

Proposed Otolith Marks for Brood Year 2019 Salmon in Japan

by

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Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

by

Japan

March 2019

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:

Yamaya, K., M. Kuwaki, and S. Urawa. 2019. Proposed otolith marks for brood year 2019 salmon in Japan. NPAFC Doc. 1824 (Rev. 1). 15 pp. Hokkaido National Fisheries Research Institute, Japan Fisheries Research and Education Agency (Available at <https://npafc.org>).

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Abstract

Japan plans to mark approximately 375 million salmon of the 2019 brood year (232 million chum, 138 million pink, 4.0 million masu, and 150 thousand sockeye salmon) using 152 discrete thermal patterns and two ALC (alizarin complexone) patterns at 54 hatcheries. Two rings in the first band are adopted as the base mark to distinguish Japanese chum and pink salmon from other stocks.

Keywords: Japan, otolith mark plan, 2019 brood year salmon

Background

In Japan, thermal otolith marks have been used for migration, growth and survival surveys of juvenile salmon in the coastal waters, and for offshore migration surveys in the Okhotsk Sea, North Pacific Ocean and Bering Sea (Kawana et al. 1999; Urawa et al. 2000a, 2004, 2006, 2009; Sato et al. 2009). In addition, otolith marking is expected as a tool to evaluate the accuracy of homing migration and abundance of hatchery and natural spawning stocks.

Mark Plan

The proposed otolith marks for the 2019 brood year salmon include 152 discrete thermal patterns and two ALC (alizarin complexone) patterns (Table 1). We plan to mark approximately 232 million chum, 138 million pink, 4.0 million masu, and 150 thousand sockeye salmon at 54 hatcheries (Fig. 1).

The thermal marking pattern is presented as the hatch code notation (Hagen et al. 2000; Josephson et al. 2006). 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 stock (Urawa et al. 2000b). All thermal rings are induced by cooler temperature exposures.

ALC marks are used for chum, pink and masu salmon surveys by the Hokkaido Research Organization, Japan Fisheries Research and Education Agency, Yamagata Prefectural Inland Water Fisheries Experimental Station, and Non-profit Private Hatchery.

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Table 1. Proposed otolith mark releases from Japan for 2019 brood year stocks of chum, pink, masu and sockeye salmon. ALC, alizarin complexone; TM, thermal marking; AITC; Aomori Industrial Technology Center; FRA, Japan Fisheries Research and Education Agency; HAPC; Hokkaido Aquaculture Promotion Corporation; HOKK; Hokkaido Research Organization; IFTC; Iwate Fisheries Technology Center; IIFTC; Iwate Inland Fisheries Technology Center; NPH, Non-profit Private Hatchery; SSM, Sapporo Salmon Museum; TFRI, Toyama Fisheries Research Institute; YIE, Yamagata Inland Water Experimental Station.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-01	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-02	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-03	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-04	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-05	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-06	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-07	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-08	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Hiyoshi Hatchery	Tokoro River	Tokoro River
JP19-09	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Hiyoshi Hatchery	Tokoro River	Tokoro River
JP19-10	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP19-11	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP19-12	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP19-13	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP19-14	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Shintombetsu Hatchery	Tombetsu River	Tombetsu River
JP19-15	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Shintombetsu Hatchery	Tombetsu River	Tombetsu River
JP19-16	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP19-17	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP19-18	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP19-19	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP19-20	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-01	Fry	2,000,000	Shari19Chum1	2-1,6H			Down
JP19-02	Fry	1,550,000	Shari19Chum2	2,2,6H			Down
JP19-03	Fry	1,175,000	Shari19Chum3	2,6,2H			Down
JP19-04	Fry	1,175,000	Shari19Chum4	2-1,2,4H			Down
JP19-05	Fry	1,200,000	Shari19Chum5	2,1,2-4H			Down
JP19-06	Fry	2,100,000	Shari19Chum6	2-1-2,3H			Down
JP19-07	Fry	2,400,000	Shari19Chum7	2-1-2-2H			Down
JP19-08	Fry	1,900,000	Tokoro19Chum1	2,5nH			Down
JP19-09	Fry	1,900,000	Tokoro19Chum2	2,8H			Down
JP19-10	Fry	7,900,000	Tokushibetsu19Chum1	2,2,2,3H			Down
JP19-11	Fry	1,100,000	Tokushibetsu19Chum2	2-2,2,3H			Down
JP19-12	Fry	1,050,000	Tokushibetsu19Chum3	2-3,4H			Down
JP19-13	Fry	1,050,000	Tokushibetsu19Chum4	2-3-3H			Down
JP19-14	Fry	1,122,000	Tombetsu19Chum1	2,5nH			Down
JP19-15	Fry	898,000	Tombetsu19Chum2	2,8H			Down
JP19-16	Fry	2,200,000	Teshio19Chum1	2n-3H			Down
JP19-17	Fry	700,000	Teshio19Chum2	2,1-3H			Down
JP19-18	Fry	700,000	Teshio19Chum3	2-1,3H			Down
JP19-19	Fry	660,000	Teshio19Chum4	2-1-2H			Down
JP19-20	Fry	740,000	Teshio19Chum5	2,3,2H			Down

No	Otolith Mark Schedule	Comments
JP19-01	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(6X)12C:12H	
JP19-02	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP19-03	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-04	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-05	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP19-06	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-07	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-08	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	
JP19-09	(1X)12C:12H,(1X)12C:24H,(8X)12C:12H	
JP19-10	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-11	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-12	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-13	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-14	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	
JP19-15	(1X)12C:12H,(1X)12C:24H,(8X)12C:12H	
JP19-16	(1X)12C:12H,(1X)12C:36H,(3X)24C:24H	
JP19-17	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(3X)12C:12H	
JP19-18	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(3X)12C:12H	
JP19-19	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(2X)12C:12H	
JP19-20	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(2X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-21	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Nakagawa Hatchery	Teshio River	Teshio River
JP19-22	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Nakagawa Hatchery	Teshio River	Teshio River
JP19-23	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-24	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-25	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-26	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-27	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-28	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-29	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-30	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	SSM	Sapporo Salmon Museum	Ishikari River	Ishikari River
JP19-31	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	SSM	Sapporo Salmon Museum	Ishikari River	Ishikari River
JP19-32	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Yoichi River	Yoichi River
JP19-33	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Yoichi River	Yoichi River
JP19-34	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Yoichi River	Yoichi River
JP19-35	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Shiribetsu River	Shiribetsu River
JP19-36	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Shiribetsu River	Shiribetsu River
JP19-37	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Yakumo Hatchery	Ainumanai River	Ainumanai River
JP19-38	TM	2019	2020	Chum	Hokkaido	Japan Sea Coast	NPH	Yakumo Hatchery	Ainumanai River	Ainumanai River
JP19-39	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Fukushima Hatchery	Shiruchi River	Shiruchi River
JP19-40	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Fukushima Hatchery	Shiruchi River	Shiruchi River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-21	Fry	1,800,000	Teshio19Chum6	2-5H			Down
JP19-22	Fry	1,400,000	Teshio19Chum7	2,2,1,2H			Down
JP19-23	Fry	1,300,000	Ishikari19Chum1	2,2n,3H			Down
JP19-24	Fry	1,300,000	Ishikari19Chum2	2,4n,3H			Down
JP19-25	Fry	1,300,000	Ishikari19Chum3	2,6n,3H			Down
JP19-26	Fry	1,900,000	Ishikari19Chum4	2-3,3H			Down
JP19-27	Fry	900,000	Ishikari19Chum5	2-3-2H			Down
JP19-28	Fry	11,300,000	Ishikari19Chum6	2,3-3H			Down
JP19-29	Fry	12,000,000	Ishikari19Chum7	2-2-3H			Down
JP19-30	Fry	40,000	Toyohira19Chum1	2-2H			Down
JP19-31	Fry	40,000	Toyohira19Chum2	2-3H			Down
JP19-32	Fry	1,500,000	Yoichi19Chum1	2,2,1,4H			Up
JP19-33	Fry	1,500,000	Yoichi19Chum2	2,2,1,5H			Up
JP19-34	Fry	1,100,000	Yoichi19Chum3	2-3,2H			Up
JP19-35	Fry	1,010,000	Shiribetsu19Chum1	2-5H			Up
JP19-36	Fry	1,010,000	Shiribetsu19Chum2	2,2,1,2H			Up
JP19-37	Fry	1,010,000	Ainumanai19Chum1	2-5H			Down
JP19-38	Fry	1,010,000	Ainumanai19Chum2	2,2,1,2H			Down
JP19-39	Fry	1,350,000	Shiruchi19Chum1	2,3-2H			Down
JP19-40	Fry	1,350,000	Shiruchi19Chum2	2-2,3H			Down

No	Otolith Mark Schedule	Comments
JP19-21	(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP19-22	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP19-23	(1X)12C:12H,(1X)12C:24H,(1X)3C:9H,(1X)3C:21H,(3X)12C:12H	
JP19-24	(1X)12C:12H,(1X)12C:24H,(3X)3C:9H,(1X)3C:21H,(3X)12C:12H	
JP19-25	(1X)12C:12H,(1X)12C:24H,(5X)3C:9H,(1X)3C:21H,(3X)12C:12H	
JP19-26	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-27	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-28	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-29	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-30	(1X)24C:24H,(1X)24C:72H,(2X)24C:24H	
JP19-31	(1X)24C:24H,(1X)24C:72H,(3X)24C:24H	
JP19-32	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-33	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(5X)12C:12H	
JP19-34	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-35	(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP19-36	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP19-37	(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP19-38	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP19-39	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-40	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-41	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP19-42	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP19-43	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP19-44	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP19-45	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP19-46	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP19-47	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	NPH	Shibetsu Hatchery	Shibetsu River	Shibetsu River
JP19-48	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	NPH	Shibetsu Hatchery	Shibetsu River	Shibetsu River
JP19-49	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	NPH	Hombetsu Hatchery	Nishibetsu River	Nishibetsu River
JP19-50	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	NPH	Hombetsu Hatchery	Nishibetsu River	Furen Lake
JP19-51	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP19-52	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP19-53	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP19-54	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP19-55	TM	2019	2020	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP19-56	ALC	2019	2020	Chum	Hokkaido	Japan Sea Coast	HOKK	Hamamasu Hatchery	Hamamasu River	Hamamasu River
JP19-57	ALC	2019	2020	Chum	Hokkaido	Japan Sea Coast	HOKK	Hamamasu Hatchery	Hamamasu River	Hamamasu River
JP19-58	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP19-59	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP19-60	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-41	Fry	650,000	Ichani19Chum1	2-4-4H			Down
JP19-42	Fry	3,000,000	Ichani19Chum2	2-4-3H			Down
JP19-43	Fry	2,500,000	Ichani19Chum3	2-4-2H			Down
JP19-44	Fry	600,000	Ichani19Chum4	2,2,7H			Down
JP19-45	Fry	600,000	Ichani19Chum5	2-2,6H			Down
JP19-46	Fry	10,000	Ichani19Chum6	2-2n,2nH			Down
JP19-47	Fry	1,600,000	Shibetsu19Chum1	2,3,4H			Up
JP19-48	Fry	1,600,000	Shibetsu19Chum2	2-2,4H			Up
JP19-49	Fry	1,500,000	Shibetsu19Chum3	2,3,5H			Up
JP19-50	Fry	1,500,000	Shibetsu19Chum4	2,3,6H			Up
JP19-51	Fry	8,350,000	Nishibetsu19Chum1	2,1-2-3H			Down
JP19-52	Fry	8,000,000	Nishibetsu19Chum2	2,1,2,5H			Down
JP19-53	Fry	2,000,000	Nishibetsu19Chum3	2,2n,2nH			Down
JP19-54	Fry	4,650,000	Nishibetsu19Chum4	2-1-5H			Down
JP19-55	Fry	2,000,000	Nishibetsu19Chum5	2,1,2,3H			Down
JP19-56	Fry	1,500,000	Hamamasu19Chum-alc1	A1H			-
JP19-57	Fry	1,500,000	Hamamasu19Chum-alc2	A1H			-
JP19-58	Fry	1,300,000	Kushiro19Chum1	2-9H			Down
JP19-59	Fry	1,600,000	Kushiro19Chum2	2,11H			Down
JP19-60	Fry	3,000,000	Kushiro19Chum3	2-8H			Down

No	Otolith Mark Schedule	Comments
JP19-41	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP19-42	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-43	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-44	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(7X)12C:12H	
JP19-45	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP19-46	(1X)24C:24H,(1X)24C:96H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-47	(1X)12H:12C,(1X)12H:24C,(2X)12H:12C,(1X)12H:24C,(4X)12H:12C	
JP19-48	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP19-49	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-50	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP19-51	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-52	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-53	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-54	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(5X)12C:12H	
JP19-55	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-56		Single ring
JP19-57		Single ring
JP19-58	(1X)12C:12H,(1X)12C:48H,(9X)12C:12H	
JP19-59	(1X)12C:12H,(1X)12C:24H,(10X)12C:12H,(1X)12C:12H	
JP19-60	(1X)12C:12H,(1X)12C:48H,(8X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-61	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP19-62	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP19-63	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP19-64	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP19-65	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-66	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-67	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-68	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-69	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-70	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-71	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-72	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-73	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP19-74	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	NPH	Makubetsu Hatchery	Tokachi River	Tokachi River
JP19-75	TM	2019	2020	Chum	Hokkaido	East Pacific Coast	NPH	Makubetsu Hatchery	Tokachi River	Tokachi River
JP19-76	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Saruru Hatchery	Shizunai River	Erimo Msaki Fishing Port
JP19-77	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Hidakahorobetsu Hatchery	Hidakahorobetsu River	Hidakahorobetsu River
JP19-78	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Hidakahorobetsu Hatchery	Hidakahorobetsu River	Hidakahorobetsu River
JP19-79	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP19-80	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-61	Fry	3,200,000	Kushiro19Chum4	2-10H			Down
JP19-62	Fry	1,280,000	Kushiro19Chum5	2n,2n-2H			Down
JP19-63	Fry	1,310,000	Kushiro19Chum6	2n-2n,2H			Down
JP19-64	Fry	1,310,000	Kushiro19Chum7	2n-2n,3H			Down
JP19-65	Fry	2,400,000	Tokachi19Chum1	2-5-3H			Down
JP19-66	Fry	1,450,000	Tokachi19Chum2	2-5,3H			Down
JP19-67	Fry	1,450,000	Tokachi19Chum3	2,5,2H			Down
JP19-68	Fry	1,400,000	Tokachi19Chum4	2,5-3H			Down
JP19-69	Fry	1,400,000	Tokachi19Chum5	2-5-2H			Down
JP19-70	Fry	1,450,000	Tokachi19Chum6	2-5,2H			Down
JP19-71	Fry	2,900,000	Tokachi19Chum7	2,5-2H			Down
JP19-72	Fry	1,400,000	Tokachi19Chum8	2,5,4H			Down
JP19-73	Fry	1,450,000	Tokachi19Chum9	2,5,3H			Down
JP19-74	Fry	2,040,000	Sarabetsu19Chum1	2,4,1,2H			Down
JP19-75	Fry	1,620,000	Sarabetsu19Chum2	2,4,1,3H			Down
JP19-76	Fry	2,000,000	Erimo19Chum	2-3,1,2H			Down
JP19-77	Fry	2,305,000	Hidakahorobetsu19Chum1	2-7H			Down
JP19-78	Fry	1,004,000	Hidakahorobetsu19Chum2	2,2n-2nH			Down
JP19-79	Fry	700,000	Shizunai19Chum1	2,4-3H			Down
JP19-80	Fry	1,200,000	Shizunai19Chum2	2,2-3H			Down

No	Otolith Mark Schedule	Comments
JP19-61	(1X)12C:12H,(1X)12C:48H,(10X)12C:12H	
JP19-62	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(2X)24C:24H	
JP19-63	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(2X)24C:24H	
JP19-64	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(3X)24C:24H	
JP19-65	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-66	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-67	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-68	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-69	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-70	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-71	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-72	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-73	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-74	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP19-75	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-76	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP19-77	(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	
JP19-78	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-79	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-80	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-81	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP19-82	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP19-83	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP19-84	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP19-85	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP19-86	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP19-87	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP19-88	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP19-89	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP19-90	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Shikiu Hatchery	Shikiu River	Shikiu River
JP19-91	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Shikiu Hatchery	Shikiu River	Shikiu River
JP19-92	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-93	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-94	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-95	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-96	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-97	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-98	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-99	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP19-100	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Fukushima Hatchery	Shiruiuchi River	Shiruiuchi River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-81	Fry	1,600,000	Shizunai19Chum3	2,2,5H			Down
JP19-82	Fry	1,600,000	Shizunai19Chum4	2,2-5H			Down
JP19-83	Fry	900,000	Shizunai19Chum5	2,4-4H			Down
JP19-84	Fry	400,000	Shizunai19Chum6	2-4,3H			Down
JP19-85	Fry	470,000	Shizunai19Chum7	2,3,1,2H			Down
JP19-86	Fry	1,450,000	Shizunai19Chum8	2,3,1,3H			Down
JP19-87	Fry	2,030,000	Shizunai19Chum9	2,3,1,4H			Down
JP19-88	Fry	1,480,000	Shizunai19Chum10	2-3,1,3H			Down
JP19-89	Fry	470,000	Shizunai19Chum11	2,3,1,5H			Down
JP19-90	Fry	1,611,000	Shikiu19Chum1	2-7H			Up
JP19-91	Fry	808,000	Shikiu19Chum2	2,2n-2nH			Up
JP19-92	Fry	1,830,000	Yurappu19Chum1	2,2n-4nH			Down
JP19-93	Fry	720,000	Yurappu19Chum2	2,3n-2nH			Down
JP19-94	Fry	990,000	Yurappu19Chum3	2,3n-3nH			Down
JP19-95	Fry	810,000	Yurappu19Chum4	2,3n-4nH			Down
JP19-96	Fry	530,000	Yurappu19Chum5	2,2n,4nH			Down
JP19-97	Fry	1,180,000	Yurappu19Chum6	2,2n,5nH			Down
JP19-98	Fry	530,000	Yurappu19Chum7	2,2n,6nH			Down
JP19-99	Fry	910,000	Yurappu19Chum8	2,2n,3nH			Down
JP19-100	Fry	2,110,000	Shiruiuchi19Chum3	2-7H			Down

No	Otolith Mark Schedule	Comments
JP19-81	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-82	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP19-83	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP19-84	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-85	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP19-86	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(3X)12C:12H	
JP19-87	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(4X)12C:12H	
JP19-88	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(2X)12C:24H,(3X)12C:12H	
JP19-89	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(5X)12C:12H	
JP19-90	(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	
JP19-91	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-92	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP19-93	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-94	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-95	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP19-96	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-97	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-98	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP19-99	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-100	(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-101	TM	2019	2020	Chum	Hokkaido	West Pacific Coast	NPH	Fukushima Hatchery	Shiriuchi River	Shiriuchi River
JP19-102	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Horonai River	Horonai River
JP19-103	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Horonai River	Horonai River
JP19-104	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP19-105	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP19-106	TM	2019	2020	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP19-107	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Kawabukuro Hatchery	Kawabukuro River	Kawabukuro River
JP19-108	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Kawabukuro Hatchery	Kawabukuro River	Kawabukuro River
JP19-109	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Gakko River
JP19-110	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Gakko River
JP19-111	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Minowa) River	Gakko River
JP19-112	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Minowa) River	Gakko River
JP19-113	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Gakko River
JP19-114	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Gakko River
JP19-115	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Momote Hatchery	Momote River	Momote River
JP19-116	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Momote Hatchery	Momote River	Momote River
JP19-117	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Jintsu Hatchery	Jintsu River	Jintsu River
JP19-118	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Jintsu Hatchery	Jintsu River	Jintsu River
JP19-119	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River
JP19-120	TM	2019	2020	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-101	Fry	1,934,000	Shiriuchi19Chum4	2,2n-2nH			Down
JP19-102	Fry	1,000,000	Kitami19Chum1	2,1,7H			Down
JP19-103	Fry	1,000,000	Kitami19Chum2	2,1-6H			Down
JP19-104	Fry	800,000	Kitami19Chum3	2,1-2,4H			Down
JP19-105	Fry	800,000	Kitami19Chum4	2,1,4-2H			Down
JP19-106	Fry	800,000	Kitami19Chum5	2,3-1-2H			Down
JP19-107	Fry	1,160,000	Kawabukuro19Chum1	2,1,2,2H			Down
JP19-108	Fry	2,500,000	Kawabukuro19Chum2	2-1,2H			Down
JP19-109	Fry	705,000	Gakkou19Chum1	2,1-2H			Down
JP19-110	Fry	705,000	Gakkou19Chum2	2,3nH			Down
JP19-111	Fry	706,000	Gakkou19Chum1	2,1-2H			Down
JP19-112	Fry	704,000	Gakkou19Chum2	2,3nH			Down
JP19-113	Fry	200,000	Gakkou19Chum3	2-2,1,2H			Down
JP19-114	Fry	400,000	Gakkou19Chum4	2,2,1-2H			Down
JP19-115	Fry	1,700,000	Momote19Chum1	2-3H			Down
JP19-116	Fry	1,700,000	Momote19Chum2	2,7nH			Down
JP19-117	Fry	240,000	Jintsu19Chum2	2,4nH			Down
JP19-118	Fry	100,000	Jintsu19Chum3	2,6nH			Down
JP19-119	Fry	900,000	Shogawa19Chum2	2,4nH			Down
JP19-120	Fry	720,000	Shogawa19Chum3	2,6nH			Down

No	Otolith Mark Schedule	Comments
JP19-101	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-102	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(7X)12C:12H	
JP19-103	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(6X)12C:12H	
JP19-104	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-105	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP19-106	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:48H,(1X)12C:48H,(2X)12C:12H	
JP19-107	(1X)12C:12H,(2X)12C:24H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-108	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(2X)12C:12H	
JP19-109	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(2X)12C:12H	
JP19-110	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP19-111	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(2X)12C:12H	
JP19-112	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP19-113	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(2X)12C:12H	
JP19-114	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(2X)12C:12H	
JP19-115	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP19-116	(1X)12C:12H,(1X)12C:24H,(7X)3C:9H	
JP19-117	(1X)12C:12H,(1X)12C:24H,(4X)3C:9H	
JP19-118	(1X)12C:12H,(1X)12C:24H,(6X)3C:9H	
JP19-119	(1X)12C:12H,(1X)12C:24H,(4X)3C:9H	
JP19-120	(1X)12C:12H,(1X)12C:24H,(6X)3C:9H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-121	ALC	2019	2020	Chum	Honshu	Japan Sea Coast	FRA	Shogawa Hatchery	Shogawa a River	Shogawa a River
JP19-122	ALC	2019	2020	Chum	Honshu	Japan Sea Coast	FRA	Shogawa Hatchery	Shogawa a River	Shogawa a River
JP19-123	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Oirase Hatchery (Pacific)	Oirase River (Pacific)	Oirase River (Pacific)
JP19-124	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Oirase Hatchery (Pacific)	Oirase River (Pacific)	Oirase River (Pacific)
JP19-125	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Oippe Hatchery (Pacific)	Oippe River(Pacific)	Oippe River(Pacific)
JP19-126	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Oippe Hatchery (Pacific)	Oippe River(Pacific)	Oippe River(Pacific)
JP19-127	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Shimoakka Hatchery	Akka River	Akka River
JP19-128	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Shimoakka Hatchery	Akka River	Akka River
JP19-129	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Akedo Hatchery	Akedo River	Akedo River
JP19-130	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Akedo Hatchery	Akedo River	Akedo River
JP19-131	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Taro Hatchery	Taro River	Taro River
JP19-132	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Taro Hatchery	Taro River	Taro River
JP19-133	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Tsugaruishi Hatchery	Tsugaruishi River	Tsugaruishi River
JP19-134	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Tsugaruishi Hatchery	Tsugaruishi River	Tsugaruishi River
JP19-135	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Orikasa Hatchery	Orikasa River	Orikasa River
JP19-136	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Orikasa Hatchery	Orikasa River	Orikasa River
JP19-137	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP19-138	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP19-139	TM	2018	2020	Chum	Honshu	Pacific Coast	NPH	Sakari Hatchery	Sakari River	Sakari River
JP19-140	TM	2018	2020	Chum	Honshu	Pacific Coast	NPH	Sakari Hatchery	Sakari River	Sakari River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-121	Eyed Egg	200,000	Shogawa a19Chum-alc1	A1H			-
JP19-122	Fry	200,000	Shogawa a19Chum-alc2	A2H			-
JP19-123	Fry	845,000	Oirase-p19Chum1	2-6H			Down
JP19-124	Fry	840,000	Oirase-p19Chum2	2,2,3H			Down
JP19-125	Fry	300,000	Oippe-p19Chum1	2-6H			Down
JP19-126	Fry	300,000	Oippe-p19Chum2	2,2,3H			Down
JP19-127	Fry	3,680,000	Akka19Chum1	2,1,3H			Down
JP19-128	Fry	3,680,000	Akka19Chum2	2,1,4H			Down
JP19-129	Fry	830,000	Akedo19Chum1	2,1,3H			Down
JP19-130	Fry	1,200,000	Akedo19Chum2	2,1,4H			Down
JP19-131	Fry	550,000	Tarou19Chum1	2,1,3H			Down
JP19-132	Fry	800,000	Tarou19Chum2	2,1,4H			Down
JP19-133	Fry	1,270,000	Tsugaruishi19Chum1	2,1,3H			Down
JP19-134	Fry	1,270,000	Tsugaruishi19Chum2	2,1,4H			Down
JP19-135	Fry	700,000	Orikasa19Chum1	2,1,3H			Down
JP19-136	Fry	400,000	Orikasa19Chum2	2,1,4H			Down
JP19-137	Fry	1,990,000	Kasshi19Chum1	2,1,3H			Down
JP19-138	Fry	1,990,000	Kasshi19Chum2	2,1,4H			Down
JP19-139	Fry	780,000	Sakari19Chum1	2,1,3H			Down
JP19-140	Fry	1,250,000	Sakari19Chum2	2,1,4H			Down

No	Otolith Mark Schedule	Comments
JP19-121		Single ring
JP19-122		Double ring
JP19-123	(1X)12C:12H,(1X)12C:48H,(6X)12C:12H	
JP19-124	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-125	(1X)12C:12H,(1X)12C:48H,(6X)12C:12H	
JP19-126	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-127	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-128	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-129	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-130	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-131	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-132	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-133	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-134	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-135	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-136	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-137	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-138	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-139	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-140	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-141	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kesen Hatchery	Kesen River	Kesen River
JP19-142	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kesen Hatchery	Kesen River	Kesen River
JP19-143	TM	2019	2020	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP19-144	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kumano Hatchery	Kumano River	Kumano River
JP19-145	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kumano Hatchery	Kumano River	Kumano River
JP19-146	TM	2019	2020	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Yamada Bay
JP19-147	TM	2019	2020	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Yamada Bay
JP19-148	TM	2019	2020	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Orikasa River
JP19-149	TM	2019	2020	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Yamada Bay
JP19-150	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP19-151	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP19-152	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP19-153	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP19-154	TM	2019	2020	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP19-155	TM	2019	2020	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP19-156	TM	2019	2020	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP19-157	TM	2019	2020	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP19-158	TM	2019	2020	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP19-159	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kesennumaokawa Hatchery	Kesennumaokawa River	Kesennumaokawa River
JP19-160	TM	2019	2020	Chum	Honshu	Pacific Coast	NPH	Kesennumaokawa Hatchery	Kesennumaokawa River	Kesennumaokawa River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-141	Fry	880,000	Kesen19Chum1	2,1,3H			Down
JP19-142	Fry	1,400,000	Kesen19Chum2	2,1,4H			Down
JP19-143	Fry	200,000	Kumano19Chum1	2,2,3,2H			Down
JP19-144	Fry	100,000	Kumano19Chum7	2,5H2			Down
JP19-145	Fry	100,000	Kumano19Chum8	2,5H3			Down
JP19-146	Fry	400,000	Orikasa19Chum1	2,5H			Down
JP19-147	Fry	400,000	Yamada19Chum	2,2nH			Down
JP19-148	Fry	400,000	Orikasa19Chum2	2n-2H			Down
JP19-149	Fry	400,000	OrikasaChum5	2-2,2H			Down
JP19-150	Fry	300,000	Kasshi19Chum8	2,4,3H2			Down
JP19-151	Fry	300,000	Kasshi19Chum9	2,4,3H3			Down
JP19-152	Fry	300,000	Kasshi19Chum10	2,2,3,2H2			Down
JP19-153	Fry	300,000	Kasshi19Chum11	2,2,3,2H3			Down
JP19-154	Fry	200,000	Kumano19Chum2	2,4,3H			Down
JP19-155	Fry	200,000	Kumano19Chum3	2,4H			Down
JP19-156	Fry	200,000	Kumano19Chum4	2,2,4H			Down
JP19-157	Fry	200,000	Kumano19Chum5	2,4H2			Down
JP19-158	Fry	200,000	Kumano19Chum6	2,2,4H2			Down
JP19-159	Fry	1,600,000	Kesennumaokawa19Chum1	2,3H			Down
JP19-160	Fry	1,600,000	Kesennumaokawa19Chum2	2,2H			Down

No	Otolith Mark Schedule	Comments
JP19-141	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-142	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-143	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-144	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-145	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-146	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-147	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H	
JP19-148	(1X)12C:12H,(1X)12C:36H,(2X)24C:24H	
JP19-149	(1X)12C:12H,(1X)12C:36H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP19-150	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H,HATCH,(2X)12C:12H	
JP19-151	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H,HATCH,(3X)12C:12H	
JP19-152	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,HATCH,(2X)12C:12H	
JP19-153	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,HATCH,(3X)12C:12H	
JP19-154	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-155	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-156	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-157	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,HATCH,(2X)12C:12H	
JP19-158	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,HATCH,(2X)12C:12H	
JP19-159	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP19-160	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	

Table 1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-161	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Iwaoabetsu River	Rusha River
JP19-162	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Iwaoabetsu River	Iwaoabetsu River
JP19-163	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Iwaoabetsu River	Onnebetsu River
JP19-164	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Okushibetsu River	Okushibetsu River
JP19-165	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Shari Hatchery	Shari River	Shari River
JP19-166	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP19-167	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River	Yambetsu River
JP19-168	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River	Urashibetsu River
JP19-169	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Mokoto River
JP19-170	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Abashiri River
JP19-171	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Bairagi River
JP19-172	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Notori Lake
JP19-173	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Tokoro River	Tokoro River
JP19-174	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Tokoro River	Tokoro River
JP19-175	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Yubetsu River	Yubetsu River
JP19-176	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Tokoro River	Hamasaroma
JP19-177	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Tokoro River	Toppushi Fishing Port
JP19-178	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Yubetsu River	Yubetsu Fishing Port
JP19-179	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River	Mobetsu River
JP19-180	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River	Shokotsu River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-161	Fry	4,000,000	East Okhotsk Coast19Pink1	2,1,3H			Down
JP19-162	Fry	8,000,000	East Okhotsk Coast19Pink2	2,1,3H			Down
JP19-163	Fry	3,000,000	East Okhotsk Coast19Pink3	2,1,3H			Down
JP19-164	Fry	7,800,000	East Okhotsk Coast18Pink3	2,1,3H			Down
JP19-165	Fry	4,700,000	Shari19Pink	2,3nH			Down
JP19-166	Fry	5,300,000	East Okhotsk Coast19Pink4	2,1,3H			Down
JP19-167	Fry	3,000,000	East Okhotsk Coast19Pink5	2,1,3H			Down
JP19-168	Fry	3,000,000	East Okhotsk Coast19Pink6	2,1,3H			Down
JP19-169	Fry	2,000,000	East Okhotsk Coast19Pink7	2,1,3H			Down
JP19-170	Fry	3,700,000	East Okhotsk Coast19Pink8	2,1,3H			Down
JP19-171	Fry	2,000,000	East Okhotsk Coast19Pink9	2,1,3H			Down
JP19-172	Fry	2,000,000	East Okhotsk Coast19Pink10	2,1,3H			Down
JP19-173	Fry	1,000,000	Tokoro19Pink	2,3n~2nH			Down
JP19-174	Fry	4,800,000	Middle Okhotsk Coast19Pink1	2,1,4H			Down
JP19-175	Fry	6,000,000	Middle Okhotsk Coast19Pink2	2,1,4H			Down
JP19-176	Fry	1,400,000	Middle Okhotsk Coast19Pink3	2,1,4H			Down
JP19-177	Fry	1,500,000	Middle Okhotsk Coast19Pink4	2,1,4H			Down
JP19-178	Fry	500,000	Middle Okhotsk Coast19Pink5	2,1,4H			Down
JP19-179	Fry	1,000,000	Middle Okhotsk Coast19Pink6	2,1,4H			Down
JP19-180	Fry	3,500,000	Middle Okhotsk Coast19Pink7	2,1,4H			Down

No	Otolith Mark Schedule	Comments
JP19-161	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-162	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-163	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-164	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-165	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP19-166	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-167	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-168	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-169	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-170	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-171	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-172	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP19-173	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:36H,(2X)12C:12H	
JP19-174	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-175	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-176	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-177	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-178	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-179	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-180	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	

Table 1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-181	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River Etc	Saru River
JP19-182	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River Etc	Mokoppe River
JP19-183	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River Etc	Okoppe River
JP19-184	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Horonai River	Omu River
JP19-185	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Horonai River	Horonai River
JP19-186	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River	Mombetsu Fishing Port
JP19-187	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP19-188	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tokushibetsu Hatchery	Tokushibetsu River	Kitamihorobetsu River
JP19-189	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Kitamihorobetsu River
JP19-190	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Tombetsu River
JP19-191	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Onishibetsu River
JP19-192	TM	2019	2020	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Chirabetsu River
JP19-193	TM	2019	2020	Pink	Hokkaido	Japan Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Masuhoro River
JP19-194	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Rusa River
JP19-195	TM	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Nijibetsu Hatchery	Sashirui River Etc	Rusa River Etc
JP19-196	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Sashirui River
JP19-197	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Rausu River
JP19-198	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Shunkarikotan River
JP19-199	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Kumbetsu River
JP19-200	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Churui River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-181	Fry	1,000,000	Middle Okhotsk Coast19Pink8	2,1,4H			Down
JP19-182	Fry	1,000,000	Middle Okhotsk Coast19Pink9	2,1,4H			Down
JP19-183	Fry	1,500,000	Middle Okhotsk Coast19Pink10	2,1,4H			Down
JP19-184	Fry	2,000,000	Middle Okhotsk Coast19Pink11	2,1,4H			Down
JP19-185	Fry	4,000,000	Middle Okhotsk Coast19Pink12	2,1,4H			Down
JP19-186	Fry	1,000,000	Middle Okhotsk Coast19Pink13	2,1,4H			Down
JP19-187	Fry	1,700,000	Tokushibetsu19Pink	2-3H			Down
JP19-188	Fry	1,300,000	Kitamihorobetsu19Pink	2n-3H			Down
JP19-189	Fry	4,000,000	West Okhotsk Coast19Pink1	2,1,2H			Down
JP19-190	Fry	5,000,000	West Okhotsk Coast19Pink2	2,1,2H			Down
JP19-191	Fry	2,200,000	West Okhotsk Coast19Pink3	2,1,2H			Down
JP19-192	Fry	2,000,000	West Okhotsk Coast19Pink4	2,1,2H			Down
JP19-193	Fry	2,000,000	West Okhotsk Coast19Pink5	2,1,2H			Down
JP19-194	Fry	1,000,000	Nemuro Coast19Pink-alc1	A1H			-
JP19-195	Fry	5,300,000	Shunkarikotan19Pink	2,4nH			Down
JP19-196	Fry	1,000,000	Nemuro Coast19Pink-alc2	A1H			-
JP19-197	Fry	1,000,000	Nemuro Coast19Pink-alc3	A1H			-
JP19-198	Fry	2,000,000	Nemuro Coast19Pink-alc4	A1H			-
JP19-199	Fry	1,000,000	Nemuro Coast19Pink-alc5	A1H			-
JP19-200	Fry	2,700,000	Nemuro Coast19Pink-alc6	A1H			-

No	Otolith Mark Schedule	Comments
JP19-181	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-182	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-183	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-184	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-185	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-186	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP19-187	(1X)24C:24H,(1X)24C:72H,(3X)24C:24H	
JP19-188	(1X)12C:12H,(1X)12C:36H,(3X)24C:24H	
JP19-189	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP19-190	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP19-191	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP19-192	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP19-193	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP19-194		Single ring
JP19-195	(1X)24C:24H,(1X)24C:48H,(4X)12C:12H	
JP19-196		Single ring
JP19-197		Single ring
JP19-198		Single ring
JP19-199		Single ring
JP19-200		Single ring

Table 1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-201	TM	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River Etc	Ichani River
JP19-202	TM	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Tokushibetsu River Etc	Ichani River
JP19-203	TM	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Shari River Etc	Ichani River
JP19-204	TM	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River Etc	Ichani River
JP19-205	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Shibetsu River
JP19-206	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Tohoro River
JP19-207	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Shumbetsu River
JP19-208	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Tokotan River
JP19-209	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Nishibetsu River
JP19-210	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Furen River
JP19-211	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Bettoga River
JP19-212	ALC	2019	2020	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Onnebetsu River
JP19-213	TM	2019	2020	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-214	TM	2019	2020	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP19-215	TM	2019	2020	Masu	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-216	TM	2019	2020	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
JP19-217	TM	2019	2020	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shubuto River
JP19-218	TM	2019	2020	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Ichani River	Ichani River
JP19-219	TM	2019	2020	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Shibetsu River	Shibetsu River
JP19-220	ALC	2019	2020	Masu	Honshu	Japan Sea Coast	YIE	Yamato Hatchery	Akagawa River	Iragawa River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-201	Fry	1,125,000	Ichani19Pink1	2,4n-2H			Down
JP19-202	Fry	1,125,000	Ichani19Pink2	2,4H			Down
JP19-203	Fry	1,125,000	Ichani19Pink3	2,4H			Down
JP19-204	Fry	1,125,000	Ichani19Pink4	2,5H			Down
JP19-205	Fry	5,000,000	Nemuro Coast19Pink-alc7	A1H			-
JP19-206	Fry	3,000,000	Nemuro Coast19Pink-alc8	A1H			-
JP19-207	Fry	2,000,000	Nemuro Coast19Pink-alc9	A1H			-
JP19-208	Fry	1,000,000	Nemuro Coast19Pink-alc10	A1H			-
JP19-209	Fry	4,000,000	Nemuro Coast19Pink-alc11	A1H			-
JP19-210	Fry	3,000,000	Nemuro Coast19Pink-alc12	A1H			-
JP19-211	Fry	4,000,000	Nemuro Coast19Pink-alc13	A1H			-
JP19-212	Fry	1,000,000	Nemuro Coast19Pink-alc14	A1H			-
JP19-213	Fry	650,000	Shari19Masu-f	4H			Down
JP19-214	Fry	500,000	Tokushibetsu19Masu-f	2,3nH			Down
JP19-215	Fry	60,000	Ishikari19Masu-f	2,3H			Down
JP19-216	Fry	900,000	Shiribetsu19Masu-f	2,5nH			Up
JP19-217	Fry	500,000	Shubuto19Masu-f	5H			Up
JP19-218	Fry	50,000	Ichani19Masu-f	2,5H			Down
JP19-219	Fry	220,000	Shibetsu19Masu-f	2,4H			Down
JP19-220	Eyed Egg	30,000	Ira19Masu-alc	A1H			-

No	Otolith Mark Schedule	Comments
JP19-201	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H,(1X)12C:24H,(2X)24C:24H	
JP19-202	(1X)24C:24H,(1X)24C:48H,(4X)24C:24H	
JP19-203	(1X)24C:24H,(1X)24C:96H,(4X)24C:24H	
JP19-204	(1X)24C:24H,(1X)24C:48H,(5X)24C:24H	
JP19-205		Single ring
JP19-206		Single ring
JP19-207		Single ring
JP19-208		Single ring
JP19-209		Single ring
JP19-210		Single ring
JP19-211		Single ring
JP19-212		Single ring
JP19-213	(4X)24C:24H	
JP19-214	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP19-215	(1X)24C:24H,(1X)24C:96H,(3X)24C:24H	
JP19-216	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	
JP19-217	(5X)24C:24H	
JP19-218	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-219	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-220		Single ring

Table 1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP19-221	TM	2019	2020	Masu	Honshu	Japan Sea Coast	TFRI	Toyama Fish.Res.Inst.	Toyama Fish.Res.Inst.	Jintsu River
JP19-222	TM	2019	2020	Masu	Honshu	Japan Sea Coast	TFRI	Toyama Fish.Res.Inst.	Toyama Fish.Res.Inst.	Jintsu River
JP19-223	TM	2019	2020	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Akka River
JP19-224	TM	2019	2020	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Akka River
JP19-225	TM	2019	2020	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Akka River
JP19-226	TM	2019	2020	Sockeye	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP19-227	TM	2019	2020	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-228	TM	2019	2021	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP19-229	TM	2019	2020	Masu	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-230	TM	2019	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP19-231	TM	2019	2020	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
JP19-232	TM	2019	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
JP19-233	TM	2019	2020	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Ichani River	Ichani River
JP19-234	TM	2019	2021	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Ichani River	Ichani River
JP19-235	TM	2019	2020	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Shibetsu River	Shibetsu River
JP19-236	TM	2019	2021	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Shibetsu River	Shibetsu River
JP19-237	TM	2019	2020	Sockeye	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Abira River Etc	Shizunai River
JP19-238	TM	2019	2021	Sockeye	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Abira River Etc	Shizunai River
JP19-239	TM	2019	2021	Sockeye	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Abira River Etc	Abira River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP19-221	Eyed Egg	100,000	Jintsu19Masu1	2,2nH			Up
JP19-222	Eyed Egg	30,000	Jintsu19Masu2	3H			Up
JP19-223	Fry	260,000	Iwate19Masu1	2n-2H			Down
JP19-224	Fry	50,000	Iwate19Masu2	2n-3H			Down
JP19-225	Fry	50,000	Iwate19Masu3	2n-4H			Down
JP19-226	Fry	50,000	Kushiro19Sockeye-f	2,3H			Down
JP19-227	Juvenile	50,000	Shari19Masu-j	4H			Down
JP19-228	Smolt	50,000	Shari19Masu-s	4H			Down
JP19-229	Juvenile	10,000	Ishikari19Masu-j	2,3H			Down
JP19-230	Smolt	30,000	Ishikari19Masu-s	2,3H			Down
JP19-231	Juvenile	80,000	Shiribetsu19Masu-j	2,5nH			Up
JP19-232	Smolt	220,000	Shiribetsu19Masu-s	2,5nH			Up
JP19-233	Juvenile	30,000	Ichani19Masu-j	2,5H			Down
JP19-234	Smolt	20,000	Ichani19Masu-s	2,5H			Down
JP19-235	Juvenile	60,000	Shibetsu19Masu-j	2,4H			Down
JP19-236	Smolt	20,000	Shibetsu19Masu-s	2,4H			Down
JP19-237	Juvenile	30,000	Shizunai19Sockeye-j	2,6H			Down
JP19-238	Smolt	20,000	Shizunai19Sockeye-s	2,6H			Down
JP19-239	Smolt	50,000	Abira19Sockeye-s	2,6H			Down

No	Otolith Mark Schedule	Comments
JP19-221	(1X)12C:12H,(1X)12C:24H,(2X)3C:9H	
JP19-222	(3X)12C:12H	
JP19-223	(1X)12C:12H,(1X)12C:36H,(2X)24C:24H	
JP19-224	(1X)12C:12H,(1X)12C:36H,(3X)24C:24H	
JP19-225	(1X)12C:12H,(1X)12C:36H,(4X)24C:24H	
JP19-226	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP19-227	(4X)24C:24H	
JP19-228	(4X)24C:24H	
JP19-229	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP19-230	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP19-231	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	
JP19-232	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	fincilps(right,left ventral fin)
JP19-233	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-234	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP19-235	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-236	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP19-237	(1X)24C:24H,(1X)24C:48H,(6X)24C:24H	
JP19-238	(1X)24C:24H,(1X)24C:48H,(6X)24C:24H	
JP19-239	(1X)24C:24H,(1X)24C:48H,(6X)24C:24H	

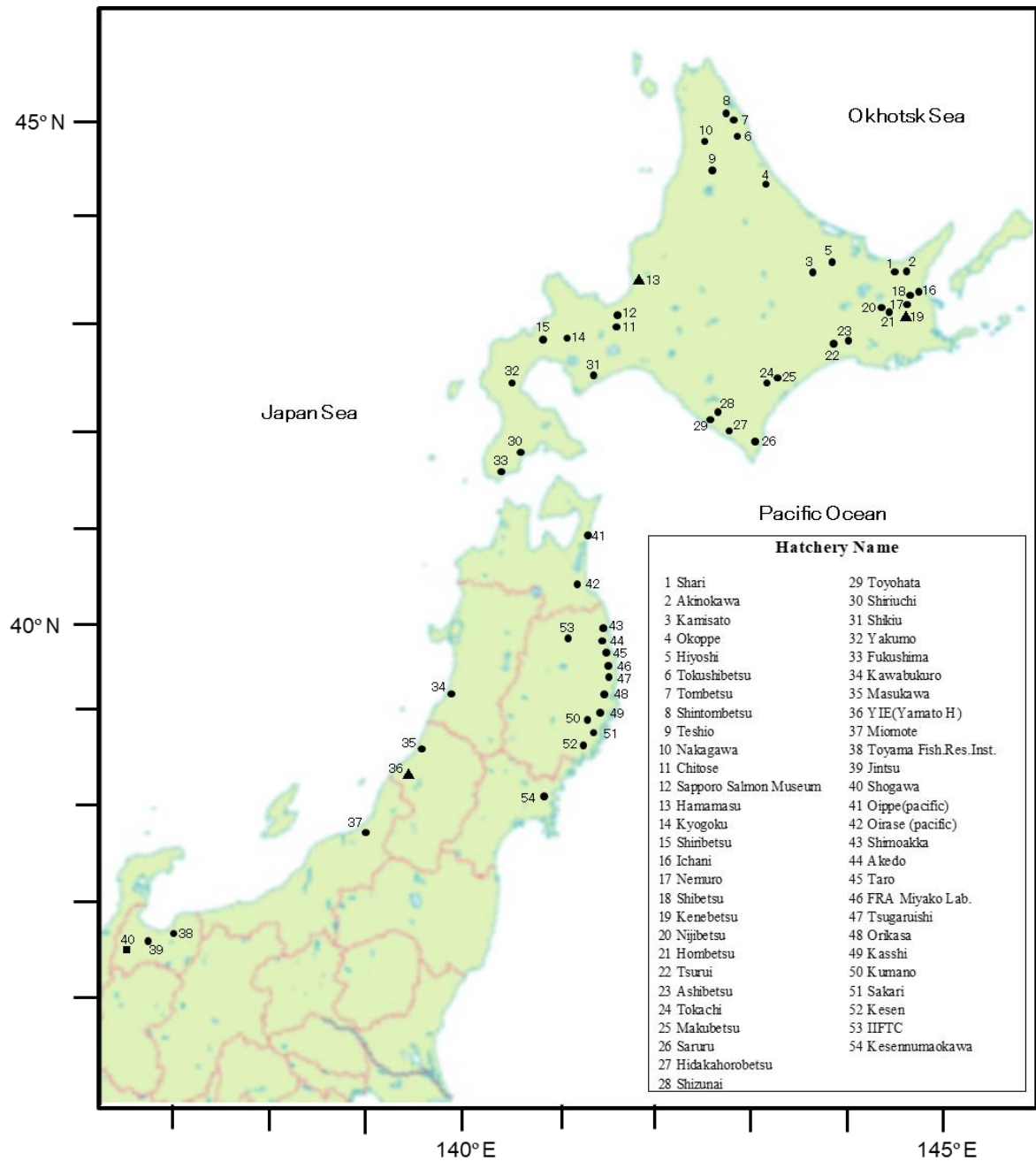


Fig. 1. Locations of hatcheries where brood year 2019 salmon will be otolith-marked. Fifty (closed circles) and three (closed triangles) hatcheries conduct otolith thermal marking and ALC marking, respectively. One hatchery (closed rectangle) plan to conduct otolith thermal marking and ALC marking. YIE, Yamagata Inland Water Experimental Station; FRA, Japan Fisheries Research and Education Agency; IIFTC, Iwate Inland Fisheries Technology Center.