

**Recoveries of High Seas Tags and Tag Releases from
High Seas Research Vessel Surveys in 2019**

by

Working Group on Salmon Marking (WGSM)
Committee on Scientific Research and Statistics (CSRS)

S. Sato, E. Akinicheva, A. Bugaev, L. Campbell, J.K. Choi, M. Dolgikh, J. Holmes, J.K. Kim, C. Kondzela, C. Neville, S. Urawa, K. Yamaya, A. Yamborko, S.M. Yun, D. Oxman, and A. Seitz

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Seitz

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Abstract

In late July and early August 2019, tagging operations were conducted in the central Bering Sea by the Japanese R/V *Hokko maru*, and 44 chum salmon were released with FAJ/NPAFC disk tags and archival tags (ARCGEO, DST-magnetic, and AZBL tags). Furthermore, 37 sockeye, eight chum, and three coho salmon were tagged with FAJ/NPAFC disk tags and released into the central Bering Sea. In 2019, one tagged recovery was reported from a chum salmon caught in Okhotsk Sea coast, Hokkaido, Japan on October 7, 2019. In addition, one coho salmon which originally tagged in the North Pacific Ocean (46° 00'N, 180° 00') and released on June 23, 2010, was recovered in the Krutogorova River (55° 01'N, 155° 34' E) in western Kamchatka coast, Russia, on September 22, 2010.

Introduction

The Working Group on Salmon Tagging (WGST) was established by the Committee on Scientific Research and Statistics (CSRS) at the 15th Annual Meeting in 2007 to manage the INPFC-NPAFC tagging database and to coordinate high seas tagging activities of the Parties. The WGST was taken over by the Working Group on Salmon Marking (WGSM) in 2016. This document summarizes releases of tagged high-seas salmon in 2019 and reports recoveries of high-seas tags by the Parties, covering information updated since the previous report (WGSM 2019).

Releases of High Seas Tags in 2019

The Japanese R/V *Hokko maru* conducted trawl and hook-and-line operations at 17 stations in the Bering Sea in the summer of 2019 (Honda et al. 2020). During the research cruise, 44 chum salmon (*Oncorhynchus keta*) were tagged with two (Fisheries Agency of Japan, FAJ and NPAFC) disk tags and archival tags, and released into the central Bering Sea (Table 1). The archival tags attached to chum salmon were ARCGEO ($n=37$), DST-magnetic

(n=5), and AZBL (n=2). The ARCGEO tag (manufactured by Lotek, Newmarket, Canada, size, 9×38 mm; weight in air, 5.1 g) records seawater temperature, depth, and ambient light intensity. The DST magnetic tag (manufactured by Star-Oddi, Gardabaer, Iceland, size, 15×46 mm; weight in air, 19 g; number of records, 4,000 per sensor) records seawater temperature, depth, earth's magnetic field strength (in three directions), and tilt (in three directions). Relative magnetic field vectors are calculated from the magnetic field strength measurements, which can be put into models to find longitude and latitude of the fish. It is also a useful tool for recording compass directions. The AZBL tag (manufactured by AI Technology, Tokyo, Japan, size 14×35 mm; weight in air, 9 g) records seawater temperature and depth. In addition, 37 sockeye, eight chum, and three coho salmon were tagged with FAJ and NPAFC disk tags, and released into the central Bering Sea (Table 1)

Recovery of High Seas Tags in 2019

A female chum salmon which tagged and released in the Bering Sea (55° 30' N, 180° 00') on July 26, 2019 was recovered by a salmon set net along the Abashiri coast, Okhotsk Sea, Japan (44° 03'N, 144° 16' E) on October 7, 2019 (Table 2). Although the collected chum salmon was released with two disc and DST-magnetic tags in the Bering Sea, we could not recover the DST-magnetic tag in the Abashiri coast. In addition, one coho salmon which originally tagged with two (FAJ and NPAFC) disc tags in the North Pacific Ocean (46° 00'N, 180° 00') and released on June 23, 2010 by R/V *Wakatake maru*, was recovered in the Krutogorova River (55° 01'N, 155° 34' E) in western Kamchatka coast, Russia, on September 22, 2010.

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Table 1. Releases of high-seas tagged salmon in 2019. DS, compass, tilt (3D), temperature, and depth record tag; ARCGEO, seawater temperature, depth, and ambient light intensity record tag; AZBL, seawater temperature and depth record tag; G, sampling gear; HL, hook and line; FL, fork length (mm). Age designation is the European method, where the first number is the number of freshwater annuli and the second number is the number of ocean annuli. x, unreadable.

No.	Japan tag #	NPAFC tag #	Archival tag		Date	Latitude	Longitude	G	Species	FL (mm)	Age
			#	Type							
1	E0563	NA5920	J1042	DS	23 Jul.	54°00'N	175°00'E	HL	Chum	583	0.4
2	E0600	NA5938	J1096	DS	26 Jul.	55°30'N	180°00'	HL	Chum	651	x.x
3	E0566	NA5912			28 Jul.	58°30'N	180°00'	HL	Sockeye	495	1.2
4	E0565	NA5901			28 Jul.	58°30'N	180°00'	HL	Sockeye	464	2.2
5	E0560	NA5904			28 Jul.	58°30'N	180°00'	HL	Sockeye	467	2.2
6	E0589	NA5933			28 Jul.	58°30'N	180°00'	HL	Sockeye	485	1.2
7	E0564	NA5911			28 Jul.	58°30'N	180°00'	HL	Sockeye	477	1.2
8	E0552	NA5900	L01465	ARCGEO	28 Jul.	58°30'N	180°00'	HL	Chum	362	0.1
9	E0577	NA5907			28 Jul.	58°30'N	180°00'	HL	Sockeye	488	1.2
10	E0567	NA5902			28 Jul.	58°30'N	180°00'	HL	Sockeye	511	0.3
11	E0570	NA5915			28 Jul.	58°30'N	180°00'	HL	Sockeye	475	2.2
12	E0558	NA5903			28 Jul.	58°30'N	180°00'	HL	Sockeye	464	1.2
13	N4774	NA5860			28 Jul.	58°30'N	180°00'	HL	Sockeye	445	1.2
14	E0842	NA5870			28 Jul.	58°30'N	180°00'	HL	Sockeye	530	1.2
15	E0572	NA5916	L01466	ARCGEO	28 Jul.	58°30'N	180°00'	HL	Chum	541	0.4
16	E0576	NA5913	L01467	ARCGEO	28 Jul.	58°30'N	180°00'	HL	Chum	652	0.4
17	E0846	NA5879	L01468	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	444	0.3
18	E0849	NA5884			29 Jul.	58°00'N	175°00'W	HL	Sockeye	488	1.2
19	N4790	NA5859			29 Jul.	58°00'N	175°00'W	HL	Sockeye	447	1.2
20	N4767	NA5836	L01470	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	534	0.3
21	N4784	NA5845			29 Jul.	58°00'N	175°00'W	HL	Sockeye	501	1.2
22	E0843	NA5871	L01472	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	485	0.2
23	E0593	NA5931	L01473	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	488	0.2
24	E0595	NA5942	L01469	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	479	0.2
25	E0554	NA5886			29 Jul.	58°00'N	175°00'W	HL	Sockeye	445	1.2
26	E0588	NA5932	L01477	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	484	0.2
27	E0546	NA5881			29 Jul.	58°00'N	175°00'W	HL	Sockeye	469	1.2
28	E0635	NA6068			29 Jul.	58°00'N	175°00'W	HL	Sockeye	501	1.2
29	E0649	NA6054	L01727	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	448	0.2
30	E0617	NA6086	L01726	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	530	0.2
31	E0630	NA6073			29 Jul.	58°00'N	175°00'W	HL	Chum	436	0.2
32	E0650	NA6053	L01479	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	377	0.1
33	E0614	NA6089			29 Jul.	58°00'N	175°00'W	HL	Sockeye	372	2.1
34	E0607	NA6096	L01480	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	495	0.3
35	E0616	NA6087	L01482	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	473	0.2
36	E0623	NA6080	L01481	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	573	0.3
37	E0620	NA6083			29 Jul.	58°00'N	175°00'W	HL	Sockeye	479	1.2
38	E0629	NA6074	L01487	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	383	0.2
39	E0633	NA6070	L01720	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	468	0.2
40	E0632	NA6071			29 Jul.	58°00'N	175°00'W	HL	Sockeye	359	2.1
41	E0642	NA6061	L01722	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	468	0.2
42	E0631	NA6072	L01746	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	474	0.2
43	E0578	NA5910	L01724	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	512	0.2
44	E0640	NA6063	L01725	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	344	0.1

Table 1. Continued.

No.	Japan tag #	NPAFC tag #	Archival tag		Date	Latitude	Longitude	G	Species	FL (mm)	Age
			#	Type							
45	E0611	NA6092	L01728	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	326	0.1
46	E0606	NA6097	L01733	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	474	0.3
47	E0626	NA6077			29 Jul.	58°00'N	175°00'W	HL	Sockeye	443	1.2
48	E0619	NA6084	L01730	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	343	0.1
49	E0641	NA6062			29 Jul.	58°00'N	175°00'W	HL	Sockeye	468	1.2
50	E0624	NA6079			29 Jul.	58°00'N	175°00'W	HL	Sockeye	468	1.2
51	E0603	NA5847	L01731	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	364	0.1
52	E0608	NA6095			29 Jul.	58°00'N	175°00'W	HL	Sockeye	348	1.1
53	E0628	NA6075	L01723	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	491	0.2
54	E0605	NA6098	L01729	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	339	0.1
55	E0621	NA6082	L01740	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	558	0.3
56	E0613	NA6090			29 Jul.	58°00'N	175°00'W	HL	Sockeye	500	1.2
57	E0693	NA5949			29 Jul.	58°00'N	175°00'W	HL	Sockeye	495	1.2
58	E0615	-	L01739	ARCGEO	29 Jul.	58°00'N	175°00'W	HL	Chum	448	0.2
59	E0696	NA5946			30 Jul.	58°00'N	175°00'W	HL	Sockeye	519	1.2
60	E0692	NA5950			30 Jul.	58°00'N	175°00'W	HL	Sockeye	495	1.2
61	E0698	NA5944			30 Jul.	58°00'N	175°00'W	HL	Sockeye	463	1.2
62	E0690	NA5952	J1116	DS	30 Jul.	58°00'N	175°00'W	HL	Chum	540	0.4
63	E0695	NA5947	J1097	DS	30 Jul.	58°00'N	175°00'W	HL	Chum	554	0.2
64	E0684	NA5958	L01732	ARCGEO	30 Jul.	58°00'N	175°00'W	HL	Chum	404	0.2
65	E0699	NA5943	L01734	ARCGEO	30 Jul.	58°00'N	175°00'W	HL	Chum	372	0.1
66	E0689	NA5953	L01745	ARCGEO	30 Jul.	58°00'N	175°00'W	HL	Chum	365	0.1
67	E0691	NA5951	L01744	ARCGEO	30 Jul.	58°00'N	175°00'W	HL	Chum	484	0.2
68	E0700	NA5929	L01737	ARCGEO	30 Jul.	58°00'N	175°00'W	HL	Chum	433	0.2
69	E0694	NA5948	L01736	ARCGEO	30 Jul.	58°00'N	175°00'W	HL	Chum	488	0.2
70	E0682	NA5960			30 Jul.	58°00'N	175°00'W	HL	Coho	576	2.1
71	E0679	NA5963			30 Jul.	58°00'N	175°00'W	HL	Chum	359	0.1
72	E0697	NA5945			30 Jul.	58°00'N	175°00'W	HL	Chum	362	0.1
73	E0686	NA5956			30 Jul.	58°00'N	175°00'W	HL	Chum	340	0.1
74	E0678	NA5964			30 Jul.	57°00'N	175°00'W	HL	Coho	505	2.1
75	E0685	NA5957			30 Jul.	57°00'N	175°00'W	HL	Sockeye	478	1.2
76	E0680	NA5962			30 Jul.	57°00'N	175°00'W	HL	Sockeye	458	1.2
77	E0683	NA5959			30 Jul.	57°00'N	175°00'W	HL	Sockeye	474	1.2
78	E0677	NA5965			30 Jul.	57°00'N	175°00'W	HL	Sockeye	487	1.2
79	E0673	NA5969			30 Jul.	57°00'N	175°00'W	HL	Sockeye	365	2.1
80	E0681	NA5961			30 Jul.	57°00'N	175°00'W	HL	Sockeye	334	1.1
81	E0674	NA5968			30 Jul.	57°00'N	175°00'W	HL	Sockeye	322	1.1
82	E0688	NA5954			30 Jul.	57°00'N	175°00'W	HL	Sockeye	328	1.1
83	E0654	NA5988	J1228	DS	30 Jul.	57°00'N	175°00'W	HL	Chum	512	0.3
84	E0652	NA5990			31 Jul.	56°00'N	175°00'W	HL	Coho	539	2.1
85	E0665	NA5977			31 Jul.	56°00'N	175°00'W	HL	Chum	353	x.x
86	E0653	NA5989			31 Jul.	56°00'N	175°00'W	HL	Chum	439	0.2
87	E0659	NA5983	2	AZBL	31 Jul.	56°00'N	175°00'W	HL	Chum	485	0.3
88	E0687	NA5955	4	AZBL	31 Jul.	56°00'N	175°00'W	HL	Chum	454	0.3
89	E0675	NA5967	L01742	ARCGEO	31 Jul.	56°00'N	175°00'W	HL	Chum	513	0.3
90	E0662	NA5980			31 Jul.	56°00'N	175°00'W	HL	Chum	477	0.2
91	E0658	NA5984			31 Jul.	56°00'N	175°00'W	HL	Chum	472	0.2
92	E0671	NA5971	L01743	ARCGEO	1 Aug.	54°00'N	175°00'W	HL	Chum	488	0.2

Table 2. Recovery of high-seas tagged salmon recorded in 2019 and one newly reported recovery from 2010. DS, compass, tilt (3D), temperature, and depth record tag; Lat., latitude; Long., longitude; Sp., species; CM, chum salmon; CO, coho salmon; F, female; M, male; FL, fork length (mm); BW, body weight (g). Age designation is the European method, where the first number is the number of freshwater annuli and the second number is the number of ocean annuli. x, unreadable.

No.	Japan tag #	NPAFC tag #	DS tag #	Release						Recovery									
				Date	Lat.	Long.	Sp	FL (mm)	Age	Date	Lat.	Long.	Gear	Sex	FL (mm)	BW (g)	Age	Location	Note
1	E0600	NA5938	J109 6	26 Jul., 2019	55°30'N	180°00'	CM	651	x.x	7 Oct., 2019	44°03'N	144°16'E	Setnet	F	660	2900	0.4	Abashiri No.5 Salmon-Setnet	No recovery DS tag
2	KK4078	NA4078	-	23 Jun., 2010	46°00'N	180°00'	CO	526	-	Sep. 22, 2010	55°01'N	155°34'E	Gillnet	M	470*	1630		Krutogorova River	