beliefs of the management system. This has highlighted the need for a more rigorous standard.

5.2 Evaluation Techniques

5.2.1 Traditional assessment

Principles and Criteria

The *MSC's Principles and Criteria for Sustainable Fishing*, produced through an international consultation process, describe statements against which a fishery may be compared to enable its operators to make a claim that the fish sold on to retailers, processors and consumers comes from ***a well-managed and sustainable source.*** The certification methodology adopted by the MSC involves the application and interpretation of the Principles and Criteria to the specific fishery undergoing assessment. This is considered necessary, as the precise assessment of a fishery will vary with the nature of the species, capture method used, etc. The Principles and Criteria are presented below:

Principle 1. A fishery must be conducted in a manner that does not lead to over- fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Intent. The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criterion 1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.

Criterion 2. Where the exploited populations are depleted, the fisheries will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.

Criterion 3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Principle 2. Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Intent. The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criterion 1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.

Criterion 2. The fishery is conducted in a manner that does not threaten biological diversity (at the genetic, species or population levels) and avoids or minimizes mortality of, or injuries to, endangered, threatened or protected species.

Criterion 3. Where exploited populations of non-target species are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

Principle 3. The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent. The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

Criterion 1. The management system has a clearly defined scope capable of achieving sustainable fisheries in accordance with MSC Principles 1 and 2 and their associated criteria, and includes short and long-term objectives, including those for mitigating ecological impacts of fishing.

Criterion 2. The management system recognizes applicable legislative and institutional responsibilities and coordinates implementation on a regular, integral and explicit basis.

Criterion 3. The management system includes a rational and effective process for acquisition, analysis and incorporation of new scientific, social, cultural, economic and institutional information.

Criterion 4. A comprehensive research program is conducted.

Criterion 5. The management system ensures that there is a high degree of compliance in the fisheries with management measures and directives regarding fishing practices required by the system.

Criterion 6. The performance of the management system is regularly and candidly evaluated in a systematic fashion and the system responds positively to appropriate recommendations for change.

Generic Assessment Tree

The FAM V2 contains a generic assessment tree for use on all future MSC assessments. Each of the MSC's Principles and Criteria for Sustainable Fishing has been integrated into the new structure. Some rearranging of concepts has occurred and some criteria are now considered as issues of scope rather than under specific PIs (i.e. destructive fishing practices and controversial unilateral exemptions from international agreements).

A complete illustration of the new structure is provided in the FAM V2 (Figure 2 on page 11). Among other things, the new tree has eliminated much of the duplication and overlap that previously occurred between Principle 3 and Principles 1 and 2. This has been achieved by addressing the MSC Principles in a more holistic way rather than developing separate performance indicators under each Criterion. For example, many of the operational components formerly under Principle 3 (bycatch and discards, habitat impacts), are now addressed solely under Principle 2.

The new assessment tree organizes the performance indicators into components that focus upon the outcomes of the fisheries management process and the management strategies implemented that aim to achieve those outcomes. Therefore the new Assessment Tree structure is divided into three levels for the purposes of scoring:

- Level 1 – is the **MSC Principle** as described in the MSC's Principles and Criteria for Sustainable Fishing (also referred to as the MSC standard).
- Level 2 – is the **Component**, which is a high level sub-division of the Principle.
- Level 3 – is the **Performance Indicator** which is a further sub-division of the Principle and the point at which scoring of the fishery occurs.

Table 13 lists the components and performance indicators under each Principle in the generic assessment tree.

Table 13 MSC Components and Performance Indicators under each Principle

Principle	Component	Performance Indicator
Principle 1.	Outcomes: The current status of the target stock resource	1.1.1 Stock status
		1.1.2 Reference Points
		1.1.3 Stock recovery and rebuilding
	Harvest Strategy (Management): A precautionary and effective harvest strategy	1.2.1 Performance of harvest strategy
		1.2.2 Harvest control rules and tools
		1.2.3 Information / monitoring
		1.2.4 Assessment of stock status
Principle 2.	Retained species	2.1.1 Outcome Status
		2.1.2 Management strategy
		2.1.3 Information / monitoring
	Bycatch species	2.2.1 Outcome Status
		2.2.2 Management strategy
		2.2.3 Information / monitoring
	ETP species	2.3.1 Outcome Status
		2.3.2 Management strategy
		2.3.3 Information / monitoring
	Habitats	2.4.1 Outcome Status
		2.4.2 Management strategy
		2.4.3 Information / monitoring
	Ecosystem	2.5.1 Outcome Status
		2.5.2 Management strategy
		2.5.3 Information / monitoring
Principle 3	Governance and policy	3.1.1 Legal and/or customary framework
		3.2.1 Consultation, roles and responsibilities
		3.1.3 Long term objectives
		3.1.4 Incentives for sustainable fishing
	Fishery- specific management system	3.2.1 Fishery- specific objectives
		3.2.2 Decision-making processes
		3.2.3 Compliance and enforcement
		3.2.4 Research plan
		3.2.5 Monitoring and management performance evaluation

The following definitions apply with respect to the Components under Principle 2:

a) Retained species: Species that are retained by the fishery under assessment (usually because they are commercially valuable or because they are required to be retained by management rules).

b) Bycatch species: Organisms that have been taken incidentally and are not retained (usually because they have no commercial value).

c) ETP species: Endangered, threatened or protected species are those that are recognized by national legislation and/or binding international agreements (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party.

d) Habitats: The habitats within which the fishery operates.

e) Ecosystem: Broader ecosystem elements such as trophic structure and function, community composition, and biodiversity.

As with previous assessment trees, the generic assessment tree contains scoring guideposts that describe the main thresholds in the scoring system for each performance indicator:

- 100 – defines the upper boundary of the scoring and represents the level of performance on an individual performance indicator that would be expected in a theoretically 'perfect' fishery.
- 80 – defines the unconditional pass mark for a performance indicator for that type of fishery. Weighted scores for Criteria under each MSC Principle must average to 80 or higher.
- 60 – defines the minimum, conditional pass mark at the Criterion level for that type of fishery. Any score below 60 represents a performance level that is unsatisfactory.

For each Performance Indicator, the fishery's characteristics are compared with the requirements of the pre-specified attributes for each of three Scoring Guideposts (60, 80, 100) to establish a score on a scale of 0-100 points. Scoring occurs in increments of 5 points. A performance score of 60 is intended to reflect 'a pass with condition', a score of 80 represents 'pass without condition', while a 100 score reflects 'perfect performance.' For a fishery to be certified it must accomplish three things:

- Achieve a score of 60 or greater for every performance indicator
- Each MSC Principle must achieve a weighted average score of at least 80, or pass without conditions.
- A contractual commitment to performance improvement for each indicator that has a score less than 80.

6 ASSESSMENT RESULTS

6.1 Determination

6.1.1 Scoring summary tables

Northeast

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3) Either	Weight in Either	Or	Or	Score	Contribution to Principle Score Either	Or
One	1	Outcome	0.3	1.1.1	Stock status	0.5	0.167	0.333	0.1111	80	13.33	
				1.1.2	Reference points	0.5	0.167	0.333	0.1111	80	13.33	
				1.1.3	Stock rebuilding			0.333	0.1111			
		Management	0.3	1.2.1	Harvest strategy	0.25	0.083			95	7.92	
				1.2.2	Harvest control rules & tools	0.25	0.083			75	6.25	
				1.2.3	Information & monitoring	0.25	0.083			70	5.83	
				1.2.4	Assessment of stock status	0.25	0.083			75	6.25	
		Enhancement	0.3	1.3.1	Enhancement outcome	0.333	0.111			80	8.88	
				1.3.2	Enhancement management	0.333	0.111			80	8.88	
				1.3.3	Enhancement information	0.333	0.111			90	9.99	
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.067			60	4.00	
				2.1.2	Management	0.333	0.067			80	5.33	
				2.1.3	Information	0.333	0.067			75	5.00	
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.067			80	5.33	
				2.2.2	Management	0.333	0.067			95	6.33	
				2.2.3	Information	0.333	0.067			80	5.33	
		ETP species	0.2	2.3.1	Outcome	0.333	0.067			80	5.33	
				2.3.2	Management	0.333	0.067			80	5.33	
				2.3.3	Information	0.333	0.067			70	4.67	
		Habitats	0.2	2.4.1	Outcome	0.333	0.067			90	6.00	
				2.4.2	Management	0.333	0.067			80	5.33	
				2.4.3	Information	0.333	0.067			85	5.67	
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.067			90	6.00	
				2.5.2	Management	0.333	0.067			85	5.67	
				2.5.3	Information	0.333	0.067			80	5.33	
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			85	10.63	
				3.1.2	Consultation, roles &	0.25	0.125			85	10.63	
				3.1.3	Long term objectives	0.25	0.125			80	10.00	
				3.1.4	Incentives for sustainable fishing	0.25	0.125			80	10.00	
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.100			80	8.00	
				3.2.2	Decision making processes	0.2	0.100			100	10.00	
				3.2.3	Compliance & enforcement	0.2	0.100			70	7.00	
				3.2.4	Research plan	0.2	0.100			70	7.00	
				3.2.5	Management performance	0.2	0.100			80	8.00	

Overall weighted Principle-level scores		Either	Or
Principle 1 - Target species	Stock rebuilding PI not scored	80.7	
	Stock rebuilding PI scored		
Principle 2 - Ecosystem		80.7	
Principle 3 - Management		81.3	

6.1.2 Principle I – Target Stocks (Northeast Region)

The northeast Sakhalin pink salmon fishery in the Nogliki and Smirnykh districts meets all 60 scoring guideposts as well as exceeding a minimum weighed score of 80 for principle I. A number of indicators were scored between 60 and 80 which necessitated identification of conditions for continuing certification.

Indicator	Criteria @ 60				Criteria @ 80					Criteria @ 100						Score
	1	2	3	4	1	2	3	4	5	1	2	3	4	5	6	
1.1.1 Stock Status - Outcome	1				1	1				0	0					80
1.1.2 Reference Points - Outcome	1	1			1	1	1	1	1	X	0	0	0			80
1.1.3 Stock Rebuilding - Outcome	na	na			na	na				na						
1.2.1 Harvest Strategy - Mgmt	1	1	1		1	1				1	0	1				95
1.2.2 Harvest Control Rules & Tools - Mgmt	1	1			1	1	0									75
1.2.3 Information & Monitoring - Mgmt	1	1	1		1	1	0	0								70
1.2.4 Assessment of Stock Status - Mgmt	1	1	1	1	1	0	1	0	1							75
1.3.1 Enhancement Outcomes	1	1			1	1				0	X					80
1.3.2 Enhancement Management	1				1					0						80
1.3.3 Enhancement Information	1	1			1	1				0	1					90
															Net	80.7

1.1.1 Stock Status		
The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.		
SG 60	**SG 80**	**SG 100**
It is likely that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.	It is highly likely that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status. The wild stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status. There is a high degree of certainty that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Score: 80

Justification

It is highly likely that the wild stock of pink salmon in both the Smirnykh and Nogliki districts is above the point where recruitment would be impaired. Returns and escapements have over the last 30 year period have been variable with a stable or increasing trend. Aggregate escapements of the dominant odd-year brood cycle are typically at or above levels observed to produce maximum recruitment in subsequent years in northeast region streams (Figure 8). Survival and productivity estimates of pink salmon reported by Kaev et al. (2008) are also quite high relative to other pink salmon populations, highlighting the resilience of this stock in response to fishing and environmental variation. While IUU fishing targeting roe occurs in the freshwater environment, escapement counts effectively take illegal harvest into consideration.

Aggregate escapements of the subdominant even-year brood cycle are much less than odd-year numbers as is typical for pink salmon throughout their range (Heard 1991). The historical data indicate that this pattern has been prevalent for decades as this stock has varied from year-to-year around long term average numbers. This naturally-occurring pattern is independent of the fishery which exploits the subdominant years at a substantially reduced rate. Due to risks of disruption of long-term productivity patterns, it is neither realistic nor appropriate to attempt to increase spawning escapements in the subdominant years to the capacity of the spawning habitat.

The wild stock is at or fluctuating around its target reference point based on escapement data for wild population in index rivers of this district. Spawning escapements are monitored annually in a sample of wild populations. Annual escapements average over 100% of capacity-based targets for monitored streams in odd years of this odd-year cycle dominant pink salmon stock. Targets are met or exceeded in 29% (Smirynkhovskii District) and 50% (Nogliki District) of dominant years. Escapements of at least 50% of target levels are met or exceeded in 70% (Nogliki District) and 100% (Smirynkhovskii District) of the dominant years. While targets are not met in even-run years, this pattern is typical of pink salmon and does not represent a sustainability concern. The assessment team considers escapements of 50-100% of the capacity-based target identified by the management system as clearly within a range that avoids recruitment overfishing.[19] The pattern of fluctuation around the target reference point has continued over the last few years as documented in Section 4.3.3. In fact, pink salmon returns during 2011 were among the highest on record in this region.

While it is highly likely that the fishery does not impair recruitment and the stock is fluctuating around its target reference point, this determination cannot be made with a high degree of certainty due to questions regarding precision of escapement estimation and the accuracy of sample streams in representing other systems within the district. This issue is further addressed under Indicator 1.2.4.

1.1.2 Reference Points		
Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock.		
SG 60	**SG 80**	**SG 100**
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the wild stock and can be estimated. The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive	Reference points are appropriate for the wild stock and can be estimated. The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following

[19] *The assessment team identified escapements in the range of 50-100% of capacity as within a range that easily avoids recruitment overfishing. This conclusion was drawn from on an independent analysis by the assessment team based on salmon stock-recruitment theory and historical data for northeastern Sakhalin pink salmon. Information in Ricker (1975) indicates that maximum sustained yield and maximum production generally occur at values around or above 50% of the stock-recruitment replacement abundance (i.e. where adult recruits equals spawners). The assessment team defined capacity based on the stock-recruitment replacement abundance consistent with descriptions provided by scientists working within the management system. Historical production data reported by Kaev and Geraschenko (2008) for the aggregate northeast pink salmon run (*Figure 8*) is consistent with typical stock-recruitment patterns observed for pink salmon.*

Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.	capacity. The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome. For low trophic level species, the target reference point takes into account the ecological role of the stock. Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.	consideration of relevant precautionary issues. The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty. Where the wild stock is a management unit comprised of more than one subcomponent, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.

Score: 80

Justification

Reference points are appropriate for the wild stock and can be estimated. These are based on stream-specific spawning escapement targets established from the amount of suitable spawning habitat and an optimum fish spawning density of 2 fish/m^2 in suitable habitats. Escapement goals function as target reference points. The fishery is managed to generally approach but not exceed the stream-specific targets. These escapement targets function as target reference points for each stream for comparison with actual escapement estimates. Table 5 summarizes stream-specific escapements. Table 4 describes aggregate escapements for the entire district based on a run reconstruction from monitored streams.

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. This fishery has not historically been managed intensively based on annual run size to meet specific minimum escapement goals for each stream. No specific minimum escapement goals have been identified because fishery management generally provides spawning escapements consistent with sustainable levels of production and yield seen in the historical dataset. Thus, management for consistent high levels of escapement referenced to stream spawning habitat capacity provides a functional equivalent of a limit reference point where substantial spawning escapements are consistently achieved.

The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome. Salmon escapement goals are typically managed 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. Escapement goals for Sakhalin pink salmon are representative of the point of maximum production. The available data indicate that this fishing strategy successfully produces escapements in index streams for the dominant brood year cycle that generally reach or exceed 50-100% of the capacity, which the assessment team estimates is consistent with maximum yield and production from this stock. This conclusion is supported by analysis of the stock-recruitment pattern in historical data for the aggregate pink salmon stock in northeast Sakhalin (Figure 8). These data, based on run reconstructions of the aggregate northeast Sakhalin pink salmon stock by the government scientific agency, confirm that aggregate escapements are consistently at or above levels that produce maximum yields and production.

Highly variable annual run sizes are characteristic of salmon, particularly pink salmon. Thus, it is not always possible to meet optimum targets in every population and year. 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. Due to the passive nature of the fishing gear consisting mainly of fixed trapnets, annual escapement is heavily dependent on annual run strength and timing. Exploitation rates are relatively modest in comparison with other heavily-fished pink salmon runs in Russia and Alaska.

Escapements of even-year subdominant brood cycle are not actively managed to achieve capacity-based targets which would be inappropriate for this component of the run. The even-odd year cycle is a naturally occurring phenomenon that occurs independent of fishery effects. The even-year fishery is reduced such that annual exploitation rates are substantially reduced from the already-modest dominant year rates. This ensures that escapements are not greatly affected by the fishery on average.

While salmon are not a low trophic level species, target reference point indirectly take into account the ecological role of the stock in providing food for predators and marine derived nutrients important to the freshwater ecosystem. Target reference points established based on spawning habitat capacity consistently provide high levels of spawning escapement with corresponding freshwater ecosystem benefits.

It is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of subcomponent of the northeast Sakhalin pink salmon which is comprised entirely of the ocean-type stock. The early run, Sea-of-Japan stock is not present in the Northeast region. Stock structure of the NE Sakhalin pink salmon stock is contained in among and within population diversity. This diversity is effectively protected by distributing harvest across the breadth of the run timing and the fishery area. This strategy results from the passive nature of the fishing gear and limited number of nets.

The NE district pink salmon fishery meets scoring guideposts for this indicator at the 80 level but not at the 100 level. While the target reference points can be considered to provide operation equivalents of limit reference points, this approach does not meet a standard of high precautionary management that would be afforded with an explicit definition of limit reference points. Nor is the ecological role of the stock explicitly incorporated into escapement goals with a high degree of certainty in a highly precautionary manner. It is highly likely that reference points are consistent with maintaining stock subcomponents but a higher degree is certainty is precluded by the absence of an assessment of intra and inter-population diversity and the lack of escapement monitoring on some major systems. While

monitored systems appear to provide an appropriate index of annual abundance due to exposure to common environmental conditions in freshwater and marine portions of life cycle, the synchrony in returns among systems of varying productivity has not been evaluated. Spawning escapement goals are periodically re-evaluated and updated based on improved estimates of suitable spawning habitat availability, although stakeholder input has identified the need for a more timely and comprehensive review of current spawning habitat in this region.

1.1.3 Stock Rebuilding		
Where the wild stock or wild stock components are depleted, there is evidence of stock rebuilding.		
SG 60	**SG 80**	**SG 100**
Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place. The rebuilding strategy should prohibit targeting depleted stocks. Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.	Where stocks are depleted rebuilding strategies are in place. There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modeling or previous performance that they will be able to rebuild the stock within a specified timeframe.	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the shortest practicable timeframe.

This indicator is not applicable to pink salmon in the NE Sakhalin region. No depleted wild stock components have been identified. The pink salmon stock is composed of the oceanic race – the depleted Sea of Japan stock is limited to southern portions of Sakhalin.

1.2.1 Harvest Strategy		
There is a robust and precautionary harvest strategy in place.		
SG 60	**SG 80**	**SG 100**
The harvest strategy is expected to achieve wild stock management objectives reflected in the target and limit reference points. The harvest strategy is likely to work based on prior experience or plausible argument. Monitoring is in place that is expected to determine whether the harvest strategy is working.	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points. The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.	The harvest strategy is responsive to the state of the wild stock and is designed to achieve stock management objectives reflected in the target and limit reference points. The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. The harvest strategy is

		periodically reviewed and improved as necessary.

Score: 95

Justification

There is a robust and precautionary harvest strategy in place involving intensive in-season monitoring of spawning escapements and real time fishery management. The harvest strategy is responsive to the state of the wild stock and is designed to achieve stock management objectives reflected in stream-specific objectives for natural spawning escapements. Local and regional fishery closures are regularly implemented based on fish numbers. A consistent pattern of reaching escapement objectives in monitored streams provides evidence that the strategy is achieving objectives. However the strategy has not been fully evaluated with regards to representation of all significant production areas based on index streams for which data has been reported to us.[20]

The harvest strategy effectively addresses even-year and odd-year run cycles of pink salmon with reduced exploitation rates on the even-year subdominate cycle. Even-odd year cycle dominance patterns are typical of pink salmon throughout their range (Heard 1991). Although many causes for dominance have been proposed, no single factor satisfactorily explains the event. The northeastern Sakhalin pink salmon population is characterized by odd-year dominance with the dominant year run averaging ten times the size of the even-year run. The historical data indicate that this pattern has been prevalent for decades as this stock has varied from year-to-year around long term average numbers. Stock-recruitment patterns are also substantially different between the two cycles. The naturally-occurring pattern is independent of the fishery which exploits the subdominant years at a substantially reduced rate. Due to risks of disruption of long-term productivity patterns, it is neither realistic nor appropriate to attempt to increase spawning escapements in the subdominant years to the capacity of the spawning habitat.

The harvest strategy is periodically reviewed and improved as necessary – extensive changes in the strategies since 2008 providing for more local and responsive regulation are evidence to this effect. While the management system based on the same principles (i.e. control of spawning escapement) did not prevent depletion of the early pink run in the 1990s, substantial improvements in harvest strategies were subsequently implemented. These include increased local control and authority, increased funding of enforcement and decreased economic incentives for illegal harvest associated with an improving regional economy.

1.2.2 Harvest Control Rules & Tools		
There are well defined and effective harvest control rules in place.		
SG 60	**SG 80**	**SG 100**
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced

[20] *Additional escapement data are compiled by the management system and utilized for fishery regulation but have not been reported in a readily-accessible form. A condition requiring additional data collection and reporting of index stream escapement data for indicator 1.2.4 addresses this issue.*

rate as limit reference points are approached. There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	as limit reference points are approached. The selection of the harvest control rules takes into account the main uncertainties. Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	as limit reference points are approached. The design of the harvest control rules take into account a wide range of uncertainties. Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

Score: 75

Justification

Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as reference points are approached. These include time and area fishery closures based on real time escapement monitoring data in conjunction with other indicators of run strength and timing based on harvest and biological composition of the harvest. Catch per effort, fish size, and sex ratio are all utilized as indicators. The fishery is managed annually to regulate harvest consistent with escapement targets. While catch rates and harvest are monitored along with escapement during the course of the fishing season, this information typically triggers management action only at very large and very low numbers. Due to the passive nature of the trap net fishing gear, fishing effort and fishery power do not vary substantially in response to abundance such that unsustainably high exploitation rates occur under most conditions. Run reconstructions of the stock aggregate provide estimates of annual exploitation rates which are relatively conservative for an unenhanced pink salmon stock in relatively pristine spawning habitat and favorable ocean productivity conditions. The intensity of monitoring and regulation in the northeast region is less than in Aniva Bay but the scale is appropriate to needs of the fish runs and fisheries, particularly in the absence of significant returns of hatchery fish. In Aniva Bay, where hatchery enhancement results in very high exploitation rates in some areas, intensive daily management is required to access harvestable surpluses while also meeting escapement objectives. In contrast, a less intensive annual management strategy is employed in the Northeast Sakhalin Region because the fishery involves relatively modest exploitation rates in comparison with other fisheries throughout the north Pacific and Sakhalin regions including the heavily enhanced Aniva fishery. These lower exploitation rates provide an added measure of protection.

The selection of the harvest control rules takes into account the main uncertainties. These are primarily related to run strength and timing. While run forecasts are made based on brood year escapements and recent production patterns, recommended harvest levels based on these forecasts are utilized primarily as preseason planning tools. Once the fishing season begins, management to control exploitation rates is based on in-season data. Data is 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. Sakhalin in-season management utilizes indicators based on biological characteristics of the harvest to avoid this potential problem. Terminal fisheries in river mouths are also employed to

regulate upstream escapements to avoid overseeding spawning areas in the event of very large run sizes.

While harvest control rules take into account the main uncertainties, it remains unclear whether they encompass the wide range of concern for the sustainability of this fishery. Significant uncertainty regarding the among-population variation and substructure in portions of the region does not appear to be considered by the harvest control rules for the northeast district fisheries. For instance, escapement in several large systems including the Tym River (Nogliki District) and Langeri River (Smirnykh District) was not provided. It is unclear how effectively the smaller monitored systems are representative of stock substructure and numbers from these larger systems. However, this concern is tempered somewhat by the fact that larger systems in this area are likely to be more stable and productive for pink salmon than the smaller systems which are more prone to annual weather-related habitat limitations such as reduced flows and elevated stream temperatures during drought years.

Some questions remain regarding the effectiveness of the available tools in achieving the exploitation levels required under the harvest control rules across the full range of run sizes observed in these highly variable pink salmon stocks. Harvest and exploitation is regulated by the in-season management system employed in the northeast region pink salmon fishery. Average annual escapements are approximately 100% of capacity-based targets for monitored streams and escapements fluctuate around target levels in odd years of this odd-year cycle dominant pink salmon stock. The assessment team considers escapements of 50-100% of the capacity-based target identified by the management system as clearly within a range that avoids recruitment overfishing. However, it remains unclear whether escapements observed to fall under target levels in non-dominant even years and some odd years reflect limitations of the current harvest control years under certain conditions. Of particular concern is the use of river mouth nets or weirs and the planned increase in that fishing method in years and streams where escapement objectives are not met. It appears that a variable exploitation rate or escapement goal fishing strategy is employed but that has not been clearly articulated by the management system. In addition, empirical support for the escapement target of 2 fish/m^2 has not been made available and it is unclear whether this value represents a yield or capacity based objective or benchmark.

1.2.3 Information and Monitoring		
Relevant information is collected to support the harvest strategy.		
SG 60	**SG 80**	**SG 100**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,</u> and one or more indicators are available and monitored with sufficient	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available. <u>All information</u> required by the harvest control rule is

control rule. Some relevant information is available on the significance of fishery harvests on various stock components.	frequency to support the harvest control rule. There is good information on all other fishery removals from the stock. Information is sufficient to estimate the significance of fishery harvests on stock components.	monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty. A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.

Score: 70

Justification

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 and spawning distribution.

Stock abundance and fishery 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. Indicators include time and area spawning escapements, numbers entering index rivers as estimated in river mouth weirs, site-specific harvests and catch rates, and biological characteristics of the run.

Excellent information is collected on harvest in the commercial salmon fishery of the Northeast region. Changes in the management system over the previous decade have substantially improved the accuracy of catch reporting by removing incentives for inaccurate accounting to avoid taxes or remain within a designated allocation. General information is available on the significance of incidental harvest of pink salmon in the marine drift net fishery and its effects are implicitly included in production estimates based on estimates of juvenile and adult numbers. However, good information is not available on illegal unregulated harvest of pink salmon in freshwater streams. Multiple sources report a high incidence of illegal harvest but estimates of numbers and exploitation rates are not available. Risks to fishery sustainability are somewhat ameliorated by consistent achievement of spawning escapement goals. An assessment should include estimates the approximate scale of illegal harvest relative to the legal harvest and a description of a defensible rationale for estimation.

Some relevant information is available on the significance of fishery harvests on various stock components. However, information is not sufficient to estimate the significance of fishery harvests on population-level stock components which represent the diversity of the pink salmon stock within the northeast region. Information is available on the aggregate harvest in the region but not on key stock components represented by returns to different systems throughout the Northeast Sakhalin Region.

1.2.4 Assessment of Stock Status		
There is an adequate assessment of the stock status.		
SG 60	**SG 80**	**SG 100**

The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements. Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks. The assessment estimates stock status relative to reference points. The major sources of uncertainty are identified.	The stocks are well-defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements. Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of the other stocks they represent within the management unit to the extent that a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk). The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points. The assessment takes uncertainty into account. The stock assessment is subject to peer review.	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements. Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit. The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. The assessment has been internally and externally peer reviewed.

Score: 75

Justification

The stocks are well-defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements. Pink

salmon harvested in NE fisheries are almost entirely comprised of local populations returning to area streams and only the Okhotsk sea middle run component is present. Assessments are based on a combination of time and area-specific estimates of spawning escapement; size and sex structure; downstream migration of juveniles; and harvest and catch rate patterns.

Assessments are based on indicator populations rather than indicator stocks. These include multiple pink salmon production areas in the region. However, escapement data are limited for several of the larger pink salmon producing systems in the region including the Tym and (Nogliki District) and Langery (Smirnykh District) rivers. It is unclear whether the monitored systems are representative of the diversity and status of the larger systems which account for a significant portion of the harvest. It is also noteworthy that hatchery production of pinks in this region is limited to the Tym system for which wild escapement data is unavailable. The concern is that much of the fishery in this region is driven by production from the large systems but assessment data is based on the smaller systems and it is unknown how representative the index populations are of the whole. Information is lacking on the coherence between the status of the indicator populations and the status of populations in the larger river systems. Assessments also include a historical run reconstruction of the aggregate pink salmon stock a reported by Kaev and Geraschenko (2008). This assessment provides a basis for estimates of total production, survival and exploitation rates.

The distinction between “stocks” and “populations” is essential to this indicator. The stock is northeast Sakhalin pink salmon which includes a number of populations returning to different rivers within the region. The genetic and life history characteristics of these populations are very similar with no obvious distinctions among populations. In addition, pink salmon, particularly those returning to smaller systems, are reported to stray regularly among proximate systems to the point where significant genetic differences cannot be distinguished. The northeast region stock structure is much different than in other areas such as Aniva Bay where pink salmon include an early-run stock that utilizes the sea of Japan and a later-timed stock which utilizes the sea of Okhotsk and North Pacific ocean.

The northeast region pink salmon stock is clearly defined and there are no indicator stocks – it is all one stock. Therefore, this fishery clearly meets the 60 scoring guidepost for this indicator. However, there is anecdotal information for pink salmon on Sakhalin that the larger river systems may support more diverse populations utilizing different areas at different times. This assessment has identified the need for additional information on covariation in abundance of the single northeastern Sakhalin pink salmon stock at the population scale. There is clearly a high degree of covariation in abundance of pink salmon returning to indexed and unindexed streams such that index streams provide stock assessment information appropriate for the harvest control rule at current levels of exploitation. It is also likely that the productivity of the larger systems is greater than that of the smaller indexed streams such that the index streams provide a more precautionary estimate of annual run strength. However, population-scale information is currently inadequate to corroborate these conclusions and the condition for this indicator identifies the need for additional monitoring and evaluation.

The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points. Harvest is controlled in-season based on real-time data on spawning escapement as well as numbers and characteristics of fish entering the fishery. Spawning escapement goals are established for each population based on stream-specific habitat availability and optimum spawner numbers per unit area.

The major sources of uncertainty are identified but uncertainty is not fully taken into account with respect to the characteristics and status of populations in the larger rivers, the degree of correlation between numbers in monitored and unmonitored systems, and difference in productivity patterns of the even and odd-year returns of this cycle dominant stock. In particular, it is unclear how the available stock status information is interpreted for even and odd year returns with respect to management of escapement.

The stock assessment is subject to extensive peer review within the management system. Assessment information is collected and exchanged by local agency staff from both SakNiro and SakhRybvod. SakhNIRO scientists regularly review and improve assessment methodologies and results which are subject to additional review by the regional scientific institute (VNIRO). Stock assessment results are regularly published in the technical scientific literature (e.g. Kaev and Geraschenko 2008; Temnykh et al. 2010; Kaev 2011).

1.3.1 Enhancement Outcomes		
Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy.		
SG 60	**SG 80**	**SG 100**
It is likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity of wild stocks based on reasonable estimates of likely proportions of hatchery-origin fish in the natural spawning escapement. It is likely that hatchery-origin spawners occur in a small proportion of the natural spawning populations/locations and that they represent a small fraction of the total natural spawning escapement. 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.	It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity of wild stocks, based on appropriate levels of marking and monitoring to reliably estimate proportions of hatchery-origin fish in the natural spawning escapement. It is highly likely that hatchery-origin spawners occur in a small proportion of the natural spawning populations/locations and that they represent a small proportion of the total natural spawning escapement for individual spawning populations. Enhancement activities are not used as a stock rebuilding strategy.	There is a high degree of certainty that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity of wild stocks, based on appropriate levels of marking and monitoring to reliably estimate proportions of hatchery origin fish in the natural spawning escapement. There are no salmon enhancement programs within expected straying distances of the natural spawning areas, which periodic monitoring has verified. Enhancement activities are not used as a stock rebuilding strategy.

Score: 80

Justification

It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity of wild stocks in the Nogliki

and Smirnykh areas of northeast Sakhalin. It is highly likely that hatchery-origin spawners occur in a small proportion of the natural spawning populations/locations and that they represent a small proportion of the total natural spawning escapement for individual spawning populations. Enhancement of pink salmon in the northeast region is very small in scale and occurs in only one facility of the Nogliki region. Production also occurs on a tributary (Pilenga River) where returns can be localized and managed separately from returns of the larger the Tym River. Local scientists believe that the larger size and longer freshwater migration distance for pink salmon in larger systems like the Tym River help increase the strength of juvenile imprinting and subsequent homing of adults to specific areas.

At the same time, specific marking and monitoring programs sufficient to estimate proportions of hatchery-origin fish in the natural spawning escapement are not in place. Thus we cannot determine with a high degree of certainty that the enhancement activities do not have significant localized effects in some areas of natural spawning escapement.

Enhancement activities are not used as a stock rebuilding strategy. The stock of pink salmon is not depleted in the northeast region of Sakhalin.

1.3.2 Enhancement Management		
Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status.		
SG 60	**SG 80**	**SG 100**
Practices and protocols are in place and considered likely to protect wild stocks from significant detrimental impacts of enhancement, based on plausible argument.	There is a strategy in place and confidence that the strategy will protect wild stocks from significant detrimental impacts of enhancement, based on evidence that the strategy is effectively achieving the outcome metrics used to define these minimum impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).	There is a comprehensive strategy in place and clear evidence for successful protection of wild stocks from significant detrimental impacts of enhancement.

Score: 80

Justification

Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status. In this region, wild stocks are protected from enhancement impacts by the fact that hatchery production of pink salmon is practically negligible. See section 4.5 for a detailed explanation of enhancement management consistent with the scoring for this indicator. Practices and protocols are in place and considered likely to provide some level of protection wild stocks from significant detrimental impacts of enhancement, based on plausible argument. These include hatchery conditions and practices designed to emulate natural conditions so as to avoid artificial selection or domestication. Hatchery practices in conjunction with the overarching effect of limited hatchery production in this region combine to ensure that wild stocks are protected from significant detrimental impacts of enhancement. However, a comprehensive strategy for

continuing to limit salmon enhancement in this region and to effectively monitor hatchery impacts does not appear to be in place.

1.3.3 Enhancement Information		
Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status.		
SG 60	**SG 80**	**SG 100**
Some relevant information is available on the contribution of enhanced fish to the harvest and escapement of the wild stock. The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and escapement of the wild stock. The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and escapement of the wild stock. The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.

Score: 90

Justification

Sufficient relevant information is available on the contribution of enhanced fish to the harvest and escapement of the wild stock. Total production of hatchery and wild fish has been estimated and hatchery fish have been found to comprise a negligible fraction of the total pink salmon return to this region. Hatchery marking and mark sampling in natural production areas has not been implemented but the scale of hatchery production is so limited that hatchery effects can be confidently assessed without this information. However, hatchery marking and mark sampling would be a necessary component of a comprehensive assessment of the contribution of enhanced fish to the harvest and escapement of the wild stock in the river system where the current hatchery program is in operation in the event that hatchery production increases significantly from historical levels.

Estimates of the impacts of enhancement activities on the aggregate wild stock status, productivity and diversity have been completed for this region (Kaev and Geraschenko 2008). This level of assessment is appropriate to the limited scale of hatchery production in this region. Current hatchery production is limited to the Tym River, which is the largest river in the region. While annual escapement is not estimated for this river, pink salmon spawning capacity has been estimated at 3.7 million which is approximately 40% of the total production capacity of the region. Based on escapement patterns in other local systems and Kaev and Geraschenko's (2008) aggregate run reconstruction, it is likely that annual escapement to the Tym River during the dominant brood year cycle numbers a million or more pink salmon. In contrast, hatchery production of juveniles is typically less than one million per year which at an average survival rate of 3% would produce just 30,000 adults. It should be noted, however, that hatchery production appears to have increased in recent years and is concentrated in the subdominant even years where contributions may be substantially greater. This issue is effectively addressed by conditions identified under

Indicator 1.2.4 requiring additional monitoring of natural escapement in the Tym River and an assessment of the implications of even and odd-year run escapement patterns.

6.1.3 Principle II – Ecosystem

The pink salmon fisheries in the Northeast region of Sakhalin Island meets all 60 scoring guideposts and exceeds a minimum weighed score of 80 for Principle II. Several indicators were scored between 60 and 80, which necessitated identification of conditions for continuing certification.

	Criteria @ 60				Criteria @ 80					Criteria @ 100						
Indicator	1	2	3	4	1	2	3	4	5	1	2	3	4	5	6	Score
2.1.1 Retained Species - Outcome	1	1			0											60
2.1.2 Retained Species - Management	1	1			1	1	1			0	0	0	0			80
2.1.3 Retained Species - Information	1	1	1		1	1	1	0								75
2.2.1 Bycatch Species - Outcome	1	1			1					0						80
2.2.2 Bycatch Species - Management	1	1			1	1	1			1	1	0				95
2.2.3 Bycatch Species - Information	1	1	1		1	1	1	1								80
2.3.1 ETP Species - Outcome	1	1			1	1	1			0	0					80
2.3.2 ETP Species - Management	1	1			1	1	1			0	0	0				80
2.3.3 ETP Species - Information	1	1	1		1	0										70
2.4.1 Habitats - Outcome	1	1			1	1				1	0					90
2.4.2 Habitat - Management	1	1			1	1	1			0	0	0				80
2.4.3 Habitats - Information	1	1			1	1	1			1	0	0				85
2.5.1 Ecosystem - Outcome	1	1			1	1				0	1					90
2.5.2 Ecosystem - Management	1	1			1	1	1	1		0	1	0	0	0		85
2.5.3 Ecosystem - Information	1	1			1	1	1	1	1	0	0	0	0	0		80
															Net	80.7

2.1.1 Retained Species – Outcome		
The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.		
SG 60	**SG 80**	**SG 100**
Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.	Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points.

Score: 60

Justification

The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species. Other retained species in the commercial pink salmon fisheries primarily include chum salmon with very small numbers of other salmon, flatfish, and char. Chum salmon are considered a "main" species according to

MSC guidelines. No other species comprises the 5-20% of the total catch or is considered valuable or vulnerable that would categorize it as a main retained species for the purposes of this assessment. Thus the fisheries in the Northeast Sakhalin regions satisfies outcome guideposts at the 80 scoring level.

Chum salmon are reportedly depressed in all areas primarily as a result of historical illegal harvests. Thus chum salmon are neither within biologically based limits or fluctuating around their target reference points which are defined by annual spawning escapement objectives. Chum salmon exploitation rates in the pink salmon target fishery are limited by differences in run timing. The majority of the chum salmon return occurs in fall after the pink salmon time frame. Only a portion of the chum salmon return is vulnerable to harvest in the pink salmon fishery at the tail end of the pink season. A fishery management strategy of late season closures is at least partially effective in limiting impacts to chum salmon which might be sufficient to hinder recovery and rebuilding. However, exploitation rates on chum salmon in the pink salmon fishery time frame are not reported. Substantial exploitation rates of pink salmon in some areas leave open the possibility that chum salmon harvest rates might be meaningful. In addition, summer run chum salmon, whose timing overlaps that of pink salmon, are reportedly present in some large rivers such as the Tym. On average, bycatch of chum might be somewhat small (most are fall run) but harvest rates of the most vulnerable summer chum salmon are not available.

Based on the available information, it cannot be concluded that the fishery strategy for pink salmon is demonstrably effective in not hindering recovery and rebuilding of chum salmon.

2.1.2 Retained Species – Management		
There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.		
SG 60	**SG 80**	**SG 100**
There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. There is some evidence that the partial strategy is being implemented successfully.	There is a strategy in place for managing retained species. The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its overall objective.

Score: 80

Justification

There is a partial strategy in place for managing chum salmon which is the only main retained species. The strategy involves completion of the pink salmon commercial fishery prior to the time frame when a majority of the chum salmon return. However, testing has not confirmed that this strategy by itself is adequate to restore depleted chum salmon populations in this region.

There is some objective basis for confidence that the strategy has substantially reduced fishery exploitation rates on chum salmon to the point where the fishery does not hinder their recovery and rebuilding at such time as other factors contributed to depletion are effectively addressed.. However, these fishery restrictions by themselves have not led to chum salmon escapements meeting escapement objectives in all areas, apparently due to habitat limitations and illegal harvest in freshwater. It is unclear if intensive fisheries toward the end of the pink salmon run, including those occurring in river mouths, continue to have significant impacts on some local chum populations.

Estimates of chum salmon harvest relative to total production in the region provide some evidence that the partial strategy has reduced total commercial fishery exploitation of chum salmon as expected with the reduction in chum target fisheries in the period after the pink salmon run. However, pink salmon fisheries do not appear to be managed based on in-season indicators of chum salmon escapement relative to objectives. It is also unclear if additional fishery restrictions in some areas during the latter part of the pink salmon run might be more effective in achieving chum salmon escapement objectives.

2.1.3 Retained Species – Information		
Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.		
SG 60	**SG 80**	**SG 100**
Qualitative information is available on the amount of main retained species taken by the fishery. Information is adequate to qualitatively assess outcome status with respect to biologically based limits. Information is adequate to support measures to manage main retained species.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main retained species. Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.

Score: 75

Justification

Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. Quantitative data are collected on the harvest and escapement of chum salmon which is the primary retained species. Any significant retention of other species, including flatfish and char, for the purposes of commercial sales is also quantified and reported to the management system although this information has not been made available to this assessment. While information on retained species that are sold is reportedly collected, data on species retained for personal use may not be recorded.

Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits which for chum salmon are measured based on escapement objectives. However, quantitative estimates of chum salmon exploitation rates during the pink salmon fishery timeframe are not available.

The catch and escapement data are adequate to support the management strategy for chum salmon during the pink salmon fishery timeframe. The accuracy of harvest data for chum salmon has been considerably improved by changes in regulation which have removed historical incentives for under-reporting harvest of bycatch species.

Sufficient data continue to be collected to detect any increase in the risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy) for chum salmon. However, monitoring of retained species is not conducted in sufficient detail to assess ongoing mortalities to other significant retained species (e.g. cherry salmon, coho salmon, char) such that increasing risk levels can be detected.

2.2.1 Bycatch Species – Outcome		
The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.		
SG 60	**SG 80**	**SG 100**
Main bycatch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery.	Main bycatch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that bycatch species are within biologically based limits.

Score: 80

Justification

Bycatch comprises a very small proportion of the total harvest in the commercial pink salmon fishery. Common bycatch species include flatfish, far eastern dace, sculpins, codfish, smelt, and crab. Results of bycatch and retained species monitoring efforts were summarized in section 4.6. Bycatch levels in this fishery are very small in comparison with those commonly observed in marine fisheries for other species (see section 4.6.2 for

additional explanation. The large majority of the non-retained bycatch is released alive. No non-retained bycatch species comprises anywhere near 5% of the total catch. None are valuable or vulnerable. Crabs are sometimes retained for personal use but catches of crab is very low as this species is not particularly vulnerable to the fishing method. Incidental impacts of this fishery on crabs species is negligible based on reported catch levels in section 4.6. Thus all bycatch species are considered to be minor species. No species is categorized as a main bycatch species for the purposes of this assessment. Thus fishery in the Northeast Sakhalin districts satisfies outcome guideposts at the 80 scoring level.

Species-specific biologically-based limits have not been established for bycatch species because exploitation rates in the salmon fishery are deemed to be so low as to constitute no significant impact on the status of these lightly or unexploited species. The bycatch species have no commercial value and are widespread in the region. Therefore, it is likely that the bycatch species are within biologically-based limits. However, bycatch does include some species such as crab that are not currently within biologically based limits. Local crab species are depleted due to historical overfishing. Crab retention is prohibited in the salmon trap net fishery although some illegal retention for personal use undoubtedly occurs. However, the net effect of crab bycatch in the salmon fishery does not appear to constitute a significant risk to the status of crab populations due to the low incidence of harvest.

2.2.2 Bycatch species – Management		
There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations.		
SG 60	**SG 80**	**SG 100**
There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. There is some evidence that the partial strategy is being implemented successfully.	There is a strategy in place for managing and minimizing bycatch. The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.

Score: 95

Justification

The bycatch strategy consists of effectively managing and minimizing bycatch in the commercial pink salmon fishery by use of fixed trap nets with some use of river mouth

weirs, which are very effective in passively capturing salmon during spawning migrations while also avoiding significant catches of other non-migratory local fish species.

The very low incidence of observed bycatch, based on information directly about the fishery and/or the species involved, provides a strong objective basis that this strategy is effective. The strategy is mainly based on information directly about the fishery and/or species involved, and testing through bycatch monitoring supports high confidence that the strategy is working.

There is clear evidence that the fishing strategy is being implemented successfully to harvest pink salmon with minimal bycatch of other species, as the trap nets and weirs inherently have low bycatch rates and allow for live releases of some bycatch species.

However, independent evidence that bycatch has not significantly affected bycatch populations has not been verified with independent assessments of the status of bycatch species, except in a few cases (e.g., crabs), so does not reach the 100 score.

2.2.3 Bycatch Species – Information		
Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch.		
SG 60	**SG 80**	**SG 100**
Qualitative information is available on the amount of main bycatch species affected by the fishery. Information is adequate to broadly understand outcome status with respect to biologically based limits. Information is adequate to support measures to manage bycatch.	Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main bycatch species. Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations. Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.

Score: 80

Justification

Qualitative information and some quantitative information are available on the amount of minor bycatch species affected by the fishery. This information was collected in a dedicated subsampling program conducted for the fishery in 2010. A more intensive monitoring program was implemented in 2011 collecting quantitative information on retained bycatch

in a subsample of the fishery (Table 11). Unretained bycatch was not quantified but was substantially less than the retained species. Results were consistent with findings of more detailed bycatch monitoring efforts for similar coastal trapnet fisheries in the Kurile Islands and Kamchatka. These passive trapnets fished in the nearshore coastal zone during the limited period of the pink salmon return do not take a significant amount of bycatch.

This information showing low amounts of bycatch was sufficient to estimate outcome status and to demonstrate that the level of bycatch is not likely to approach any meaningful biologically based limits, but not with a high degree of certainty.

Information is adequate to support a partial strategy to manage main bycatch species by minimizing bycatch in salmon fisheries by employing a highly effective and selective fixed trap net gear. However, information is not adequate to support a comprehensive strategy to manage bycatch with a high degree of certainty based on specific bycatch limitation objectives.

Assuring that the salmon fishery uses only low bycatch gears through regulations and ongoing monitoring and enforcement demonstrates that the risk to the bycatch species is unlikely to change.

2.3.1 ETP Species – Outcome		
The fishery meets national and international requirements for protection of ETP species. The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.		
SG 60	**SG 80**	**SG 100**
Known effects of the fishery are <u>likely</u> to be within limits of national and international requirements for protection of ETP species. Known direct effects of the fishery including its enhancement activities are <u>unlikely</u> to create <u>unacceptable impacts</u> to ETP species.	The effects of the fishery are known and are <u>highly likely</u> to be within limits of national and international requirements for protection of ETP species. Direct effects of the fishery including its enhancement activities are highly unlikely to create <u>unacceptable impacts</u> to ETP species. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. There is a <u>high degree of confidence</u> that there are <u>no significant detrimental effects (direct and indirect)</u> of the fishery including its enhancement activities on ETP species.

Score: 80

<u>Justification</u>

For the purposes of this assessment, endangered, threatened, or protected species are those that are recognized by national legislation and/or binding international agreements (e.g. CITES) to which jurisdictions controlling the fishery under assessment are party. Protected fish species occasionally intercepted by the Sakhalin pink salmon commercial fishery include Sakhalin taimen, and two species of sturgeon, all of which are included in the Russian Red Book of endangered species as well as the IUCN red-list. Sturgeon species are also addressed by the Convention for International Trade of Endangered Species (CITES).

Harbor seals are also listed in the Red Book of Russia and therefore receive protections by law.

The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Taimen and sturgeon are occasionally caught in the commercial pink salmon fisheries but the incidence of capture is reported rare and current fishery exploitations are assumed to be quite low due to temporal and spatial differences between fisheries and the seasonal distribution of these species. No taimen catch was documented in retained catch or bycatch samples of the fishery in 2010 and 2011 summarized in section 4.6 of this report. Taimen stock status on Sakhalin Island is documented in Semenchenko and Zolotukin (2011). Taimen spawning migrations into fresh water occur during spring well prior to the pink salmon fishery time frame. It must be noted, however, that even a very low incidence of taimen occurrence in fishing nets could pose a concern where taimen are at critical low abundance levels. This incidental impact on taimen would be a greater concern in Northeast Sakhalin if the fishery consisted of a substantially greater number of fishing nets and if the local taimen populations were not among the most common in this region. Sturgeon encounters by the fishery are very rare. The incidence is so low that it cannot be reasonably estimated with any reasonable bycatch monitoring program. Sturgeon are not particularly vulnerable to the fishing method or subject to mortality if caught. This species is particularly conspicuous and any that might enter the fishing traps are released alive. The incidental impact on sturgeon would be of greater concern if the fishery occurred in closer proximity to large mainland rivers where this species originates. Thus this fishery indicator satisfies the indicator guideposts for a score of 80 but does not satisfy the 100 scoring guideposts.

Due to the low reported incidence of harvest of these species, direct fishery effects of the fishery are highly unlikely to create unacceptable impacts to these ETP species.

Similarly, no significant indirect effects of fisheries have been identified which might pose unacceptable risk to these species.

While existing information is adequate to make a qualitative determination regarding effectiveness of the commercial fishery strategy in minimizing mortality of taimen, some level of uncertainty remains due to a lack of detailed quantitative information on taimen harvest and status.

2.3.2 ETP Species – Management		
The fishery has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; - ensure the fishery does not hinder recovery of ETP species; and - minimize mortality of ETP species.		
SG 60	**SG 80**	**SG 100**
There are measures in place that minimize mortality due to the fishery and its enhancement activities, and are expected to be highly likely to achieve national and	There is a strategy in place for managing the impact due to the fishery and its enhancement activities on ETP species, including measures to minimize mortality that is designed to be highly likely to	There is a comprehensive strategy in place for managing the impact due to fishery and enhancement activities on ETP species, including measures to minimize mortality that is designed to achieve above national and international requirements for the protection of

international requirements for the protection of ETP species. The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	achieve national and international requirements for the protection of ETP species. There is an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved. There is evidence that the strategy is being implemented successfully.	ETP species. The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.

Score: 80

Justification

There is a strategy in place for managing the impact due to the fishery and its enhancement activities on ETP species, including measures to minimize mortality that is designed to be highly likely to achieve national and international requirements for the protection of ETP species. The strategy involves times and areas where ETP species are uncommon and a ban on retention of these species. However, while fishery impacts are estimated to be very low, a comprehensive fishery management strategy designed to avoid ETP impacts has not been implemented.

Observations of a low incidence of ETP catch in the fishery provide an objective basis for confidence that the fishery strategy based on qualitative information directly about the fishery and/or the species involved. However, information on the distribution and abundance of taimen in particular does not allow for a quantitative analysis sufficient to support high confidence that the strategy is effective.

The available information on catch and biology of taimen and sturgeon provides evidence that the strategy is being implemented successfully. The incidence of taimen catch in the pink salmon fishery is reportedly very low. The northeast Sakhalin populations of taimen are among the most significant in the region. Other factors, including illegal harvest in freshwater, are believed to be the primary contributors to the depletion of this species in this region. However, clear evidence is lacking on the contribution of the fishery strategy to objectives for conservation and recovery for taimen. **A definitive assessment is precluded by the lack of quantitative information on taimen status. Questions remain regarding whether the low incidence of taimen catch in the fishery is due to low exploitation rate or low abundance.**

2.3.3 ETP Species – Information		
Relevant information is collected to support the management of fishery impacts on ETP species, including: - information for the development of the management strategy; - information to assess the effectiveness of the management strategy; and - information to determine the outcome status of ETP species.		
SG 60	**SG 80**	**SG 100**

Information is adequate to broadly understand the impact of the fishery and its enhancement activities on ETP species. Information is adequate to support measures to manage the impacts on ETP species Information is sufficient to qualitatively estimate the fishery and enhancement activities related mortality of ETP species.	Information is sufficient to determine whether the fishery and enhancement activities may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts. Sufficient data are available to allow fishery and enhancement activities related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage impacts from both the fishery and enhancement activities, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. Accurate and verifiable information is available on the magnitude of all impacts from the fishery and enhancement activities, mortalities and injuries and the consequences for the status of ETP species.

Score: 70

Justification

Information on the incidence of catch of taimen and sturgeon in the fishery is adequate to broadly understand the impact of the fishery on these ETP species. This information is generally sufficient to determine that the fishery does not constitute the primary threat to protection and recovery of the ETP species. Information is adequate to support current measures to manage the impacts on ETP species based on prohibition of retention and fishing during times and areas where taimen and sturgeon are uncommon. Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.

However, data are not sufficient for the impact of fishing to be quantitatively estimated for taimen. Even though reported catches of ETP species occur, there is no special monitoring of them. Occasional monitoring occurs from observers from research institutes and fisheries inspection. Documentation of the catch is limited to historical records from commercial sales prior to implementation of conservation regulations, and limited data from independent observations reported previously in this assessment. Information on the distribution and abundance of Sakhalin taimen in the fishery areas is simply inadequate to complete such an assessment.

2.4.1 Habitats – Outcome		
The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.		
SG 60	**SG 80**	**SG 100**
The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where

irreversible harm. The enhancement activities are likely to have minimal impact on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (such as physical features, spawning and rearing flows and water temperatures).	serious or irreversible harm. The enhancement activities are highly likely to have minimal impact on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (such as physical features, spawning and rearing flows and water temperatures).	there would be serious or irreversible harm. There is evidence that the enhancement activities are highly likely to have minimal impact on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (such as physical features, spawning and rearing flows and water temperatures).

Score: 90

Justification

There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Trap nets and related operations have been observed to cause no significant habitat impacts. Mostly, the fishery uses stationary nets. These are net wings of up to 1500-2000 m length set up perpendicularly to the sea coastline. The only conceivable effects would involve highly localized and temporary disturbances of the substrate due to net anchors or possibly occasional movement of weighed lead lines. Any related damage to the bottom communities is minor and local. Beach seines can impact the bottom, but this damage is considered minor because beach seines are generally restricted to a small location at the same locations. The intensity of impact is not large because beach seines are supplied with not-heavy sinkers to prevent catch of various things from bottom (trunks etc.). Moreover, salmon are caught not from bottom, but rather near surface.

Enhancement activities are highly likely to have minimal impact on water quality, and quality of stream habitat (such as physical features, spawning and rearing flows and water temperatures). However, the available evidence is such that we cannot preclude the possibility of impacts of enhancement activities on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (spawning and rearing flows and water temperatures) in every case.

2.4.2 Habitats – Management		
There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.		
SG 60	**SG 80**	**SG 100**
There are measures in place for managing the impact of the fishery and enhancement activities on habitat types, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. The measures are	There is a partial strategy in place for managing the impact of the fishery and enhancement activities on habitat types, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. There is some objective basis	There is a strategy in place for managing the impact of the fishery and enhancement activities on habitat types. The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.

considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved. There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.

Score: 80

Justification

There is a partial strategy in place for managing the impact of the fishery and enhancement activities on habitat types, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. The fishing strategy involves use of passive trap net gear which has no significant physical habitat effects. The limited development of hatchery facilities in the northeast Sakhalin region is an effective strategy for avoiding related habitat impacts.

The limited scale of fishery and enhancement relative to the available habitat provides an objective basis for confidence that the partial strategy will work and is being implemented successfully. However, it remains unclear whether enhancement strategies include a comprehensive strategy for managing habitat related impacts. Testing and evaluations of enhancement activity effects on fish habitat have not been explicitly identified. Additional evaluations of hatchery effects on water quality and effects of hatchery weir operation on access to natural spawning areas will be appropriate in the event of expansion of salmon enhancement activities in this region.

2.4.3 Habitats – Information		
Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.		
SG 60	**SG 80**	**SG 100**
There is a basic understanding of the types and distribution of main habitats in the area of the fishery. Information is adequate to broadly understand the main impacts of gear use and enhancement activities on the main habitats, including spatial extent of interaction.	The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. Sufficient data are available to allow the nature of the impacts of the fishery and enhancement activities on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear. Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. Changes in habitat distributions over time are measured. The physical impacts of the gear and enhancement activities on the habitat types have been quantified fully.

	measures).	

Score: 85

Justification

The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. The fishery is not conducted in habitat areas vulnerable to impact from the operation of the fishing gear. Fixed trap nets are placed primarily on smooth bottom areas in intertidal and subtidal littoral zones with sand, gravel, or cobble substrates. Any associated disturbance of benthic structure or communities is localized and temporary.

Sufficient data are available to allow the nature of the impacts of the fishery and enhancement activities on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear. Changes in habitat distributions over time are not measured although habitat is relatively homogenous through the fishing area and fishery impacts are very small relative to normal effects including ice and storm impacts.

Information is sufficient to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures); an increase in risk would result from a change in fishing gear, which is closely controlled. While the physical impacts of enhancement activities on the habitat types have not been specifically quantified, the scale of impact is negligible given the limited scope of hatchery production in this region.

2.5.1 Ecosystem – Outcome		
The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.		
SG 60	**SG 80**	**SG 100**
The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. Enhanced fish are likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. Enhanced fish are highly likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. There is evidence that the enhancement activities are highly likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission.

Score: 90

Justification

The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. These ecosystem

components are separate from retained, bycatch, and ETP species considerations already addressed by specific indicators. Potential ecosystem concerns related to fishing might involve effects of changes in salmon abundance on ecosystem structure, trophic relationships, and biodiversity. For instance, decreases in salmon abundance due to fishing might favor prey species of salmon and harm predator species of salmon. However, the Sakhalin fishery has complex short and long term effects on pink salmon abundance. Salmon fishery management to provide escapements consistent with maximum sustained yield generally increases average abundance in the ocean and return relative to what can be expected in an unmanaged system. Conversely, high exploitation rates and management for optimum rather than equilibrium escapements will substantially reduce the average number of fish escaping to freshwater. Effects of salmon abundance on ecosystem productivity in the ocean have been the subject of extensive research over the last 20 years and the scientific literature generally suggests that high abundance of salmon on the high seas due to the net effects of fishery management and hatchery enhancement throughout the north Pacific Rim has is related to ecosystem changes. However, the contribution from any specific area, including Sakhalin Island, to total salmon abundance in the ocean is relatively small. Effects of salmon abundance on ecosystem productivity in freshwater have also been well documented in other systems. Larger escapements provide more food for salmon predators such as bears and eagles and also more marine derived nutrients to support primary and secondary productivity. However, while fishery management may affect abundance, it also reduces the variability in abundance relative to what can be expected in an unmanaged system, thus providing a more stable resource and avoiding catastrophic extremes. On balance these effects are not expected to result in serious or irreversible harm to any other component of the ecosystem.

The current scale of enhanced fish is likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission. While large numbers of hatchery fish are produced in some regions, wild production continues to exceed that of the hatcheries. In the northeast region, hatchery fish comprise just 2% or less of the total production based on data from Kaev et al. (2008). While some level of interaction between hatchery and wild fish is likely to occur, significant negative impacts are not evident. Fishery managers and scientists have concluded that no adverse ecosystem impacts of hatchery production occur but this conclusion is based on qualitative rather than quantitative assessments. The low level of hatchery production in the Northeast region supports this conclusion.

2.5.2 Ecosystem – Management		
There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
SG 60	**SG 80**	**SG 100**
There are measures in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem. There is an established artificial production strategy in place, if necessary, that is	There is a partial strategy in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. There is a tested and	There is a strategy that consists of a plan, containing measures to address all main impacts of the fishery on the ecosystem and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components

expected to achieve the SG 60 outcome as a minimum performance requirement. The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).	evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that the strategy is effective in achieving theSG80 outcome. The partial strategy is considered likely to work, based on plausible argument (eg, general experience, theory or comparison with similar fisheries/ ecosystems). There is some evidence that the measures comprising the partial strategy are being implemented successfully.	and elements of the ecosystem. There is a comprehensive and fully evaluated artificial production strategy, if necessary, to verify with certainty that the SG 100 outcomes are being achieved This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery and its enhancement activities do not cause serious or irreversible harm. The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. There is evidence that the measures are being implemented successfully.

Score: 85

Justification

There is a partial strategy in place that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. The strategy includes spawning escapement targets that factor in ecosystem needs. This strategy also involves significant monitoring and research of ecosystem components at a regional scale. However, it is not apparent that the strategy involves a specific plan containing measures to address all main impacts of the fishery on the ecosystem, nor that all functional relationships between the fishery and the components and elements of the ecosystem are well understood.

There is an established artificial production strategy that the strategy in place that is expected to achieve the SG100 outcome. This strategy involves extremely limited hatchery production in the northeast Sakhalin, which ensures that related ecosystem concerns are moot. Current plans by the management system call for a substantial increase in hatchery production in the Sakhalin-Kuril area but the large majority of the additional facilities are planned for areas outside of the northeast region covered by this assessment. It is also likely that not all hatchery development plans will be implemented. Additional hatchery construction in the Northeast Region would warrant reconsideration of this assessment.

The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems). Salmon populations are inherently dynamic with large interannual variation on run sizes due to normal environmental variation in abundance. Related ecosystems are affected by these same dynamic conditions. Management of fisheries to provide significant spawning escapements ensures future production of salmon to fuel future fisheries while also providing fish and marine derived nutrients critical to sustaining freshwater and nearshore marine ecosystems.

There is some evidence that the measures comprising the partial strategy are being implemented successfully. Qualitative information and observations readily indicate that stream and nearshore ecosystems throughout northeast Sakhalin Island are relatively intact, diverse, and productive.

2.5.3 Ecosystem – Information		
There is adequate knowledge of the impacts of the fishery on the ecosystem.		
SG 60	**SG 80**	**SG 100**
Information is adequate to identify the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity). Main impacts of the fishery and enhancement activities on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Information is adequate to broadly understand the functions of the key elements of the ecosystem. Main impacts of the fishery and enhancement activities on these key ecosystem elements can be inferred from existing information, but may not have been investigated in detail. The main functions of the Components (i.e. Target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. Sufficient information is available on the impacts of the fishery and enhancement activities on these Components to allow some of the main consequences for the ecosystem to be inferred. Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is adequate to broadly understand the key elements of the ecosystem. Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. The impacts of the fishery and enhancement activities on Target, Bycatch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are understood. Sufficient information is available on the impacts of the fishery and enhancement activities on the Components and elements to allow the main consequences for the ecosystem to be inferred. Information is sufficient to support the development of strategies to manage ecosystem impacts.

Score: 80

Justification

Information is adequate to broadly understand the functions of the key elements of the ecosystem. The salmon life cycle encompasses a vast ecosystem including natal rivers and lakes, the nearshore ocean, and the high seas of the North Pacific Ocean. Key ecosystem elements include trophic structure and function (in particular key prey, predators, and competitors), community composition, productivity pattern (e.g. upwelling or spring bloom, abyssal, etc.), and characteristics of biodiversity.

Main impacts of the fishery and enhancement activities on these key ecosystem elements can be inferred from existing information, but may not have been investigated in detail specifically for Sakhalin Island. Marine-derived nutrients from salmon carcasses can have a significant impact on freshwater communities as well as those communities in the freshwater to terrestrial interface. The relationships between salmon play and the population dynamics of their terrestrial predators has been well documented in other systems. It has been reported that these nutrients also form a base for rich development of zooplankton in coastal area, which serves a food for young salmon just after downstream migration.

The main functions of the components (i.e. Target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. It is clear that salmon influence the food webs in the North Pacific although the effect varies widely between systems and is dependent on many factors like timing, scale and alternative nutrient sources, etc. 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).

Sufficient information is available on the impacts of the fishery and enhancement activities on these Components to allow some of the main consequences for the ecosystem to be inferred. Active fishery management might help stabilize returns by avoiding excessively large escapements which can depress future returns under some conditions. Enhancement with hatcheries can substantially increase salmon numbers in certain times and areas although hatchery contributions to Sakhalin pink salmon runs remain uncertain. Enhancement of Pacific salmon across the Pacific Rim since the 1970s has resulted in very large abundance in the North Pacific Ocean. There is some evidence that high salmon abundances in the ocean might adversely affect wild salmon through competition.

Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). 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. Based on this work, the Russian management system has generally concluded that there is no capacity limitation based on oceanographic data which indicates that pink salmon utilize only 20% of the plankton in the ocean (Shuntov and Temnykh 2004; Shuntov et al. 2010).

Of particular concern to salmon fishery management throughout the North Pacific Region including Sakhalin Island are the effects of ocean environmental conditions on stock productivity. Short term and long term variability in these conditions is now understood to be strongly related to patterns of ocean productivity. Ocean productivity regimes have been observed shift periodically to more or less favorable conditions. The region is currently in a very productive ocean regime for many northern salmon stocks including Sakhalin pink salmon. These patterns and their effects are generally understood but future patterns are cannot be forecast. Thus salmon productivity and sustainability would be negatively affected by a shift to a less favorable regime. It remains unclear whether knowledge of fishery-ecosystem interactions is sufficient to recognize changes and to revise management objectives and practices in a timely fashion. Thus while information on fishery-ecosystem

functions and elements is sufficient to meet 80 scoring guideposts, it does not rise to the standard of the 100 scoring guideposts.

6.1.4 Principle III – Management System

The Sakhalin management system for pink salmon fisheries in Northeast regions meet all 60 scoring guideposts as well as exceeding a minimum weighed score of 80 for Principle I. Two indicators were scored between 60 and 80 which necessitated identification of conditions for continuing certification.

Indicator	Criteria @ 60				Criteria @ 80					Criteria @ 100						Score
	1	2	3	4	1	2	3	4	5	1	2	3	4	5	6	
3.1.1 Legal/Customary Framework	1	1	1	1	X	1	1	1		X	0	0	1			85
3.1.2 Consultation, Roles & Responsibilities	1	1			1	1	1			0	1	0				85
3.1.3 Long Term Objectives	1				1					0						80
3.1.4 Incentives for Sustainable Fishing	1				1					0						80
3.2.1 Fishery Specific Objectives	1				1					0						80
3.2.2 Decision-Making Processes	1	1			X	1	1	1		X	1	X	1			100
3.2.3 Compliance & Enforcement	1	1	1		0	0	1	1								70
3.2.4 Research Plan	1	1			0	1										70
3.2.5 Management & Performance Evaluation	1				1					0						80
															Net	81.3

3.1.1 Legal/Customary Framework		
The management system exists within an appropriate and effective legal and/or customary framework which ensures that it: - Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework.		
SG 60	**SG 80**	**SG 100**
The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system. Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation	The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. The management system or fishery is attempting to comply in a timely fashion	The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective. The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding

necessary for the sustainability for the fishery. The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	with binding judicial decisions arising from any legal challenges. The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	judicial decisions arising from legal challenges. The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Score: 85

Justification

The management system exists within an appropriate and effective legal and/or customary framework. The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2 (SG 60). Section 4.7.1 provides details of the Russian management system, including federal and state scientific and management agencies and the laws under which they operate.

The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery (SG 80). The Public Council for FAR and the FESFC provide for an opportunity for participants to bring up disputes for resolution (see Section 4.7.1), and the federal and regional courts are available for resolving disputes not otherwise addressed. It remains unclear whether the mechanism is proven to be effective under a full spectrum of tests (SG 100).

The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges (SG 80). In 2011 SKTU intended to terminate the contracts with 241 fishing companies for usage of fishing sites. SKTU filed lawsuits in the Court of Arbitration for termination of contracts. However, due to the intervention of the government of Sakhalin and Associations of Fisheries, as well as a result of open public consultations with the leaders of FAR, the majority of lawsuits were withdrawn. The remaining cases were declined to be accepted by the Arbitration Court. These decisions came into force in accordance with legal regulations. It remains unclear whether the management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges (SG 100).

The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2 (SG 80). The degree of formal commitment to these legal rights is clear (SC 100): The federal law on indigenous peoples of the Far North applies to the management system to ensure their traditional fisheries and livelihoods. In accordance with the law, every district establishes fishing sites for indigenous peoples near their homes. While distributing quotas for salmon fishing, the Anadromous Fish Commission first sets a quota for indigenous peoples (the rate of 200 kg of Pink salmon and 100 kg of Chum per person). The remainder of the quota is distributed between the other users of water resources. Representatives of the Association of Indigenous Peoples of

Sakhalin are involved in the distribution of the quota. In the case the interests of the indigenous peoples are violated, the prosecutors are being involved to redress violations and to review and overturn measures inconsistent with indigenous rights.

3.1.2 Consultation, Roles & Responsibilities		
The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.		
SG 60	**SG 80**	**SG 100**
Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood. The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. The consultation process provides opportunity for all interested and affected parties to be involved.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used. The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Score: 85

Justification

Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction (80), as describe in Section 4.7.1. However, functions, roles and responsibilities related to some responsibilities and interactions remain somewhat uncertain (100). In accordance with Federal Law on Fisheries, all stakeholders are included in the decision-making process. This includes fishing companies and public organizations. All interested parties are part of main management body – The Anadromous Fish Commission. Each representative has the right to vote and can influence the decision. However, this collective body bears all the responsibilities for the decisions made, shielding the individuals from being personally responsible for the actions of the Commission. The Federal law does not provide liability for the decisions that lead to negative effects (especially in application to the decisions to fill the spawning grounds and prevent the occurrence of mass mortality of fish due to unfavorable hydrological factors)

The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge (80). The management system demonstrates consideration of the information and explains how it is used or not used through public discussions in the Anadromous Fish Commission (AFC) with decisions publicized on the internet. Consultations with stakeholders are conducted on the regional level (Sakhalin Region) via the AFC. As part of the consultation process AFC sends information used for pre-season management (Section 4.7.2) to all stakeholders. During its meeting, the AFC examines data on the intensity of salmon runs, hydrological regime in the spawning grounds and fill rate of spawning ground by spawners, as well as recommendation of SakhNIRO and Sakhrybvod on the timing and regulation of fishing. AFC decisions are recorded. The protocols of the AFC meetings are sent to all interested parties and published on web site of SKTU (100).

The consultation process provides opportunity for all interested and affected parties to be involved, and facilitates their effective engagement (80). However, the process does not appear to always encourage and facilitate effective engagement by non-governmental or industry interests. Mechanisms for involvement of environment and different interest groups as well as the broader community are not well developed, but there are number of non-governmental organizations that are interested in salmon fisheries in the Sakhalin Island. Stakeholders may have an opportunity for involvement, but may have reluctance to participate as a carryover from Soviet days. In addition, while internal information from the management agencies is technically available to the public, the process for obtaining it can be involved making access difficult.

3.1.3 Long Term Objectives		
The management policy has clear long-term objectives to guide decision-making for wild stock components and the use of enhancement programs that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach.		
SG 60	**SG 80**	**SG 100**
Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.

Score: 80

Justification

Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy (80). However, objectives consistent with MSC Principles and Criteria and the precautionary approach are not always required by management policy. The over-arching fisheries and resource regulations cited earlier in this report lay out long-term objectives and long-term goals for the salmon fisheries of the Russian Far East. The regional fisheries management demonstrates its strategy towards sustainable use of fish resources by contribution to fisheries research, increasing control over poaching, development of modern fish-processing factory, by hatchery operation, and organization of protected areas. This performance indicator deals only with the high or broad management policy context – perhaps within

overarching legislation, perhaps policy or custom that applies to many or all fisheries within a broader management system – and with whether laws, policies, practices or customs at that high or broad level imply or specify and/or require long term objectives that are consistent with a precautionary approach. The precautionary approach, in this context and for the purposes of scoring this performance indicator, means: being cautious when information is uncertain, unreliable or inadequate, and that the absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Laws and regulations are explicit with respect to protecting spawning escapement, unclear on the environmental/ecosystem end. Where ecosystem changes were observed, a response would be expected but haven't seen such a decline, although unclear if it is actually being monitored. Hatchery objectives are clearly specified in authorizing plans.

At the same time, operation of many hatcheries, by intention, is directed to increase of production of salmon for fisheries rather than protection of wild stocks. No objectives for wild stock management or precautionary approach to hatcheries were noted. There is no policy for the sustainability of wild stocks or a mechanism to protect wild stocks from additional hatchery development. Goals to achieve optimal natural spawning objectives provide some measure of protection for wild fish by ensuring that a significant portion of the production occurs in the wild. This is particularly true in areas without hatcheries. However, the available information indicate that wild escapement goals may not be consistently achieved. Further, there is no assurance that the wild spawning population is not comprised of a significant fraction of hatchery-origin fish subject to potential artificial selection or domestication in the hatchery.

3.1.4 Incentives for Sustainable Fishing		
The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.		
SG 60	**SG 80**	**SG 100**
The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

Score: 80

Justification

The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing and seeks to ensure that negative incentives do not arise (80). According to Federal Law of Fisheries, fishing companies are leasing the fishing sites for 20 years. Therefore, companies are interested in ensuring a sustainable fishery and take measures to protect their resources, develop educational programs to prevent poaching and protect the environment. Replacing management through pre-season TACs and catches quotas with a system designed around

achieving spawning escapement goals in-season has helped reduce IUU catches by fishing companies, and reduced the need for further developed the hatcheries due to lack of need for additional quotas. However, consideration of the potential for unintentional incentives for potentially unsustainable fishing practices does not appear to be an explicit consideration in regular reviews of management policy or procedures.

3.2.1. Fishery-Specific Objectives		
The fishery and its enhancement activities have clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.		
SG 60	**SG 80**	**SG 100**
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system and enhancement activities.	Short and long term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and enhancement activities.	Well defined and measurable short and long term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and enhancement activities.

Score: 80

Justification

Short and long term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and enhancement activities (80). These include short term objectives for spawning escapements intended to provide for maximum sustained yield and long term objectives for fishery sustainability reflected in management regulation. However, short and long term objectives do not always provide clear measurable standards with respect to ecosystem, sensitive species such as taimen, and hatchery effects on wild stocks.

With respect to enhancement, while the management system has not established specific policies for protecting wild population from detrimental hatchery effects, it has established specific hatchery objectives designed to avoid detrimental effects. These include continued infusion of a high proportion of natural-origin fish in the broodstock, collection of broodstock across the breadth of run timing, rearing on surface water which maintains natural developmental timing, etc.

3.2.2 Decision-Making Processes		
The fishery-specific and hatchery management systems include effective decision-making processes that result in measures and strategies to achieve the objectives.		
SG 60	**SG 80**	**SG 100**
There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific and	There are established decision-making processes that result in measures and strategies to achieve the fishery specific and enhancement objectives. Decision-making processes	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific and enhancement objectives. Decision-making processes

enhancement objectives. Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. Decision-making processes use the precautionary approach and are based on best available information. Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. Decision-making processes use the precautionary approach and are based on best available information. Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Score: 100

Justification

Sections 4.7.1, 4.7.2, and 4.7.3 provide information demonstrating the high degree of sophistication of the decision making process in the fishery. The fishery-specific and hatchery management systems include established decision-making processes, both pre-season and in-season, that result in measures and strategies to achieve the fishery-specific and enhancement objectives.

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

Decision-making processes use the precautionary approach and are based on best available in-season catch and escapement data collected by SakhNIRO and SakhRybvod. The use of a capacity-based spawning escapement target to provide a functional equivalent for target and limit reference points demonstrates a precautionary element to decision making.

Formal reporting to all interested stakeholders through the Anadromous Fish Commission describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. Reports are posted on line to document decisions.

3.2.3 Compliance & Enforcement		
Monitoring, control and surveillance mechanisms ensure the fishery and hatchery management measures are enforced and complied with		
SG 60	**SG 80**	**SG 100**
Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and enhancement activities under assessment, and there is a reasonable expectation that they are effective. Sanctions to deal with noncompliance exist and there is some evidence that they are applied. Fishers and hatchery operators are generally thought to comply with the management system for the fishery and its enhancement activities under assessment, including, when required, providing information of importance to the effective management of the fishery.	A monitoring, control and surveillance system has been implemented in the fishery and enhancement activities under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules. Sanctions to deal with noncompliance exist, are consistently applied and thought to provide effective deterrence. Some evidence exists to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery and its enhancement activities. There is no evidence of systematic noncompliance.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery and enhancement activities under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules. Sanctions to deal with noncompliance exist, are consistently applied and demonstrably provide effective deterrence. There is a high degree of confidence that fishers and hatchery operators comply with the management system under assessment, including, providing information of importance to the effective management of the fishery and its enhancement activities. There is no evidence of systematic noncompliance.

Score: 70

Justification

Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and enhancement activities under assessment, and there is a reasonable expectation of effectiveness (60). Improvements in economic conditions and enforcement efforts appear to have significantly reduced illegal harvest that was so prevalent in the past. However, continuing problems with illegal harvest call into question the adequacy of enforcement of relevant management measures, strategies and/or rules in providing comprehensive controls. While commercial fishing companies participating in the fisheries appear to be effectively regulated, illegal harvest by others in freshwater erodes the benefits of those efforts. Poaching is widespread through the region, but seems lower in some rivers that are actively protected by fishery companies in collaboration with governmental enforcement agencies. Some fishing enterprises have private anti-poaching activities that reduce the level of illegal catch. The efforts to control illegal fishing are undertaken in all levels starting from individual companies, district fisheries associations, and regional administration. Commendable anti-poaching efforts by companies and the local authorities may have

reduced or removed poaching as a threat in some regions. The proportion of poaching as a total of removals is lowest in the northern areas. However, overall lack of control presents a clear opportunity for depletion of wild stocks. The Russian Far East fishery system has developed a reputation for systemic corruption, in which some companies underreport or mis-report catches, pay bribes for choice fishing locations, and poachers pay bribes for being allowed by enforcement agencies to poach is widespread. While some fishing enterprises have taken positive steps to reduce poaching, control over poaching requires larger scale efforts on the part of government and stakeholders to change the culture of poaching and find alternative livelihoods. However, the current system might encourage other activities. Evidence of parcel operators placing or extending nets beyond the boundary of the parcels indicates that the management system has not implemented a procedure to assure compliance with permits for operations at the parcels. Continuing problems with illegal harvest call into question the adequacy of enforcement of relevant management measures, strategies and/or rules in providing comprehensive controls.

Sanctions to deal with noncompliance exist and are regularly applied. These measures appear to provide some level of effective deterrence to noncompliance by commercial fisheries and hatchery operators. For example, loss of opportunity to fish when convicted of serious offenses provides a major incentive for fishery operators to stay within the rules. Questions remain regarding the consistency of application and the effectiveness of deterrence for other illegal harvest activities in freshwater (60).

Some evidence exists to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery and its enhancement activities. Many fishery operators help fund local enforcement activities or implement monitoring activities on their own to reduce the amount of poaching occurring in the region (80). The new management system encourages full reporting of catch, which has reduced under-reporting and mis-reporting. Noncompliance was a significant issue under the historical management system.

There is no evidence of systematic noncompliance by fishery operators under the current management system. The current system has reportedly reduced systematic noncompliance by fishing companies by eliminating significant incentives for noncompliance related to unreported or under-reported harvest and bycatch (80). While commercial fishing companies participating in the fisheries appear to be effectively regulated, illegal harvest by others in freshwater erodes the benefits of those efforts. Questions remain regarding the consistency of application and the effectiveness of deterrence for illegal harvest activities in freshwater.

3.2.4 Research Plan		
The fishery and its related enhancement activities have a research plan that addresses the information needs of management.		
SG 60	**SG 80**	**SG 100**
Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information

Research results are available to interested parties.	consistent with MSC's Principles 1 and 2. Research results are disseminated to all interested parties in a timely fashion.	sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Score: 70

Justification

Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2. A substantial amount of research occurs in the Sakhalin region with development of research plan showing that research occurs in a systematic way to address the management needs for the fishery (60).

A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. One and five year research plans are compiled by SakhNIRO. A research program was approved by the Federal Agency for Fisheries in 2007. Its official name is "Far Eastern Basin program of complex investigation of Pacific salmon for period 2007-2012". This program appears to addresses all the information necessary for effective fishery management of the directed fishery. Sakhalin fisheries are essential part of this program (80). However, the team has not received a copy of the plan, so it remains unclear where all questions related to MSC principles 1 and 2 are addressed, particularly with respect to ecosystem effects, ETP species, and hatchery impacts.

Research results are generally available and disseminated to interested parties in a timely fashion. The pre-season forecasts are provided to the Anadromous Fish Commission. Significant research results are regularly published in the scientific literature (80). However, research plans and some internal research reports may not be widely disseminated and publicly available.

3.2.5 Management & Performance Evaluation		
There is a system for monitoring and evaluating the performance of the fishery and hatchery management system against its objectives. There is effective and timely review of the fishery and hatchery management system.		
SG 60	**SG 80**	**SG 100**
The fishery and its enhancement programs have in place mechanisms to evaluate some parts of the management system and are subject to occasional internal review.	The fishery and its enhancement programs have in place mechanisms to evaluate key parts of the management system and are subject to regular internal and occasional external review.	The fishery and its enhancement programs have in place mechanisms to evaluate all parts of the management system and are subject to regular internal and external review.

Score: 80

Justification

The fishery and its enhancement programs have in place mechanisms to evaluate key parts of the management system and are subject to regular internal and occasional external review. The FAR interacts with various agencies at the federal level while controlling its territorial departments and provides oversight of departments under its jurisdiction. The FAR evaluates the management system through its responsibility for defining the rules and the areas of fisheries and for preparation of federal-level and agency-level reports on the fishing industry (80). However, all parts of the fishery and its enhancement programs may not be subject to regular internal and external review.

6.2 Tracking and tracing fish and fish products

6.2.1 Traceability

Daily catch of pink salmon is delivered in two ways:

1. by boats to the shore, where it is weighed and reloaded to mobile containers which transport chilled fish. Ice is used for cooling the fish. While the catch is transported, it is being accompanied by a document specifying the place and the crew which captured it, the weights of the transported fish, and the processing facility where the catch is being delivered. Upon delivery, the vehicle is being weighted again by the processing facility and then the catch is sent for processing.
2. by small boats to processing vessels stationed offshore of the nets. The catch is stored in ice until processing occurs. Each processing vessels handles fish from only one company. Each processing vessel will require chain of custody and no certified product may pass through the processing vessels until chain of custody is achieved

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

Only pink and chum salmon are commercially fished in the UoC; these species are easily distinguished by size and color and by the documentation required. In Nogliki region, some small volumes of salmon are caught by native fishermen in beach seines but would be distinguished from certified fish by the documentation required. 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. The companies in the catch sharing agreement will not sell fish as certified during the 2012 fishing season, and will have chain of custody in place for the 2013 season.

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. . The documentation and chain of custody arrangements described above will assure segregation of certified products. 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 Chain of Custody 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 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.

6.2.2 Points of landing

The limit of identification of landings is those landings at fishing parcels of companies operating under the certificate sharing agreement, and only those companies and parcels. A list of fishing parcels authorized for participation in the certified fishery will be posted through Ecert and available on the MSC website so that processors receiving products can confirm participants in the 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.

6.2.3 Eligibility to enter chains of custody

Pink salmon produced by fishing companies in the client group with authorization to fish with set nets and trap nets within the Nogliki and Smirnykh districts landed at authorized parcels are eligible to enter further chain of custody. Any companies buying from approved fishing companies or processing facilities that receive certified product are required to have chain of custody certification for further sale and distribution. 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 pink salmon product to permitted fishing companies from the Nogliki and Smirnykh districts with a certificate sharing agreement and landing at approved facilities.

6.2.4 Target eligibility date

The target eligibility date for product from the fishery (as and when certified) to bear the MSC label will be 1 July 2012. This coincides with the start of the 2012 fishing season, and is less than six months since posting of the Public Comment Draft Report.

6.3 Stakeholder comments

No stakeholder comments were received during the public comment period, other than those of the MSC. The MSC comments are presented in Appendix 3

6.4 Objections Process

To be determined.

7 CONCLUSION & AGREEMENT

7.1 Certification Recommendation

The Performance of the Northeast Sakhalin pink salmon Fishery in relation to MSC Principles 1, 2 and 3 is summarized below:

MSC Principle	Fishery Performance
Principle 1: Sustainability of Exploited Stock	Overall: 80.7
Principle 2: Maintenance of Ecosystem	Overall: 80.7
Principle 3: Effective Management System	Overall: 81.3

The fishery attained a score of 80 or more against each of the MSC Principles. The MRAG Americas Assessment Team, therefore, recommends that the Northeast Region Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries. A number of Conditions have been identified that the fishery must satisfy in order to maintain this Certification. Details are provided in Section 7.3.

Following this Recommendation of the assessment team, and review by stakeholders and peer-reviewers, a determination is hereby made by the MRAG Americas Certification Committee to certify the fishery.

7.2 Scope of Certification

Northeast Sakhalin stock of pink salmon harvested in coastal trap nets by the companies of the Nogliki district that have a certificate sharing agreement with the clients (Sakhalin Salmon Initiative Center and Sakhalin Regional Fisheries Association), managed under the Russian federal and state salmon management systems. The certificate sharing agreement allows companies in the regions to use of the certificate subject to complying with conditions imposed on the fishery and subject to delivery at designated facilities/companies. SSI Center and Sakhalin Fisheries Association will accept new participants and designated companies or facilities based on an agreement to equitably share the costs associated with obtaining and maintaining the certificate. The list of client group companies is currently correct, and will be updated on the MSC website as appropriate.

Northeast Sakhalin stock of pink salmon harvested in coastal trap nets by the companies of the Smirnykh that have a certificate sharing agreement with the clients (Sakhalin Salmon Initiative Center and Sakhalin Regional Fisheries Association), managed under the Russian federal and state salmon management systems.

Coastal trap nets are defined for the purposes of this certification as those operated outside a river mouth. Included are those operated in marine waters as well as coastal bays and lagoons.

Other fishing gears (including seines and fishing weirs in rivers) that might be operated in either the Nogliki or Smirnykh districts by companies that have a certificate sharing agreement with the clients (Sakhalin Salmon Initiative Center and Sakhalin Regional Fisheries Association) are not included in the certification. Any harvest of pink salmon that

might occur in fishing gear besides coastal trap nets would need to be effectively distinguished under chain of custody requirements.

7.3 Conditions and recommendations associated with Certification

Condition 1

1.2.2 Harvest Control Rules & Tools: There are well defined and effective harvest control rules in place.

SG 80

- *Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.*
- *The selection of the harvest control rules takes into account the main uncertainties.*
- *Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.*

Some questions remain regarding the effectiveness of the available tools in achieving the exploitation levels required under the harvest control rules across the full range of run sizes observed in these highly variable pink salmon stocks. Harvest and exploitation is regulated by the in-season management system employed in the northeast region pink salmon fishery. Average annual escapements are approximately 100% of capacity-based targets for monitored streams and escapements fluctuate around target levels in odd years of this odd-year cycle dominant pink salmon stock. The assessment team considers escapements of 50-100% of the capacity-based target identified by the management system as clearly within a range that avoids recruitment overfishing. However, it remains unclear whether escapements observed to fall under target levels in non-dominant even years and some odd years reflect limitations of the current harvest control years under certain conditions. Of particular concern is the use of river mouth nets or weirs and the planned increase in that fishing method in years and streams where escapement objectives are not met. In addition, empirical support for the escapement target of 2 fish/m^2 has not been made available and it is unclear whether this value represents a yield or capacity based objective or benchmark.

Condition

By the first surveillance audit, the fishery client must present evidence that a plan is in place to demonstrate that tools are appropriate and effective in achieving the exploitation levels required under the harvest control rules. By the second surveillance the fishery client must present evidence that the plan has been implemented. By the third surveillance the fishery client must demonstrate that tools are appropriate and effective in achieving the exploitation levels required under the harvest control rules throughout the Northeast Sakhalin Region.

Client Action Plan

The goal of Russia's salmon management system is to achieve a regionally optimal escapement of spawners, which is currently set at 2 adult pink per m2 of spawning grounds (if sex ratio is 50:50). The Client will work with SakhNIRO, SKTU, and other authorities to provide justification for this target, including a description of the data and methods used to demonstrate it is robust and appropriate for this region. If adequate justification is lacking (compared to other regions in the Russian Far East or compared to best practices used outside of Russia), the client will develop a research plan to determine an optimal level of escapement for the rivers in the certification unit, including a monitoring plan that can gauge whether escapement targets are routinely being met once they are established. The

research plan will be implemented by the 2013 fishing season and the results of the analysis will be provided to the audit team during the third surveillance audit. The success indicator for the plan will be the escapement of the fish to the spawning grounds being at a level that is not lower than the optimal escapement based on existing data from SakhNIRO and Sakhrybvod.

In the future, Client will work in cooperation with other interested organizations and with the assistance of specific research studies in order to clarify the optimal escapement level for each individual river which flows into the sea at Client's sites, taking into account the ecosystem's needs for this basin.

To achieve the optimal escapement of spawning grounds by pink producers, Client will regulate the fishery (catch of pink by using stationary nets in sea parcels). Every 5 days companies that are under assessment will indicate the catch in a table, which takes into account the forecast for the area, claimed and fixed quota as well as catch for every five days and the catch with cumulative totals. In addition, the catch of the companies that are not participating in the certification but fishing in the district which is under full assessment is also taken in to account. Monitoring will be conducted from the time when the Anadromous fish Commission decides to begin the fishing season until the fishing season is officially closed.

The Client will undertake all possible efforts to prevent fishing pink in the spawning rivers on fishing counting weirs. The only exception is in cases of a clear threat of the mass death of salmon resulting from a combination of unfavorable hydrological factors. However, the criteria and appearance of such a threat must be pre-designed for specific rivers relevant to the certified fisheries. In the NE Sakhalin Unit of Certifications, there has been no use of counting weirs in the past. But the Client will investigate the possible use of fish counting weirs and their impacts on wild salmon runs in the Unit of Certification in the case weirs are used. In this case, a report about use and impacts will be provided to the certification body by the second surveillance audit.

Consultation

SakhNIRO forecasts the fishery and gives information about the pink returns. Sakhrybvod monitors the escapement and the hydrology of rivers. SKTU approves the decisions of the Commission about harvest regulation. The results of the Anadromous Fish Commission are published at http://sktufar.ru.The representatives of the Client have met with SakhNIRO, Sakhrybvod and SKTU to begin collaboration in order to control the catch and the escapement of spawners to the spawning grounds by using stationary nets, as well as monitoring the hydrological characteristics of the rivers flowing into the sea on their fishing grounds, with the spread of this practice to all rivers.

Condition 2

1.2.3 Information and monitoring. Relevant information is collected to support the harvest strategy.

SG 80

- *Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.*
- *Stock abundance and fishery 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.*
- *There is good information on all other fishery removals from the stock.*
- *Information is sufficient to estimate the significance of fishery harvests on stock components.*

Good information is not available on illegal unregulated harvest of pink salmon in freshwater streams. Multiple sources report a high incidence of illegal harvest but estimates of numbers and exploitation rates are not available.

Information is not sufficient to estimate the significance of fishery harvests on population-level stock components which represent the diversity of the pink salmon stock within the northeast region. Estimates of the relative magnitude of illegal, unregulated harvest in the Northeast Sakhalin Region are not available. An assessment should include estimates the approximate scale of illegal harvest relative to the legal harvest and a description of a defensible rationale for estimation. The evaluation should also consider the effect of illegal harvests on escapement estimates.

Condition

By the first surveillance audit, the fishery client must present evidence that a plan is in place with an estimation protocol to obtain good information on all other fishery removals from the stock. By the second surveillance the fishery client must present evidence that the plan has been implemented. For subsequent surveillance audits, the client must present credible estimates of other fishery removals.

By the first surveillance audit, the fishery client must present evidence that a plan is in place to demonstrate that information is sufficient to estimate the significance of fishery harvests on stock components. By the second surveillance the fishery client must present evidence that the plan has been implemented. By the third surveillance the fishery client must describe the significance of fishery harvests on key stock components represented by returns to different systems throughout the Northeast Sakhalin Region

Client Action Plan

Fishing companies that are under assessment have been actively involved in actions to reduce illegal fishing in the Northeast Sakhalin for the past 10 years. These companies work with local and regional enforcement agencies, private security agencies and public organizations to improve the level of protection of the rivers. This work will be continued. The budget for security measures for 2012 has already been adopted. In this case, there is a clear understanding that for the evaluation of the results of anti-poaching actions, and respectively, in general, to develop an effective strategy to control poaching, there must be

a clear idea about the illegal fishing - its scope, organization, etc. Therefore, Client has a clear understanding of the need to objectively assess the level of illegal fishing.

By the first surveillance audit, the Client along with the regional fisheries associations, the local salmon councils, Sakhalin Environment Watch, Sakhalin State University will develop a plan to estimate the scale of illegal unregulated salmon harvests in NE Sakhalin. Annual estimates will be available to the surveillance team during the second and subsequent audits. According to this plan, information about illegal fishing reported in the press and information gathered from SKTU, Ministry of Internal Affairs, and Prosecutor's office and other organizations will be analyzed. In addition, the plan will include working with public organizations. The participation of public organizations will ensure the gathering of the most accurate information because an objective picture about the level of illegal harvests cannot always be done according to official data.

The Client, together with SakhNIRO and Sakhalinrybvod, will develop a plan to estimate illegal fishing not only on fishery stocks in whole, but also on its the most important components (in particular, key populations and subpopulation of the Nogliki and Smirnyh districts). A joint plan will be prepared by the beginning of the first audit and its implementation should be started by the beginning of the second audit. Initial results will be presented by the beginning of the third audit.

The criteria for measuring the reliability of the assessment of the level of illegal harvest will be the verification of the results of the assessments with independent sources of information.

To demonstrate that information is sufficient to estimate the significance of fishery harvests on stock components, the client will begin reporting annual harvest by fishing site beginning with the first annual surveillance.

Consultation

Different organizations are interested in the assessment of the level of illegal harvest. SakhNIRO: should take into consideration when producing fishing forecasts (although in recent years, after Pacific salmon are excluded from Total Allowable Catch, the level of SakhNIRO's interest has declined), SKTU: has the duty to monitor compliance with fishing regulations. Accordingly, the level of illegal harvests is a measure of the effectiveness of this control. Fishermen: catch is directly affected by the level of illegal harvests especially under the conditions of the modern methods of fishery management and environmental organizations. Client will engage in dialogue with these organizations.

Condition 3

1.2.4. Assessment of Stock Status. There is an adequate assessment of the stock status.

SG 80

- The stocks are well-defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
- Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of the other stocks they represent within the management unit to the extent that a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
- The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.
- The assessment takes uncertainty into account.
- The stock assessment is subject to peer review.

Assessments are based on indicator populations rather than indicator stocks. Escapement data is limited for several of the larger pink salmon producing systems in the region including the Tym and (Nogliki District) and Langery (Smirnykh District) rivers. It is unclear whether the monitored systems are representative of the diversity and status of the larger systems which account for a significant portion of the harvest. It is also noteworthy that hatchery production of pinks in this region is limited to the Tym system for which wild escapement data is unavailable. The concern is that much of the fishery in this region is driven by production from the large systems but assessment data is based on the smaller systems and it is unknown how representative the index populations are of the whole. Differences in stock-productivity patterns and their application to escapement management are unclear between even and odd-year returns of this cycle dominant stock.

Condition

By the first surveillance, the fishery client must provide evidence that a plan is in place to provide evidence of coherence between the status of the indicator stocks and the status of the other stocks they represent within the management unit to the extent that a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk). The plan must also address uncertainty in the effects of consistent low escapements of even year returns which are substantially below escapement target levels applied to the dominant odd-year returns. A plan for assessing the validity of the index streams will require escapement data for representative rivers in the area including current index streams and a statistically valid array of non-index streams to show that the index streams are statistically correlated. Representative streams will need to be stratified by size and geography at the very least. By the second and third surveillance audit, the fishery client must provide evidence that the plan has been implemented and necessary data collection and analysis is underway. By the fourth surveillance audit the client must provide evidence of coherence between the status of the indicator stocks and the status of the other stocks they represent within the management unit to the extent that a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).

Client Action Plan

Client will work with Sakhalinrybvod and SakhNIRO to monitor pink salmon escapements and juvenile out-migrations into the sea in the index and non-index rivers of NE Sakhalin, including the Tym River. This monitoring plan will be available by the first surveillance audit. Initial data will be provided to the audit team starting from the second audit. A minimum of three years of data will be necessary to demonstrate whether index population is representative of other stocks in NE Sakhalin. Also, Client will assess the existing data (archival or published) in order to analyze the relationship between the fluctuations in the number of index populations and those that they represent. Rivers that are currently in use as index rivers by SakhNIRO will be used for this purpose in this monitoring. These were chosen in 1950-60 on the criteria of convenience of observing the changes in the number of commercial stock. It will be determined by using correlative analysis how informative these rivers are for management units in general, and if their information value is low, recommendations will be given for their revision. The analysis will also examine differences in the validity of the index streams between even and odd year cycles. The plan will determine the gradual expansion of the list of rivers in certified districts as well as their inclusion in the analysis.

The plan also provides for monitoring of the construction of new hatcheries (despite the fact that at the present time specific plans for such construction are not available). Additionally, Client will monitor the activities of the salmon hatchery Pilenga, which is currently the only hatchery in the district that releases pink salmon even though in small numbers. A planned tagging program will begin with an increase in the release of salmon fries from the hatchery. Data on actual release are quite transparent, and therefore allow for reliable estimates. During the period of the release of fries from any hatchery, a commission is formed that includes stakeholders, representatives of authorities, sanitation control, hatcheries, etc. The client can request data on production and keep records accordingly. If the release of pink salmon from the hatcheries grows, then after the number of hatchery salmon reaches a certain percentage of the number of wild fish (the definition of this percentage will require further consultation) a tagging program will be required. Deadlines for the implementation of this program will be determined later. At the same time, an assessment program for returning salmon will be developed. Because Pilenga is a privately owned, a tagging program will be conducted only with the consent of the hatchery.

The initial results of the work performed according to this plan will be presented by the beginning of second audit.

Consultation

SakhNIRO and Sakhrybvod share responsibility for the monitoring of pink salmon streams on Sakhalin and they have sufficiently detailed data for many rivers. Client has met with these agencies. Sakhrybvod monitors juvenile releases from hatcheries in the region, regardless of ownership.

Condition 4

2.1.1 Retained Species – Outcome: The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.

SG 80

- Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in

place such that the fishery does not hinder recovery and rebuilding.

Chum salmon are reportedly depressed in all areas primarily as a result of historical illegal harvests. Thus chum salmon are neither within biologically based limits nor fluctuating around their target reference points, which are defined by annual spawning escapement objectives. While a fishery management strategy of late season closures is at least partially effective in limiting impacts to chum salmon, exploitation rates on chum salmon in the pink salmon fishery time frame are not reported. In addition, summer run chum salmon, whose timing overlaps that of pink salmon, are reportedly present in some large rivers such as the Tym. Based on the available information, it cannot be concluded that the fishery strategy for pink salmon is demonstrably effective in not hindering recovery and rebuilding of chum salmon.

Condition

By the first surveillance, the fishery client must provide evidence that a plan is in place to ensure that pink salmon fishery is demonstrably effective in not hindering recovery and rebuilding of chum salmon. By the second and third surveillance audit, the fishery client must provide evidence that the plan has been implemented. By the fourth surveillance audit the client must provide evidence that the plan is effective.

Client Action Plan

Client will work with Sakhalinrybvod and SakhNIRO to develop and implement a plan for assessing the catch and stock status of the summer and fall chum salmon in NE Sakhalin by the first surveillance audit. The seasonal data on catch (with a period of 5-10 days) and escapement data to assess the impact of the pink fishery on chum, will be submitted separately for the Smirnykh and Nogliki districts. Moreover, the possibility of thermal marking of chum for the separation of hatchery and wild chum salmon will be studied.

Consultation

SakhNIRO and Sakhrybvod share responsibility for the monitoring of chum escapement on Sakhalin and they have sufficiently detailed data for many rivers. Client has met with these agencies. Sakhrybvod monitors juvenile releases from hatcheries in the region, regardless of ownership

Condition 5

2.1.3 Retained Species – Information: Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.

SG 80

- Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.
- Information is sufficient to estimate outcome status with respect to biologically based limits.
- Information is adequate to support a partial strategy to manage main retained species.
- Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).

Quantitative data are collected on the harvest and escapement of chum salmon, which is the main retained species. Any significant retention of other species, including flatfish and char, for the purposes of commercial sales is also quantified and reported to the management system. While information on retained species that are sold is reportedly collected, data on species retained for personal use may not be recorded. Sufficient data continue to be collected to detect any increase in the risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy) for chum salmon. However, monitoring of retained species is not conducted in sufficient detail to assess ongoing mortalities to other significant retained species (e.g. cherry salmon, coho salmon, char) such that increasing risk levels can be detected.

Condition

By the first surveillance, the fishery client must provide evidence that a plan is in place to provide sufficient data to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy) of significant retained species such as cherry salmon, coho salmon, and char. By the second and third surveillance audit, the fishery client must provide evidence that the plan has been implemented and necessary data collection and analysis is underway. By the fourth surveillance audit the client must provide data sufficient results to show that they can detect any increase in risk level of significant retained species such as cherry salmon, coho salmon, and char.

Client Action Plan

Client will work with Sakhalinrybvod, SakhNIRO and SKTU to develop a plan for monitoring and collecting quantitative data about the catch, any personal use take, and the population status of all retained species in NE Sakhalin, including, but not limited to chum, cherry, coho and char. At the present time, SakhNIRO conducts monitoring and regulation for these species at certain levels. According to the Fishery Rules, the whole catch, including bycatch (used and unused) must be registered in the fishing log. However, since the amount of bycatch is very low, and it is generally used for personal consumption or is simply thrown out (a special permit is required in order to have the fish commercially moved, bycatch in the fishing log goes completely unreported. Because of this, a special methodology for monitoring of bycatch has been developed and successfully applied in 2010. The methodology includes an assessment of the number of species, their sex (for those species in which this determination is possible without special methods), and their size. These studies have allowed the quantification of the amount of bycatch, which has confirmed its small volume. This monitoring was continued in 2011. In order to assess the impact of the salmon fishery on bycatch species, consultations will be held with the experts of SakhNIRO and TINRO in order to identify any potential risks. The initial results will be made available to auditors during the second and third audits. Analysis of the impact of salmon fisheries on the status of by-catch species will be available to the stakeholders and other interested parties as well as a group of auditors during the fourth audit.

Consultation

The Client has experience in the collection of data on the size of catches and with receiving biological information on bycatch species at the fishing sites and in the processing plants. Data collection will be done on their own and in cooperation with SakhNIRO. This is especially true for the assessment of the impact of the fisheries on the population status of bycatch species.

Condition 6

2.3.3 ETP Species – Information: Relevant information is collected to support the management of fishery impacts on ETP species, including:
- information for the development of the management strategy;
- information to assess the effectiveness of the management strategy; and
- information to determine the outcome status of ETP species.

SG 80

- Information is sufficient to determine whether the fishery and enhancement activities may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts.
- Sufficient data are available to allow fishery and enhancement activities related mortality and the impact of fishing to be quantitatively estimated for ETP species.

Data are not sufficient for the impact of fishing to be quantitatively estimated for taimen. Even though reported catches of ETP species occur, there is no special monitoring of them. Occasional monitoring occurs from observers from research institutes and fisheries inspection. Documentation of the catch is limited to historical records from commercial sales prior to implementation of conservation regulations, and limited data from independent observations reported previously in this assessment. Information on the distribution and abundance of Sakhalin taimen in the fishery areas is simply inadequate to complete such an assessment.

Condition

By the first surveillance audit, the fishery client must provide evidence that a plan is in place to quantitatively estimate fishery and enhancement related mortality and the impact of fishing for ETP species, including taimen. By the second surveillance audit, estimates must be available. Estimates of mortality and impacts must be provided at the third and fourth surveillance audits. It is recommended that the plan includes quantitative estimates of abundance, distribution, and stock structure for ETP species as well as better harvest and incidental take data so that fishery and enhancement related mortality for ETP species, including taimen, can be fully assessed.

Client Action Plan

The Client, in cooperation with SakhNIRO and/or the Institute of General Genetics (Moscow), will develop an independent observer program on NE Sakhalin sufficient to estimate related mortality of taimen and other ETP species, such as sturgeon, as a result of salmon fishing as well to estimate the impact of this mortality on the state of populations of ETP species. This program will be evaluated in terms of its cost and effectiveness. In the case of there being funds available to ensure a sufficient level of efficiency of such a program, it will be available by the time of the first audit and it will be implemented. In the event that available funds are insufficient for implementing a full observation program, alternative opportunities will be considered. In particular, acoustic tags which will mark several fish in different certification areas will be used in order to assess the degree of overlap that exists of outmigrations of ETP species with active salmon fishing. The clients will also examine the potential of implementing annual taimen spawning surveys on NE Sakhalin rivers. Such alternative programs will be submitted by the time of the first audit. Additionally, all available data (not just scientific) regarding population status of Sakhalin taimen and cases of capture of ETP species will be summarized. Preliminary results will be available to the audit team by the second surveillance audit. Additionally, during the first audit, the client

will present materials about the activities of hatcheries and analysis of any potential threats from hatchery activities to taimen populations (e.g. evidence that hatchery equipment is not physically blocking the migration path to the spawning grounds). In accordance with the agreement with the Institute of General Genetics, a taimen monitoring program has been ongoing for three years. A report on this program has been published and will be made available during the first surveillance audit. This report shows the results of the genetic analysis of taimen taken from different districts of Sakhalin. Based on these results, the program offers guidelines for the taimens' conservation. These proposals will be considered when developing a program to evaluate the impact of pink salmon fishing on the taimen population.

Consultation

The client will conclude an agreement with SakhNIRO and the Institute of General Genetics (Moscow) to evaluate and, if practical, to implement the above mentioned observer programs.

Condition 7

3.2.3 Compliance & Enforcement. Monitoring, control and surveillance mechanisms ensure the fishery and hatchery management measures are enforced and complied with.

SG 80

- *A monitoring, control and surveillance system has been implemented in the fishery and enhancement activities under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.*
- *Sanctions to deal with noncompliance exist, are consistently applied and thought to provide effective deterrence.*
- *Some evidence exists to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery and its enhancement activities.*
- *There is no evidence of systematic noncompliance.*

Evidence of parcel operators placing or extending nets beyond the boundary of the parcels indicates that the management system has not implemented a procedure to assure compliance with permits for operations at the parcels. Continuing problems with illegal harvest call into question the adequacy of enforcement of relevant management measures, strategies and/or rules in providing comprehensive controls. Independent sources of information are largely nonexistent for verifying the legality of commercial fishery operators. While commercial fishing companies participating in the fisheries appear to be effectively regulated, illegal harvest by others in freshwater erodes the benefits of those efforts. Questions remain regarding the consistency of application and the effectiveness of deterrence for illegal harvest activities in freshwater.

Condition

By the first surveillance audit, the fishery client must provide evidence that a plan is in place to assure a monitoring, control and surveillance system for the fishery and enhancement activities under assessment will demonstrated an ability to enforce relevant management measures, strategies and/or rules. By the second surveillance audit, the fishery client must

provide evidence that the plan has been implemented. By the third annual audit the fishery client must provide evidence that the system enforces relevant management measures, strategies and/or rules with sanctions that provide effective deterrence for illegal harvest. It is recommended that evidence provided consistent with this condition include documentation and corroboration from official sources.

Client Action Plan

Client will work with the fishing companies in the certification unit to explore and implement options for cooperatively policing their fishery for regulation compliance. The Client will document the official data on the number of raids, identified offenses, arrests, fines, as well as the number of cases brought to court. At the same time, an attempt will be made to assess how the official information corresponds to the actual state of affairs. An analysis will be made of governmental agency as well as private company activities to ensure compliance with the Fishery Rules. There will also be an attempt to understand how the decision about the level of protection is made and how the effectiveness of law enforcement organizations is evaluated. Based on this, options for improving the monitoring and protection will be offered. In addition, the client will work with relevant non governmental organizations to obtain satellite imagery of NE Sakhalin fishing parcels to determine regulatory compliance with gear use regulations. The client is committed to conduct this monitoring work at least during “fish years” for pink (e.g. 2013, 2015). A plan for funding and implementing this work will be developed by the first annual audit. Satellite photos will be taken at undisclosed times during the following fishing seasons by a third party (presumably by "ScanEx").

Consultation

Much of this work can be initiated by the Client without governmental assistance. Discussions have already begun with relevant experts and non governmental organizations including ScanEx http://www.scanex.ru/en/ and Sakhalin Environment Watch http://sakhalin.environment.ru/

Condition 8

3.2.4 Research Plan. The fishery and its related enhancement activities have a research plan that addresses the information needs of management.

SG 80

- *A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.*
- *Research results are disseminated to all interested parties in a timely fashion.*

A research program was approved by the Federal Agency for Fisheries in 2007. Its official name is "Far Eastern Basin program of complex investigation of Pacific salmon for period 2007-2012". This program appears to addresses all the information necessary for effective fishery management of the directed fishery. Sakhalin fisheries are essential part of this program. However, the team has not received a copy of the plan, so it remains unclear where all questions related to MSC principles 1 and 2 are addressed, particularly with respect to ecosystem effects, ETP species, and hatchery impacts.

Condition

By the first surveillance audit, the fishery client must provide evidence of a research plan with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.

Client Action Plan

The Client will develop a research plan for what is needed in order to obtain information regarding the salmon fisheries in the districts of the certification. This will allow salmon fisheries to conform the principles MSC 1 and 2 (i.e., information about the status of the target species and the effect of fishing on ecosystems). This plan will identify specific goals and objectives for the research and set priorities for conducting of such studies. A number of studies that will be included in such a plan (e.g. a review of the optimal density of the spawners in the spawning grounds, a study of the effect of salmon fisheries on bycatch and ETP species) have already been discussed within the Client Action Plan. Depending on the need and amount of funds available, different elements of the plan will be carried out either by the Client directly or by the Client in collaboration with the fishing companies, NGOs or government agencies. Part of the objectives of the research plan is to study problems for public institutions, such as SakhNIRO and Sakhrybvod and they must be carried out by these organizations. In developing our research plan, SakhNIRO's research plan will be studied as well as work plans of other stakeholders. A general plan will be developed by the first audit.

Consultation

SakhNIRO is the agency responsible for scientific research on salmon on Sakhalin. Client has met with SakhNIRO' representatives who have agreed to develop a research plan. SSI Center, as the Client, implements its work while in constant contact with SakhNIRO. We understand that any actions, and especially action plans, require agreement and financing.

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9 APPENDICES

Appendix 1 Peer Review 1

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	Partially	Conformity Assessment Body Response
Justification A re-occurring issue in Principle 1 was the fact that escapements of even year pink salmon averaged only 6% of the habitat capacity estimate in the Noglikskii District. The capacity estimate is the basis for the TRP and LRP but it is not clear what specific values were used by the management system for TRPs and LRPs. Were goals developed for each district or watershed, and are they the same for odd and even year pink salmon? The assessment team assumed that MSY was probably 50-100% of the capacity estimate, but it was not clear that the management system also made this assumption. Given that even year escapements in the Noglikskii District average only 6% of the capacity estimate, one might conclude that the genetically unique even year populations were not coming close to the TRP or possibly the LRP. However, the data also indicate that the TRP and LRP for even year pink salmon should be different from that that of odd year pink salmon. Table 5 presented annual escapement estimates of surveyed streams in the two districts, 2001-2010. This is appreciated. However, the table reveals that many of these index streams are not surveyed each year. For example, two or fewer streams were surveyed in the Smirnykh District in 2002, 2004, 2005, 2006, and 2008. This did not appear to trigger a condition, but it probably should. The assessment team noted several times that no escapement estimates were available for two of the larger pink salmon watersheds; this appropriately led to conditions. It is not clear how the fishery can be properly managed (and receive MSC certification) without some reasonable level of escapement estimation during each year, including the less dominant even year. Hatchery production is relatively small in these two districts at this time. However, hatchery production on Sakhalin Island is very large and there are reportedly plans to increase hatchery production. It would be worthwhile to mass mark hatchery production in the two MSC districts (and elsewhere) so that their contributions to the harvest and natural escapement can be estimated. These data are needed to better estimate productivity and status of the wild stock, especially as hatchery production increases in the two		*See specific comments below for performance indicators regarding these issues*

districts. Specific comments below sometimes question the somewhat high scores in light of text provided in the report and in the justification text. I raised these issues but I did not attempt to re-score these indicators.	

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Sometimes**	**Conformity Assessment Body Response**
Justification: Conditions were developed where conditions were clearly needed. However, as discussed below, there are some indicators that may also need conditions. Although conditions were often appropriate, the findings of the conditions are needed before one can conclude that the condition will satisfy SG80. There is at least one condition where the action plan did not fully address the condition.		*See specific comments below for performance indicators regarding these issues*

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Sometimes**	**Conformity Assessment Body Response**
Justification: Specific comments were provided on each action plan item. The action plan often addressed the condition, but not always. Meeting SG80 will sometimes depend on the findings of the action plan.		*See specific comments below for performance indicators regarding these issues*

General Comments on the Assessment Report (optional)

The report is well-written and well-organized. I appreciate the fairly lengthy description of fish and fisheries management. However, I would have liked to have seen more references to reports that describe stock status and fisheries management. For example, do these fisheries have annual management reports and periodic escapement goal reports that provide detailed analyses? It seems much of the presented information was provided verbally to the assessment team rather than through documentation in reports that are publicly available. I believe that fisheries certified by the MSC should have publicly available fisheries management reports that include updates of annual fishery metrics and management decisions.

Please see specific comments below.

Performance Indicator Review

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	yes	no	NA	On P. 30, the report states that escapements averaged 6% of the capacity-based benchmarkes in even years in the Noglikskii District (avg 70% of target in Smirnykhovskii District). Even yr pink salmon are genetically distinct populations (no interbreeding with odd yr salmon). Based on the capacity approach, the even year population is not meeting its escapement target reference point. Ideally, the escapement reference point should incorpoprate population productivity in addition to capacity (e.g., recruitment curve); if it did then the even year escapement levels might be closer to meeting its goal (see below). However, based on the current benchmark, escapement during even years is not meeting the established benchmark, therefore the second item in SG80 does not appear to be met and a condition may be needed.	Even-odd year cycle dominance patterns are typical of pink salmon throughout their range (Heard 1991). Although many causes for dominance have been proposed, no single factor satisfactorily explains the event. The northeastern Sakhalin pink salmon population is characterized by odd-year dominance with the dominant year run averaging ten times the size of the even-year run. The historical data indicate that this pattern has been prevalent for decades as this stock has varied from year-to-year around long term average numbers. Stock-recruitment patterns are also substantially different between the two cycles. The naturally-occuring pattern is independent of the fishery which exploits the subdominant years at a substantially reduced rate. Due to risks of disruption of long-term productivity patterns, it is neither realistic nor appropriate to attempt to increase spawning escapements in the subdominant years to the capacity of the spawning habitat.
1.1.2	yes	Partially	NA	The text on P 30-31 did not clearly identify escapement goals, although it describes habitat	The explanation of escapement targets may be found under the justification for this indicator. Escapement

				capacity for spawning pink salmon for the entire region. Are escapement goals based on individual monitored rivers, or the sum of rivers in each district? How do the escapement values in Tables 4 & 5 relate to the target reference points? The text notes that MSY may be ~50% to 100% of the capacity estimate. If so, what is the targeted escapement goal range for each river or district and what proportion of recent years was the escapement goal met? It is not clear that the reference points are appropriate for even year pink salmon populations—since escapements continually fail to met the capacity estimate in even years, e.g., Noglikskii District. Are even year escapements continually below the LRP in the Noglikskii District? What is the LRP relative to the TRP? The FAM indicates that fisheries falling below the LRP cannot be certified (However, I agree with report that defining an LRP in salmon populations is problematic). It may be more appropriate to base escapement goals on a recruitment curve that includes both capacity and productivity. This should be a key goal for the research plan (Principle 3). Table 5 shows that index streams are not surveyed every year. For example, in the Smirnykhovskii District, two or fewer streams were surveyed in 2002, 2004, 2005, 2006, and 2008. Furthermore, escapement in some of the larger systems (Tym,	targets are defined for each stream based on the estimated spawning capacity which is the product of suitable spawning area and target spawner density per unit area. These escapement targets function as target reference points for each stream. The fishery is managed to generally approach but not exceed the stream-specific targets. Escapement values in Table 5 refer to stream-specific escapements. Escapement values in Table 4 refer to aggregate escapements for the entire district based on a run reconstruction from monitored streams. This fishery has not historically been managed intensively based on annual run size to meet specific minimum escapement goals for each stream. No specific minimum escapement goals have been identified because fishery management generally provides spawning escapements consistent with sustainable levels of production and yield seen in the historical dataset. Thus, management for consistent high levels of escapement referenced to stream spawning habitat capacity provides a functional equivalent of a limit reference point where substantial spawning escapements are consistently achieved. Due to the passive nature of the fishing gear consisting mainly of fixed trapnets, annual escapement is heavily dependent on annual run strength and timing. Exploitation rates also do not vary substantially based on run size within odd or even brood year cycles. Exploitation rates are relatively modest in comparion with other heavily-fished pink salmon runs in Russia and Alaska. The available data indicate that this fishing strategy successfully produces escapements in index streams for the dominant brood year cycle that generally fall

				Langeri) were not provided. How do we know if the TRP was met? How was the fishery managed in these years? As appropriated described by the assessment team, additional information is needed on how capacity of streams for pink salmon is estimated. Does the area approach apply to the entire stream or to spawning areas? How is spawning area defined?	within 50-100% of the capacity which the assessment team estimates is consistent with maximum yield and production from this stock. This conclusion is supported by analysis of the stock-recruitment pattern in historical data for the aggregate pink salmon stock in northeast Sakhalin. Escapements of even-year subdominant brood cycle are not actively managed to achieve capacity-based targets, which would be inappropriate for this component of the run. The even-odd year cycle is a naturally occuring phenomenon which occurs independent of fishery effects. The even-year fishery is reduced such that annual exploitation rates are substantially reduced from the already-modest dominant year rates. This ensures that escapements are not greatly affected by the fishery on average. Plots of stock-recruitment data like those requested by the reviewer have been added to this assessment in Figure 8. These data, based on run reconstructions of the aggregate northeast Sakhalin pink salmon stock by the government scientific agency, confirm that aggregate escapements are consistently at or above levels that produce maximum yields and production. Capacity of the spawning streams was estimated by the regional scientific agency based on expert judgement of habitat suitability. Only significant spawning habitats are included. Spawning areas were defined based on and observed utlization patterns. The assessment ream agrees that additional clarification is needed regarding the interpretation of even year spawning escapement data. This clarification has been incorporated into the condition

					for indicator 1.2.4 regarding information for assessment of stock status.
1.1.3	Yes	No	NA	Given that the even year escapement to the Noglikskii District averages only 6% of the capacity estimate, it seems this even year population, which is assumed to be genetically distinct from odd year pink salmon, is likley depleted. However, this statement is based on a potentially inappropriate target reference point for even year pink salmon. In general, pink salmon returning to Sakhalin have been very productive in recent years, as stated.	The reviewer is correct that the capacity-based target reference point in inapproriate for even year escapements. Much lower even-year abundance is a naturally-occurring condition among northeast Sakhalin chum salmon. The trend in even-year abundance has been stable or increasing for an extended period. This run component is not depleted.
1.2.1	Yes	No	NA	As noted above, it is not clear that the harvest strategy is appropriate during even yrs given that escapements averaged only 6% of capacity estimates in the Noglikskii District. Also, in the most recent even yr for which data were available (2006), the harvest rate on even year pink salmon was 41% even though escapement (0.59 million) was low compared with odd yr escapements (avg. 5.7 million). Thus, it is not clear that this strategy is robust and precautionary as indicated by the 95 score. Separate TRPs are likely needed for even and odd year populations.	Additional explanation was added to the justification to clarify the basis for the score of 95. This conclusion was based on a combination of stream-specific and stock aggregate spawning escapement data which indicate that numbers are consistent with maintaining high levels of production and yield. Run reconstructions of the stock aggregate also provide estimates of annual exploitation rates which are relatively conservative for an unenhanced pink salmon stock in relatively pristine spawning habitat and favorable ocean productivity conditions. Note that the 2006 exploitation rate was 27% rather than 41% as previously reported. The 41% figure was based on preliminary data which has subsequently been updated.
1.2.2	Yes	Partially	Maybe	Table 5 shows that index streams are not surveyed every year. For example, in the Smirnykhovskii	Additional escapement data are compiled by the management system and utilized for fishery

				District, two or fewer streams were surveyed in 2002, 2004, 2005, 2006, and 2008. Furthermore, escapement in some of the larger systems (Tym, Langeri) were not provided. How can well defined harvest control rules be in place and evaluated against an LRP or TRP when escapements are not monitored? Apparently catch per effort is monitored inseason. Is the harvest control rule more precautionary in years when few streams are monitored? If harvest control rules are well defined, why was the harvest rate 41% in 2006 when total escapement was only 0.59 million (Table 4)? Condition: the key is to demonstrate that harvest rates are declining when population abundances are declining and approaching the TRP. The data should show that harvest rate is especially low when the LRP is being approached. As discussed above, the key test for this condition will likley be during even years.	regulation but has not been reported in a readily-accessible form. The issue of index stream representation is addressed under indicator 1.2.4. A condition requiring additional data collection and reporting of index stream escapement data for indicator 1.2.4 addresses this issue. While index stream information is incomplete, the data that were available indicate that substantial escapement occurs in virtually all years except those when run size is very low. The aggregate run reconstruction indicates that exploitation rates are substantially reduced in years of low returns including the subdominant even years. Note that the 2006 exploitation rate was 27% rather than 41% as previously reported. The 41% figure was based on preliminary data which has subsequently been updated. While catch rates and harvest are monitored along with escapement during the course of the fishing season, this information typically triggers management action only at very large and very low numbers. Due to the passive nature of the trap net fishing gear, fishing effort and fishery power do not vary in response to abundance such that unsustainably high exploitation rates occur.
1.2.3	Yes	Partially	No, the client action plan did not fully address the stated Condition.	Harvest data are reported, except for illegal catch. It would be good to know to what extent stocks from other Districts contribute to the two Districts considered for MSC certification. If non-local stocks are somewhat significant, then greater precaution is needed in the harvest rule to make sure local and non-local stocks are not over harevsted. The text indicated that the presence of non-local pink salmon from other Sakhalin Districts was low, but it was not clear how this was determined. Reference?	The fishery management system generally assumes that harvest of fish within each district generally originate from streams within the district. This conclusion appears to have been drawn based on expert judgment from historical harvest and migration patterns but appears reasonable given the highly terminal nature of the fishery. This conclusion is also corroborated by mark sampling information for hatchery pink salmon on Iturup Island and Aniva Bay.

				Also, given the proposed increase in hatchery production, hatchery pink salmon should be mass-marked (otolith) so that the hatchery and wild components in the harvest and escapement can be estimated. Condition: Estimates of illegal catch is a good condition, if the estimates are reasonably accurate. The evaluation should also consider the effect of illegal harvests on escapement estimates. The Client Action Plan did not address the second part of the condition to estimate stock components in the harvest. This analysis should consider comments above on non-local and hatchery stocks.	Given the current very limited scale of hatchery production of pink salmon in the northeast Sakhalin region (<1%), hatchery marking would provide very limited information given the sample sizes necessary to identify the hatchery component of the run. In the event of substantial increases in hatchery production of pink salmon, we agree that the issue of hatchery marking will warrant reconsideration. The need to consider the effect of illegal harvest on escapement estimates was added to the description of the condition. Given the consensus of the management system scientists that harvest within northeast Sakhalin region terminal fishery areas consists almost entirely of local stocks and corroborating evidence for this conclusion in other areas where hatchery fish are abundant, expansion of this condition to include assessment of non-local stocks is not warranted.
1.2.4	yes	Partially	Maybe	The assessment notes that two of the larger pink salmon rivers do not have escapement estimates. Also, according to Table 5, many of the index streams are not monitored in some years. Given this, it is difficult to determine that the information is appropriate for the harvest control rule and reference point evaluation. The text notes that stock assessment is subject to "extensive peer review". References and pdf copies of recent reports that contain these reviews should be provided. How have these reviews led to changes in stock assessment over time? Why is age of pink salmon estimated (P. 88)?	The need for additional escapement information is addressed by the condition and action plan for this indicator. See previous explanations for dicussion of other information used to evaluate the harvest control rule and reference points. Example references have been added to the assessment justification for this indicator. Reviewer is correct – pink salmon age is not estimated. See explanation for 1.2.2 regarding the availability of index stream monitoring data.

				Condition: The condition is appropriate for the issues identified. However, as noted above, there is a need to also have monitoring of index streams every year.	
2.1.1	yes	Partially	NA	The report notes that summer run chum salmon, whose timing overlaps that of pink salmon, is not common in Sakhalin but is present in some large rivers such as the Tym. All chum runs are reportedly depressed. On average, bycatch of chum might be somewhat small (most are fall run) but I did not see information on harvest rates of the most vulnerable summer chum salmon. Is the harvest of summer chum salmon within the biologically-based limits and is there a strategy to minimize impacts to rebuilding efforts? (SG80). Addtionally, the report notes that it is unclear whether large late season harvests of pink salmon leads to high harvest rates on early portion of some local fall run chum populations. The report notes that harvest levels during the pink salmon fishery do not appear to be influenced by in-season indicators of chum salmon abundance, suggesting there may be the potential to overharevst depleted chum stocks. The current regulation allowing harvest of non-target species up to 49% of the total catch seems very high, especially since pink salmon is a highly abundance species.	The assessment team concurs with this comment and rescored this indicator to 60 requiring a condition for demonstrating that management measures to protect chum salmon do not hinder recovery and rebuilding.
2.1.2	yes	Partially	NA	Please see comment 2.1.1 above.	See above
2.1.3	yes	Partially	Maybe	Please see comment 2.1.1 above. Although the	Harvest of retained species, including chum, is

				report indicates that bycatch of summer and fall run chum harvests in the pink salmon fishery is documented, I did not see evidence of these data. The condition to monitor and report bycatch of cherry, coho, and char should also include summer and fall run chum salmon.	reported through the management system that issues permits authorizing catch and sale of these species. Chum salmon harvest is reported in Table 6. Additional data are being collected by the fishing companies on retained species. Information on 2011 bycatch sampling has been added to this report in Table 11.
2.2.1	yes	Clarification needed	NA	The indicator text (P 96) states that there are no "main" bycatch species in this pink salmon fishery, yet on page p. 92 the text says chum salmon is a "main" species. I suspect this is because chum are retained, whereas this indicator involves discared bycatch. Nevertheless, the text needs to be clarified for the reader.	Text revised to clarify that chum are a main retained species and no other retained or bycatch species are classified as a main species.
2.2.2	yes	yes	NA	Adequate justification given that they have some limited bycatch data for non-ETP species.	OK
2.2.3	yes	Clarification needed	NA	See clarification request in 2.2.1. This indicator refers to main bycatch species, which could imply chum salmon.	See above
2.3.1	yes	Partially	NA	It is good that regulations require that ETP species such as taimen are to be live released and that penalties for violations are reportedly significant. Fig. 13 suggests that the taimen population has declined to exceptionally low levels in the mid-1990s, apparently reflecting declining abundances, assuming that fishing effort has not significantly declined. Text on page 58 states that taimen catches in the northeast region are thought to average one to two fish per stationary net per year. If there are ~200 nets in the MSC evaluation	Additional explanation has been added to the justification highlighting this issue. It is noted that the total number of fishing companies in the northeast region is 24 and each company only fishes a few nets. Numbers of taimen and sturgeon encountered by this fishery, either in the retained catch, released bycatch, or incidental mortality due to entanglement are reportedly negligible. The issue of incidental capture of ETP species is addressed by the condition

				area, then ~200-400 taimen might be captured in the nets. This seems like a high catch rate for this ETP species. Although regulations require live release, what is the chance that some taimen could be retained with large catches of abundant pink salmon? Given very low abundance what is the effect of this unintential bycatch on taimen? The effects of the fishery on taimen may not be known to the degree required by SG80. How many sturgeon are tangled and killed in net wings, as described on p. 59?	for additional monitoring of bycatch species under Indicator 2.3.3.
2.3.2	yes	yes	NA	The use of live-capture trap nets and the high bycatch penalty is good for reducing potential mortality of ETP species. However, this program will only work if fishermen are vigilent and actively release ETP species alive. The penalty is only a deterent if there is active enforcement. Bycatch sampling data did not reveal capture of ETP species, but what is the probability of capture given the sampling rate and the exceptionally low abundances of ETP species? Sampling effort needs to reflect the rare abundance of ETP species.	The issue of incidental capture of ETP species is addressed by the condition for additional monitoring of bycatch species under Indicator 2.3.3.
2.3.3	yes	yes	Maybe	The condition is appropriate. The condition has potential to raise the score depending on the ability of the client to implement the action plan. As a means to increase sample size, the action plan should also include sampling of gear that is not deployed by companies applying for MSC certification. The plan did not specify whether all	The action plan was clarifed that a representative subset of fishing traps would be sampled.

				or a subset of traps would be sampled.	
2.4.1	yes	No	NA	The text on page 102 states, "However, the available evidence is such that we cannot preclude the possibility of impacts of enhancement activities on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (spawning and rearing flows and water temperatures) in every case." This text raises uncertainty. Also, there is concern that hatchery operations (weirs) may block or impede the migration of natural spawners (see Condition 2.3.3). Page 47 states, "Weir operations also significantly affect the number and diversity of salmon passing into upstream spawning areas. For instance, weir operations have been correlated with a decline in cherry salmon escapement although the nature of the effect has not been identified." Based on this information, the score of 90 may not be warranted even though hatchery production is presently limited in this region of Sakhalin; part of SG80 may not have been met.	Concern for hatchery effects generally relates to other areas of Sakhalin Island where enhancement is more prevalent. The scale of hatchery operation in the northeast region is negligible.
2.4.2	yes	Maybe	NA	Given the information mentioned in 2.4.1, it would be worthwhile to document hatchery weir operations & evaluate potential impacts on wild salmonids.	The need to evaluate hatchery weir operations was identified under this indicator in the event of signficant expansion of hatchery activity in this region.
2.4.3	yes	No	NA	Given information in 2.4.1, the last bullet of SG80 may not be met. The report text implies uncertainty in the effects of the hatchery weirs, although it is recognized that hatchery operations	Basis for score was clarified with additional explanation.

				in this region are not yet widespread. Still, it seems additional evaluation is needed based on the assessment text.	
2.5.1	yes	Maybe	NA	Hatchery production of pink salmon in this relatively small region of NE Sakhalin Island is currently small compared to wild salmon abundance. The text on P 46 states, "If too few fish return to a hatchery in the low years, some programs may bring in fish from other rivers. Federal programs are allowed to bring in brood from other rivers but private hatcheries are not." Are these fish checked for possible disease? Protocols for disease risk management at hatcheries should be described in greater detail.	General descriptions of hatchery practices are more appropriate to other portions of the region than to the Northeast region. Section 4.5.4 on hatchery practices notes that disease issues are not significant for pink salmon in this region.
2.5.2	yes	No	NA	The justification text states, "There is an established artificial production strategy that the strategy in place that is expected to achieve the SG100 outcome. This strategy involves extremely limited hatchery production in the northeast Sakhalin which ensures that related ecosystem concerns are moot." However, elsewhere the report notes that there are plans to significanty increase hatchery production. The SG100 reported here does not reflect the growing hatchery production. Also, the SG100 outcome requires evidence of minimal impacts, which can be interpreted as meaning monitoring evidence where hatcheries currently exist. A perfect score should require direct not indirect evidence.	The justification was expanded to explain that plans for hatchery expansion are concentrated in other regions and this indicator would be re-evaluated in the event of additional hatchery construction in the northeast region.

2.5.3	yes	Yes	NA	Justification is adequate	OK
3.1.1	yes	Mostly	NA	Justification is adequate for selected guideposts. However, it is not clear why the 1st bullet of SG80 was not scored. I have some concern that the reportedly significant illegal and unreported harvests is not consistent with bullet 1, which says the management system is consistent with local and international standards. While the fishery is sustainable, in part because ocean productivity is high, the illegal harvests are not consistent with the concept of sustainable fishing practices.	For the last 2 years fishing companies no longer have an incentive to under-report their catch, because they are not limited to a quota and the fishery is conducted according to the Olympic system and regulated by the Anadromous Fishery Commission on base of the recommendations of SakhNIRO and Sakhrybvod for the filling of the spawning grounds (see Section 4.7.1, 4.7.3). Although illegal fishing of salmon exists in certified areas, government agencies, fishing companies, and public organizations use effective measures against it (see Section 4.4.3.) such that illegal fishing does not impact the sustainability of the fishery.
3.1.2	yes	Maybe	NA	In order to involve consultation, people need information. The assessment text did not provide documentation of annual management reports that should collate past harvest and escapement data for individual streams plus a review of inseason management activities. A fishery receiving a high score should have annual management reports that are publicly available for people to review.	Reports exist on websites SKTU FAR and SFA (Sakhalin Fisheries Agency). These sites contain information on catch per each 5 days and catch per year, and operational decisions taken by AFC. This information is available to any interested person (see websites sktufar.ru and fish.admsakhalin.ru).
3.1.3	yes	No	NA	The justification text (p. 114) states that there is no policy in place that protects the sustainability of wild salmon in light of increasing hatchery production. The lack of this policy indicates that the SG80 precautionary principle guidepost may not be met.	The management system has defined objectives for operation of pink salmon hatcheries which provide a high level of precautionary protection to wild production. These include continued infusion of a high proportion of natural-origin fish in the broodstock, collection of broodstock across the breadth of run timing, rearing on surface water which maintains natural developmental timing, etc.

3.1.4	yes	Yes	NA	Justification is adequate. However, increasing hatchery production in the NE region could eventual lead to harvest rates that are too high for wild pink salmon. Hatchery production might be considered a subsidy to the extent that it leads to high harvest rates on wild salmon.	No response required
3.2.1	yes	Maybe	NA	It is not clear that the fishery objectives are explicit, as required by the SG80. For example, text on P. 114 states that there is no policy in place that protects the sustainability of wild salmon in light of increasing hatchery production.	The management system has defined objectives for operation of pink salmon hatcheries which provide a high level of precautionary protection to wild production. These include continued infusion of a high proportion of natural-origin fish in the broodstock, collection of broodstock across the breadth of run timing, rearing on surface water which maintains natural developmental timing, etc.
3.2.2	yes	No	NA	Justification text states, "Decision-making processes use the precautionary approach and are based on best available in-season catch and escapement data collected by SakhNIRO and SakhRybVod. The use of optimum spawning escapement as both target and limit reference points demonstrates a precautionary element to decision making." It is not clear that 1) the management system uses optimum spawning escapement as both the TRP and LRP. What are the specific TRP and LRP values? Where are the references of analyses that convert spawning capacities to optimum escapements? How can the decision process receive a perfect 100 score when a 40% harvest rate occurs when the escapement in 2006 was 82% below the long-term average?	Justification rationale was revised to clarify that escapement benchmarks were capacity-based targets rather than optimum reference points as defined in the salmon fishery management literature. In 2006 the number of Pink salmon population was low and it was allowed to catch only 27% (not 40% as was erroneously) reported in the peer review draft) of pink salmon according to SakhNIRO calculations. Fishery was not allowed in all fishing sites and the rivers of Smirnychovsky District were closed for fishery. A poor filling of spawning grounds was due both to a low number of Pink salmon population and unfavorable ecological situation in the rivers (high water temperatures – up to 23 degrees and a low content of oxygen in the water). It was therefore decided to limit the run of fish on the spawning ground in order to avoid fish mortality before spawning.

				The perfect score also implies significant reporting, such as detailed annual management reports that are publicly available. These reports should be referenced.	Reports exist on websites SKTU FAR and SFA (Sakhalin Fisheries Agency). These sites contain information on catch per each 5 days and catch per year, and operational decisions taken by AFC. This information is available to any interested person (see websites sktufar.ru and fish.admsakhalin.ru).
3.2.3	yes	Yes	Maybe	Scoring is justified. Condition is reasonable. However, in addition to monitoring, the condition should document the extent to which illegal fishing has declined and the degree to which it may be impacting the resource. See SG80 guidance.	Suggestion to document extent to which illegal fishing has declined and is impacting the resource has been effectively addressed by the condition for additional information under Indicator 1.2.3.
3.2.4	yes	Yes	Yes	Scoring and condition are justified.	No response required
3.2.5	yes	No	NA	SG80 requires "The fishery and its enhancement programs have in place mechanisms to evaluate key parts of the management system". However, the enhancement program does not have in place a method for evaluating the number of returing hatchery pink salmon, including the contribution of hatchery salmon to the fishery and the spawning grounds. These data are needed to manage and evaluate both the wild and the hatchery components of a well-managed fishery.	The management system has estimated the relative contribution of hatchery and wild fish to pink salmon juvenile production in the northeast region. These data were adequate for evaluation of enhancement effects consistent with the current very limited scale of hatchery production in this region.

Any Other Comments

Comments	Conformity Assessment Body Response
None	

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Sometimes**	**Conformity Assessment Body I**
Justification: This relatively small region of NE Sakhalin Island has relatively little hatchery production at present, but the report documents that there are plans for increasing hatchery production. Given the likely increase in hatchery production, I have concern that the management system does not yet have a policy in place to conserve wild salmon production in light of increasing hatchery production. Presently, there is no monitoring or estimates of adult hatchery pink salmon returning to this region, either in the catch or escapement. The text noted that pink salmon are sometimes transferred between watersheds, yet I did not see a policy or protocols for transferring fish between watersheds as a means to prevent transfer of disease. Genetic issues will become a greater concern as hatchery production increases. Is there a hatchery plan that provides guidance of hatchery production based on ecological and genetic factors? An enhanced fishery that is certified by MSC should have a comprehensive hatchery management plan that documents these important factors, and that provides the framework for conserving wild salmon, including harvest rates on hatchery versus wild salmon in the mixed stock fisheries.		*See specific comments above fo* *plans for additional enhanceme* *and facilities may or may not u* *watershed primarily occurred f* *unnecessary for pink salmon w* *the region. Disease is not an is* *management objectives, plans* *of protection for wild populatio* *production in this region. In th* *expanded these issues will need*

Appendix 1 - Peer Review 2

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**No**	**Conformity Assessment Body Response**
Justification: **I believe that some of the scores under Principle 1 and Principle 2 need reconsideration, and as a result may change the overall scores for those Principles.**		*See specific comments below for performance indicators regarding these issues*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**No**	**Conformity Assessment Body Response**
Justification: **I think the Conditions need some additional work.**		*See specific comments below for performance indicators regarding these issues*

I

Do you think the client action plan is sufficient to close the conditions raised?	**No**	**Conformity Assessment Body Response**
Justification: **I think the Client Action Plans need some additional work.**		*See specific comments below for performance indicators regarding these issues*

General Comments on the Assessment Report (optional)

None

Performance Indicator Review

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	?	No		The report justification provided states, "The assessment team considers escapements of 50-100% of the capacity-based target identified by the management system as clearly within a range that avoids recruitment overfishing." No justification for 50% of target reference points is provided, it is just stated as acceptable. In addition, the report justification also states, "While it is highly likely that the fishery does not impair recruitment and the stock is fluctuating around its target reference point, this determination cannot be made with a high degree of certainty due to questions regarding precision of escapement estimation and the accuracy of sample streams in representing other systems within the district." While high degree of certainty is actually a benchmark for the score of 100, the assessment team does not provide any explanation for why it meets a "highly likely" determination as required for 80. No reference is provided to show that index streams have ever been statistically shown to represent all streams. It is not even clear what proportion of streams are indexed and what	Additional explanation for the justification for 50% of target reference points was provided in the explanation for this indicator. This assessment based on an independent evaluation of the available stock-recruitment data by the assessment team. Additonal explanation was added for the basis of the conclusion of high likelihood that the fishery does not impair recruitment based on an analysis of historical stock-recruitment data. The question of index stream respresentation is addressed under indicator 1.2.4 which was scored at a 75 with a condition to provide evidence of coherence between the status of indicator stocks and the status of other stocks they represent within the management unit.

				proportion of spawning escapements they represent (somewhere around 36% for Northeast region).	
1.1.2	yes	Yes (Mostly)		The justification is barely adequate. The assessment team continues to use language that just restates the indicator scoring guideposts. For example, the justification reads. "It is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of subcomponent……." The statement does not provide an explanation of why it is highly likely. This is concerning.	Additional explanation regarding the justification has been added.
1.1.3	Na	na			na
1.2.1	Yes	No		The score of 95 seems remarkably high given the uncetainty stated around using index streams. The assessment team states in its justification. "A consistent pattern of reaching escapement objectives in monitored streams provides evidence that the strategy is achieving objectives. However the strategy has not been fully evaluated with regards to representation of all significant production areas based on index streams for which data has been reported to us." How can it provide evidence if it has not been tested and there is no evaluation of how the index streams correlate to all other streams? I would say that a score of 80 is agreeable, although generous, givn the lack of evaluation about the use of index streams. Also, when the assessment team uses words like "for which data has been reported	Additional explanation was added to the justification to clarify the basis for the score of 95. This conclusion was based on a combination of stream-specific and stock aggregate spawning escapement data, which indicate that numbers are consistent with maintaining high levels of production and yield. Run reconstructions of the stock aggregate also provide estimates of annual exploitation rates which are relatively conservative for an unenhanced pink salmon stock in relatively pristine spawning habitat and favorable ocean productivity conditions.

				to us" suggests that there are limitations regardng the data used to make the evaluation. If this is not the case, then these problematic phrases should not be used to describe the situation.	
1.2.2	Yes	Yes	No	I believe the uncertainty around the escapement goals, the variability in reporting the goals, and the use of index streams that may not be well correlated to the larger productions streams (all stated by th team), are legitimate reasons to score this 75. The Condition seems adequate, but is so generally written that it is difficult to know exactly what needs to be done. Some more specificity in what is expected and what the eliverables should be. As this is an outcome based indicator, there should be specific outcomes specified. The client can then decide how to best answer the specific outcomes. The required outcomes hould not be vague in any way.	The question of index stream respresentation is addressed under indicator 1.2.4 which was scored at a 75 with a condition to provide evidence of coherence between the status of indicator stocks and the status of other stocks they represent within the management unit. Note that the concern over representation of the index streams is tempered somewhat by the fact that larger, unmonitored systems in this area are likely to be more stable and productive for pink salmon than the smaller systems which are more prone to annual weather-related habitat limitations such as reduced flows and elevated stream temperatures during drought years.
1.2.3	yes	Yes	No	The lack of information on unregulated and illegal fishing and the inability to fully understand stock components throughout the region are a legitimate basis for a score of 70. The Client action plan does not match the Action items in the Condition. The client action plan is solely focused on illegal harvests. However, the Condition requires better	The issue of coherence between index and non-index streams is treated by the condition identified for Indicator 1.2.4 and effectively addressed. The action plan has been updated to address the need to understand the significance of harvest on different population-level stock components.

				information on legal harvests as well to understand major stock components. And as pointed out in this review, there needs to be some better scientific basis for the use of index streams. There is no basis for assuming the index streams are well correlated to the rest of the river systems, let alone being useful to look at major stock components for each river system, both large and small. Last, the client action plan timing does not match the timing of the Condition. The deliverables year by year do not match up with the Condition deliverables timing.	The schedule for the condition and action plan has been reconciled.
1.2.4	Yes	No	Yes (with caveat)	The justification clearly states, "Assessments are based on indicator populations rather than indicator stocks. These include multiple pink salmon production areas in the region. However, escapement data is limited for several of the larger pink salmon producing systems in the region including the Tym and (Noglikskii District) and Langery (Smirnykhovskii District) rivers. It is unclear whether the monitored systems are representative of the diversity and status of the larger systems which account for a significant portion of the harvest. It is also noteworthy that hatchery production of pinks in this region is limited to the Tym system for which wild escapement data is unavailable. The concern is that much of the fishery in this region is driven by production from the large systems but assessment data is based on the smaller systems and it is unknown how representative the index populations are of the whole. Information is lacking on the coherence between the status of the indicator	The distinction between "stocks" and "populations" is essential to this indicator. The stock is northeast Sakhalin pink salmon which includes a number of populations returning to different rivers within the region. The genetic and life history characteristics of these populations are very similar with no obvious distinctions among populations. In addition, pink salmon, particularly those returning to smaller systems, are reported to stray regularly among proximate systems to the point where significant genetic differences cannot be distinguished. The northeast region stock structure is much different than in other areas such as Aniva bay where pink salmon include an early-run stock that utilizes the sea of Japan and a later-timed stock which utilizes the sea of Okhotsk and North Pacific ocean. The northeast region pink salmon stock is clearly defined and there are no indicator stocks – it is all one stock. Therefore, this fishery clearly meets the 60 scoring guidepost

				populations and the status of populations in the larger river systems." These concerns are well founded and justify a score below 80. In fact, it is not clear what the scientific basis required by 60 is so it is not clear why the fishery even achieves a score of 60. The scientific basis needs to be clearly articulated. And even the score of 75 is not justified by the fact that 2 of 3 points under the 80 guidepost are not met leaving a score of 72, which is more reflective of 70 rather than 75. The 75 score seems a stretch in either case. The Condition is reasonably clear. The Client Action Plan however does not appear to match the deliverables in the Condition. Does the Client realize that a plan for assessing the validity of the index streams will require escapement data for many rivers in the area to show the correlations? In the Action Plan the client says that they will monitor index streams. They need to say they will continue to monitor index streams and a statistically valid array of non-index streams to show that the index streams are statistically correlated. The non-index streams need to be stratified by size and geography at the very least.	for this indicator. However, there is anecdotal information for pink salmon on Sakhalin that the larger river systems may support more diverse populations utilizing different areas at different times. This assessment has identified the need for additional information on covariation in abundance of the single northeastern Sakhalin pink salmon stock at the population scale. There is clearly a high degree of covariation in abundance of pink salmon returning to indexed and unindexed streams such that index streams provide stock assessment information appropriate for the harvest control rule at current levels of exploitation. It is also likely that the productivity of the larger systems is greater than that of the smaller indexed streams such that the index streams provide a more precautionary estimate of annual run strength. However, population-scale information is currently inadequate to corroborate these conclusions and the condition for this indicator identifies the need for additional monitoring and evaluation. Additonal explanation was added to the condition making it clear that the monitoring plan will need to compare a representative suite of streams and rivers throughout the region.
1.3.1	Yes	No		It appears based on the scoring guideposts the a score of 80 is not justified. I agree with the assessment team that the small hatchery produciton in the region should not be cause or alarm compared to the natural production. However, the hatchery is on one of the larger	The assessment team concluded that marking of hatchery pink salmon at historical production levels was no appropriate because, even in local areas, natural production so dwarfed hatchery production that mark sampling could not reasonably be expected to

				rivers so it could have some influence yet undiscovered. Regardless, the 80 Scoring guidepost requires, "….based on appropriate levels of marking and monitoring to reliably estimate proportions of hatchery-origin fish in the natural spawning escapement." So it appears that without mark and recovery the fishery cannot score an 80 by definition. The assessment team should reconsider how it answers this question if an 80 score is to be permitted.	provide meaningful estimates of hatchery contribution to the harvest or the escapement. Increases in hatchery production would warrant reassessment of the need for hatchery marking. This potential need for marking of hatchery fish was recognized in the client action plan for condition 3 to address Indicator 1.2.4.
1.3.2	Yes	Yes		I believe that plausible argument and logic do work for the present only because of a small amount of hatchery production. In reality this may not last long as there are plans to build many more hatcheries it appears. This being the case, there is also a plausible argument that the current strategy which includes building more hatcheries, is not an effective strategy. In fact, the outcome is based on a lack of strategy that kept more hatcheries from being built. So a score of 80 is about the best one can expect given the evidence provided.	Note that plans for additional hatchery construction in the region are quite preliminary. Hatcheries may or may not ultimately be constructed depending on the availability of funding and priorities among regions.
1.3.3	Yes	No		The requirements for 80 are barely met. The justification states, "Estimates of the impacts of enhancement activities on the aggregate wild stock status, productivity and diversity have been completed for this region (Kaev and Geraschenko 2008).". This is on the aggregate. The fact that a large productive river is where the hatchery operations exist, and there are not even good escapement numbers for the river beg the question of an assessment at all on the very river where the fish are returning.	Additional information was provide in the justifcation explaining the basis for this score. The concern for effects of increased hatchery production is effectively addressed by conditions identified under Indicator 1.2.4 requiring additional monitoring of natural escapement in the Tym River and an assessment of the implications of even and odd-year run escapement patterns.

				Even the assessment team note under other indicators that the government biologists believe the fish home largely back to the river due to the distance traveled to leave the river. With possible stock structure within a large river, it is hard to know if the hatchery returns could be affecting a sub-stock of some importance. I would only give this an 80 even though the proportion of hatchery fish is low, and this is simply because the wording of the scoring guidepost requires more evidence than has been presented.	
2.1.1	yes	No		Again,the wording of the 80 scoring guidepost makes the score of 80 for this indicator problematic. The scoring guidepost for 80 states, "Main retained species arehighly likely to be within biologically based limits,or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding." The assessment team then states, "Chum salmon are considered a "main" species according to MSC guidelines. No other species comprises the 5-20% of the total catch or is considered valuable or vulnerable that would categorize it as a main retained species for the purposes of this assessment.". However, in other parts of the report, the assessment team notes that, "However, monitoring of retained species is not conducted in sufficient detail to assess ongoing mortalities to other **significant retained species** (e.g. cherry salmon, **coho** salmon, char) such that increasing risk levels can be detected." And yet in other parts of the	Coho risks from the pink salmon fishery are neglible owing to wide differences in run timing. The lack of significant coho impact is demonstrated by recent monitoring data for retained species which has been added to this report. However, the same case cannot be made for chum salmon. This indicator was rescored and a condition added to address chum salmon.

				report, the team notes that coho are at the southern-most distribution of coho salmon in Asia, which could make them vulnerable. This needs further explanation to achieve 80. I would have only allowed 70 without further explanation and evidence about the risks to coho.	
2.1.2	Yes	No		I do not believe a score of 90 has been properly justified. The scoring guidepost for 80 states, "There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding." Yet the justification and report note that chum escapement never meet goals. Regardless of the partial strategy, it does not appear to be working, and does seem to be hindering recovery. Whether it is poaching, poor monitoring, or anything else, something is not allowing chum to reach escapements, so the strategy is not working. This suggests that the fishery does not even meet the 80 coring guidepost for this indicator. The assessment team needs to reconsider its explanation.	The concern over chum salmon impacts in the pink salmon fishery was addressed by rescoring indicator 2.1.1 to 60 and requiring a condition for demonstrating that management measures to protect chum salmon do not hinder recovery and rebuilding. The assessment team agrees that the 100 scoring guidepost are not met with respect to chum salmon and rescored this indicator to an 80. Additional explanation was added to the justification for this indicator. The concern here is that whether the pink salmon fishing impacts are hindering recovery, not whether effective measures have been implemented to address all the other factors that have led to depletion of the chum salmon stock.
2.1.3	Yes	Yes	No	The justification makes sense. While it is bit generous, it is a reasonable score. With regard to the Condition, it seems very direct. However, the requirement that there is enough knowledge of cherry and coho salmon to detect risks does not appear to be picked up by the Client Action plan. It is not clear if the Client will collect additional data on population	The client action plan specifically recognizes the need for information on status and associated biological indicators (size, sex, etc.) consistent with the requirement of the condition. Condition was clarified with the wording as suggested.

				size, structure, and geographic location for each retained pecies so that harvests and escapements can be evaluated for risk on an ongoing basis. Also, the Condition says, "By the fourth surveillance audit, the client must provide sufficient data to detect any increase in the risk level of significant retained species of retained bycatch such as cherry salmon, coho salmon, and char." The statement should read, "By the fourth surveillance audit, the client must provide sufficient **results to show that they can detect** any increase in the risk level of significant retained species of retained bycatch such as cherry salmon, coho salmon, and char."	
2.2.1	Yes	Yes		The justification is adequate and accurate according to the information provided.	No response required
2.2.2	Yes	Yes		The justification is reasonable.	No response required
2.2.3	No	no		The justification, as well as other parts of the report, mention a 2010 bycatch study. There is no explanation of the study methods to indicate adequate information. It is hard to see how the fishery meets the 80 scoring guidepost without an adequate explanation of the monitoring study. Wild Salmon Center has made specific comments about concerns over bycatch on Iturup Island, which appears to have far more control and moniroting and reporting. There is little explanation of the monitoring and reporting of bycatch species in this fishery, which does not appear to providde adequate information to base opinions of having bycatch species within biologically	Justification has been revised to provide more details on rationale for scoring. Additional bycatch monitoring information has been added to the report from the 2011 fishery.

				based limits. I would only assign a score of 75 as without more information on what and how much information is being collected on an ongoing basis, the fishery does not appear to meet the last point under the 80 scoring guidepost that requires continuous collection of information adequate o assess ongoing risks.	
2.3.1	No	No		A score of 80 does not appear to be justified. There is no explanation of the monitoring that is used to get adequate numbers on Taimen or sturgeon bycatch. Throughout the report there is mention that there is not adequate monitoring of bycatch. Although timing is different for both sturgeon and Taimen, the historical catch of Taimen was significant. Not sure of sturgeon. The 80 scoring guidepost states, "The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species." Clearly, the effects of the fishery are not know, they are estimated at best a more likely derived from logical argument rather than actual data. This would cause me to be suspect of a score of 80, as the scoring guidepost says "known" not estimated without reasonable justification. Again, specific wording of the guidepost needs to be properly addressed by the assessment team.	Additional explanation has been added to the justification regarding bycatch of taimen and sturgeon. Numbers of taimen and sturgeon encountered by this fishery, either in the retained catch, released bycatch or incidental mortality due to entanglement, are reportedly negligible. The issue of incidental capture of ETP species is addressed by the condition for additional monitoring of bycatch species under Indicator 2.3.3
2.3.2	No	No		A score of 80 again is based on statements that there is evidence or information on catch. Reports of low catch for taimen and sturgeon are based on what? Again, there is no explanation of where the information is coming from and who is checking its adequacy. The	The issue of incidental capture of ETP species is addressed by the condition for additional monitoring of bycatch species under Indicator 2.3.3.

				fact that the report states, “The northeast Sakhalin populations of taimen are among the most significant in the region.” If the numbers are high enough, then incidental catch could be of concern. There needs to be some basis for the belief that there are low catches of taimen and sturgeon. A score of 70 or 75 woud seem more arranted.	
2.3.3	Yes	Yes	No	Agree with the score. The Condition is reasonably general and needs to have some language that is unambiguous with regard to what is needed in terms of data. In the general statement above the Condition, the report says – “Information on the distribution and abundance of Sakhalin taimen in the fishery areas is simply inadequate to complete such an assessment.” The Condition therefore should state the need for this type of data more directly. For example, the Condition could possibly read, “By the first surveillance audit, the fishery client must provide evidence that a plan is in place to quantitatively estimate abundance, distribution, and stock structure for ETP species as well as better harvest and incidental take data so that fishery and enhancement related mortality for ETP species, including taimen, can be fully assessed.” The Client Action Plan is very general and promises little due to the vagueries of funding. However, there is no mention of collecting data on the actual populations of taimen and sturgeon such that a baseline exists to evaluate fishery and hatchery related mortalities. The client says they will use observers, however	The proposed clarification was added to the condition in the form of a recommendation. Progress toward satisfactory completion of this condition will be assessed during the surveillance audit. Failure to develop and implement an approriate plan will be treated accordingly.

				observers will only be useful for incidental catches, not a population or stock assessment that is sufficient to use for determining risks. Since this area has the largest population of Taimen according o the report, the assessment is the more important need and also the more costly and difficult to complete.	
2.4.1	Yes	Yes		Agree with justification and score	No response required
2.4.2	Yes	No		I would argue that a score of more than 80 is warranted. Here the strategy of using passive fishing gear is protective of the habitat. Also, limited hatchery development also protects habitat. Lastly, the protocols and regulations surrounding hatcheries are significant and may well have habitat protection built in, yet this is not discussed. Based on the 100 scoring guidepost, it appears the fishery could achieve a score of 90 or 95.	The score was not revised. The lack of significant habitat impacts is appears due more to the use of fishing gear that is effective and efficient rather than a concerted effort to avoid habitat impacts. A score change would have no substantive effect on the outcome of this assessment.
2.4.3	Yes	Yes		Agree	No response required
2.5.1	Yes	Yes		Agree	No response required
2.5.2	Yes	Yes		Agree	No response required
2.5.3	Yes	No		Would have scored an 85 at least as the fishery appears to meet the first two points under the 100 scoring guidepost.	The score was not revised. While information is adequate to satisfy the 80 scoring guideposts, a detailed ecosystem evaluation has not been undertaken specific to this region. A score change would have no substantive effect on the outcome of this assessment.

3.1.1	Yes	Yes		Agree	No response required
3.1.2	Yes	Yes		Agree	No response required
3.1.3	Yes	Yes		Agree	No response required
3.1.4	Yes	Yes		Agree	No response required
3.2.1	Yes	Yes		Agree	No response required
3.2.2	Yes	Yes		Agree	No response required
3.2.3	Yes	Yes	Yes	Agree The only comment on the Condition and Client Action Plan is that if all the work is done by the client, what measures will be taken to ensure an independent check on what the client is doing? This is necessary as the Client has every incentive to cheat, not that they would, but there must be check by the government or some other independent source to ensure true compliance. I am not suggesting a requirement for independent observers as this is expensive, but I am suggesting that the government should have an adequate check to ensure compliance.	A recommendation was added to the condition highlighting the need for independent corroboration from official sources.
3.2.4	Yes	Yes	Yes	Agree	No response required
3.2.5	Yes	Yes		Agree	No response required

Appendix 3 Stakeholder Comments

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SUBJECT: MSC Review and Report on Compliance with the scheme requirements

Dear Robert Trumble

Please find below the results of our partial review of compliance with scheme requirements.

CAB	MRAG Americas, Inc.
Lead Auditor	Robert Trumble
Fishery Name	Northeast Sakhalin Island and Aniva Bay trap net pink salmon
Document Reviewed	Public Comment Draft Report Posted

Ref	Type	Page	Requirement	Reference	Details
TO.324	Major		CRT-V1.2-2.1 b	The report shall contain: Names of the peer reviewers	Names of the peer reviewers are not included in the report. Lead auditor is also not identified.
TO.325	Major		CR-V1.1-27.10.6.1	Rationale shall be presented to support the team's conclusion.	For PI 1.1.1 the rationale does not support the score given. The report discusses the IUU fishing in the freshwater environment, including significant targeting of roe. The report does not estimate how these removals may affect the stock status. Are the escapement counts made before or after the point where the illegal harvest occurs?

TO.326	Major		CRT-V1.2-A1.1.1 b	In the following PI Evaluation Tables the following shall be documented for each PI: A reference to the source of information used to make a judgement about that indicator.	PI 2.3.1 No reference to the source of information used to make a judgement about the indicator is included. No referenced data is provided about catches of Taimen in the fishery, nor is there information on stock status. If this data is unavailable, is a score of 80 justified? CB 3.11.3.1 states that to score 80 for scoring issue a there should be 'direct demonstration that requirements for protection and rebuilding are being achieved. Is this the case? Performance indicators in P1 also need to be reviewed for inclusion of references.
TO.327	Major		CR-V1.1-27.10.7.3	Scores should be determined for each scoring element by applying the process in section 27.10.5 to each scoring element	Scores for each scoring element of PIs are not clearly presented in the ETP PIs. For example in PI 2.3.1, the case for an 80 score for sturgeon is not made.
TO.328	Major		CR-V1.1-27.10.6.1	Rationale shall be presented to support the team's conclusion.	Crab catch is considered in the bycatch component of P2. It is accepted however that there is some illegal retention of crabs. There is no information provided about the extent of the bycatch monitoring programme (or a reference to any report). It is not therefore possible to assess whether the information supports the scores given in PIs 2.2.1-2.2.3. It is not clear if crabs should be scored in bycatch or retained component of P2 as the report states they are often retained, either intentionally for personal consumption or when catches are too high to allow sorting of catch on site. Crabs are not classified as main species due to catch levels but as populations are reported as 'not currently within biologically-based limits', have the assessors considered whther they ought to be included as a main species due to vulnerability?

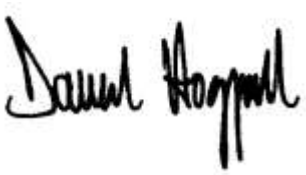
TO.330	Major		CR-V1.2-CB2.2.2.1	The team shall consider the biology of the species and the scale and intensity of both the fishery and management system and other relevant issues in determining relevant time periods over which to judge fluctuations. CB2.2.2.1 At SG80, there shall be evidence that the stock is at the target reference point now or has fluctuated around the target reference point for the past few years.	For P1.1.1 the evidence given for the stock fluctuating around the target reference point is not specific to the "past few years" as required.
TO.332	Major	124	CR-V1.2-27.11.2.3	The CAB shall require the client to prepare a "client action plan" that includes: The specified time period within which the conditions and milestones will be addressed.	The Client Action Plan for PI 1.2.2 does not commit the client to a milestone for delivery of the detailed management required for the increased use of the in-river fishing weirs (described in last paragraph of action plan). Use of these weirs for fishing has clear potential to affect non-target species. It is not clear whether the client is commiting not to use these weirs until the criteria and threat of mass death has been 'pre-designed' for specific rivers.
TO.334	Major		CR-V1.1-27.10.6.2	The rationale shall make direct reference to every scoring issue and whether or not it is fully met.	PI 1.2.1 The rationale does not directly address each scoring issue at the different guidepost levels (responses only appear to apply to the SG100 level). Information is also not provided on any differences in how the harvest strategy is applied between even-year and odd-year cycles. A lack of attention to the (lower abundance) even year cycles is also apparent in other Pis (e.g. 1.1.1, 1.1.2, 1.2.2).

TO.335	Major		CR-V1.1-27.10.6.1	Rationale shall be presented to support the team's conclusion.	PIs 1.3.2 and 1.3.3 The rationale does not support the score given for either PI. PI 1.3.2 SG80 requires "evidence that the strategy is effectively achieving the outcomes metrics used to define these minimum impacts" No evidence is presented in the justification. PI 1.3.3 justification states "Hatchery marking and mark sampling in natural production areas has not been implemented but the scale of hatchery production is so limited that hatchery effects can be confidently assessed without this information." This statement contradicts with information provided in the Introduction, "However, the Pilenga hatchery has developed a potentially significant pink salmon production program, with releases as high as 2.2 million fish in 2010 (from 2009 returns)….The contribution and distribution of hatchery-origin fish to natural spawning escapements is unknown."
TO.338	Major	121	CR-V1.1-27.6.3	The CAB shall document the rationale for the target eligibility date and include an assessment regarding how the assessed risks to the traceability system in the fishery are adequately addressed by the applicant to give confidence in this date.	There is no rationale given for the target eligibility date
TO.339	Major	120	CR-V1.1-27.12.1.5	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: Any transhipment activities taking place.	It is not confirmed whether transhipment is taking place. There are known risks of IUU in the region and other fishing companies outside of the unit of certification.
TO.341	Major	120	CR-V1.1-27.12.1.1	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: The systems in use.	The eligible parties and categories or parties are not clear. Although there are lists of "Client Group Companies" on page 6, it is not clear if this is a full list of either companies or vessels. It is not clear how companies or vessels join the certificate sharing agreements, or if other companies or vessels may join in the future, and if there are any stipulations for joining.

TO.342	Major	120	CR-V1.1-27.12.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products. The opportunity of substitution of certified with non-certified fish prior or at landing.	The systems of tracking and tracing enforcement relating to risks of substitution are not fully explained. It is not explained how the risk of companies within the unit of certification using a gear outside of the unit of certification is managed. The report does not state the document accompanying the catch indicates catch method. It is not explained how the risk of substitution between the different species of salmon is managed as most fishing companies will also catch chum, cherry, Chinook and coho.
TO.344	Major	120	CR-V1.1-27.12.1.7	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products. The robustness of the management systems	The enforcement activities to manage the risks of IUU being received from other fishery companies are not explained.
TO.323	Guidance		NA		Peer review A does not include PIs 1.3.1-1.3.3. Is this an unintentional omission from the report or were no comments provided?
TO.336	Guidance	79	NA		The scoring tables in the report (e.g. on page 79) refer to the number of 'Criteria' being met at the different scoring levels. Scoring is required against 'scoring issues', not 'criteria'.
TO.337	Guidance		NA		The scoring rationales would be clearer if the comments were more clearly related to specific scoring issues and guidepost levels. Many paragraphs start with the text copied from the scoring guideposts, but it is not clear if a statement is thereby being made that the guidepost is met, or if this is just the focus of the following text.
TO.340	Guidance	121	CR-V1.1-27.12.1.6	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: The number and/or location of points of landing.	The points of landing are not clearly defined. The report states 'fishing parcels of companies operating under the certificate sharing agreement' but does not list these.

TO.343	Guidance	120	CR-V1.1-27.12.1.2	The possibility of vessels fishing outside the unit of certification.	It is not specified if there is any risk of fishing outside the geographical region of the unit of certification or how these are managed. The location is specified on the catch document but not how it is managed relating to the MSC unit of certification.
TO.345	Guidance	40	NA		Typo in 3rd paragraph- "their monitoring activities and joint efforts with government authorities appear to provide AND effective deterrent" - to change to 'AN'?
TO.346	Guidance	122	NA		Typo in last paragraph- "...either the Nogliki or Smirnykh distrcts..."- to change to "districts"?
TO.347	Guidance	120	CR-V1.1-27.12.1.4	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: At-sea processing activities.	It is not clear if there is any processing at sea or related segregation control measures.
TO.350	Guidance	109, 6.1.4	NA		Typo. Review first sentence. Assume this should read Principle III. As the reports for these Units are now separate is it intented to retain the information here about the Aniva Bay scoring?

This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact Megan Atcheson (megan.atcheson@msc.org) for more information.



Best regards,
Dan Hoggarth
Fisheries Oversight Director
Marine Stewardship Council

cc: Accreditation Services International

Assessment team response to MSC comments, NE Sakhalin Pink Salmon

Ref	Type	Response
TO.324	Major	Names of peer reviewers added to Section 3.1. Lead auditor identified in Section 3.1
TO.325	Major	Additional explanation added to PI 1.1.1 rationale to the effect that escapement counts effectively take illegal harvest into consideration.
TO.326	Major	References were added to the PI 2.3.1 rationale in the form of literature citations and referral to section 4.6 of the report where related information was described in detail.
TO.327	Major	Additional explanation was provided to support the scoring of 80 for sturgeon.
TO.328	Major	Additional explanation was added to the rationale for 2.2.1 regarding the bycatch monitoring program with reference to section 4.6.2 where results are presented in detail. Additional explanation regarding disposition of crab bycatch was also added.
TO.330	Major	Rationale was amended to affirm that stock fluctuations around target reference points are applicable in the last few years. Referral was added to section 4.3.3 where this data was reported.
TO.332	Major	Fish counting weirs are not currently used in the area of certification. The client has added a milestone for the second surveillance for addressing counting weirs should they occur. Clarification provided in the text.
TO.334	Major	Additional explanation was provided to the scoring rationale for 1.2.1 regarding the treatment of even and odd year pink salmon returns.
TO.335	Major	Additional explanation was provided in scoring rationales with reference to extensive supporting explanations in section 4.5.
TO.338	Major	Rationale provided in Section 6.2.4.
TO.339	Major	Processing at sea does occur, and all processing vessels will receive CoC certification before certified fish may enter the supply chain. Clarification provided in the text.
TO.341	Major	Explanation of certificate sharing agreement and a requirement to update the client group companies as appropriate added to Section 7.2
TO.342	Major	Additional explanation was added to section 6.2.1 regarding tracking and tracing enforcement.
TO.344	Major	Government monitoring of proper documentation assures that fish from non-certified companies do not enter the supply chain. Clarification provided in the text.
TO.323	Guidance	No comments per provided presumably because enhancement is practically negligible in this fishery. Lines were added to peer reviewer comments to this effect.
TO.336	Guidance	Table headings were revised from criteria to issues as directed.
TO.337	Guidance	Where text is copied from scoring guideposts, this indicates the

Ref	Type	Response
		guidepost is met. These sentences are followed by explanations why this is the case.
TO.340	Guidance	A list of fish parcels is being provided by the client
TO.343	Guidance	Trap nets are fished at fixed locations, and government-required documentation of landing site assures fish from outside the unit of certification do not enter the supply chain.
TO.345	Guidance	Typo corrected
TO.346	Guidance	Typo corrected
TO.347	Guidance	Processing at sea does occur, and all processing vessels will receive CoC certification before certified fish may enter the supply chain. Clarification provided in the text.
TO.350	Guidance	Typo corrected; reference to Aniva Bay removed