

## **Proposed Otolith Marks for Brood Year 2020 Salmon in Japan**

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## Abstract

Japan plans to mark approximately 367 million salmon of the 2020 brood year (225 million chum, 138 million pink, 3.9 million masu, and 180 thousand sockeye salmon) using 152 discrete thermal patterns and two ALC (alizarin complexone) patterns at 51 hatcheries. Two rings in the first band are adopted as the base mark to distinguish Japanese chum and pink salmon from other stocks.

## 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 (Honda et al. 2017, 2019; 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 2020 brood year salmon include 152 discrete thermal patterns and two ALC (alizarin complexone) patterns (Table 1). We plan to mark approximately 225 million chum, 138 million pink, 3.9 million masu, and 180 thousand sockeye salmon at 51 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, Yamagata Prefectural Inland Water Fisheries Experimental Station, and Non-profit Private Hatchery.

## References

- Hagen, P., H.J. Geiger, E.C. Volk, and J.J. Grimm. 2000. Thermal mark patterns applied to salmon from Alaska, Washington and Oregon for brood year 1999 and some proposed marks for brood year 2000. NPAFC Doc. 463. Rev.1. 8 pp. (Available at <https://npafc.org>).
- Honda, K., T. Kawakami, T. Saito, and S. Urawa. 2019. First report of growth rate of juvenile chum salmon *Oncorhynchus keta* captured in the Sea of Okhotsk offshore. Ichthyol. Res. 66: 155–159.
- Honda, K., T. Kawakami, K. Suzuki, K. Watanabe, and T. Saito. 2017. Growth rate characteristics of juvenile chum salmon *Oncorhynchus keta* originating from the Pacific coast of Japan and reaching Konbumori, eastern Hokkaido. Fish Sci. 83: 987–996.
- Josephson, R., B.A. Agler, K.F. Van Kirk, and D.S. Oxman. 2006. A proposal to simplify the thermal mark code notation. NPAFC Doc. 944. 4 pp. (Available at <https://npafc.org>).
- Kawana, M., S. Urawa, G. Anma, Y. Kamei, T. Shoji, M. Fukuwaka, K. Munk, K. W. Myers, and E. V. Farley, Jr. 1999. Recoveries of thermally marked maturing pink salmon in the Gulf of Alaska in the summer of 1998. Bull. National Salmon Resources Center 2: 1–9.
- Sato, S., M. Takahashi, N. Watanabe, S. Kitatsuji, D. Takasaki, T. Chiba, S. Imai, Y. Goda, M. Watanabe, M. Fukuwaka, B.A. Agler, and S. Urawa. 2009. Preliminary records of otolith-marked chum salmon found the Bering Sea and North Pacific Ocean in 2006 and 2007. N. Pac. Anadr. Fish Comm. Bull. 5: 99–104.
- Urawa, S., M. Kawana, G. Anma, Y. Kamei, T. Shoji, M. Fukuwaka, K. Munk, K. W. Myers, and E. V. Farley, Jr. 2000a. Geographical origin of high-seas chum salmon determined by genetic and thermal otolith markers. N. Pac. Anadr. Fish Comm. Bull. 2: 283–290.
- Urawa, S., M. Kawana, and T. Ishiguro. 2000b. Releases of thermally marked salmon from Japan in 1999 and 2000 with a thermal mark plan for 2000 brood year stocks. NPAFC Doc. 461. 7 pp. (Available at <https://npafc.org>).
- Urawa, S., J. Seki, M. Kawana, T. Saito, P. A. Crane, L. Seeb, K. Gorbatenko, and M. Fukuwaka. 2004. Juvenile chum salmon in the Okhotsk Sea: their origins estimated by genetic and otolith marks. NPAFC Tech. Rep. 5: 87–88.
- Urawa, S., J. Seki, M. Kawana, T. Saito, P. A. Crane, L. W. Seeb, M. Fukuwaka, and E. Akinicheva. 2006. Origins of juvenile chum salmon caught in the southwestern Okhotsk Sea during the fall of 2000. Bull. National Salmon Resources Center 8: 9–16.
- Urawa, S., S. Sato, P.A. Crane, B. Agler, R. Josephson, and T. Azumaya. 2009. Stock-specific ocean distribution and migration of chum salmon in the Bering Sea and North Pacific Ocean. N. Pac. Anadr. Fish Comm. Bull. 5: 131–146.

**Table 1.** Proposed otolith mark releases from Japan for 2020 brood year stocks of chum, pink, masu and sockeye salmon. ALC, alizarin complexone; TM, thermal marking; FRA, Japan Fisheries Research and Education Agency; HRO, 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.

Note: Red text lines indicate otolith mark plans updated on September 18.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-01	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-02	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-03	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-04	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-05	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-06	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-07	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-08	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP20-09	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP20-10	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP20-11	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Hiyoshi Hatchery	Tokoro River	Tokoro River
JP20-12	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Hiyoshi Hatchery	Tokoro River	Tokoro River
JP20-13	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Horonai River	Horonai River
JP20-14	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Horonai River	Horonai River
JP20-15	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-16	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-17	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-18	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-19	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-20	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Shintombetsu Hatchery	Tombetsu River	Tombetsu River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP20-01	Fry	2,000,000	Shari20Chum1	2-1,6H			Down
JP20-02	Fry	1,550,000	Shari20Chum2	2,2,6H			Down
JP20-03	Fry	1,175,000	Shari20Chum3	2,6,2H			Down
JP20-04	Fry	1,175,000	Shari20Chum4	2-1,2,4H			Down
JP20-05	Fry	1,200,000	Shari20Chum5	2,1,2,4H			Down
JP20-06	Fry	2,100,000	Shari20Chum6	2-1-2,3H			Down
JP20-07	Fry	2,400,000	Shari20Chum7	2-1-2-2H			Down
JP20-08	Fry	750,000	Akinokawa20Chum2	2,1,4-2H			Down
JP20-09	Fry	750,000	Akinokawa20Chum1	2,1-2,4H			Down
JP20-10	Fry	750,000	Akinokawa20Chum3	2,3-1-2H			Down
JP20-11	Fry	1,806,000	Hiyoshi20Chum1	2,5nH			Down
JP20-12	Fry	1,806,000	Hiyoshi20Chum2	2,8H			Down
JP20-13	Fry	750,000	Horonai20Chum1	2,1,7H			Down
JP20-14	Fry	750,000	Horonai20Chum2	2,1-6H			Down
JP20-15	Fry	5,350,000	Tokushibetsu20Chum1	2,2,2,3H			Down
JP20-16	Fry	1,100,000	Tokushibetsu20Chum2	2-2,2,3H			Down
JP20-17	Fry	1,500,000	Tokushibetsu20Chum3	2-3,4H			Down
JP20-18	Fry	1,050,000	Tokushibetsu20Chum4	2-3-3H			Down
JP20-19	Fry	2,100,000	Tokushibetsu20Chum5	2,4,4H			Down
JP20-20	Fry	2,004,000	Tombetsu20Chum1	2,5nH			Down

No	Otolith Mark Schedule	Comments
JP20-01	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(6X)12C:12H	
JP20-02	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP20-03	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-04	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-05	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP20-06	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-07	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-08	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-09	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-10	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:48H,(1X)12C:48H,(2X)12C:12H	
JP20-11	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	
JP20-12	(1X)12C:12H,(1X)12C:24H,(8X)12C:12H	
JP20-13	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(7X)12C:12H	
JP20-14	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(6X)12C:12H	
JP20-15	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-16	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-17	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-18	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-19	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-20	(1X)24C:24H,(1X)24C:48H,(5X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-21	TM	2020	2021	Chum	Hokkaido	Okhotsk Sea Coast	NPH	Shintombetsu Hatchery	Tombetsu River	Tombetsu River
JP20-22	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP20-23	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP20-24	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Teshio Hatchery	Teshio River	Teshio River
JP20-25	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Nakagawa Hatchery	Teshio River	Teshio River
JP20-26	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Teshio Hatchery	Teshio River	Teshio River
JP20-27	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-28	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-29	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-30	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-31	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-32	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-33	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-34	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-35	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	SSM	Sapporo Salmon Museum	Ishikari River	Ishikari River
JP20-36	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	SSM	Sapporo Salmon Museum	Ishikari River	Ishikari River
JP20-37	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Yoichi River	Yoichi River
JP20-38	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Yoichi River	Yoichi River
JP20-39	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Yoichi River	Yoichi River
JP20-40	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Shiribetsu River	Shiribetsu River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP20-21	Fry	1,032,000	Tombetsu20Chum2	2,8H			Down
JP20-22	Fry	3,500,000	Teshio20Chum1	2n-3H			Down
JP20-23	Fry	750,000	Teshio20Chum2	2-1,2H			Down
JP20-24	Fry	750,000	Teshio20Chum3	2,3,2H			Down
JP20-25	Fry	2,000,000	Teshio20Chum6	2-5H			Down
JP20-26	Fry	1,600,000	Teshio20Chum7	2,2,1,2H			Down
JP20-27	Fry	1,300,000	Ishikari20Chum1	2,2n,3H			Down
JP20-28	Fry	1,300,000	Ishikari20Chum2	2,4n,3H			Down
JP20-29	Fry	1,300,000	Ishikari20Chum3	2,6n,3H			Down
JP20-30	Fry	1,900,000	Ishikari20Chum4	2-3,3H			Down
JP20-31	Fry	1,000,000	Ishikari20Chum5	2-3,2H			Down
JP20-32	Fry	11,300,000	Ishikari20Chum6	2,3-3H			Down
JP20-33	Fry	1,200,000	Ishikari20Chum7	2-2,3H			Down
JP20-34	Fry	1,300,000	Ishikari20Chum8	2-1,4H			Down
JP20-35	Fry	60,000	Ssm20Chum1	2-2H			Down
JP20-36	Fry	40,000	Ssm20Chum2	2-3H			Down
JP20-37	Fry	1,600,000	Yoichi20Chum1	2,2,1,4H			Up
JP20-38	Fry	2,000,000	Yoichi20Chum2	2,2,1,5H			Up
JP20-39	Fry	2,400,000	Yoichi20Chum3	2-3,2H			Up
JP20-40	Fry	1,200,000	Shiribetsu20Chum1	2-5H			Up

No	Otolith Mark Schedule	Comments
JP20-21	(1X)12C:12H,(1X)12C:24H,(8X)12C:12H	
JP20-22	(1X)12C:12H,(1X)12C:36H,(3X)24C:24H	
JP20-23	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(2X)12C:12H	
JP20-24	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-25	(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP20-26	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP20-27	(1X)12C:12H,(1X)12C:24H,(1X)3C:9H,(1X)3C:21H,(3X)12C:12H	
JP20-28	(1X)12C:12H,(1X)12C:24H,(3X)3C:9H,(1X)3C:21H,(3X)12C:12H	
JP20-29	(1X)12C:12H,(1X)12C:24H,(5X)3C:9H,(1X)3C:21H,(3X)12C:12H	
JP20-30	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-31	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-32	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-33	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-34	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(4X)12C:12H	
JP20-35	(1X)24C:24H,(1X)24C:72H,(2X)24C:24H	
JP20-36	(1X)24C:24H,(1X)24C:72H,(3X)24C:24H	
JP20-37	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-38	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(5X)12C:12H	
JP20-39	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-40	(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	

Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-41	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Kyogoku Hatchery	Shiribetsu River	Shiribetsu River
JP20-42	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Yakumo Hatchery	Ainumanai River	Ainumanai River
JP20-43	TM	2020	2021	Chum	Hokkaido	Japan Sea Coast	NPH	Yakumo Hatchery	Ainumanai River	Ainumanai River
JP20-44	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP20-45	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP20-46	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River	Ichani River
JP20-47	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	NPH	Shibetsu Hatchery	Shibetsu River	Shibetsu River
JP20-48	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	NPH	Shibetsu Hatchery	Shibetsu River	Shibetsu River
JP20-49	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	NPH	Hombetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-50	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-51	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-52	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-53	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-54	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-55	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	FRA	Nijibetsu Hatchery	Nishibetsu River	Nishibetsu River
JP20-56	TM	2020	2021	Chum	Hokkaido	Nemuro Strait Coast	NPH	Hombetsu Hatchery	Nishibetsu River	Furen Lake
JP20-57	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP20-58	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP20-59	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP20-60	TM	2020	2021	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
JP20-41	Fry	1,200,000	Shiribetsu20Chum2	2,2,1,2H			Up
JP20-42	Fry	1,000,000	Ainumanai20Chum1	2-5H			Down
JP20-43	Fry	1,000,000	Ainumanai20Chum2	2,2,1,2H			Down
JP20-44	Fry	2,500,000	Ichani20Chum1	2-4-2H			Down
JP20-45	Fry	3,000,000	Ichani20Chum2	2-4-3H			Down
JP20-46	Fry	2,500,000	Ichani20Chum3	2-4-4H			Down
JP20-47	Fry	1,910,000	Shibetsu20Chum1	2,3,4H			Up
JP20-48	Fry	1,910,000	Shibetsu20Chum2	2-2-4H			Up
JP20-49	Fry	1,500,000	Hombetsu20Chum1	2,3,5H			Down
JP20-50	Fry	8,350,000	Nijibetsu20Chum1	2,1-2-3H			Down
JP20-51	Fry	6,500,000	Nijibetsu20Chum2	2,1,2,5H			Down
JP20-52	Fry	1,000,000	Nijibetsu20Chum3	2,2-1,3H			Down
JP20-53	Fry	2,000,000	Nijibetsu20Chum4	2,2n,2nH			Down
JP20-54	Fry	4,650,000	Nijibetsu20Chum5	2-1-5H			Down
JP20-55	Fry	2,000,000	Nijibetsu20Chum6	2,1,2,3H			Down
JP20-56	Fry	1,500,000	Hombetsu20Chum2	2,9H			Down
JP20-57	Fry	1,300,000	Tsurui20Chum1	2-9H			Down
JP20-58	Fry	1,600,000	Tsurui20Chum2	2,11H			Down
JP20-59	Fry	3,000,000	Tsurui20Chum3	2-8H			Down
JP20-60	Fry	3,200,000	Tsurui20Chum4	2-10H			Down

No	Otolith Mark Schedule	Comments
JP20-41	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP20-42	(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP20-43	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP20-44	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-45	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-46	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP20-47	(1X)12H:12C,(1X)12H:24C,(2X)12H:12C,(1X)12H:24C,(4X)12H:12C	
JP20-48	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP20-49	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-50	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-51	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-52	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(3X)12C:12H	
JP20-53	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-54	(1X)12C:12H,(1X)12C:48H,(1X)12C:48H,(5X)12C:12H	
JP20-55	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-56	(1X)12C:12H,(1X)12C:24H,(9X)12C:12H	
JP20-57	(1X)12C:12H,(1X)12C:48H,(9X)12C:12H	
JP20-58	(1X)12C:12H,(1X)12C:24H,(10X)12C:12H,(1X)12C:12H	
JP20-59	(1X)12C:12H,(1X)12C:48H,(8X)12C:12H	
JP20-60	(1X)12C:12H,(1X)12C:48H,(10X)12C:12H	

**Table1. Continued.**

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-61	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP20-62	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP20-63	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP20-64	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	NPH	Ashibetsu Hatchery	Kushiro River	Kushiro River
JP20-65	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-66	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-67	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-68	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-69	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-70	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-71	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-72	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-73	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-74	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	FRA	Tokachi Hatchery	Tokachi River	Tokachi River
JP20-75	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	NPH	Sarabetsudaini Hatchery	Tokachi River	Tokachi River
JP20-76	TM	2020	2021	Chum	Hokkaido	East Pacific Coast	NPH	Sarabetsudaini Hatchery	Tokachi River	Tokachi River
JP20-77	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Hidakahorobetsu Hatchery	Hidakahorobetsu River	Hidakahorobetsu River
JP20-78	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Hidakahorobetsu Hatchery	Hidakahorobetsu River	Hidakahorobetsu River
JP20-79	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP20-80	TM	2020	2021	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
JP20-61	Fry	1,200,000	Ashibetsu20Chum1	2n,2n-2H			Down
JP20-62	Fry	1,200,000	Ashibetsu20Chum2	2n-2n,2H			Down
JP20-63	Fry	1,200,000	Ashibetsu20Chum3	2n-2n,3H			Down
JP20-64	Fry	1,200,000	Ashibetsu20Chum4	2n-3n,2H			Down
JP20-65	Fry	2,400,000	Tokachi20Chum1	2-5-3H			Down
JP20-66	Fry	1,450,000	Tokachi20Chum2	2-5,3H			Down
JP20-67	Fry	1,450,000	Tokachi20Chum3	2,5,2H			Down
JP20-68	Fry	1,400,000	Tokachi20Chum4	2,5-3H			Down
JP20-69	Fry	1,400,000	Tokachi20Chum5	2,5-2H			Down
JP20-70	Fry	1,400,000	Tokachi20Chum6	2,5,4H			Down
JP20-71	Fry	1,400,000	Tokachi20Chum7	2,5,2H			Down
JP20-72	Fry	1,500,000	Tokachi20Chum8	2,5,3H			Down
JP20-73	Fry	1,450,000	Tokachi20Chum9	2,2-7H			Down
JP20-74	Fry	1,450,000	Tokachi20Chum10	2,5-2H			Down
JP20-75	Fry	2,290,000	Sarabetsu20Chum1	2,4,1,2H			Down
JP20-76	Fry	1,510,000	Sarabetsu20Chum2	2,4,1,3H			Down
JP20-77	Fry	2,447,000	Hidakahorobetsu20Chum1	2-7H			Down
JP20-78	Fry	1,222,000	Hidakahorobetsu20Chum2	2,2n-2nH			Down
JP20-79	Fry	700,000	Shizunai20Chum1	2,4-3H			Down
JP20-80	Fry	1,200,000	Shizunai20Chum2	2,2-3H			Down

No	Otolith Mark Schedule	Comments
JP20-61	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(2X)24C:24H	
JP20-62	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(2X)24C:24H	
JP20-63	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(3X)24C:24H	
JP20-64	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(1X)12C:24H,(2X)24C:24H	
JP20-65	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-66	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-67	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-68	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-69	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-70	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-71	(1X)12C:12H,(1X)12C:48H,(4X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-72	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-73	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	
JP20-74	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-75	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP20-76	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-77	(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	
JP20-78	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-79	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-80	(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
JP20-81	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP20-82	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP20-83	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP20-84	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Shizunai Hatchery	Shizunai River	Shizunai River
JP20-85	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP20-86	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP20-87	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP20-88	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP20-89	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Toyohata Hatchery	Shizunai River	Shizunai River
JP20-90	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Shikiu Hatchery	Shikiu River	Shikiu River
JP20-91	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Shikiu Hatchery	Shikiu River	Shikiu River
JP20-92	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-93	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-94	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-95	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-96	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-97	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-99	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-98	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	FRA	Yakumo Hatchery	Yurappu River	Yurappu River
JP20-100	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Shiruiuchi 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
JP20-81	Fry	1,600,000	Shizunai20Chum3	2,2,5H			Down
JP20-82	Fry	1,600,000	Shizunai20Chum4	2,2-5H			Down
JP20-83	Fry	900,000	Shizunai20Chum5	2,4-4H			Down
JP20-84	Fry	400,000	Shizunai20Chum6	2-4,3H			Down
JP20-85	Fry	1,120,000	Toyohata20Chum1	2,3,1,2H			Down
JP20-86	Fry	1,120,000	Toyohata20Chum2	2,3,1,3H			Down
JP20-87	Fry	1,120,000	Toyohata20Chum3	2,3,1,4H			Down
JP20-88	Fry	1,120,000	Toyohata20Chum4	2,3,1,5H			Down
JP20-89	Fry	1,120,000	Toyohata20Chum5	2-3,1,3H			Down
JP20-90	Fry	1,900,000	Shikiu20Chum1	2-7H			Up
JP20-91	Fry	900,000	Shikiu20Chum2	2,2n-2nH			Up
JP20-92	Fry	1,830,000	Yurappu20Chum1	2,2n-4nH			Down
JP20-93	Fry	910,000	Yurappu20Chum2	2,2n,3nH			Down
JP20-94	Fry	720,000	Yurappu20Chum3	2,3n-2nH			Down
JP20-95	Fry	530,000	Yurappu20Chum4	2,2n,4nH			Down
JP20-96	Fry	990,000	Yurappu20Chum5	2,3n-3nH			Down
JP20-97	Fry	810,000	Yurappu20Chum6	2,3n-4nH			Down
JP20-99	Fry	530,000	Yurappu20Chum 7	2,2n,5nH			Down
JP20-98	Fry	1,180,000	Yurappu20Chum8	2,2n,6nH			Down
JP20-100	Fry	1,300,000	Shiruiuchi20Chum1	2,3-2H			Down

No	Otolith Mark Schedule	Comments
JP20-81	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-82	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:48H,(5X)12C:12H	
JP20-83	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP20-84	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-85	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(2X)12C:12H	
JP20-86	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(3X)12C:12H	
JP20-87	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(4X)12C:12H	
JP20-88	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(2X)12C:24H,(5X)12C:12H	
JP20-89	(1X)12C:12H,(1X)12C:48H,(2X)12C:12H,(2X)12C:24H,(3X)12C:12H	
JP20-90	(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	
JP20-91	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-92	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP20-93	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-94	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-95	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-96	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-97	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:48H,(4X)12C:12H	
JP20-99	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-98	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP20-100	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:48H,(2X)12C:12H	



Table1. Continued.

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-101	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Shiruiuchi Hatchery	Shiruiuchi River	Shiruiuchi River
JP20-102	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Fukushima Hatchery	Shiruiuchi River	Shiruiuchi River
JP20-103	TM	2020	2021	Chum	Hokkaido	West Pacific Coast	NPH	Fukushima Hatchery	Shiruiuchi River	Shiruiuchi River
JP20-104	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Kawabukuro Hatchery	Kawabukuro River	Kawabukuro River
JP20-105	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Kawabukuro Hatchery	Kawabukuro River	Kawabukuro River
JP20-106	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Kawabukuro Hatchery	Kawabukuro River	Kawabukuro River
JP20-107	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Gakko River
JP20-108	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Gakko River
JP20-109	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Minowa) River	Gakko River
JP20-110	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Minowa) River	Gakko River
JP20-111	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Mogami River
JP20-112	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Masukawa Hatchery	Gakko(Masukawa) River	Mogami River
JP20-113	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Miomote Hatchery	Miomote River	Miomote River
JP20-114	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Miomote Hatchery	Miomote River	Miomote River
JP20-115	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Jintsu Hatchery	Jintsu River	Jintsu River
JP20-116	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Jintsu Hatchery	Jintsu River	Jintsu River
JP20-117	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River
JP20-118	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River
JP20-119	TM	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River
JP20-120	TM	2020	2021	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
JP20-101	Fry	1,400,000	Shiruiuchi20Chum2	2-2,3H			Down
JP20-102	Fry	2,250,000	Shiruiuchi20Chum3	2-7H			Down
JP20-103	Fry	2,250,000	Shiruiuchi20Chum4	2,2n-2nH			Down
JP20-104	Fry	2,500,000	Kawabukuro20Chum1	2-1,2H			Down
JP20-105	Fry	1,160,000	Kawabukuro20Chum2	2,1,2,2H			Down
JP20-106	Fry	300,000	Kawabukuro20Chum3	2,6H			Down
JP20-107	Fry	720,000	Gakkou20Chum1	2,1-2H			Down
JP20-108	Fry	730,000	Gakkou20Chum2	2,3nH			Down
JP20-109	Fry	790,000	Gakkou20Chum1	2,1-2H			Down
JP20-110	Fry	790,000	Gakkou20Chum2	2,3nH			Down
JP20-111	Fry	500,000	Gakkou20Chum3	2-2,1,2H			Down
JP20-112	Fry	500,000	Gakkou20Chum4	2,2,1-2H			Down
JP20-113	Fry	1,650,000	Miomote20Chum1	2-3H			Down
JP20-114	Fry	1,650,000	Miomote20Chum2	2,7nH			Down
JP20-115	Fry	190,000	Jintsu20Chum1	2,4nH			Down
JP20-116	Fry	150,000	Jintsu20Chum2	2,6nH			Down
JP20-117	Fry	600,000	Shogawa20Chum1	2,4nH			Down
JP20-118	Fry	480,000	Shogawa20Chum2	2,6nH			Down
JP20-119	Fry	300,000	Shogawa20Chum3	2,8nH			Down
JP20-120	Fry	240,000	Shogawa20Chum4	2,10nH			Down

No	Otolith Mark Schedule	Comments
JP20-101	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-102	(1X)12C:12H,(1X)12C:48H,(7X)12C:12H	
JP20-103	(1X)24C:24H,(1X)24C:48H,(1X)12C:12H,(1X)12C:48H,(2X)12C:12H	
JP20-104	(1X)12C:12H,(1X)12C:48H,(1X)12C:24H,(2X)12C:12H	
JP20-105	(1X)12C:12H,(2X)12C:24H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-106	(1X)12C:12H,(1X)12C:24H,(6X)12C:12H	
JP20-107	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(2X)12C:12H	
JP20-108	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP20-109	(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(2X)12C:12H	
JP20-110	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP20-111	(1X)12C:12H,(1X)12C:48H,(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(2X)12C:12H	
JP20-112	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(1X)12C:48H,(2X)12C:12H	
JP20-113	(1X)12C:12H,(1X)12C:48H,(3X)12C:12H	
JP20-114	(1X)12C:12H,(1X)12C:24H,(7X)3C:9H	
JP20-115	(1X)12C:12H,(1X)12C:24H,(4X)3C:9H	
JP20-116	(1X)12C:12H,(1X)12C:24H,(6X)3C:9H	
JP20-117	(1X)12C:12H,(1X)12C:24H,(4X)3C:9H	
JP20-118	(1X)12C:12H,(1X)12C:24H,(6X)3C:9H	
JP20-119	(1X)12C:12H,(1X)12C:24H,(8X)3C:9H	
JP20-120	(1X)12C:12H,(1X)12C:24H,(10X)3C:9H	

**Table1. Continued.**

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-121	ALC	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River
JP20-122	ALC	2020	2021	Chum	Honshu	Japan Sea Coast	NPH	Shogawa Hatchery	Shogawa River	Shogawa River
JP20-123	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Oirase Hatchery (Pacific)	Oirase River (Pacific)	Oirase River (Pacific)
JP20-124	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Oirase Hatchery (Pacific)	Oirase River (Pacific)	Oirase River (Pacific)
JP20-125	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Oirase Hatchery (Pacific)	Oippe River(Pacific)	Oippe River(Pacific)
JP20-126	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Oirase Hatchery (Pacific)	Oippe River(Pacific)	Oippe River(Pacific)
JP20-127	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Shimoakka Hatchery	Akka River	Akka River
JP20-128	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Shimoakka Hatchery	Akka River	Akka River
JP20-129	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Akedo Hatchery	Akedo River	Akedo River
JP20-130	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Akedo Hatchery	Akedo River	Akedo River
JP20-131	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Taro Hatchery	Taro River	Taro River
JP20-132	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Taro Hatchery	Taro River	Taro River
JP20-133	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Tsugaruishi Hatchery	Tsugaruishi River	Tsugaruishi River
JP20-134	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Tsugaruishi Hatchery	Tsugaruishi River	Tsugaruishi River
JP20-135	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Orikasa Hatchery	Orikasa River	Orikasa River
JP20-136	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Orikasa Hatchery	Orikasa River	Orikasa River
JP20-137	TM	2020	2021	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Orikasa River
JP20-138	TM	2020	2021	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Yamada Bay
JP20-139	TM	2020	2021	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Yamada Bay
JP20-140	TM	2020	2021	Chum	Honshu	Pacific Coast	FRA	Fra.Miyako Lab.	Orikasa River	Yamada Bay

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP20-121	Eyed Egg	200,000	Shogawa20Chum-alc1	A1H			
JP20-122	Fry	200,000	Shogawa20Chum-alc2	A2H			
JP20-123	Fry	840,000	Oirase-p20Chum1	2,2,3H			Down
JP20-124	Fry	990,000	Oirase-p20Chum2	2-6H			Down
JP20-125	Fry	300,000	Oippe-p20Chum1	2,2,3H			Down
JP20-126	Fry	300,000	Oippe-p20Chum2	2-6H			Down
JP20-127	Fry	3,440,000	Akka20Chum1	2,1,3H			Down
JP20-128	Fry	4,200,000	Akka20Chum2	2,1,4H			Down
JP20-129	Fry	860,000	Akedo20Chum1	2,1,3H			Down
JP20-130	Fry	1,240,000	Akedo20Chum2	2,1,4H			Down
JP20-131	Fry	550,000	Tarou20Chum1	2,1,3H			Down
JP20-132	Fry	820,000	Tarou20Chum2	2,1,4H			Down
JP20-133	Fry	1,320,000	Tsugaruishi20Chum1	2,1,3H			Down
JP20-134	Fry	1,320,000	Tsugaruishi20Chum2	2,1,4H			Down
JP20-135	Fry	740,000	Orikasa20Chum1	2,1,3H			Down
JP20-136	Fry	400,000	Orikasa20Chum2	2,1,4H			Down
JP20-137	Fry	400,000	Orikasa20Chum3	2n-2H			Down
JP20-138	Fry	400,000	Yamada20Chum1	2,5H			Down
JP20-139	Fry	400,000	Yamada20Chum2	2,2nH			Down
JP20-140	Fry	400,000	Yamada20Chum3	2-2,2H			Down

No	Otolith Mark Schedule	Comments
JP20-121		Single ring
JP20-122		Double ring
JP20-123	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-124	(1X)12C:12H,(1X)12C:48H,(6X)12C:12H	
JP20-125	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-126	(1X)12C:12H,(1X)12C:48H,(6X)12C:12H	
JP20-127	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-128	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-129	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-130	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-131	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-132	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-133	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-134	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-135	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-136	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-137	(1X)12C:12H,(1X)12C:36H,(2X)24C:24H	
JP20-138	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-139	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H	
JP20-140	(1X)12C:12H,(1X)12C:36H,(1X)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
JP20-141	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP20-142	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP20-143	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP20-144	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kasshi River
JP20-145	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kamaishi Bay
JP20-146	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kasshi Hatchery	Kasshi River	Kamaishi Bay
JP20-147	TM	2020	2021	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP20-148	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kumano Hatchery	Kumano River	Kumano River
JP20-149	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kumano Hatchery	Kumano River	Kumano River
JP20-150	TM	2020	2021	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP20-151	TM	2020	2021	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP20-152	TM	2020	2021	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP20-153	TM	2020	2021	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP20-154	TM	2020	2021	Chum	Honshu	Pacific Coast	IFTC	Kumano Hatchery	Kumano River	Kumano River
JP20-155	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Sakari Hatchery	Sakari River	Sakari River
JP20-156	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Sakari Hatchery	Sakari River	Sakari River
JP20-157	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kesen Hatchery	Kesen River	Kesen River
JP20-158	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kesen Hatchery	Kesen River	Kesen River
JP20-159	TM	2020	2021	Chum	Honshu	Pacific Coast	NPH	Kesennumaokawa Hatchery	Kesennumaokawa River	Kesennumaokawa River
JP20-160	TM	2020	2021	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
JP20-141	Fry	2,065,000	Kasshi20Chum1	2,1,3H			Down
JP20-142	Fry	2,065,000	Kasshi20Chum2	2,1,4H			Down
JP20-143	Fry	300,000	Kasshi20Chum3	2,4,3H2			Down
JP20-144	Fry	300,000	Kasshi20Chum4	2,4,3H3			Down
JP20-145	Fry	300,000	Kasshi20Chum5	2,2,3,2H2			Down
JP20-146	Fry	300,000	Kasshi20Chum6	2,2,3,2H3			Down
JP20-147	Fry	200,000	Kumano20Chum1	2,2,3,2H			Down
JP20-148	Fry	100,000	Kumano20Chum2	2,5H2			Down
JP20-149	Fry	100,000	Kumano20Chum3	2,5H3			Down
JP20-150	Fry	200,000	Kumano20Chum4	2,4,3H			Down
JP20-151	Fry	200,000	Kumano20Chum5	2,4H			Down
JP20-152	Fry	200,000	Kumano20Chum6	2,2,4H			Down
JP20-153	Fry	200,000	Kumano20Chum7	2,4H2			Down
JP20-154	Fry	200,000	Kumano20Chum8	2,2,4H2			Down
JP20-155	Fry	830,000	Sakari20Chum1	2,1,3H			Down
JP20-156	Fry	1,280,000	Sakari20Chum2	2,1,4H			Down
JP20-157	Fry	970,000	Kesen20Chum1	2,1,3H			Down
JP20-158	Fry	1,400,000	Kesen20Chum2	2,1,4H			Down
JP20-159	Fry	1,500,000	Kitakami20Chum1	2,2H			Down
JP20-160	Fry	1,500,000	Kitakami20Chum2	2,3H			Down

No	Otolith Mark Schedule	Comments
JP20-141	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-142	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-143	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H,HATCH,(2X)12C:12H	
JP20-144	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H,HATCH,(3X)12C:12H	
JP20-145	(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	
JP20-146	(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	
JP20-147	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(2X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-148	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-149	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-150	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H,(1X)12C:24H,(3X)12C:12H	
JP20-151	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-152	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-153	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,HATCH,(2X)12C:12H	
JP20-154	(1X)12C:12H,(1X)12C:24H,(1X)12C:12H,(1X)12C:24H,(4X)12C:12H,HATCH,(2X)12C:12H	
JP20-155	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-156	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-157	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-158	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-159	(1X)12C:12H,(1X)12C:24H,(2X)12C:12H	
JP20-160	(1X)12C:12H,(1X)12C:24H,(3X)12C:12H	

**Table 1. Continued.**

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-161	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Iwaobetsu River	Rusha River
JP20-162	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Iwaobetsu River	Iwaobetsu River
JP20-163	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Iwaobetsu River	Onnebetsu River
JP20-164	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Okushibetsu River	Okushibetsu River
JP20-165	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Shari Hatchery	Shari River	Shari River
JP20-166	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Akinokawa Hatchery	Shari River	Shari River
JP20-167	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River	Yambetsu River
JP20-168	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River	Urashibetsu River
JP20-169	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Mokoto River
JP20-170	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Abashiri River
JP20-171	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Bairagi River
JP20-172	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Yambetsu River Etc	Notori Lake
JP20-173	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Tokoro River	Tokoro River
JP20-174	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Tokoro River	Tokoro River
JP20-175	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Yubetsu River	Yubetsu River
JP20-176	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Tokoro River	Hamasaroma
JP20-177	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Kamisato Hatchery	Tokoro River	Toppushi Fishing Port
JP20-178	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Yubetsu River	Yubetsu Fishing Port
JP20-179	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River	Mobetsu River
JP20-180	TM	2020	2021	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
JP20-161	Fry	4,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-162	Fry	8,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-163	Fry	3,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-164	Fry	7,800,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-165	Fry	5,000,000	Shari20Pink	2,3nH			Down
JP20-166	Fry	5,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-167	Fry	3,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-168	Fry	3,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-169	Fry	2,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-170	Fry	3,700,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-171	Fry	2,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-172	Fry	2,000,000	East Okhotsk Coast20Pink	2,1,3H			Down
JP20-173	Fry	1,000,000	Tokoro20Pink	2,3n-2nH			Down
JP20-174	Fry	4,800,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-175	Fry	6,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-176	Fry	1,400,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-177	Fry	1,500,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-178	Fry	500,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-179	Fry	1,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-180	Fry	3,500,000	Middle Okhotsk Coast20Pink	2,1,4H			Down

No	Otolith Mark Schedule	Comments
JP20-161	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-162	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-163	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-164	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-165	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP20-166	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-167	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-168	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-169	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-170	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-171	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-172	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(3X)12C:12H	
JP20-173	(1X)24C:24H,(1X)24C:48H,(2X)12C:12H,(1X)12C:36H,(2X)12C:12H	
JP20-174	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-175	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-176	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-177	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-178	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-179	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-180	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	

**Table 1. Continued.**

	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-181	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River Etc	Saru River
JP20-182	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River Etc	Mokoppe River
JP20-183	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River Etc	Okoppe River
JP20-184	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Horonai River	Omu River
JP20-185	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Horonai River	Horonai River
JP20-186	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Okoppe Hatchery	Shokotsu River	Mombetsu Fishing Port
JP20-187	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-188	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tokushibetsu Hatchery	Tokushibetsu River	Kitamihorobetsu River
JP20-189	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Kitamihorobetsu River
JP20-190	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Tombetsu River
JP20-191	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Onishibetsu River
JP20-192	TM	2020	2021	Pink	Hokkaido	Okhotsk Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Chiraihetsu River
JP20-193	TM	2020	2021	Pink	Hokkaido	Japan Sea Coast	NPH	Tombetsu Hatchery	Tokushibetsu River Etc	Masuhiro River
JP20-194	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Rusa River
JP20-195	TM	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Nijibetsu Hatchery	Sashirui River Etc	Rusa River Etc
JP20-196	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Sashirui River
JP20-197	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Rausu River
JP20-198	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Shunkarikotan River
JP20-199	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Kumbetsu River
JP20-200	ALC	2020	2021	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
JP20-181	Fry	1,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-182	Fry	1,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-183	Fry	1,500,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-184	Fry	2,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-185	Fry	4,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-186	Fry	1,000,000	Middle Okhotsk Coast20Pink	2,1,4H			Down
JP20-187	Fry	1,700,000	Tokushibetsu20Pink	2-3H			Down
JP20-188	Fry	1,500,000	Kitamihorobetsu20Pink	2n-3H			Down
JP20-189	Fry	3,800,000	West Okhotsk Coast20Pink	2,1,2H			Down
JP20-190	Fry	5,000,000	West Okhotsk Coast20Pink	2,1,2H			Down
JP20-191	Fry	2,200,000	West Okhotsk Coast20Pink	2,1,2H			Down
JP20-192	Fry	2,000,000	West Okhotsk Coast20Pink	2,1,2H			Down
JP20-193	Fry	2,000,000	West Okhotsk Coast20Pink	2,1,2H			Down
JP20-194	Fry	1,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-195	Fry	5,300,000	Shunkarikotan20Pink	2,4nH			Down
JP20-196	Fry	1,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-197	Fry	1,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-198	Fry	2,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-199	Fry	1,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-200	Fry	2,700,000	Nemuro Coast20Pink-alc	A1H			-

No	Otolith Mark Schedule	Comments
JP20-181	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-182	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-183	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-184	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-185	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-186	(1X)12C:12H,(1X)12C:24H,(1X)12C:24H,(4X)12C:12H	
JP20-187	(1X)24C:24H,(1X)24C:72H,(3X)24C:24H	
JP20-188	(1X)12C:12H,(1X)12C:36H,(3X)24C:24H	
JP20-189	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP20-190	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP20-191	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP20-192	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP20-193	(1X)24C:24H,(1X)24C:48H,(1X)24C:48H,(2X)24C:24H	
JP20-194		Single ring
JP20-195	(1X)24C:24H,(1X)24C:48H,(4X)12C:12H	
JP20-196		Single ring
JP20-197		Single ring
JP20-198		Single ring
JP20-199		Single ring
JP20-200		Single ring

**Table 1. Continued.**

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-201	TM	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Ichani River Etc	Ichani River
JP20-202	TM	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Shari River Etc	Ichani River
JP20-203	TM	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	FRA	Ichani Hatchery	Tokushibetsu River Etc	Ichani River
JP20-204	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Sashirui River Etc	Shibetsu River
JP20-205	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Tohoro River
JP20-206	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Shumbetsu River
JP20-207	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Tokotan River
JP20-208	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Nishibetsu River
JP20-209	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Furen River
JP20-210	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Bettoga River
JP20-211	ALC	2020	2021	Pink	Hokkaido	Nemuro Strait Coast	NPH	Kenebetsu Hatchery	Tohoro River Etc	Onnebetsu River
JP20-212	TM	2020	2021	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-213	TM	2020	2021	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Tokushibetsu Hatchery	Tokushibetsu River	Tokushibetsu River
JP20-214	TM	2020	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-215	TM	2020	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
JP20-216	TM	2020	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shubuto River
JP20-217	TM	2020	2021	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Ichani River	Ichani River
JP20-218	TM	2020	2021	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Shibetsu River	Shibetsu River
JP20-219	ALC	2020	2021	Masu	Honshu	Japan Sea Coast	TFRI	Toyama Fish.Res.Inst.	Toyama Fish.Res.Inst.	Jintsu River
JP20-220	TM	2020	2021	Masu	Honshu	Japan Sea Coast	TFRI	Toyama Fish.Res.Inst.	Toyama Fish.Res.Inst.	Jintsu River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP20-201	Fry	1,500,000	Ichani20Pink1	2,4H			Down
JP20-202	Fry	1,500,000	Ichani20Pink2	2,4H			Down
JP20-203	Fry	1,500,000	Ichani20Pink3	2,5H			Down
JP20-204	Fry	5,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-205	Fry	3,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-206	Fry	2,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-207	Fry	1,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-208	Fry	4,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-209	Fry	3,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-210	Fry	4,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-211	Fry	1,000,000	Nemuro Coast20Pink-alc	A1H			-
JP20-212	Fry	600,000	Shari20Masu-f	4H			Down
JP20-213	Fry	500,000	Tokushibetsu20Masu-f	2,3nH			Down
JP20-214	Fry	60,000	Ishikari20Masu-f	2,3H			Down
JP20-215	Fry	900,000	Shiribetsu20Masu-f	5H			Up
JP20-216	Fry	500,000	Shubuto20Masu-f	5H			Up
JP20-217	Fry	100,000	Ichani20Masu-f	2,5H			Down
JP20-218	Fry	200,000	Shibetsu20Masu-f	2,4H			Down
JP20-219	Fry	100,000	Jintsu20Masu-alc	A1H			-
JP20-220	Eyed Egg	130,000	Jintsu20Masu1	3H			Up

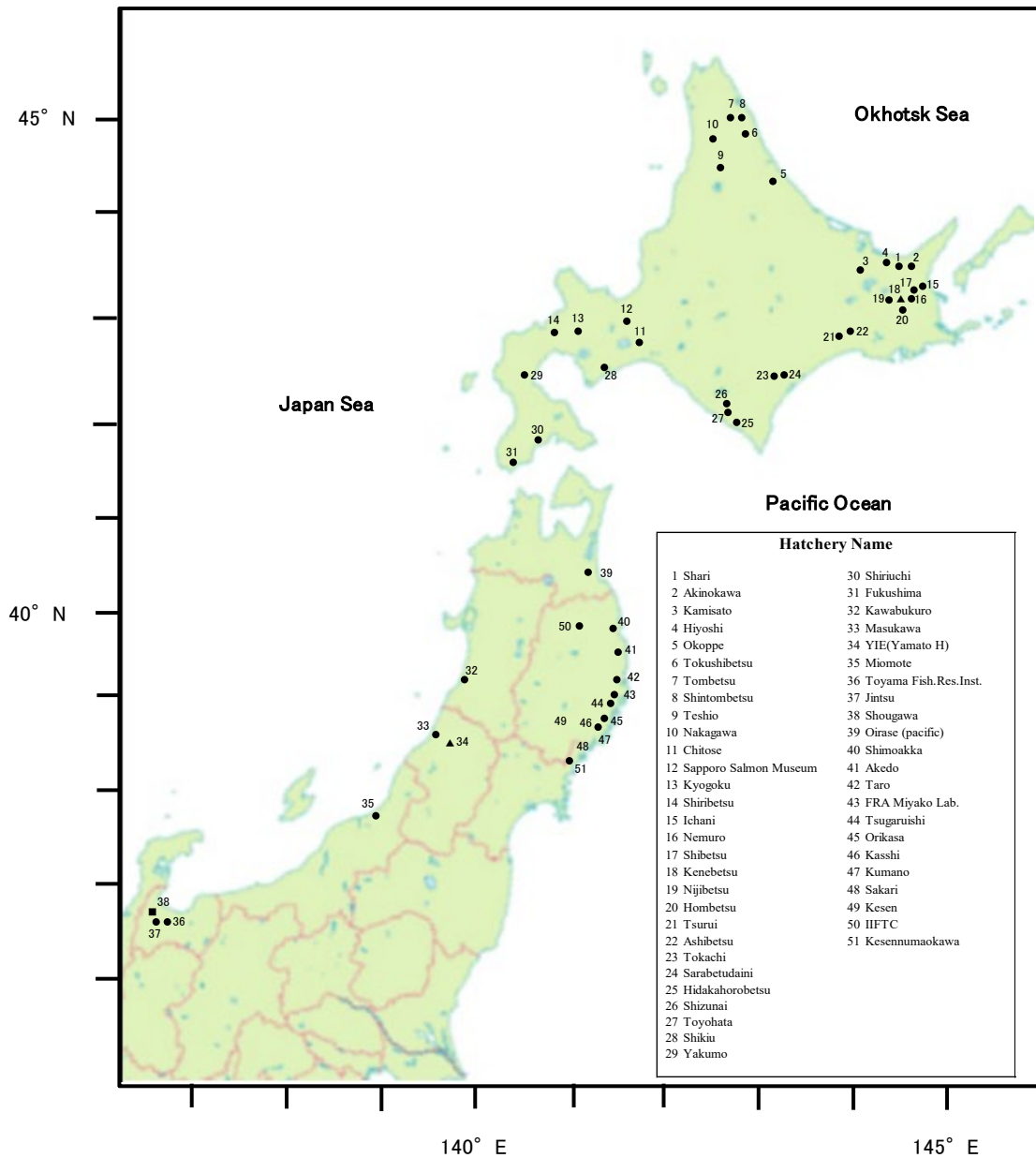
No	Otolith Mark Schedule	Comments
JP20-201	(1X)24C:24H,(1X)24C:48H,(4X)24C:24H	
JP20-202	(1X)24C:24H,(1X)24C:96H,(4X)24C:24H	
JP20-203	(1X)24C:24H,(1X)24C:48H,(5X)24C:24H	
JP20-204		Single ring
JP20-205		Single ring
JP20-206		Single ring
JP20-207		Single ring
JP20-208		Single ring
JP20-209		Single ring
JP20-210		Single ring
JP20-211		Single ring
JP20-212	(4X)24C:24H	
JP20-213	(1X)24C:24H,(1X)24C:48H,(3X)12C:12H	
JP20-214	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP20-215	(5X)12C:12H	
JP20-216	(5X)24C:24H	
JP20-217	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-218	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-219		Single ring
JP20-220	(3X)12C:12H	

**Table 1. Continued.**

No	Mark Type	Brood Year	Year of Release	Species	Prefecture	Region	Agency	Facility	Stock	Final Release Site
JP20-221	TM	2020	2021	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Akka River
JP20-222	TM	2020	2021	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Hei River
JP20-223	TM	2020	2021	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Hei River
JP20-224	TM	2020	2021	Masu	Honshu	Pacific Coast	IIFTC	Iwate In. Fish. Tech. Ctr	Akka River	Akka River
JP20-225	ALC	2020	2021	Masu	Honshu	Japan Sea Coast	YIE	Yamato Hatchery	Akagawa River	Iragawa River
JP20-226	TM	2020	2021	Sockeye	Hokkaido	West Pacific Coast	FRA	Chitose Hatchery	Shizunai River	Shizunai River
JP20-227	TM	2020	2021	Sockeye	Hokkaido	East Pacific Coast	FRA	Tsurui Hatchery	Kushiro River	Kushiro River
JP20-228	TM	2020	2021	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-229	TM	2020	2022	Masu	Hokkaido	Okhotsk Sea Coast	FRA	Shari Hatchery	Shari River	Shari River
JP20-230	TM	2020	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-231	TM	2020	2022	Masu	Hokkaido	Japan Sea Coast	FRA	Chitose Hatchery	Ishikari River	Ishikari River
JP20-232	TM	2020	2021	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
JP20-233	TM	2020	2022	Masu	Hokkaido	Japan Sea Coast	FRA	Shiribetsu Hatchery	Shiribetsu River	Shiribetsu River
JP20-234	TM	2020	2021	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Ichani River	Ichani River
JP20-235	TM	2020	2022	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Shibetsu River	Shibetsu River
JP20-236	TM	2020	2021	Masu	Hokkaido	Nemuro Strait Coast	FRA	Nemuro Hatchery	Shibetsu River	Shibetsu River
JP20-237	TM	2020	2021	Sockeye	Hokkaido	West Pacific Coast	FRA	Chitose Hatchery	Shizunai River	Shizunai River
JP20-238	TM	2020	2022	Sockeye	Hokkaido	West Pacific Coast	FRA	Chitose Hatchery	Shizunai River	Shizunai River
JP20-239	TM	2020	2022	Sockeye	Hokkaido	West Pacific Coast	FRA	Chitose Hatchery	Abira River	Abira River

No	Stage	Preliminary Number of OM Released	OM ID	Hatch Code	Prehatch Graphic Image	Posthatch Graphic Image	Temp Shift Direction
JP20-221	Fry	200,000	Iwate20Masu1	2n-2H			Down
JP20-222	Fry	30,000	Iwate20Masu1	2n-2H			Down
JP20-223	Fry	30,000	Iwate20Masu2	2n-3H			Down
JP20-224	Fry	20,000	Iwate20Masu3	2n-4H			Down
JP20-225	Eyed Egg	60,000	Ira20Masu-alc	A1H			-
JP20-226	Fry	30,000	Shizunai20Sockeye-f	2.8H			Down
JP20-227	Fry	50,000	Kushiro20Sockeye-f	2.3H			Down
JP20-228	Juvenile	50,000	Shari20Masu-j	4H			Down
JP20-229	Smolt	50,000	Shari20Masu-s	4H			Down
JP20-230	Juvenile	10,000	Ishikari20Masu-j	2.3H			Down
JP20-231	Smolt	30,000	Ishikari20Masu-s	2.3H			Down
JP20-232	Juvenile	80,000	Shiribetsu20Masu-j	5H			Up
JP20-233	Smolt	220,000	Shiribetsu20Masu-s	5H			Up
JP20-234	Juvenile	30,000	Ichani20Masu-j	2.5H			Down
JP20-235	Smolt	20,000	Ichani20Masu-s	2.4H			Down
JP20-236	Juvenile	60,000	Shibetsu20Masu-j	2.4H			Down
JP20-237	Juvenile	30,000	Shizunai20Sockeye-j	2.8H			Down
JP20-238	Smolt	20,000	Shizunai20Sockeye-s	2.8H			Down
JP20-239	Smolt	50,000	Abira20Sockeye-s	2.8H			Down

No	Otolith Mark Schedule	Comments
JP20-221	(1X)12C:12H,(1X)12C:36H,(2X)24C:24H	
JP20-222	(1X)12C:12H,(1X)12C:36H,(2X)24C:24H	
JP20-223	(1X)12C:12H,(1X)12C:36H,(3X)24C:24H	
JP20-224	(1X)12C:12H,(1X)12C:36H,(4X)24C:24H	
JP20-225		Single ring
JP20-226	(1X)24C:24H,(1X)24C:48H,(8X)24C:24H	
JP20-227	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP20-228	(4X)24C:24H	
JP20-229	(4X)24C:24H	
JP20-230	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP20-231	(1X)24C:24H,(1X)24C:48H,(3X)24C:24H	
JP20-232	(5X)12C:12H	
JP20-233	(5X)12C:12H	finclips(right,left ventral fin)
JP20-234	(1X)12C:12H,(1X)12C:24H,(5X)12C:12H	
JP20-235	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-236	(1X)12C:12H,(1X)12C:24H,(4X)12C:12H	
JP20-237	(1X)24C:24H,(1X)24C:48H,(8X)24C:24H	
JP20-238	(1X)24C:24H,(1X)24C:48H,(8X)24C:24H	
JP20-239	(1X)24C:24H,(1X)24C:48H,(8X)24C:24H	



**Fig. 1.** Locations of hatcheries, from where conduct otolith marking of salmon for brood year 2020. Forty-eight (closed circles) and two (closed triangles) hatcheries conduct otolith thermal marking and ALC marking, respectively. One hatchery (closed square) plan to mark using both thermal and ALC marking methods.