SakhalinRybVod

Report of the Reydovo Salmon Hatchery for the 1st half of 2007

Reydovo
Reydovo Salmon Hatchery

2007

CONTENTS

I.Hatchery target for young salmon release and its achievement

The Reydovo Salmon Hatchery has been releasing young salmon since 1961, with particular emphasis on two species: pink and chum salmon.

*During the 2006 – 2007 hatchery cycle, **67700.3** thousand young salmon were released, including **41664.9** thousand pink salmon young and **26035.4** thousand chum salmon young. The 2007 salmon release plan was 62.6 million fish, including 38.1 million pink salmon young and 24.4 million chum salmon young. This plan was met by 108.15 %. The average weight of released pink salmon young was **308.8** mg, and the average weight of released chum salmon young was **1100.4** mg.*

In the reporting year, the numbers of eggs incubated and young salmon released corresponded to the designed capacity of the hatchery. Chum Salmon was set out to hatch and grow in 62 (2356 m^2) channels, and Pink Salmon in 54 (2052 m^2).

Information on the extent to which the plan was met during the last six years is presented in Table 1 of the Appendix.

In 2007, the chum and pink salmon young were fed with various formulations of the Danish Fish food pellets, "ALLER AQUA" (Table 11). The feed coefficient for pink salmon was 1.04, and for chum salmon was 0.7 (Tables 10.1-10.2 of the Appendix).

II.Description of the conditions of egg incubation and sac-fry holding

A.Hydrometrological Observations

The weather conditions for the past six month period were characterized by a moderate amount of precipitation at the beginning of winter (December-January) and by an increase in February-March. Throughout the winter, thaws occurred on a regular basis. The onset of snow cover during the reporting period occurred during the beginning of December, in keeping with the normal time frame.

The weather during the entire month of **January** 2007 was overcast and unstable, with moderate north-west winds. There were only two sunny days during the entire month. On 09JAN07, a typhoon passed through the area, with strong NW and W winds and blizzard conditions, as a result of which the mouth of the base rivers, Reydovaya and Argunj, was washed out and wind damaged.

In **February** the weather was predominantly overcast, with winds from the northwest and snowstorms of various intensity. In February there were two strong blizzards (02FEB and 14FEB) with winds of more than 20 meters per second, as well as several thaws, when the air temperature was between 0 and +5 ºC, accompanied by wet snow and rain. The surface flow of water in the river during this winter never stopped, which made it possible to supply the nursery with river water during the entire period of pink salmon incubation.

During the first twenty days of **March**, the weather was predominantly overcast and unstable, with southeast and northwest winds. There were 4 days of sunshine. During the last ten days of March, the weather was predominantly sunny and calm. Chum salmon young first appeared at the spawning grounds during the first ten days of March.

During **April**, cold, overcast weather predominated with precipitation in the form of rain and wet snow, and there were six sunny days recorded for the month. Snow melt occurred gradually, without causing the water level in the river to increase very much.

During **May** the weather was predominantly overcast with drizzling rain and moderate southeast and northwest winds. During the month there were four days of sunshine. The water level in the river varied by 0.5 - 2.0 meters. Sea water temperature at the end of the month was 4.2 degrees C. *Beginning on 30 April, water was added from the well shaft (with an average temperature of 8.2 ºC) to warm the water up, and such pumping was halted on 10 June.*

For the entire month of **June** the weather was predominantly sunny and variable, with no significant precipitation. There was no flooding during the month, and *the release of the young salmon was accomplished during favorable hydrological conditions both in the river and at sea.*

Data on the temperature regimes are presented in Tables 3.1 – 3.5 of the Appendix.

B.Placing of eggs in incubators

During the reporting year, the incubation of pink salmon eggs occurred in 78 "BOX" incubators and 8 "ATKINS" cells. An average of 555.0 thousand eggs were incubated in the "BOX" units, and each cell of the "ATKINS" unit held 153.6 thousand eggs. For the incubation of chum salmon eggs, 62 "BOX" units were used, with an average of 416.8 thousand eggs, and 36 "ATKINS" incubators, with an average of 114.2 thousand eggs in each cell. Altogether in 2006 there were 140 "BOX" incubators and 11 ATKINS units. The hatchery has a total of 144 "BOX" incubators and 12 "ATKINS" units (each having 4 cells).

C.__Incubation of eggs__

Altogether during the 2006 season, 73490.9 thousand salmon eggs were collected, including 44711.5 thousand pink salmon eggs and 28779.4 thousand chum salmon eggs. All pink and chum salmon eggs were collected on the base river – the Reydovaya.

Egg die-off during incubation (including as a result of transport) for __**pink salmon**__ was 2869.9 thousand, or 6.4%. The percentage of fertilized eggs was 95.5%. Saprolegniosis of the eggs was insignificant. Prophylactic cleaning was done on the second day following collection, after the dead eggs were removed from the incubators using Malachite Green. Dead eggs were removed from the incubators at an age of from 300 to 450 degree days using JX egg removers. Before the dead eggs were removed, the eggs were first stressed by pouring them from one basin into another. Water consumption for the incubation period was set at 50 liters per minute at the start of incubation, and 70 liters per minute at the end of incubation. The water was supplied from groundwater from 18SEP through 16NOV06, then was subsequently shifted to the infrabed drainage water supply. Mass hatching occurred on days 86 – 113 at 467.3– 561.4 degree days in the period from 22DEC through 30JAN07.

Egg die-off for __**chum salmon**__ was 2626.1 thousand, or 9.1 %. No transport die-off was removed. The percentage of fertilized eggs was 95.2%. Eggs were treated with Malachite Green on the second day after placement and before removal of dead eggs from the incubators. After stressing the eggs (as with the pink salmon eggs), dead eggs were removed from the incubators at an age of from 300 to 450 degree days using JX egg removers. Water consumption for the incubation period was set at 50 liters per minute at the start of incubation, and 70 liters per minute at the end of incubation. The water was supplied from groundwater from 15OCT through 21NOV, from the infrabed supply from 22NOV through 20DEC, and then subsequently from a mixture of infrabed and groundwater. Mass hatching occurred on days 90 – 99, at 483.9 – 506.5 degree days in the period from 12JAN through 17FEB07.

The eggs were subjected to washing and declumping during the incubation period. Egg washing before the "eye-spot" stage was accomplished by draining water from the incubators, and subsequently the water drainage was accompanied by active declumping by hand.

Information on egg incubation is presented in Tables 6 and 7 of the Appendix.

Characteristics of hatchery production capacities

Item #	Description	Qty.	sq. m.	Dimensions, cm.	Changes
1.	**Far-East type incubators**	**-**	**-**	**-**	**Fully removed from use in SEP99.**
2.	**Box-type incubator units – "Box".**	**144**	**-**	**-**	**Placed into use in 1998**
3.	**Box-type incubator units – "Atkins"**	**12**	**-**	**-**	**Placed into use in 1998**
4.	**Far-East type nursery (Line)**	**-**	**-**	**-**	**Fully removed from use in 2000**
5.	**Nursery channels**	**39**	**1482**	**1900x200**	**Placed into use in 1998. Used for chum salmon**
6.	**Nursery channels**	**23**	**874**	**1900x200**	**Placed into use in 1999. Used for chum salmon**
7.	**Nursery channels**	**54**	**2052**	**1900x200**	**Placed into use in 2000. Used for pink salmon**
8.	**Rearing ponds:** ™ **concrete**	**-**	**-**	**-**	**Fully removed from use in 2000**
	™ **pit-type**	**-**	**-**	**-**	**Fully removed from use in 2000**
9.	**Mesh spawner holding pen**	**2**	**12**	**200x300**	**None**

Egg development compared with parent generation

Lot, year collected	Average temperature, °C	Mass Hatching Date	Days in incubators	Age, deg. dy.
Pink Salmon 2005				
First	**5.6**	**10JAN06**	**91**	**512.7**
Middle	**5.2**	**29JAN06**	**96**	**498.9**
Last	**4.7**	**16FEB06**	**104**	**489.6**
Pink Salmon 2006				
First	**6.2**	**22DEC06**	**96**	**561.4**
Middle	**4.9**	**10JAN07**	**104**	**510.7**
Last	**4.2**	**30JAN07**	**113**	**467.3**
Chum Salmon 2002				
First	**5.2**	**25JAN02**	**96**	**498.0**
Middle	**4.9**	**13FEB02**	**103**	**507.9**
Last	**4.9**	**27FEB02**	**104**	**513.2**
Chum Salmon 2006				
First	**5.6**	**12JAN07**	**90**	**506.5**
Middle	**5.3**	**30JAN07**	**95**	**501.2**
Last	**4.9**	**17FEB07**	**99**	**483.9**

D. Hatching and holding of sac-fry

Pink Salmon eggs were placed for hatching:

⇒ In **54** channels (2052 m^2) in an amount of 42074.5 thousand at a density of 20.9 thousand/m^2. The fry were held in black tubular Japanese substrata in 26 channels and white substrata in 28 channels.

Altogether 42074.5 thousand pink salmon eggs were placed for hatching, of which 41841.6 thousand hatched (minus dead eggs after trays were removed).

The holding period for the free embryos continued from 19DEC06 through 13MAY07. The fry began swimming on day 220 – 225 at 783.6 – 840.4 degree days. Shading was stopped in the period from 25APR through 13MAY07.

Water supply:

- Water supplied to the pink salmon portion of the plant was a mixture of infrabed and river water. Temperature was between 1.8 and 6.4 degrees C

Chum salmon eggs were placed in **62** nursery channels (2356 m^2) in the amount of 26237.2 thousand, of which 26153.3 thousand hatched (minus dead eggs after trays were removed), which comprised a density of 10.6 thousand/m^2. The fry were held in gray tubular Japanese substrata. The holding period for the chum salmon

A. Information on fish food

Feed for the 2006-2007 hatchery cycle was purchased in the fall of 2006 and delivered to the island in March 2007. The total amount of feed acquired for the Reydovo Salmon Hatchery was 16.15 MT, plus the previous year's 16.75 MT. Altogether during the feeding period the following amounts of feed were consumed: for pink salmon – 4077 kg, for chum – 12643 kg, for masu – 30 kg. Detailed data are presented in Table 10.2 of the Appendix. All of the fish food was consumed.

IV. Diseased eggs and salmon fry and treatment methods

During the 2006-2007 hatchery cycle, the eggs and salmon fry were subjected to scheduled treatment with Malachite Green and Formalin. The first treatment was performed on the eggs following their collection, with subsequent treatment conducted if symptoms were evident (incidence of saprolegniosis). The fry were treated to suppress the development of parasitic infusers of the genus Trichodina.

The following prophylactic measures were conducted throughout the hatchery cycle at the Reydovo Salmon Hatchery:

Date conducted	*Purpose of treatment*	*Target*				*Concentration*	*Duration*	*Preparation*	
		Eggs, fry, young	*Incubators, nursery channels*					*Name*	*Amount*
			Qty.	*S,m^2*	*V,m^3*				
Pink Salmon									
20SEP-10OCT06	*Prevention of saprolegiosis*	*Eggs 44711.5 thousand*	*78 B, 4 A*			*1:800*	*30 minutes*	*Formalin*	*51 lit.*
11NOV-29NOV06	*Treatment of saprolegiosis*	*Eggs 43649.1 thousand*	*64 B*			*1:800*	*30 minutes*	*Formalin*	*46 liters*
01MAY07	*Prophylactic treatment of trichodiniosis*	*Young 9409.3 thousand*	*13 channels*	*494*	*98.8*	*1:800000*	*2 hours*	*Malachite Green*	*117 grams*
30MAY07	*Treatment of initial stage of trichodiniosis*	*Young 18197.5 thousand*	*26 channels*	*988*	*197.6*	*1:800*	*20 minutes. (bath)*	*Formalin*	*65 lit.*
31MAY07	***Treatment of initial stage of trichodiniosis***	***Young 42450.7 thousand***	***54 channels***	***2052***	***410.4***	***1:800***	***1.5 hr. Drip method***	***Formalin***	***216 lit.***
Total for pink salmon							*Formalin*		*378 lit.*
							Malachite Green		*117 g*
Chum Salmon									
17OCT-11NOV06	*Prophylactic treatment of saprolegniosis*	*Eggs 28779.4 thousand*	*62 B, 36 A*			*1:800*	*30 minutes*	*Formalin*	*48 liters*
22-29NOV06	*Treatment of saprolegniosis*	*Eggs 21870.6 thousand*	*53 B*			*1:800*	*30 minutes*	*Formalin*	*18 liters*
02DEC06	*Treatment of saprolegniosis*	*Eggs 26607.1*	*60 B*			*1:800*	*30 minutes*	*Formalin*	*27 liters*

		thousand	*36 A*			*1:800*	*30 minutes*	*Formalin*	
11DEC06	*Treatment of saprolegniosis*	*Eggs 26607.1 thousand*	*60 B*			*1:800*	*30 minutes*	*Formalin*	*27 liters*
			36 A			*1:800*	*30 minutes*	*Formalin*	
19DEC06	*Treatment of saprolegniosis*	*Eggs 2172.3 thousand*	*5 B*			*1:800*	*30 minutes*	*Formalin*	*2 liters*
06JAN07	*Treatment of saprolegniosis*	*Eggs 845 thousand*	*2 B*			*1:800*	*30 minutes*	*Formalin*	*1 liters*
20JAN07	*Treatment of saprolegniosis*	*Eggs 2573.2 thousand*	*6 boxes*			*1:800*	*30 minutes*	*Formalin*	*2 liters*
18APR - 08MAY07	*Prophylactic treatment of trichodiniosis*	*Young 26070 thousand*	*62 chan-nels*	*2356*	*471.2*	*1:800000*	*2hours*	*Malachite Green*	*558 grams*
11MAY07	*Prophylactic treatment of trichodiniosis*	*Young 783.3 thousand*	*2 chan-nels*	*76*	*15.2*	*1:800*	*20 mi-nutes. (bath)*	*Formalin*	*5 liters*
14MAY - 28MAY	*Treatment of trichodiniosis*	*Young 16000 thousand*	*40 channels*	*1520*	*304*	*1:800000*	*2 hours*	*Malachite Green*	*435 grams*
04JUN-14JUN	*Prophylactic treatment*	*Young 15750 thousand*	*35 chan-nels*	*1330*	*266*	*1:800000*	*2 hours*	*Formalin*	*115 liters*
Total for chum salmon							*Formalin*		***245 lit.***
							Malachite Green		***993 g***
Total for pink salmon and chum							*Formalin*		***623 lit.***
							Malachite Green		***110 g***

V.Release of young

During the reporting year, 41664.9 thousand pink salmon young and 26035.4 thousand chum salmon young were released, for a total release of 67700.3 thousand young salmon.

Release of **pink Salmon** young was begun as planned, on 06JUN. The beginning of the release is timed to correspond to the beginning of the decline in the numbers of mass downstream migration among the natural pink salmon young. The qualitative characteristics of young is presented in the Table on page 13. The average measured weight of young salmon was 308.8 mg. At the time of release, water temperatures varied between 5.1-13.0 degrees C in the river and between 5.2-9.4 degrees C at sea. The young salmon was released during the evening hours (after 20:00). The mesh barriers on the nursery channels were removed, allowing the young to descend by itself. 95 % of the young salmon departed withing two days, after which time the shutter panels were removed and the remaining young was released. At the time of pink salmon release no flooding was noted. Data on release are presented in Table 2 of the Appendix.

The release of young chum salmon was begun on 07JUN at a rate of 1.0 – 2.0 million per day. The release occurred during the evening hours (beginning at 20:00). The qualitative characteristics of the young salmon is presented on page 13. At the time the young salmon was released, no significant flooding was noted. On the whole, the downstream migration occurred under normal hydrological conditions in the river, and there were no storms at sea. Water temperatures in the river at the time of release were between 6.4 – 13.4 degrees C, and at sea 5.4 - 9.4 degrees C.

Data on release are presented in Table 2 of the Appendix.

VI.Experimental work

During the 2006 – 2007 period, the following experimental work was conducted:

1. Young masu collected in 2006 was grown, and on 24JUN 5.723 thousand young were released with an average weight of 3005.7 mg
2. 7 individual taymen were held at the facility (they were artificially fed)
3. 20 lots of chum salmon eggs were hatched and their sac-fry were held in gravel incubators(Canadian-style boxes), with the young being grown in ponds.

A report on the results of the experimental work will be presented by 01 SEPT 2007.

The qualitative characteristics of released young in 2007

Pink Salmon

Class intervals	180-200	201-220	221-240	241-260	261-280	281-300	301-320	321-340	341-360	361-380	381-400	401-420	421-440	441-460	461-480	481-500
%	8.7	3.9	5.6	6.7	10.6	11.1	10.6	11.0	8.4	5.9	5.4	4.3	2.7	2.4	0.9	0.4
Thousand	**3630.8**	**1636.8**	**2351.1**	**2797.5**	**4434.3**	**4612.9**	**4434.3**	**4583.1**	**3482.0**	**2470.1**	**2232.1**	**1785.6**	**1130.9**	**1011.9**	**357.1**	**178.6**
Class intervals	501-520	521-540	541-560	561-580	581 - 600	601 - 620										
%	0.6	0.2	0.3	0.1	0.1	0.1										
Thousand	**267.9**	**59.5**	**119.0**	**29.8**	**29.8**	**29.8**										

Chum Salmon

Class intervals	601 - 650	651 - 700	701 - 750	751 - 800	801 - 850	851 - 900	901 - 950	951-1000	1001-1050	1051-1100	1101-1150	1151-1200	1201-1250	1251-1300
%	0.1	0.9	1.1	3.0	6.6	6.6	6.1	8.0	10.2	10.1	9.2	7.9	7.4	5.1
Thousand	**28.9**	**245.9**	**2893**	**781.1**	**1706.8**	**1706.8**	**1591.1**	**2082.3**	**2646.9**	**2632.5**	**2401.0**	**2068.4**	**1938.2**	**1330.7**
Class intervals	1301-1350	1351-1400	1401-1450	1451-1500	1501-1550	1551-1600	1601-1650	1651-1700	1701-1750	1751-1800	1801-1850	1851-1900	1901-1950	1951-2000
%	3.9	4.7	2.6	2.3	1.7	1.4	0.3	0.4	0	0	0.1	0.1	0.1	0.1
Thousand	**1027.0**	**1229.4**	**665.3**	**607.5**	**433.9**	**361.6**	**72.3**	**101.2**	**0**	**0**	**28.9**	**14.5**	**28.9**	**14.5**

VII.Measures undertaken to enhance aquaculture efficiency

1. Thermal regulation for the pink salmon in the reporting year differed from the standard:

→ During the entire period that the pink salmon was held, the water supply was a mixture of infrabed and river water with an average temperature by month of 1.1-2.3^{0}C at the beginning of the holding period to 4.6^{0}C at the end.

→ In order to create the optimum temperature conditions (5 – 5.5^{0}C for pink salmon and 6.5-7.0^{0}C for chum salmon) during the feeding period, water was pumped from a shaft well, by which a lack of even daily fluctuations in water temperature was achieved, and decreased during the snow melt period.

2. In the reporting year, there were two types of fish food used: Aller Futura, with an enhanced vitamin content, and Aller Oil, with lower fat content (fish food composition is presented in Table 11.1 of the Appendix). At the beginning of the feeding period, following prophylactic treatment and before release, the young were fed with Aller Futura, while the majority of the feeding was accomplished using Aller Oil.

Feeding was also carried out with the recommendations of the fish food manufacturer in mind: the fish food comprised 50-70% of the full ration (which comprised 1.5-1.8% of the young salmon's biomass).

This feeding regime allowed us to achieve a feeding coefficient of Cf = 0.7 for chum and to carry the feeding out efficiently.

3. Workers were assigned specific areas, within which they were responsible for all of the operations associated with the feeding of the fry (cleaning, feeding, maintaining the preliminary records). This allocation of workers allowed us to enhance the level of worker's interest and improve the quality of work accomplished during the feeding period.

VIII. Hatchery preparation for the next season

During preparation for the next season, the following must be done:

- Perform repair and prepare the equipment for the egg collection stations
- Prepare the incubators and the documentation for egg placement
- Prepare the egg transportation equipment
- Clean out the nursery channels, discharge and feed chutes after release
- Disinfect the water supply system, nursery channels and fish hatchery tools and supplies

IX. Analysis of operations over the first six months. Conclusions and suggestions

During the first six months of the year, chum and pink salmon eggs were incubated, sac-fry was held, and the young salmon was fed and released. A total of 67700.3 thousand young salmon were released, including 41664.9 thousand young pink salmon and 26035.4 thousand young chum salmon. The average measured weight of the released young was as follows: 308.8 mg for pink salmon, 1100.4 mg for chum salmon.

During the first six months of the year, in order to regulate the temperature for **holding** the fish, we used river water, infrabed water and groundwater.

- ✓ A mixture of river and infrabed water was used for holding the pink salmon. For growth: initially a combination of ground water and infrabed water was used, and beginning on 10JUN , a mixture of infrabed and river water.
- ✓ Chum salmon development proceeded under planned temperature regimes using a mixture of infrabed water and ground water, with water added from the shaft well.

During the reporting year, we purchased high-efficiency pelletized fish food manufactured by the Danish company "Aller Aqua", which allowed us to feed the chum and pink salmon and release healthy, active young.

This year, warm water in the coastal zone allowed us to release the young pink and chum salmon at the planned time. At the time of young salmon release, no flooding or storms occurred, and the downstream migration proceeded under favorable conditions.

Based on the results of operations during the first six months of 2007, we can draw the following conclusions:

1. The use of water from the shaft well allowed us to carry out a good quality feeding operation of the pink and chum salmon young at stable temperatures above 5^0C .
2. We determined that the main thrust of feeding should be the use of hand broadcasting of the fish food, with the fish feeders accomplishing a secondary role. This allows the fish food to be used more efficiently and to decrease the variability of the weights of the young salmon.
3. The technological process at the Reydovo Salmon Hatchery may be considered to be well worked out.

The staff and workers at the Reydovo Salmon Hatchery met their assigned goals, and in 2007 the young pink and chum salmon was healthy, active and released under optimal conditions in the river and at sea.

Director, Reydovo Salmon Hatchery T.P. Mizina

Chief Hatchery Specialist, Reydovo Salmon Hatchery L.E. Molchanov

APPENDIX

Table 1

Achievement of release targets over the past six years

#	Year	Planned release of young, million			Actual release of young, thous.			Percent achieved	Average weight, mg	
		Total	Pink Salmon	Chum Salmon	Total	Pink Salmon	Chum Salmon		Pink Salmon	Chum Salmon
1	2002	63.2	42.1	21.1	68584.3	45847.2	22737.1	108.5	251.9	1160.6
2	2003	63.7	42.0	21.7	65912.0	42793.8	23118.2	103.5	250.7	1136.9
3	2004	63.7	42.0	21.7	67475.5	44171.4	23304.1	105.9	292.1	1118.1
4	2005	61.9	40.3	21.6	67562.1	43767.2	23794.9	109.2	274.9	1148.1
5	2006	61.9	40.3	21.6	64119.2	40655.8	23463.4	103.6	342.7	1086.0
6	2007	62.6	38.1	24.4	67700.3	41664.9	26035.4	108.2	308.8	1100.4

Table 2

Release of young salmon in the reporting year by size and weight and age group

Release period		Young released		Size and weight characteristics			
From-Through	**Days**	**Thousand**	**%**	**Weight, mg**	**Length AC, mm**	**Length AD, mm**	**Cup.f.**
1	2	3	4	5	6	7	8
Pink Salmon							
06.-07JUN07	1	2634.3	6.3	317.8	37.4	33.3	0.84
07.-08JUN07	1	2914.6	7.0	314.4	37.6	33.6	0.81
08.-09JUN07	1	2942.0	7.1	311.0	37.3	33.2	0.83
09.-10JUN07	1	2585.3	6.2	311.3	37.6	33.5	0.82
10.-11JUN07	1	2586.7	6.2	307.7	36.6	32.9	0.85
11-12JUN07	1	2738.7	6.6	306.6	37.3	33.3	0.81
12-13JUN07	1	3190.2	7.7	309.3	36.9	33.0	0.85
13-14JUN07	1	3310.1	7.9	304.7	37.0	33.0	0.84
14-15JUN07	1	3430.9	8.2	310.2	37.4	33.4	0.82
15-16JUN07	1	3452.3	8.3	296.4	37.0	33.1	0.81
16-17JUN07	1	3486.5	8.3	305.5	36.9	32.9	0.84
17-18JUN07	1	3442.0	8.3	306.5	36.8	32.8	0.85
18-19JUN07	1	2463.0	5.9	311.5	37.0	33.1	0.85
19-20JUN07	1	2488.3	6.0	316.1	37.3	33.4	0.83
Total:	**14**	**41664.9**	**100**	**308.8**	**37.1**	**33.2**	**0.84**
Chum Salmon							
07JUN-08JUN07	1	1491.4	5.7	1197.7	51.7	47.0	1.14
08JUN-09JUN07	1	1112.2	4.3	957.2	48.5	44.1	1.07

08JUN-09JUN07	1	915.3	3.5	1194.3	52.4	47.8	1.08
09JUN-10JUN07	1	1535.9	5.9	1181.5	51.5	46.8	1.14
10JUN-11JUN07	1	1486.4	5.7	881.1	47.7	43.4	1.07
11JUN-12JUN07	1	1332.2	5.1	1177.2	52.4	47.9	1.06
12JUN-13JUN07	1	1548.9	5.9	1161.7	51.2	46.5	1.14
13JUN-14JUN07	1	1606.0	6.2	1099.6	51.0	46.3	1.10
14JUN-15JUN07	1	1560.3	6.0	1100.1	51.1	46.5	1.09
15JUN-16JUN07	1	1504.3	5.8	1102.8	51.1	46.4	1.10
16JUN-17JUN07	1	1151.5	4.5	1115.7	51.6	46.9	1.07
17JUN-18JUN07	1	1184.6	4.5	1101.0	51.0	46.4	1.09
19JUN-20JUN07	1	1849.7	7.1	1111.2	51.3	46.4	1.10
20JUN-21JUN07	1	1904.0	7.3	1066.3	50.4	45.8	1.11
21JUN-22JUN07	1	1734.3	6.7	1069.7	49.6	44.7	1.18
22JUN-23JUN07	1	1415.6	5.4	1092.9	50.2	45.4	1.16
23JUN-24JUN07	1	1420.6	5.5	1100.7	50.4	45.5	1.16
24JUN-25JUN07	1	1282.2	4.9	1115.7	50.6	46.0	1.13
Total	**17**	**26035.4**	**100**	**1100.4***	**50.7***	**46.1***	**1.13**
***Average measured weight, length**							

Table 3.1

Information on air temperatures

10-day period	September	October	November	December	January	February	March	April	May	June
1	17.4	11.3	8.2	-2.6	-2.6	-3.8	-1.6	3.2	7.3	15.6
2	17.6	9.2	4.5	-1.7	-5.6	-2.8	0.8	2.3	7.1	19.3
3	14.1	7.4	2.6	-1.4	-4.6	-2.8	2.1	5.5	8.4	
Average	16.4	9.3	5.1	-1.9	-4.3	-3.1	0.4	3.7	7.6	
min	11.0	1.2	-2.3	-5.6	-19.0	-14.0	-7.8	-2.0	0.8	
max	23.7	19.0	16.8	5.3	2.8	5.0	8.0	14.0	17.7	

Table 3.2

Information on temperatures in Reydovaya River

10-day period	September	October	Novem-ber	December	January	February	March	April	May	June
1	12.6	10.0	7.3	1.0	0.6	0.4	1.0	4.9	3.6	7.7
2	12.2	8.3	5.4	1.5	0.9	0.6	1.9	4.8	5.1	9.6
3	11.1	7.0	3.6	1.0	0.8	0.9	3.3	5.3	5.4	
Average	12.0	8.4	5.4	1.2	0.6	0.6	2.1	5.0	4.7	
min	9.9	5.1	2.0	0.1	0.1	0.1	0.1	1.2	0.9	
max	15.0	12.6	8.6	3.1	1.8	2.3	6.3	8.8	10.0	

Table 3.3

Information on temperature regime in pink salmon plant

10-day period	September	October	November	December	Janu-ary	February	March	April	May	June
1	-	7.4	7.0	2.6	1.2	1.2	1.5	4.4	5.2	7.4
2	7.6	7.1	6.5	2.7	1.3	1.4	2.1	4.4	5.6	8.4
3	7.6	7.0	5.5	1.8	1.1	1.4	3.0	5.1	5.7	-
Average	7.6	7.2	6.3	2.4	1.2	1.3	2.2	4.6	5.5	7.9
min	7.5	7.0	5.1	0.8	0.2	0.7	0.5	1.2	3.6	4.5
max	7.8	7.7	7.2	3.5	2.6	2.2	5.5	7.8	8.1	11.5

Table 3.4

Information on temperature regime in the chum salmon plant

10-day period	September	October	November	December	Janu-ary	February	March	April	May	June
1	-	-	7.0	4.4	4.5	4.2	4.1	4.8	6.4	6.8
2	-	7.1	6.9	4.2	5.1	4.2	4.3	5.1	6.5	7.0
3	-	7.0	5.6	4.5	4.7	4.0	4.6	5.6	6.6	7.1
Average	-	7.0	6.5	4.4	4.8	4.1	4.3	5.2	6.5	7.0
min	-	7.0	5.1	3.8	4.1	3.7	3.8	4.6	5.3	6.5
max	-	7.1	7.0	5.0	5.6	4.8	4.7	6.5	6.9	7.2

Table 3.5.

Information on temperatures at sea

10-day period	September	October	November	December	January	February	March	April	May	June
1	-	-	-	-	-	-	-	-	-	5.9
2	-	-	-	-	-	-	-	-	4.2	8.3
3	-	-	-	-	-	-	-	-	4.1	8.6
Average	-	-	-	-	-	-	-	-	4.1	7.6
min	-	-	-	-	-	-	-	-	2.2	2.9
max	-	-	-	-	-	-	-	-	5.6	9.4

Table 4

Information on water consumption by use (month end)

Month	Water consumption, liters per minute		
	Pink Salmon Plant	**Chum Salmon Plant**	**Total**
September	423	-	423
October	1614	438	2052
November	1605	1401	3006
December	4643	1621	6264
January	5998	5280	11278
February	4765	5178	9943
March	6168	3462	9630
April	6192	4686	10884
May	7320	10473	17793
June	5904	9648	15552

Table 5

Information on oxygen content of water supplied to the plants

Month	Pink Salmon Plant				Chum Salmon Plant			
	Inflow		Outflow		Inflow		Outflow	
	mg/lit.	%	mg/lit.	%	mg/lit.	%	mg/lit.	%
September	11.2	97	10.7	92	-	-	-	-
October	11.2	96	10.5	90	11.2	95	10.9	93
November	11.1	94	10.4	89	11.3	96	10.7	91
December	12.5	95	11.7	90	11.7	93	11.0	87

Continuation of Table 5

January	11.6	93	11.0	88	12.8	94	11.5	8.4
February	12.6	92	11.2	82	11.4	90	9.4	75
March	12.0	90	10.1	76	11.2	89	8.9	7.1
April	12.3	98	10.6	84	11.9	96	8.6	7.0
May	11.7	96	9.8	81	11.2	94	9.3	78
June	10.5	9.2	9.1	80	10.7	91	8.6	73

Table 6

Information on Pink and Chum salmon egg development, by Lot

Lot	Date of fertilization	Appearance of "eye spot"		Start of hatching		End of hatching		Duration of incuba-tion
		Date	days/deg.dy.	Date	days/deg.dy.	Date	days/deg.dy.	
Pink Salmon								
First	18SEP06	19OCT	32/236.5	19DEC	93/554.0	01JAN	106/577.0	**93**
Middle	29JUN06	30OCT	32/231.0	06JAN	100/506.3	26JAN	120/530.6	**120**
Last	10OCT06	12NOV	34/239.4	28JAN	111/464.1	14FEB	128/486.4	**128**
Chum Sal-mon								
First	15OCT06	18NOV	35/245.2	10JAN	88/496.8	20JAN	98/548.1	**98**
Middle	28OCT06	05DEC	39/246.4	28JAN	93/491.7	09FEB	105/544.0	**105**
Last	10NOV06	26DEC	47/245.9	15FEB	97/476.2	02MAR	112/536.9	**112**

Table 7

Information on egg incubation results and holding of sac-fry, by Lot in 2006-2007

Lot #	Eggs col-lected, thous.	Dead eggs during incubation		Sac-fry hatched, th-ous.	Sac-fry and young death during the holding and growth periods		Young released, thous.
		Thousand	**%**		**Thousand**	**%**	
Pink Sal-mon							
1	365.2	21.4	5.9	343.8	1.0	0.3	342.8
2	474.4	20.5	4.3	453.9	2.1	0.5	451.8
3	762.8	37.4	4.9	725.5	3.0	0.4	722.5
4	1137.1	57.8	5.1	1079.3	4.4	0.4	1074.9
5	1576.8	71.7	4.5	1505.1	5.9	0.4	1499.2
6	2112.0	96.1	4.5	2015.9	7.5	0.4	2008.4
7	1769.5	88.1	5.0	1681.4	6.8	0.4	1674.6

8	2251.0	132.8	5.9	2118.2	9.2	0.4	2109.0

Continuation of Table 7

9	2710.8	185.8	6.9	2525.0	9.5	0.4	2515.5
10	3520.1	221.4	6.3	3298.7	15.9	0.5	3282.8
11	1647.5	89.6	5.4	1557.9	6.2	0.4	1551.7
12	2594.4	127.1	4.9	2467.3	8.6	0.3	2458.7
13	5013.0	401.8	8.0	4611.2	16.1	0.3	4595.1
14	5196.3	389.0	7.5	4807.3	20.9	0.4	4786.4
15	3958.5	219.5	5.5	3739.0	14.8	0.4	3724.2
16	2227.6	111.3	5.0	2116.3	9.5	0.4	2106.8
17	1128.4	132.7	11.8	995.7	5.4	0.5	990.3
18	1147.5	89.2	7.8	1058.3	4.7	0.4	1053.6
19	1249.7	110.6	8.8	1139.1	5.9	0.5	1133.2
20	490.4	31.2	6.4	459.2	2.8	0.6	456.4
21	524.1	46.1	8.8	478.0	2.5	0.5	475.5
22	2256.9	165.6	7.3	2091.3	11.2	0.5	2080.1
23	597.5	23.2	3.9	574.3	2.8	0.5	571.5
Total	**44711.5**	**2869.9**	**6.3**	**41841.6**	**176.7**	**0.4**	**41664.9**
Chum Salmon							
1	402.6	26.1	6.5	376.5	1.1	0.3	375.4
2	382.2	28.0	7.3	354.2	1.3	0.4	352.9
3	824.4	60.3	7.3	764.1	2.8	0.4	761.3
4	858.8	74.5	8.7	784.3	2.7	0.3	781.6
5	803.6	58.9	7.3	744.7	2	0.3	742.7
6	827.7	58.6	7.1	769.1	3.2	0.4	765.9
7	860.0	84.3	9.8	775.7	2.8	0.4	772.9
8	819.6	92.4	11.3	727.2	2.8	0.4	724.4
9	793.6	63.8	8.0	729.8	3.4	0.5	726.4
10	1340.6	85.8	6.4	1254.8	4.6	0.4	1250.2
11	1677.8	137.7	8.2	1540.1	5.7	0.4	1534.4
12	1296.0	97.4	7.5	1198.6	4.1	0.3	1194.5
13	1645.3	132.5	8.1	1512.8	5.7	0.4	1507.1
14	1152.5	124.4	10.8	1028.1	3.3	0.3	1024.8
15	2864.8	327.6	11.4	2537.2	14.3	0.6	2522.9
16	2241.7	217.1	9.7	2024.6	14	0.7	2010.6
17	1753.0	160.1	9.1	1592.9	11	0.7	1581.9
18	797.0	80.0	10.0	717.0	4.9	0.7	712.1
19	438.1	43.4	9.9	394.7	2	0.5	392.7
20	1270.9	142.0	11.2	1128.9	4	0.4	1124.9
21	1755.5	190.8	10.9	1564.7	6.9	0.4	1557.8
22	1277.8	102.5	8.0	1175.3	4.9	0.4	1170.4
23	813.7	54.3	6.7	759.4	3.1	0.4	756.3
24	783.3	70.9	9.1	712.4	3.1	0.4	709.3
25	406.8	41.3	10.1	365.5	1.4	0.4	364.1
26	692.1	71.4	10.3	620.7	2.8	0.5	617.9
Total	**28779.4**	**2626.1**	**9.1**	**26153.3**	**117.9**	**0.43**	**26035.4**

Table 8

Information on growth rates of free embryos and sac-fry for the holding and growth periods in 2006-2007

Lot #	Date fertilized	Date of mass hatching	Size-Weight indicators	At hatching	At end of each month				
					January	**February**	**March**	**April**	**May**
Pink Salmon									
First	18SEP06	22DEC06	**AC, mm.**	**22.0**	**25.1**	**26.4**	**29.4**	**31.9**	**35.1**
			AD, mm	**20.0**	**22.7**	**23.7**	**26.1**	**28.8**	**31.6**
			P, mg	**141.4**	**174.6**	**186.5**	**190.1**	**212.7**	**266.0**
			P yolk, mg	**67.3**	**59.6**	**54.3**	**35.5**	**14.8**	**0**
Middle	29SEP06	10JAN07	**AC, mm**	**21.7**	**21.7**	**24.8**	**28.0**	**31.4**	**33.8**
			AD, mm	**19.7**	**19.7**	**22.7**	**25.6**	**28.3**	**30.3**
			P, mg	**143.8**	**143.8**	**167.9**	**176.9**	**209.5**	**233.2**
			P yolk, mg	**71.0**	**71.0**	**63.7**	**40.4**	**21.3**	**0**
Last	10OCT06	30JAN07	**AC, mm**	**21.1**	**21.1**	**23.9**	**26.4**	**31.2**	**33.6**
			AD, mm	**19.3**	**19.3**	**21.8**	**24.1**	**28.2**	**30.2**
			P, mg	**150.4**	**150.4**	**165.4**	**171.0**	**222.3**	**232.8**
			P yolk, mg	**84.9**	**84.9**	**74.7**	**53.5**	**26.1**	**2.5**
Chum Salmon									
First	15OCT06	12JAN07	**AC, mm**	**23.8**	**28.7**	**31.8**	**36.6**	**39.5**	**49.0**
			AD, mm	**21.8**	**25.8**	**28.0**	**32.5**	**35.4**	**44.7**
			P, mg	**267.6**	**323.9**	**370.5**	**396.7**	**487.6**	**1072.6**
			P yolk, mg	**159.9**	**139.3**	**109.2**	**49.9**	**3.5**	**0**
Middle	28OCT06	30JAN07	**AC, mm**	**24.7**	**-**	**28.4**	**33.5**	**39.5**	**47.1**
			AD, mm	**22.7**	**-**	**25.6**	**30.2**	**33.9**	**43.0**
			P, mg	**295.1**	**-**	**305.9**	**355.3**	**405.2**	**843.3**
			P yolk, mg	**165.3**	**-**	**140.6**	**88.5**	**16.1**	**0**
Last	10NOV06	17FEB07	**AC, mm**	**23.2**		**23.2**	**29.3**	**36.2**	**43.2**
			AD, mm	**21.1**		**21.1**	**26.4**	**32.6**	**39.3**
			P, mg	**272.6**		**272.6**	**303.5**	**390.2**	**649.3**
			P yolk, mg	**175.3**		**175.3**	**119.0**	**51.6**	**0**

Table 9

Description of fry development

Fish species, Lot	Date of fertilization	Shift to swimming stage				Beginning of feeding				Release of young			
		Date	**Days/ deg.dy.**	**Weight, mg**		**Date**		**Weight, mg**		**Date**	**Days/ deg.dy.**	**Weight, mg**	
				Total	**yolk**			**Total**	**yolk**			**Total**	**yolk**
Pink Salmon													
First	18SEP6	25APR07	**220/833.7**	**208.2**	**17.5**	01MAY	**226/863.5**	**212.7**	**14.8**	06JUN	**262/1069.0**	**317.8**	**0**
Middle	29SEP06	11MAY07	**225/840.4**	**221.2**	**15.8**	14MAY	**228/857.0**	**218.2**	**12.9**	12JUN	**257/1045.8**	**310.5**	**0**
Last	10OCT06	13MAY07	**216/783.6**	**219.5**	**18.8**	16MAY	**219/800.9**	**210.4**	**15.8**	19JUN	**253/1035.4**	**328.1**	**0**
Chum Salmon													
First	15OCT06	16APR07	**184/929.1**	**416.0**	**17.8**	20APR	**188/951.2**	**426.7**	**21.2**	07JUN	**236/1256.7**	**1204.5**	**0**
Middle	28OCT06	25APR07	**180/884.9**	**390.4**	**28.1**	28APR	**183/901.0**	**396.1**	**26.7**	16JUN	**232/1225.5**	**1155.0**	**0**
Last	10NOV06	07MAY07	**178/863.2**	**400.1**	**26.3**	11MAY	**182/889.5**	**391.3**	**19.5**	24JUN	**227/1187.5**	**1109.5**	**0**

Table 10.1

Young salmon feeding results for the reporting period

Number of young grown, thous.	Feeding period		Average weight of young, mg				Weight gain per 1 young fish, mg	Growth per 1 young fish, mm	Increase in bio-mass for all young, kg	Fish food consumed, kg
	From- through	Number of days	Before feed-ing		of released young					
			Wt.	AC	Weight	AC				
Chum Salmon										
1112.2	03MAY-08JUN	37	438.0	40.6	957.2	48.5	519.2	7.9	577.5	400
1491.4	20APR-07JUN	49	426.7	38.0	1197.7	51.7	771.0	13.7	1149.9	2450
915.3	20APR-08JUN	50	426.7	38.0	1194.3	52.4	767.6	14.4	702.6	
1535.9	20APR-09JUN	51	426.7	38.0	1181.5	51.5	754.8	13.5	1159.3	
617.1	20APR-11JUN	53	426.7	38.0	1177.2	52.4	750.5	14.4	463.1	
715.1	25APR-11JUN	48	413.0	37.9	1177.2	52.4	764.2	14.5	546.5	2200
1548.9	25APR-12JUN	49	413.0	37.9	1161.7	51.2	748.7	13.3	1159.7	
1606.0	25APR-13JUN	50	413.0	37.9	1099.6	51.0	686.6	13.1	1102.7	
402.5	25APR-14JUN	51	413.0	37.9	1100.1	51.1	687.1	13.2	276.6	
1157.8	28APR-14JUN	48	396.1	37.2	1100.1	51.1	704.0	13.9	815.1	2486
1504.3	28APR-15JUN	49	396.1	37.2	1102.8	51.1	706.7	13.9	1063.1	
1151.5	28APR-16JUN	50	396.1	37.2	1115.7	51.6	719.6	14.4	828.6	
1184.6	28APR-17JUN	51	396.1	37.2	1101.0	51.0	704.9	13.8	835.0	
1849.7	04MAY-19JUN	47	394.3	37.1	1111.2	51.3	716.9	14.2	1326.0	2697
1904.0	04MAY-20JUN	48	394.3	37.1	1066.3	50.4	672.0	13.3	1279.5	
1734.3	04MAY-21JUN	49	394.3	37.1	1069.7	49.6	675.4	12.5	1171.3	
1486.4	11MAY-10JUN	31	391.3	37.0	881.1	47.7	489.8	10.7	728.0	2410
1415.6	11MAY-22JUN	42	391.3	37.0	1092.9	50.2	701.6	13.2	993.2	
1420.6	11MAY-23JUN	43	391.3	37.0	1100.7	50.4	709.4	13.4	1007.7	
1282.2	11MAY-24JUN	44	391.3	37.0	1115.7	50.6	724.4	13.6	928.8	
26035.4	20APR-24JUN	66							18114.2	12643

Continuation of Table 10.1

Pink Salmon										
2634.3	01MAY-06JUN	37	212.7	31.9	317.8	37.4	105.1	5.5	276.9	957.9
2914.6	01MAY-07JUN	38	212.7	31.9	314.4	37.6	101.7	5.7	296.4	
2942.0	01MAY-08JUN	39	212.7	31.9	311.0	37.3	98.3	5.4	289.2	
2585.3	11MAY-09JUN	30	216.5	32.2	311.3	37.6	94.8	5.4	245.1	905.1
2586.7	11MAY-10JUN	31	216.5	32.2	307.7	36.6	91.2	4.4	235.9	
2738.7	11MAY-11JUN	32	216.5	32.2	306.6	37.3	90.1	5.1	246.8	
3190.2	11MAY-12JUN	33	216.5	32.2	309.3	36.9	92.8	4.7	296.1	
3310.1	14MAY-13JUN	31	218.2	32.4	304.7	37.0	86.5	4.6	286.3	998.5
3430.9	14MAY-14MAY	32	218.2	32.4	310.2	37.4	92.0	5.0	315.6	
3452.3	14MAY-15MAY	33	218.2	32.4	296.4	37.0	78.2	4.6	270.0	
3486.5	16MAY-16JUN	32	210.4	31.7	305.5	36.9	95.1	5.2	331.6	1215.5
3442.0	16MAY-17JUN	33	210.4	31.7	306.5	36.8	96.1	5.1	330.8	
2463.0	16MAY-18JUN	34	210.4	31.7	311.5	37.0	101.1	5.3	249.0	
2488.3	16MAY-19JUN	35	210.4	31.7	316.1	37.3	105.7	5.6	263.0	
41664.9	01MAY-19JUN	50							3932.7	4077.0
Total: Pink Salmon and Chum Salmon										
67700.3	20APR-24JUN	66							22046.9	16720

Table 10.2

Young Salmon Feeding Results

Fish species	Feed consumed by month, kg				Feed coefficient
	April	May	June	Total	
	Fish food pellets	Fish food pellets	Fish food pellets	Fish food pellets	
Pink Salmon	-	1734	2343	4077	1.04
Chum Salmon	239	6059	6345	12643	0.7
Masu	10	10	10	30	1.8
Total	249	7803	8698	16750	

Characteristics of Danish ”Aller Aqua” fish food pellets:

Table 11

Indicator	Aller Futura	Aller 514	Aller 514 - Oil
Crude protein, %	64	55	59
Crude fat, %	12	14	7
Carbohydrates, %	5	13.5	13
Ash, %	11	10	11
Starch, %	0.5	1	1
Nitrogen, dry, %	11.07	9.3	9.3
Phosphorous, dry, %	1.62	1.4	1.6
Total energy, kcal./MJ	4996/20.9	5025/21.0	4610/19.3
Digestible energy, kcal./MJ	3844/16.1	4005/16.7	3493/14.6
Feed coefficient	0.7	0.8	1.0

Table 12

The qualitative characteristics of released young

Item #	Date of biological analysis	Length AC, mm			Length AD, mm			Weight, mg			Cup.f.
		Max	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
1	2	3	4	5	6	7	8	9	10	11	12
Pink Salmon											
1	06JUN07	43	30	**37.4**	39	27	**33.3**	487	183	**317.8**	**0.84**
2	07JUN07	47	32	**37.6**	43	29	**33.6**	564	180	**314.4**	**0.81**
3	08JUN07	42	32	**37.3**	38	28	**33.2**	494	183	**311.0**	**0.83**
4	09JUN07	43	32	**37.6**	39	29	**33.5**	472	180	**311.3**	**0.82**
5	10JUN07	42	31	**36.6**	38	29	**31.9**	527	181	**307.7**	**0.85**
6	11JUN07	45	32	**37.3**	40	28	**33.3**	541	180	**306.6**	**0.81**
7	12JUN07	44	32	**36.9**	40	29	**33.0**	507	181	**309.3**	**0.85**
8	13JUN07	42	32	**37.0**	38	29	**33.0**	447	181	**304.7**	**0.84**
9	14JUN07	42	32	**37.4**	38	28	**33.4**	501	181	**310.2**	**0.82**
10	15JUN07	43	32	**37.0**	39	29	**33.1**	558	181	**296.4**	**0.81**
11	16JUN07	44	32	**36.9**	39	28	**32.9**	584	181	**305.5**	**0.84**
12	17JUN07	43	32	**36.8**	38	29	**32.8**	462	182	**306.5**	**0.85**
13	18JUN07	42	32	**37.0**	38	28	**33.1**	502	181	**311.5**	**0.85**
14	19JUN07	46	32	**37.3**	42	28	**33.4**	612	181	**316.1**	**0.83**
Average weighted amount				**37.1**			**33.0**			**308.8**	**0.84**

Continuation of Table 12

Chum Salmon											
1	07JUN	58	47	**51.7**	53	42	**47.0**	1570	817	**1197.7**	**1.14**
2	08JUN	56	43	**48.5**	51	38	**44.1**	1525	600	**957.2**	**1.11**
2	08JUN	62	45	**52.4**	57	41	**47.8**	1903	776	**1194.3**	**1.08**

3	09JUN	58	46	**51.5**	53	41	**46.8**	1670	793	**1181.5**	**1.14**
4	10JUN	52	43	**47.7**	48	39	**43.4**	1129	697	**881.1**	**1.07**
5	11JUN	61	45	**52.4**	56	41	**47.9**	1987	676	**1177.2**	**1.06**
6	12JUN	57	43	**51.2**	52	39	**46.5**	1679	640	**1161.7**	**1.14**
7	13JUN	60	43	**51.0**	55	39	**46.3**	1804	664	**1099.6**	**1.10**
8	14JUN	55	44	**51.1**	51	40	**46.5**	1525	678	**1100.1**	**1.09**
9	15JUN	59	45	**51.1**	54	41	**46.4**	1881	657	**1102.8**	**1.10**
10	16JUN	57	46	**51.6**	52	41	**46.9**	1564	690	**1115.7**	**1.07**
11	17JUN	60	45	**51.0**	54	40	**46.4**	1665	713	**1101.0**	**1.09**
12	19JUN	57	45	**51.3**	53	41	**46.4**	1604	693	**1111.2**	**1.10**
13	20JUN	56	46	**50.4**	51	42	**45.8**	1502	740	**1066.3**	**1.11**
14	21JUN	56	43	**49.6**	51	39	**44.7**	1551	672	**1069.7**	**1.18**
15	22JUN	55	44	**50.2**	50	39	**45.4**	1628	679	**1092.9**	**1.16**
16	23JUN	56	43	**50.4**	51	38	**45.5**	1557	660	**1100.7**	**1.16**
17	24JUN	57	45	**50.6**	53	40	**46.0**	1627	700	**1115.7**	**1.13**
Average weighted amount				**50.7**			**46.1**			**1100.4**	**1.13**

Table 13

Description of conditions during release

Item #	Date of Release	Amount of released young		Average water temperature, °C			Presence of sea ice	Place of Release	Length of migration route, km
		Thous.	%	Nursery	River	Sea			
<u>Pink Salmon</u>							None	Reydovaya River (at spawning area)	12 km
1	06JUN07	2634.3	6.3	7.6	8.0	6.7			
2	07JUN07	2914.6	7.0	7.7	8.2	6.7			
3	08JUN07	2942.0	7.1	8.3	8.8	7.1			
4	09JUN07	2585.3	6.2	9.0	9.8	6.8			
5	10JUN07	2586.7	6.2	9.5	10.0	6.7			
6	11JUN07	2738.7	6.6	9.4	9.9	7.9			
7	12JUN07	3190.2	7.7	9.2	10.5	7.8			
8	13JUN07	3310.1	7.9	9.5	10.7	9.0			
9	14JUN07	3430.9	8.2	9.1	10.4	9.3			
10	15JUN07	3452.3	8.3	8.0	9.0	9.1			
11	16JUN07	3486.5	8.3	7.9	8.7	8.7			
12	17JUN07	3442.0	8.3	7.5	8.2	8.3			

13	18JUN07	2463.0	5.9	7.4	8.0	8.2			
14	19JUN07	2488.3	6.0	7.9	9.1	7.1			
		41664.9	**100**						
<u>Chum Salmon</u>							None	Reydo-vaya River (at spawn-ing area)	12 km
1	07JUN07	1491.4	5.7	6.9	8.2	6.7			
2	08JUN07	1112.2	4.3	6.9	8.8	7.1			
2	08JUN07	915.3	3.5	6.9	8.8	7.1			
3	09JUN07	1535.9	5.9	7.0	9.8	6.8			
4	10JUN07	1486.4	5.7	7.0	10.0	6.7			
5	11JUN07	1332.2	5.1	6.9	9.9	7.9			
6	12JUN07	1548.9	5.9	6.9	10.5	7.8			
7	13JUN07	1606.0	6.2	7.0	10.7	9.0			
8	14JUN07	1560.3	6.0	7.1	10.4	9.3			
9	15JUN07	1504.3	5.8	7.1	9.0	9.1			
10	16JUN07	1151.5	4.4	7.0	8.7	8.7			
11	17JUN07	1184.6	4.5	7.0	8.2	8.3			
12	19JUN07	1849.7	7.1	6.9	9.1	7.4			
13	20JUN07	1904.0	7.3	6.9	11.6	7.5			
14	21JUN07	1734.3	6.7	7.1	9.9	8.6			
15	22JUN07	1415.6	5.4	7.1	11.0	8.9			
16	23JUN07	1420.6	5.5	7.1	9.4	7.9			
17	24JUN07	1282.2	4.9	7.1	9.0	8.9			
Total:		**26035.4**	**100**						

Table 17

Degree to which the chief biological norms were observed at all stages of the fish culture process

Item #	Indicator	Units	Norm		Actual	
			Pink Salmon	Chum Salmon	Pink Salmon	Chum Salmon
1.	**Spawner death in holding pens**	%	3	3	-	-
2.	**Average female fecundity**	ind.	1.2	2.5	1.3	2.1
3.	**Degree of egg fertilization**	%	96	97	95.5	95.2
4.	**Incubation death (including from transport)**	%	11	10	6.4	9.1
5.	**Sac-fry death during holding period**	%	1	2	0.2	0.3
6.	**Fry death during growth period**	%	2.5	5.0	0.3	0.2
7.	**Average piece weight of released young**	mg	300	1000	308.8	1100.4