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Proposed Thermal Marks for Brood Year 2005 Salmon in Japan

by

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Abstract

Brood year 2005 salmon (approximately 134 million chum, 7.2 million pink, 3.6 million masu, and 30 thousand sockeye salmon) at 14 hatcheries will be marked with 49 discrete patterns. The proposed marking patterns are similar with those for the brood year 2004 stocks, while additional five mark patterns are proposed for chum salmon at the Teshio Hatchery, pink salmon at the Kitami Hatchery, and sockeye salmon at the Shizunai Hatchery.

Introduction

The aim of thermal mark programs is to provide information for the ocean migration and survival of each regional salmon stocks in Japan (Urawa et al. 2000). Thermal marks are used for juvenile migration, growth, survival, and feeding surveys, and for offshore migration surveys in the Sea of Okhotsk, North Pacific Ocean, and Bering Sea. In addition, we will determine hatchery origins of returning adults using thermal marks. The present report proposes thermal otolith marks applied to brood year 2004 salmon in Japan.

Mark plan for 2005 brood year stocks

The proposed thermal marks for the 2005 brood year salmon are shown in Tables 1 - 3. We plan to mark brood year 2005 salmon (approximately 134 million chum, 7.2 million pink, 3.6 million masu, and 30 thousand sockeye salmon) at 14 hatcheries with 49 discrete patterns (Fig. 1). We plan to mark chum salmon at the Teshio Hatchery and pink salmon at the Kitami Hatchery in Hokkaido for the first time. All salmon released from the hatcheries will be thermally marked except for chum salmon at the Katagishi Hatchery and sockeye salmon at the Shizunai Hatchery.

The marking pattern is presented as the RBr notation (Munk and Geiger 1998; Hagen 1999) and Hatch code notation (Hagen et al. 2000). We extend the RBr and Hatchcode notation to describe a wide spaced band, which are opposite to a narrow spaced band (Kawana et al. 2003). The letter 'w' following a ring number is used to indicate a wide spaced band. As the base mark, two rings in the first band have been

adopted to distinguish Japanese chum and pink salmon from other stocks since 1999 brood year stocks (Kawana et al. 2000, 2001, 2002; Urawa et al. 2000). Thermal rings are induced by cooler temperature exposures except for a chum salmon stock at the Shizunai Hatchery (Shizunai05chum-tr) and all masu salmon stocks at the Shiribetsu Hatchery. The proposed marking patterns are similar with those for the brood year 2004 stocks (Kawana et al. 2004), while additional five mark patterns are proposed for chum salmon at the Teshio Hatchery, pink salmon at the Kitami Hatchery, and sockeye salmon at the Shizunai Hatchery.

References

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Table 1. Proposed thermal mark releases from Japan for 2005 brood year stocks of chum and pink salmon.

No	BROOD YEAR	YEAR OF RELEASE	SPECIES	COUNTRY	STATE/ PROVINCE	REGION	AGENCY	FACILITY	STOCK	FINAL RELEASE SITE
J05-01	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-02	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-03	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-04	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-05	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-06	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-07	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-08	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-09	2005	2006	CHUM	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Teshio Hatchery	Teshio River	Teshio River
J05-10	2005	2006	CHUM	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
J05-11	2005	2006	CHUM	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
J05-12	2005	2006	CHUM	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
J05-13	2005	2006	CHUM	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-14	2005	2006	CHUM	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-15	2005	2006	CHUM	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-16	2005	2006	CHUM	JAPAN	HOKKAIDO	Nemuro Strait coast	NASREC	Ichani Hatchery	Ichani River	Ichani River
J05-17	2005	2006	CHUM	JAPAN	HOKKAIDO	Nemuro Strait coast	NASREC	Ichani Hatchery	Ichani River	Ichani River
J05-18	2005	2006	CHUM	JAPAN	HOKKAIDO	Nemuro Strait coast	NASREC	Ichani Hatchery	Ichani River	Ichani River
J05-19	2005	2006	CHUM	JAPAN	HOKKAIDO	Nemuro Strait coast	NASREC	Nijibetsu Hatchery	Nijibetsu River	Nijibetsu River

No	REARING		PRELIMINARY NUMBER OF		RBr CODE	HATCH CODE	GRAPHIC IMAGE		MARKING SYSTEM
	TREATMENT	STAGE	TM RELEASED	OM ID			PREHATCH	POSTHATCH	
J05-01	fed	fry	3,750,000	Chitose05chum-1	1:1.2.2.3-3.2	2,3-2H		CHILLER	
J05-02	fed	fry	3,750,000	Chitose05chum-2	1:1.2.2.3-3.3	2,3-3H		CHILLER	
J05-03	fed	fry	3,750,000	Chitose05chum-3	1:1.2.2.3-3.4	2,3-4H		CHILLER	
J05-04	fed	fry	3,750,000	Chitose05chum-4	1:1.2.2.3-3.5	2,3-5H		CHILLER	
J05-05	fed	fry	3,750,000	Chitose05chum-5	1:1.2.2.3-3.2-4.2	2,3-2-2H		CHILLER	
J05-06	fed	fry	3,750,000	Chitose05chum-6	1:1.2.2.3-3.6	2,3-6H		CHILLER	
J05-07	fed	fry	3,750,000	Chitose05chum-7	1:1.2.2.3-3.2-4.3	2,3-2-3H		CHILLER	
J05-08	fed	fry	3,750,000	Chitose05chum-8	1:1.2.2.3-3.3-4.2	2,3-3-2H		CHILLER	
J05-09	fed	fry	5,000,000	Teshio05chum	1:1.2.2.1,3,3	2,1,3H		CHILLER	
J05-10	fed	fry	3,700,000	Tokushibetsu05chum-1	1:1.2.2.1n-3.3n	2,1n-3nH		CHILLER	
J05-11	fed	fry	3,700,000	Tokushibetsu05chum-2	1:1.2.2.3n-3.3n	2,3n-3nH		CHILLER	
J05-12	fed	fry	3,700,000	Tokushibetsu05chum-3	1:1.2.2.3n	2,3nH		CHILLER	
J05-13	fed	fry	3,866,000	Shari05chum-1	1:1.2/2.2w-3.3	2/2w-3H		CHILLER	
J05-14	fed	fry	3,866,000	Shari05chum-2	1:1.2/2.2w,3.2-4.2	2/2w,2-2H		CHILLER	
J05-15	fed	fry	3,866,000	Shari05chum-3	1:1.2/2.2w-3.4	2/2w-4H		CHILLER	
J05-16	fed	fry	2,660,000	Ichani05chum-1	1:1.2.2.9n	2,9nH		CHILLER	
J05-17	fed	fry	2,660,000	Ichani05chum-2	1:1.2.2.7n	2,7nH		CHILLER	
J05-18	fed	fry	2,660,000	Ichani05chum-3	1:1.2.2.8n	2,8nH		CHILLER	
J05-19	fed	fry	25,000,000	Nijibetsu05chum	1:1.2.2.5n	2,5nH		CHILLER	

No	OTOLITH MARK SCHEDULE	TEMP SHIFT	
		DIRECTION	COMMENTS
J05-01	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(8-4°C)
J05-02	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(3X)12C:12H	down	(8-4°C)
J05-03	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(4X)12C:12H	down	(8-4°C)
J05-04	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(5X)12C:12H	down	(8-4°C)
J05-05	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(1X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(8-4°C)
J05-06	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(6X)12C:12H	down	(8-4°C)
J05-07	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(1X)12C:12H,(1X)12C:36H,(3X)12C:12H	down	(8-4°C)
J05-08	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:36H,(2X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(8-4°C)
J05-09	(1X)12C:12H,(2X)12C:24H,(3X)12C:12H	down	(12-8°C)
J05-10	(1X)24C:24H,(1X)24C:48H,(1X)12C:36H,(3X)12C:12H	down	(8-5°C)
J05-11	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:36H,(3X)12C:12H	down	(8-5°C)
J05-12	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	down	(8-5°C)
J05-13	(1X)12C:12H,(1X)12C:48H,(1X)24C:24H,(1X)24C:72H,(3X)12C:12H	down	(8-4°C)
J05-14	(1X)12C:12H,(1X)12C:48H,(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(8-4°C)
J05-15	(1X)12C:12H,(1X)12C:48H,(1X)24C:24H,(1X)24C:72H,(4X)12C:12H	down	(8-4°C)
J05-16	(1X)24C:24H,(1X)24C:48H,(9X)12C:12H	down	(9-5°C)
J05-17	(1X)24C:24H,(1X)24C:48H,(7X)12C:12H	down	(8-4°C)
J05-18	(1X)24C:24H,(1X)24C:72H,(8X)12C:12H	down	(8-4°C)
J05-19	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	down	(8-4°C)

Table 1. Continued.

No	BROOD YEAR	YEAR OF RELEASE	SPECIES	COUNTRY	STATE/ PROVINCE	REGION	AGENCY	FACILITY	STOCK	FINAL RELEASE SITE
J05-20	2005	2006	CHUM	JAPAN	HOKKAIDO	East Pacific coast	NASREC	Tsurui Hatchery	Kushiro River	Kushiro River
J05-21	2005	2006	CHUM	JAPAN	HOKKAIDO	East Pacific coast	NASREC	Tsurui Hatchery	Kushiro River	Kushiro River
J05-22	2005	2006	CHUM	JAPAN	HOKKAIDO	East Pacific coast	NASREC	Tsurui Hatchery	Kushiro River	Kushiro River
J05-23	2005	2006	CHUM	JAPAN	HOKKAIDO	East Pacific coast	NASREC	Tokachi Hatchery	Tokachi River	Sarubetu River
J05-24	2005	2006	CHUM	JAPAN	HOKKAIDO	East Pacific coast	NASREC	Tokachi Hatchery	Tokachi River	Sarubetu River
J05-25	2005	2006	CHUM	JAPAN	HOKKAIDO	East Pacific coast	NASREC	Tokachi Hatchery	Tokachi River	Sarubetu River
J05-26	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River
J05-27	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River
J05-28	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River
J05-29	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River
J05-30	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Yakumo Hatchery	Yurappu River	Yurappu River
J05-31	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Yakumo Hatchery	Yurappu River	Yurappu River
J05-32	2005	2006	CHUM	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Yakumo Hatchery	Yurappu River	Yurappu River
J05-33	2005	2006	CHUM	JAPAN	HONSHU	Pacific coast	NASREC	Katagishi Hatchery	Katagishi River	Katagishi River
J05-34	2005	2006	CHUM	JAPAN	HONSHU	Pacific coast	NASREC	Katagishi Hatchery	Katagishi River	Katagishi River
J05-35	2005	2006	CHUM	JAPAN	HONSHU	Pacific coast	NASREC	Katagishi Hatchery	Katagishi River	Katagishi River
J05-36	2005	2006	CHUM	JAPAN	HONSHU	Pacific coast	NASREC	Katagishi Hatchery	Katagishi River	Katagishi River
J05-37	2005	2006	PINK	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
J05-38	2005	2006	PINK	JAPAN	HOKKAIDO	Okhotsk Sea coast	NASREC	Kitami Hatchery	Tokoro River	Tokoro River
J05-39	2005	2006	PINK	JAPAN	HOKKAIDO	Nemuro Strait coast	NASREC	Ichani Hatchery	Ichani River	Ichani River

No	REARING TREATMENT	STAGE	PRELIMINARY NUMBER OF		RBr CODE	HATCH CODE	GRAPHIC IMAGE		MARKING SYSTEM
			TM RELEASED	OM ID			PREHATCH	POSTHATCH	
J05-20	fed	fry	3,030,000	Kushiro05chum-1	1:1.2.2.5-3.2	2,5-2H			CHILLER
J05-21	fed	fry	3,030,000	Kushiro05chum-2	1:1.2.2.5-3.3	2,5-3H			CHILLER
J05-22	fed	fry	3,030,000	Kushiro05chum-3	1:1.2.2.5-3.4	2,5-4H			CHILLER
J05-23	fed	fry	5,100,000	Tokachi05chum-1	1:1.2.2.4n	2,4nH			CHILLER
J05-24	fed	fry	5,100,000	Tokachi05chum-2	1:1.2.2.4n-3.2n	2,4n-2nH			CHILLER
J05-25	fed	fry	5,100,000	Tokachi05chum-3	1:1.2.2.4n-3.3n	2,4n-3nH			CHILLER
J05-26	fed	fry	330,000	Shizunai05chum-early	1:1.2.2.2n,3.4n	2,2n,4nH			CHILLER
J05-27	fed	fry	330,000	Shizunai05chum-tr	1:1.2-2.3	2-3H			CHILLER
J05-28	fed	fry	2,870,000	Shizunai05chum-mid	1:1.2.2.6n	2,6nH			CHILLER
J05-29	fed	fry	2,870,000	Shizunai05chum-late	1:1.2.2.1n-3.5n	2,1n-5nH			CHILLER
J05-30	fed	fry	2,500,000	Yurappu05chum-1	1:1.2.2.2w	2,2wH			CHILLER
J05-31	fed	fry	2,500,000	Yurappu05chum-2	1:1.2.2.2w-3.2	2,3w-2H			CHILLER
J05-32	fed	fry	2,500,000	Yurappu05chum-3	1:1.2.2.2w-3.3	2,3w-3H			CHILLER
J05-33	fed	fry	2,000,000	Katagishi05chum-1	1:1.2.2.4	2,4H			CHILLER
J05-34	fed	fry	1,000,000	Katagishi05chum-2	1:1.2-2.2,3,2	2-2,2H			CHILLER
J05-35	fed	fry	1,000,000	Katagishi05chum-3	1:1.2.2.2,3,3	2,2,3H			CHILLER
J05-36	fed	fry	1,000,000	Katagishi05chum-4	1:1.2.2.2	2,2H			CHILLER
J05-37	fed	fry	1,700,000	Tokushibetsu05pink	1:1.2-2.3	2-3H			CHILLER
J05-38	fed	fry	1,000,000	Tokoro05pink	1:1.2.2.2w,3.2w	2,2w,2wH			CHILLER
J05-39	fed	fry	4,500,000	Ichani05pink	1:1.2.2.5	2,5H			CHILLER

No	OTOLITH MARK SCHEDULE	DIRECTION	COMMENTS	TEMP SHIFT
J05-20	(1X)12C:12H,(1X)12C:36H,(4X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(8-4°C)	
J05-21	(1X)12C:12H,(1X)12C:36H,(4X)12C:12H,(1X)12C:36H,(3X)12C:12H	down	(8-4°C)	
J05-22	(1X)12C:12H,(1X)12C:36H,(4X)12C:12H,(1X)12C:36H,(4X)12C:12H	down	(8-4°C)	
J05-23	(1X)24C:24H,(1X)24C:48H,(4X)12C:12H	down	(9-5°C)	
J05-24	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(9-5°C)	
J05-25	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H,(1X)12C:36H,(3X)12C:12H	down	(9-5°C)	
J05-26	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:36H,(4X)12C:12H	down	(10-6°C)	spawning date: early October
J05-27	(2X)24H:24C,(1X)72H:24C,(2X)24H:24C	up	(6-10°C)	spawning date: early October
J05-28	(1X)24C:24H,(1X)24C:48H,(6X)12C:12H	down	(10-6°C)	spawning date: late October and early November
J05-29	(1X)24C:24H,(1X)24C:48H,(1X)12C:36H,(5X)12C:12H	down	(10-6°C)	spawning date: middle November and December
J05-30	(1X)12C:12H,(1X)12C:24H,(2X)24C:24H	down	(8-4°C)	
J05-31	(1X)12C:12H,(1X)12C:24H,(1X)24C:24H,(1X)24C:48H,(2X)12C:12H	down	(8-4°C)	
J05-32	(1X)12C:12H,(1X)12C:24H,(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	down	(8-4°C)	
J05-33	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	down	(12-8°C)	
J05-34	(1X)12C:12H,(1X)12C:36H,(1X)12C:12H,(1X)12C:36H,(2X)12C:12H	down	(12-8°C)	
J05-35	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	down	(12-8°C)	
J05-36	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	down	(12-8°C)	
J05-37	(1X)24C:24H,(1X)24C:72H,(3X)24C:24H	down	(7-4°C)	
J05-38	(1X)12C:12H,(1X)12C:24H,(1X)24C:24H,(1X)24C:48H,(2X)24C:24H	down	(12-8°C)	
J05-39	(1X)24C:24H,(1X)24C:48H,(5X)24C:24H	down	(8-4°C)	

Table2. Proposed thermal mark releases from Japan for 2005 brood year stocks of masu salmon.

No	BROOD YEAR	YEAR OF RELEASE	SPECIES	COUNTRY	STATE/ PROVINCE	REGION	AGENCY	FACILITY	STOCK	FINAL RELEASE SITE
J05-40	2005	2006	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Shiribetsu Hatchery	Shiribetsu River	Shubuto River
J05-41	2005	2006	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
J05-42	2005	2007	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
J05-43	2005	2007	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
J05-44	2005	2006	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Yakumo Hatchery	Shiribetsu River	Shiribetsu River
J05-45	2005	2007	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Yakumo Hatchery	Shiribetsu River	Shiribetsu River
J05-46	2005	2006	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Shiribetsu River	Shiribetsu River
J05-47	2005	2007	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Shiribetsu River	Shiribetsu River
J05-48	2005	2006	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-49	2005	2006	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-50	2005	2007	MASU	JAPAN	HOKKAIDO	Japan Sea coast	NASREC	Chitose Hatchery	Chitose River	Chitose River
J05-51	2005	2006	MASU	JAPAN	HOKKAIDO	Okhotsk Sea Coast	NASREC	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
J05-52	2005	2006	MASU	JAPAN	HOKKAIDO	Okhotsk Sea Coast	NASREC	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
J05-53	2005	2006	MASU	JAPAN	HOKKAIDO	Okhotsk Sea Coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-54	2005	2006	MASU	JAPAN	HOKKAIDO	Okhotsk Sea Coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-55	2005	2006	MASU	JAPAN	HOKKAIDO	Okhotsk Sea Coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-56	2005	2007	MASU	JAPAN	HOKKAIDO	Okhotsk Sea Coast	NASREC	Shari Hatchery	Shari River	Shari River
J05-57	2005	2006	MASU	JAPAN	HOKKAIDO	Nemuro strait coast	NASREC	Nemuro Hatchery	Shibetsu River	Shibetsu River
J05-58	2005	2006	MASU	JAPAN	HOKKAIDO	Nemuro strait coast	NASREC	Nemuro Hatchery	Shibetsu River	Shibetsu River
J05-59	2005	2007	MASU	JAPAN	HOKKAIDO	Nemuro strait coast	NASREC	Nemuro Hatchery	Shibetsu River	Shibetsu River
J05-60	2005	2006	MASU	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Yakumo Hatchery	Yurappu River	Yurappu River
J05-61	2005	2007	MASU	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Yakumo Hatchery	Yurappu River	Yurappu River

No	REARING TREATMENT	STAGE	PRELIMINARY NUMBER OF		RBr CODE	HATCH CODE	GRAPHIC IMAGE		MARKING SYSTEM
			TM RELEASED	OM ID			PREHATCH	POSTHATCH	
J05-40	fed	fry	580,000	Shubuto05masu-f	1:1.2.2.2	2.2H			CHILLER
J05-41	fed	fry	485,000	Shiribetsu05masu-r-f	1:1.2.2.2	2.2H			CHILLER
J05-42	fed	juvenile	80,000	Shiribetsu05masu-r-j	1:1.2.2.2	2.2H			CHILLER
J05-43	fed	smolt	140,000	Shiribetsu05masu-r-s	1:1.2.2.2	2.2H			CHILLER
J05-44	fed	juvenile	140,000	Shiribetsu05masu-y-j	1:1.5	5H			CHILLER
J05-45	fed	smolt	20,000	Shiribetsu05masu-y-s	1:1.5	5H			CHILLER
J05-46	fed	fry	205,000	Shiribetsu05masu-c-f	1:1.3.2.3n	3.3nH			CHILLER
J05-47	fed	smolt	60,000	Shiribetsu05masu-c-s	1:1.3.2.3n	3.3nH			CHILLER
J05-48	fed	fry	30,000	Chitose05masu-f	1:1.3.2.3n	3.3nH			CHILLER
J05-49	fed	juvenile	40,000	Chitose05masu-j	1:1.3.2.3n	3.3nH			CHILLER
J05-50	fed	smolt	30,000	Chitose05masu-s	1:1.3.2.3n	3.3nH			CHILLER
J05-51	fed	fry	400,000	Tokushibetsu05masu-f	1:1.5-2.3w	5-3wH			CHILLER
J05-52	fed	juvenile	100,000	Tokushibetsu05masu-j	1:1.5-2.3w	5-3wH			CHILLER
J05-53	fed	fry	400,000	Shari05masu-f	1:1.6	6H			CHILLER
J05-54	unfed	egg	-	Shari05masu-e	1:1.4	4H			CHILLER
J05-55	fed	juvenile	100,000	Shari05masu-j	1:1.6	6H			CHILLER
J05-56	fed	smolt	100,000	Shari05masu-s	1:1.6	6H			CHILLER
J05-57	fed	fry	100,000	Shibetsu05masu-f	1:1.2.2.4	2.4H			CHILLER
J05-58	fed	juvenile	340,000	Shibetsu05masu-j	1:1.2.2.4	2.4H			CHILLER
J05-59	fed	smolt	60,000	Shibetsu05masu-s	1:1.2.2.4	2.4H			CHILLER
J05-60	fed	fry	130,000	Yurappu05masu-f	1:1.5	5H			CHILLER
J05-61	fed	smolt	60,000	Yurappu05masu-s	1:1.5	5H			CHILLER

No	OTOLITH MARK SCHEDULE	TEMP SHIFT		COMMENTS
		DIRECTION		
J05-40	(1X)24H:24C,(1X)24H:48C,(2X)24H:24C	up (6-10°C)		
J05-41	(1X)24H:24C,(1X)24H:48C,(2X)24H:24C	up (6-10°C)		
J05-42	(1X)24H:24C,(1X)24H:48C,(2X)24H:24C	up (6-10°C)	TM + Finclips	
J05-43	(1X)24H:24C,(1X)24H:48C,(2X)24H:24C	up (6-10°C)	TM + Finclips	
J05-44	(5X)24C:24H	down (8-4°C)	include TM + Finclips	
J05-45	(5X)24C:24H	down (8-4°C)	TM + Finclips	
J05-46	(2X)24C:24H,(1X)24C:48H,(3X)12C:12H	down (8-4°C)		
J05-47	(2X)24C:24H,(1X)24C:48H,(3X)12C:12H	down (8-4°C)	TM + Finclips	
J05-48	(2X)24C:24H,(1X)24C:48H,(3X)12C:12H	down (8-4°C)		
J05-49	(2X)24C:24H,(1X)24C:48H,(3X)12C:12H	down (8-4°C)	TM + Finclips	
J05-50	(2X)24C:24H,(1X)24C:48H,(3X)12C:12H	down (8-4°C)	TM + Finclips	
J05-51	(4X)12C:12H,(1X)12C:36H,(3X)24C:24H	down (8-4°C)		
J05-52	(4X)12C:12H,(1X)12C:36H,(3X)24C:24H	down (8-4°C)	TM + Finclips	
J05-53	(6X)24C:24H	down (8-4°C)		
J05-54	(4X)24C:24H	down (8-4°C)		
J05-55	(6X)24C:24H	down (8-4°C)	TM + Finclips	
J05-56	(6X)24C:24H	down (8-4°C)	TM + Finclips	
J05-57	(1X)24C:24H,(1X)24C:48H,(4X)24C:24H	down (8-4°C)		
J05-58	(1X)24C:24H,(1X)24C:48H,(4X)24C:24H	down (8-4°C)	include TM + Finclips	
J05-59	(1X)24C:24H,(1X)24C:48H,(4X)24C:24H	down (8-4°C)	TM + Finclips	
J05-60	(5X)24C:24H	down (8-4°C)		
J05-61	(5X)24C:24H	down (8-4°C)	TM + Finclips	

Table3. Proposed thermal mark releases from Japan for 2005 brood year stocks of sockeye salmon.

No	BROOD YEAR	YEAR OF RELEASE	SPECIES	COUNTRY	STATE/ PROVINCE	REGION	AGENCY	FACILITY	STOCK	FINAL RELEASE SITE
J05-62	2005	2006	SOCKEYE	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River
J05-63	2005	2006	SOCKEYE	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River
J05-64	2005	2006	SOCKEYE	JAPAN	HOKKAIDO	West Pacific coast	NASREC	Shizunai Hatchery	Shizunai River	Shizunai River

No	REARING TREATMENT	STAGE	PRELIMINARY NUMBER OF		RBr CODE	HATCH CODE	GRAPHIC IMAGE		MARKING SYSTEM
			TM RELEASED	OM ID			PREHATCH	POSTHATCH	
J05-62	fed	smolt	10,000	Shizunai05sockeye-1	1:1.2,2,6	2,6H		CHILLER	
J05-63	fed	smolt	10,000	Shizunai05sockeye-2	1:1.2,2,7	2,7H		CHILLER	
J05-64	fed	smolt	10,000	Shizunai05sockeye-3	1:1.2,2,9	2,9H		CHILLER	

No	OTOLITH MARK SCHEDULE	TEMP SHIFT	DIRECTION	COMMENTS
J05-63	(1X)24C:24H,(1X)24C:48H,(7X)24C:24H	down (10-6°C)		
J05-64	(1X)24C:24H,(1X)24C:48H,(9X)24C:24H	down (10-6°C)		

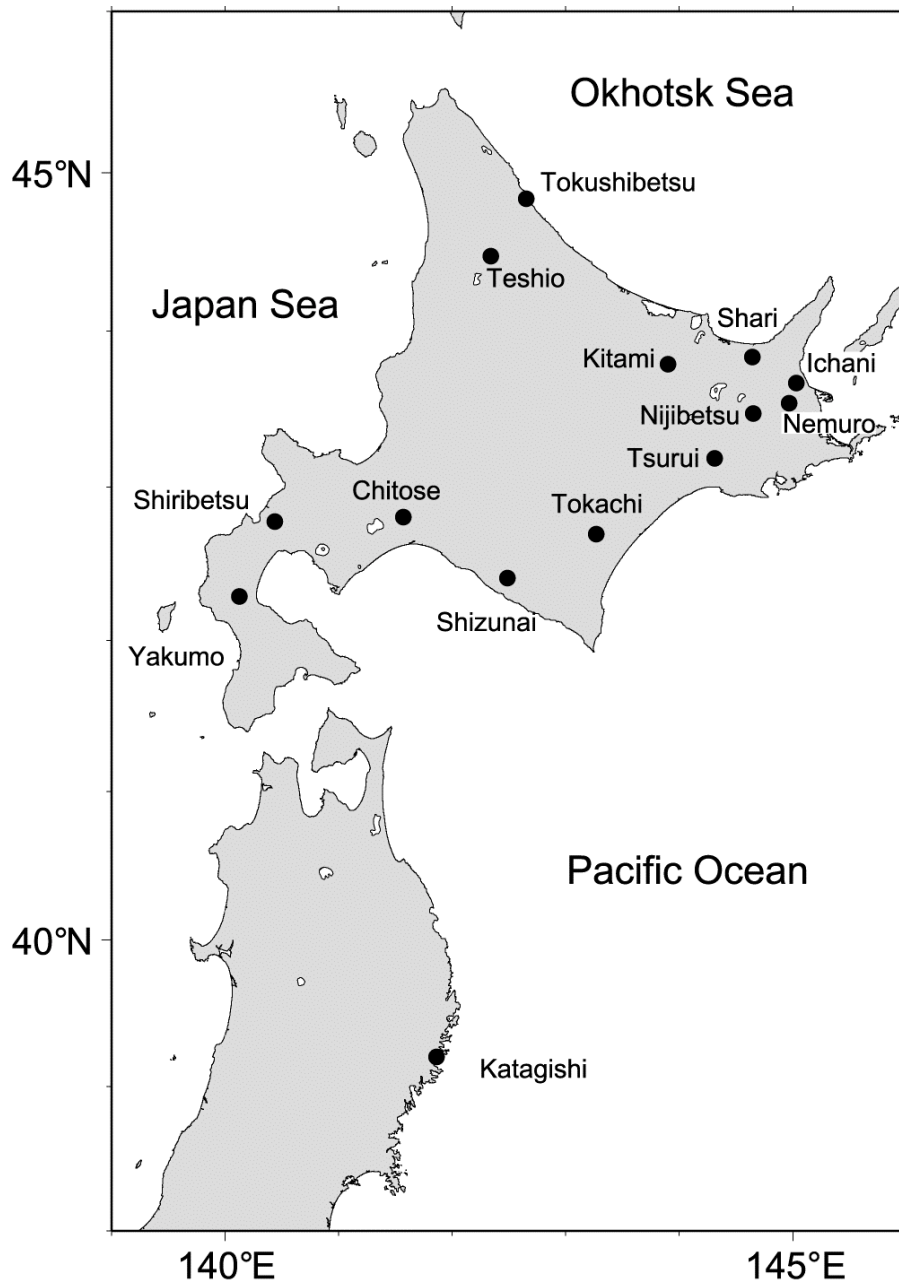


Fig. 1. Locations of hatcheries where brood year 2005 salmon will be thermally marked.