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Recoveries of High Seas Tags in 2012-2013 and Tag Releases in 2013 from High Seas Research Vessel Surveys in the North Pacific Ocean

by

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

S. Urawa, J. Guyon, J.Y. Kim, M. Koval, D. Oxman, M. Saunders,
H.Y. Song, Y. Tomida, and R. Walker

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Abstract

In July and August 2013, tagging operations were conducted by the Japanese research vessel *Hokko maru*, and 117 chum salmon and a sockeye salmon were released with tags (including data storage tags, DSTs) in the Bering Sea. High seas tags were reported from three chum salmon in Japan, two chum salmon in Russia, and two sockeye salmon in south central Alaska and eastern Kamchatka in 2012 and 2013. The recoveries included two magnetic DSTs in Japan and a LTD tag in Kamchatka.

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. This document summarizes releases of tagged high-seas salmon in 2013 and recovery reports of high-seas tags by the Parties in 2012-2013, covering updated information since the previous report (WGST 2012).

Releases of High Seas Tags in 2013

The Japanese research vessel *Hokko maru* conducted trawl and hook and line operations at 17 stations in the Bering Sea (Sato et al. 2014). During this research cruise 117 chum salmon and one sockeye salmon were tagged with two (FAJ and NPAFC) disk tags and released into the Bering Sea (Table 1). Among them, 19 chum salmon and a sockeye salmon were tagged with small archival tag (DST milli-F), and seven chum salmon were tagged with large archival tag (DST magnetic). The small archival tag (model DST milli-F manufactured by Star-Oddi, Gardabaer, Iceland; size, 13 × 38.4 mm; weight in air, 9.2 g; number of records, 340,000 per sensor) was used to record seawater temperature and depth of immature chum salmon over winter. The large archival tag (model DST magnetic manufactured by Star-Oddi, Gardabaer, Iceland, size, 15 × 46 mm; weight in air, 19 g; number of records, 4,000 per sensor) was used to record seawater temperature, depth, earth's magnetic field strength (in three directions), and tilt (in three directions) of maturing chum salmon. From the magnetic field strength measurements a relative magnetic field vector is calculated, which can be put

into models to find longitude and latitude of the fish. It is also a useful tool for recording compass directions.

Recovery of High Seas Tag in 2012

A female chum salmon tagged with DST magnetic (#608) was recovered by a set net along the Okhotsk Sea coast of Hokkaido, Japan (44°40'N, 142°52'E) on October 11, 2012 (Table 2). This fish was released in the Bering Sea (58º28'N, 179º54'E) on July 30, 2012 during the *Hokko maru* cruise (Sato et al. 2012).

Recovery of High Seas Tags in 2013

Two tagged chum salmon were recovered in the coast of Okhotsk Sea, Japan in the fall of 2013 (Table 3). One of them passed three winters after being released in the Bering Sea on July 12, 2010 by *Wakatake maru* (Ishihara et al. 2010). A magnetic tag (DST #669) was recovered from another chum salmon released in the Bering Sea on July 26, 2013. This is the second case of magnetic tag recoveries since 2012.

Two tagged chum salmon were recovered in Sakhalin and Kamchatka, Russia (Table 3). In Kamchatka a LTD tag (#7495) was recovered from chum salmon released in the eastern Bering Sea on June 27, 2004. The recorded data (temperature and depth, 30 min interval) was successfully recovered from this battery-dead archival tag in cooperation with the manufacturer, Lotek. The tagged chum salmon showed a typical vertical migration behavior for homing to Kamchatka (Fig. 1). Although the exact recovery date and location were not reported, the data indicated that the tagged fish was caught on September 4, 2004. The tag continued recording data until May 6, 2006, suggesting the battery life was almost 2 years. Chum salmon recovered in the southwest coast of Sakhalin on September 16, 2013 was originally released in the Bering Sea on July 6, 2008. The estimated age was 0.8 when the fish was recovered.

An old data storage tag (KIWI #144) from a sockeye salmon caught in the Copper River district, south central Alaska, USA was reported in November 2013 (Table 3). The exact recovery date was unknown, but very likely several weeks after the fish was released in the Gulf of Alaska (57°12'N, 145°04'W) on May 21, 1999 by the US research vessel *Great Pacific* (Walker et al. 1999). In addition, Russia reported sockeye salmon with a disc tag (NA#3661) caught in Karaginsky Bay, eastern Kamchatka on September 8, 2009. This fish was released in the central Bering Sea (56º30'N, 179º00'W) on July 5, 2009 (Table 3).

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Table 1. Releases of high-seas tagged salmon in 2013. DS tag, data storage tag; HL, hook and line; T, surface trawl; FL, fork length (mm).

No.	Japan tag #	NPAFC tag #	DS tag #	DS type	Date	Lat	Long	Gear	Species	FL	Age
1	D0901	NA5418	666	Magnetic	7/25/13	56°02'	174°55'E	HL	Chum	610	0.4
2	D0902	NA5454	669	Magnetic	7/26/13	54°01'	175°05'E	T	Chum	613	0.4
3	D0903	NA5483	673	Magnetic	7/26/13	54°01'	175°05'E	HL	Chum	561	0.3
4	D0904	NA5499	1	Micro	7/28/13	53°34'	179°59'E	HL	Sockeye	466	2.2
5	D0905	NA5500	679	Magnetic	7/28/13	53°34'	179°59'E	HL	Chum	625	0.3
6	D0911	NA5501	2	Micro	7/29/13	54°33'	179°56'E	HL	Chum	441	0.2
7	D0907	NA5502	3	Micro	7/29/13	54°33'	179°56'E	HL	Chum	431	0.2
8	D0908	NA5503	4	Micro	7/29/13	54°33'	179°56'E	HL	Chum	440	0.2
9	D0910	NA5504	5	Micro	7/29/13	54°33'	179°56'E	HL	Chum	453	0.2
10	D0920	NA5506	6	Micro	7/29/13	54°33'	179°56'E	HL	Chum	443	0.2
11	H1937	NA5508			7/29/13	55°34'	180°00'	HL	Chum	542	NA
12	H1940	NA5511			7/29/13	55°34'	180°00'	HL	Chum	514	0.3
13	H1932	NA5512			7/29/13	55°34'	180°00'	HL	Chum	489	0.3
14	D0906	NA5507	7	Micro	7/29/13	55°34'	180°00'	HL	Chum	487	0.3
15	D0912	NA5513	8	Micro	7/29/13	55°34'	180°00'	HL	Chum	487	0.3
16	D0913	NA5514	9	Micro	7/29/13	55°34'	180°00'	HL	Chum	455	0.2
17	H1935	NA5515			7/29/13	55°34'	180°00'	HL	Chum	491	0.3
18	D0914	NA5516	10	Micro	7/29/13	55°34'	180°00'	HL	Chum	458	0.2
19	H1939	NA5517	11	Micro	7/29/13	55°34'	180°00'	HL	Chum	460	0.2
20	D0915	NA5518	681	Magnetic	7/30/13	56°34'	179°59'E	HL	Chum	637	0.4
21	D0916	NA5519	12	Micro	7/30/13	56°34'	179°59'E	HL	Chum	449	0.2
22	D0917	NA5520	13	Micro	7/30/13	56°34'	179°59'E	HL	Chum	454	0.2
23	H1936	NA5521			7/30/13	56°34'	179°59'E	HL	Chum	445	0.2
24	D0918	NA5522	682	Magnetic	7/30/13	56°34'	179°59'E	HL	Chum	588	0.3
25	D0919	NA5523	14	Micro	7/30/13	56°34'	179°59'E	HL	Chum	449	0.2
26	H1931	NA5524			7/30/13	56°34'	179°59'E	HL	Chum	460	0.3
27	H1934	NA5525			7/30/13	56°34'	179°59'E	HL	Chum	504	0.3
28	H1980	NA5526			7/30/13	56°34'	179°59'E	HL	Chum	515	0.3
29	H1971	NA5527			7/30/13	56°34'	179°59'E	HL	Chum	461	0.3
30	H1977	NA5528			7/30/13	56°34'	179°59'E	HL	Chum	517	0.3
31	H1972	NA5529			7/30/13	56°34'	179°59'E	HL	Chum	510	0.3
32	H1974	NA5530			7/30/13	56°34'	179°59'E	HL	Chum	471	0.2
33	H1975	NA5531			7/30/13	56°34'	179°59'E	HL	Chum	470	0.3
34	H1973	NA5532			7/30/13	56°34'	179°59'E	HL	Chum	522	0.3
35	H1976	NA5533			7/30/13	56°34'	179°59'E	HL	Chum	493	0.3
36	D0920	NA5534	15	Micro	7/30/13	57°32'	179°59'W	HL	Chum	404	0.2
37	H1978	NA5541			7/30/13	57°32'	179°59'W	HL	Chum	449	0.3
38	H1979	NA5542			7/30/13	57°32'	179°59'W	HL	Chum	455	0.3
39	H1941	NA5543			7/30/13	57°32'	179°59'W	HL	Chum	473	0.2
40	H1942	NA5544			7/30/13	57°32'	179°59'W	HL	Chum	373	0.1
41	H1943	NA5545			7/30/13	57°32'	179°59'W	HL	Chum	452	0.2
42	H1944	NA5546			7/30/13	57°32'	179°59'W	HL	Chum	463	0.3
43	H1945	NA5547			7/30/13	57°32'	179°59'W	HL	Chum	490	0.3
44	D0922	NA5535	17	Micro	7/30/13	57°32'	179°59'W	HL	Chum	357	0.1
45	H1946	NA5548			7/30/13	57°32'	179°59'W	HL	Chum	451	0.2
46	H1947	NA5549			7/30/13	57°32'	179°59'W	HL	Chum	482	0.3
47	D0923	NA5536	16	Micro	7/30/13	57°32'	179°59'W	HL	Chum	348	0.1
48	H1948	NA5550			7/30/13	57°32'	179°59'W	HL	Chum	447	0.2
49	D0924	NA5537	18	Micro	7/30/13	57°32'	179°59'W	HL	Chum	355	0.1
50	H1949	NA5551			7/30/13	57°32'	179°59'W	HL	Chum	408	0.2

Table 1. Continued.

No.	Japan tag #	NPAFC tag #	DS tag #	DS type	Date	Lat	Long	Gear	Species	FL	Age
51	H1950	NA5552			7/30/13	57°32'	179°59'W	HL	Chum	449	0.2
52	H1951	NA5553			7/30/13	57°32'	179°59'W	HL	Chum	511	0.2
53	H1952	NA5555			7/30/13	57°32'	179°59'W	HL	Chum	442	0.2
54	H1953	NA5556			7/30/13	57°32'	179°59'W	HL	Chum	422	0.2
55	H1954	NA5557			7/31/13	58°33'	179°58'E	HL	Chum	550	0.3
56	H1955	NA5558			7/31/13	58°33'	179°58'E	HL	Chum	518	0.3
57	H1956	NA5559			7/31/13	58°33'	179°58'E	HL	Chum	479	0.3
58	H1957	NA5560			7/31/13	58°33'	179°58'E	HL	Chum	435	0.2
59	H1958	NA5561			7/31/13	58°33'	179°58'E	HL	Chum	434	0.2
60	D0925	NA5538	19	Micro	7/31/13	58°33'	179°58'E	HL	Chum	379	0.1
61	H1959	NA5562			7/31/13	58°33'	179°58'E	HL	Chum	527	0.3
62	H1960	NA5563			7/31/13	58°33'	179°58'E	HL	Chum	527	0.3
63	H1961	NA5564			7/31/13	58°33'	179°58'E	HL	Chum	437	NA
64	H1962	NA5565			7/31/13	58°33'	179°58'E	HL	Chum	498	0.3
65	H1963	NA5566			7/31/13	58°33'	179°58'E	HL	Chum	464	0.2
66	H1964	NA5567			7/31/13	58°33'	179°58'E	HL	Chum	459	0.2
67	H1965	NA5568			7/31/13	58°33'	179°58'E	HL	Chum	420	NA
68	H1966	NA5569			7/31/13	58°33'	179°58'E	HL	Chum	433	0.2
69	H1967	NA5570			7/31/13	58°33'	179°58'E	HL	Chum	449	0.2
70	H1968	NA5571			7/31/13	58°33'	179°58'E	HL	Chum	435	0.3
71	H1969	NA5572			7/31/13	58°33'	179°58'E	HL	Chum	492	0.2
72	H1970	NA5573			7/31/13	58°33'	179°58'E	HL	Chum	521	0.3
73	H1981	NA5574			7/31/13	58°33'	179°58'E	HL	Chum	549	0.3
74	H1982	NA5575			7/31/13	58°33'	179°58'E	HL	Chum	456	NA
75	H1983	NA5576			7/31/13	58°33'	179°58'E	HL	Chum	485	0.3
76	H1984	NA5577			7/31/13	58°33'	179°58'E	HL	Chum	456	0.2
77	D0927	NA5579			8/1/13	57°32'	179°59'W	HL	Chum	526	0.3
78	D0928	NA5580			8/1/13	57°32'	179°59'W	HL	Chum	445	0.2
79	D0929	NA5581			8/1/13	57°32'	179°59'W	HL	Chum	443	0.2
80	D0930	NA5540			8/1/13	57°32'	179°59'W	HL	Chum	446	0.2
81	H1985	NA5582			8/1/13	56°59'	175°00'W	HL	Chum	455	0.2
82	D1778	NA5578	20	Micro	8/1/13	56°59'	175°00'W	HL	Chum	367	0.1
83	H1986	NA5583			8/1/13	56°59'	175°00'W	HL	Chum	414	0.2
84	H1987	NA5584			8/2/13	56°59'	175°00'W	HL	Chum	442	0.2
85	H1998	NA5585			8/1/13	56°59'	175°00'W	HL	Chum	538	0.3
86	H1989	NA5586			8/2/13	55°57'	175°00'W	HL	Chum	411	0.2
87	H1990	NA5587			8/2/13	55°57'	175°00'W	HL	Chum	509	0.3
88	H1991	NA5588			8/2/13	54°59'	174°58'W	HL	Chum	439	0.2
89	H1992	NA5589			8/2/13	54°59'	174°58'W	HL	Chum	441	0.2
90	H1993	NA5590			8/2/13	54°59'	174°58'W	HL	Chum	469	0.2
91	H1994	NA5591			8/2/13	54°59'	174°58'W	HL	Chum	494	0.3
92	H1995	NA5592			8/2/13	54°59'	174°58'W	HL	Chum	445	0.3
93	D0926	NA5539	674	Magnetic	8/2/13	54°59'	174°58'W	HL	Chum	548	0.4
94	H1996	NA5593			8/2/13	54°59'	174°58'W	HL	Chum	516	0.2
95	H1997	NA5594			8/2/13	54°59'	174°58'W	HL	Chum	554	0.4
96	H1998	NA5597			8/2/13	54°59'	174°58'W	HL	Chum	482	0.2
97	H1999	NA5596			8/2/13	54°59'	174°58'W	HL	Chum	493	0.3
98	H2000	NA5595			8/2/13	54°59'	174°58'W	HL	Chum	465	0.2
99	D0963	NA5598			8/2/13	54°59'	174°58'W	HL	Chum	489	0.2
100	D0962	NA5599			8/2/13	54°59'	174°58'W	HL	Chum	489	0.3

Table 1. Continued.

No.	Japan tag #	NPAFC tag #	DS tag #	DS type	Date	Lat	Long	Gear	Species	FL	Age
101	D0969	NA5600			8/2/13	54°59'	174°58'W	HL	Chum	455	0.2
102	D0981	NA5800			8/2/13	54°59'	174°58'W	HL	Chum	431	0.2
103	D0982	NA5901			8/2/13	54°59'	174°58'W	HL	Chum	468	0.2
104	D0983	NA5802			8/2/13	54°59'	174°58'W	HL	Chum	534	0.3
105	D0990	NA5803			8/2/13	54°59'	174°58'W	HL	Chum	479	0.2
106	D0989	NA5804			8/2/13	54°59'	174°58'W	HL	Chum	544	0.5
107	D0961	NA5805			8/3/13	53°57'	174°57'W	HL	Chum	495	0.3
108	D0970	NA5806			8/3/13	53°57'	174°57'W	HL	Chum	442	0.2
109	D0984	NA5807			8/3/13	53°57'	174°57'W	HL	Chum	459	0.2
110	D0987	NA5808			8/3/13	53°57'	174°57'W	HL	Chum	487	0.3
111	D0988	NA5810			8/3/13	53°57'	174°57'W	HL	Chum	504	0.3
112	D0985	NA5809			8/3/13	53°57'	174°57'W	HL	Chum	453	0.4
113	D0986	NA5811			8/3/13	53°57'	174°57'W	HL	Chum	607	0.4
114	D0940	NA5812			8/3/13	53°57'	174°57'W	HL	Chum	589	0.4
115	D0939	NA5813			8/3/13	53°57'	174°57'W	HL	Chum	509	0.3
116	D0931	NA5814			8/3/13	53°57'	174°57'W	HL	Chum	550	0.3
117	D0932	NA5815			8/3/13	53°57'	174°57'W	HL	Chum	540	0.3
118	D0933	NA5816			8/3/13	53°57'	174°57'W	HL	Chum	526	0.3

Table 2. Recoveries of high-seas tagged salmon in 2012. Age designation is the European method. DS tag, data strage tag; FL, fork length (mm); BW, body weight (g).

No.	Japan tag #	NPAFC tag #	DS tag #	Release						Recovery							
				Date	Lat	Long	Species	FL	Age	Date	Lat	Long	Gear	Sex	FL	BW	Location
1	D1755	NA5457	608	7/30/12	58º28'N	179º54'E	Chum	650	NA	10/11/12	44º40'N	142º52'E	Trap net	F	607	2550	Oumu, Okhotsk Sea coast, Hokkaido

Table 3. Recovery records of high-seas tagged salmon in 2013. Age designation is the European method. DS tag, data storage tag; FL, fork length (mm); BW, body weight (g).

Tag #	Japan tag #	US tag #	NPAFC tag #	DS tag #	Release						Recovery							
					Date	Lat	Long	Species	FL	Age	Date	Lat	Long	Gear	Sex	FL	BW	Location
1	D0902	-	NA5454	669	7/26/13	54º01'N	175º05'E	Chum	613	NA	10/9/13	43º59'N	144º52'E	Trap net	F	635	2600	Shari, Okhotsk Sea coast, Hokkaido
2	KK5271	-	NA5271	-	7/12/10	54º30'N	178º00'W	Chum	365	0.1	9/18/13	45º00'N	142º34'E	Trap net	M	600	2600	Eshashi, Okhotsk Sea coast, Hokkaido
3	LL6999	M3999	NA0999	-	7/6/08	56º29'N	178º57'E	Chum	542	0.3	9/16/13	46º52'014N	141º57'599E	Gill net	M	720	4377	Kalinino, south-west coast, Sakhalin
4	BB1805	LL7566	-	LTD 7495	6/27/04	53º05'N	170º22'W	Chum	565	NA	9/4/04 (estimated)	NA	NA	NA	NA	NA	NA	Kamchatka
5	-	LL1231	-	144	5/21/99	57º12'N	145º04'W	Sockeye	595	1.3	1999?	60º13'N	144º43'W	NA	NA	NA	NA	Softuk Bar, Copper River district, Alaska
6	MM3661	-	NA3661	-	7/4/09	56º30'N	179º00'W	Sockeye	592	1.3	8/3/09	58º10'N	162º05'E	NA	NA	550	NA	Karaginsky Bay, Russia

Fig. 1. Temperature (red line) and depth (blue line) recorded in the LTD archival tag (#7495) on chum salmon released in the eastern Bering Sea (53º05'N, 170º22'W) on June 27, 2004 and recovered in the Kamchatka on September 4, 2004.