

**Recoveries of High Seas Tags and Tag Releases from
High Seas Research Vessel Surveys in 2014**

by

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

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Abstract

In July and August 2014, tagging operations were conducted by the Japanese R/V *Hokko maru*, and 100 chum salmon and 9 Chinook salmon were released with tags in the Bering Sea. Among them, 18 chum salmon were equipped with DST magnetic tag, and 7 Chinook salmon were carrying a pop-up satellite archival tag (PSAT). In December 2014, another tagging experiment was conducted on board the US F/V *Lucille*, and two Chinook salmon were tagged with PSATs and released into Unalaska Bay along the eastern Aleutian Islands. A high-seas tag released on August 1st, 2013 was reported from a chum salmon caught in the Okhotsk Sea coast, Hokkaido, Japan on September 29, 2014. In addition, archival tag data were retrieved with data communication through the Argos satellite system from five PSATs that were attached to Chinook salmon.

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 2014 and reports recoveries of high-seas tags by the Parties, covering information updated since the previous report (WGST 2014).

Releases of High Seas Tags in 2014

The Japanese R/V *Hokko maru* conducted trawl and hook-and-line operations at 17 stations in the Bering Sea in the summer of 2014 (Sato et al. 2015). During the research cruise 100 chum salmon and 9 Chinook salmon were tagged with two (FAJ and NPAFC) disk tags and released into the Bering Sea (Table 1). Among them, 18 chum salmon were equipped with DST magnetic tags, and 7 Chinook salmon were equipped with pop-up satellite archival tags (PSAT). In addition, a winter tagging experiment on board the US F/V *Lucille* was conducted in Unalaska Bay along the eastern Aleutian Islands in December 2014. Two large Chinook salmon caught by hook and line were tagged with PSATs and released in the bay (Table 1).

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) can 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.

The PSAT (model X-Tag, manufactured by Microwave Telemetry, Inc., Columbia, Maryland) weighed 40 g in air, had an overall length of 30.5 cm (maximum diameter 3.2 cm, antenna length 18.5 cm) and was slightly positively buoyant. The tags contained a lithium composite battery, temperature gauge, pressure sensor, light sensor, and a satellite transmitter. The PSATs recorded seawater temperature, depth, and ambient light level data every two minutes. On a programmable date, the PSATs automatically released from the fish and the recorded data were transmitted through the Argos satellite system. In addition, the tags were programmed to release and transmit data if they were at a constant depth (± 5 m) for more than 7 days.

Recovery of High Seas Tags in 2014 and 2015

A male chum salmon which was tagged and released in the Bering Sea (57°32'N, 179°59'W) on August 1st, 2013 was recovered by a set net along the Okhotsk Sea coast of Hokkaido, Japan (43°56'N, 144°38'E) on September 29, 2014 (Table 2).

Archival data were retrieved from the following five PSATs that were attached to Chinook salmon released in the Bering Sea (Table 2).

Tag 129843: The tagged fish was released in Unalaska Bay (53°56'N, 166°37'W) near Dutch Harbor on December 18, 2013, and the tag reported to satellites on April 9, 2014 from the central Gulf of Alaska (50°41'N, 145°37'W). The transmitted data showed a clear winter-time day/night pattern of vertical migration by the Chinook salmon.

Tag 133395: The tagged fish was released in the central Bering Sea (56°58'N, 175°00'W) on August 4, 2014, and the tag's pop-up location was the eastern Bering Sea (56°22'48"N, 165°36'36"W). Based on the temperature and depth records, the tagged fish appears to have stayed in the Bering Sea until the tag's pop-up date on October 21, 2014.

Tag 133398: The tag was released in the central Bering Sea (56°58'N, 175°00'W) on August 4, 2014, and the pop-up location was near the release site (58°34'23"N 177°59'38"W). Based on the recorded temperature, this tag appears to have been eaten by a warm-blooded predator (maybe salmon shark) on August 13, and the tag was expelled back into the ocean on August 15, 2014. This might provide some insight into why the other pop-up tags did not report to satellites. Perhaps the tags were crushed when the salmon was eaten by a predator.

Tag 142195: The tagged fish was released in Unalaska Bay (53°56'N, 166°37'W) on December 18, 2014, and the tag reported to satellites on January 7, 2015. The recorded temperature suggested the tagged salmon may have been eaten by a salmon shark.

Tag 129840: This tagged fish was also released in Unalaska Bay (53°56'N, 166°37'W) on December 17, 2014, and the tag reported data on December 28, 2014. The recorded depth data suggested the tagged fish might die and sink to the sea bottom roughly 12 hours after release.

References

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Table 2. Releases of high-seas tagged salmon in 2014. DS tag, data storage tag; PSAT, pop-up satellite archival tag; HL, hook and line; T, surface trawl; T/LB, surface trawl with live-box; 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.

No.	Japan tag #	NPAFC tag #	DS tag		Date	Lat	Long	Gear	Species	FL (mm)	Age
			#	Type							
1	B-0801	NA5621	671	Magnetic	7/28/14	56°00'N	175°00'E	HL	Chum	611	0.3
2	B-0802	NA5622	672	Magnetic	7/28/14	56°00'N	175°00'E	HL	Chum	563	0.3
3	G-5455	NA5639			7/29/14	55°00'N	175°00'E	HL	Chum	527	0.3
4	G-5456	NA5640			7/29/14	55°00'N	175°00'E	HL	Chum	538	0.3
5	G-5457	NA5691			7/29/14	55°00'N	175°00'E	HL	Chum	513	0.2
6	G-5459	NA5692			7/29/14	55°00'N	175°00'E	HL	Chum	524	NA
7	B-0803	NA5623	J746	Magnetic	7/29/14	54°00'N	175°00'E	HL	Chum	610	0.3
8	G-5462	NA5644			7/30/14	53°00'N	175°00'E	HL	Chum	500	0.3
9	G-5461	NA5643			7/30/14	53°00'N	175°00'E	HL	Chum	544	0.3
10	B-0804	NA5624	J747	Magnetic	7/30/14	53°00'N	175°00'E	HL	Chum	631	0.3
11	G-5471	NA5646			7/31/14	53°30'N	180°00'	T/LB	Chum	415	0.2
12	G-5476	NA5647			7/31/14	53°30'N	180°00'	T/LB	Chum	336	0.1
13	G-5492	NA5648			7/31/14	53°30'N	180°00'	T/LB	Chum	357	0.1
14	G-5478	NA5649			7/31/14	53°30'N	180°00'	T/LB	Chum	481	0.2
15	G-5480	NA5650			7/31/14	53°30'N	180°00'	T/LB	Chum	332	0.1
16	G-5465	NA5651			7/31/14	53°30'N	180°00'	T/LB	Chum	361	0.1
17	G-5466	NA5652			7/31/14	53°30'N	180°00'	T/LB	Chum	343	0.1
18	G-5468	NA5653			7/31/14	53°30'N	180°00'	T/LB	Chum	334	0.1
19	B-0805	NA5625	J750		7/31/14	53°30'N	180°00'	HL	Chum	620	0.3
20	G-5482	NA5654			7/31/14	53°30'N	180°00'	HL	Chum	508	0.3
21	G-5493	NA5655			7/31/14	53°30'N	180°00'	HL	Chum	503	0.3
22	B-0806	NA5626	J751	Magnetic	8/2/14	56°30'N	180°00'	HL	Chum	598	0.3
23	B-0807	NA5627	J752	Magnetic	8/2/14	56°30'N	180°00'	HL	Chum	571	0.3
24	B-0808	NA5628	J753	Magnetic	8/2/14	56°30'N	180°00'	HL	Chum	508	0.3
25	B-0809	NA5629	J754	Magnetic	8/2/14	57°30'N	180°00'	T/LB	Chum	525	0.3
26	B-0810	NA5630	J756	Magnetic	8/2/14	57°30'N	180°00'	T/LB	Chum	581	0.4
27	B-0811	NA5631	J677	Magnetic	8/2/14	57°30'N	180°00'	T/LB	Chum	541	0.3
28	G-5483	NA5656			8/2/14	57°30'N	180°00'	T/LB	Chum	348	0.4
29	G-5484	NA5657			8/2/14	57°30'N	180°00'	T/LB	Chum	306	0.1
30	G-5490	NA5658			8/2/14	57°30'N	180°00'	T/LB	Chum	343	0.1
31	G-5488	NA5659			8/2/14	57°30'N	180°00'	T/LB	Chum	333	0.1
32	G-5491	NA5632			8/2/14	57°30'N	180°00'	T/LB	Chum	484	0.2
33	G-5497	NA5660			8/2/14	57°30'N	180°00'	T/LB	Chum	431	0.2
34	G-5464	NA5661			8/2/14	57°30'N	180°00'	T/LB	Chum	407	0.2
35	G-5498	NA5662			8/2/14	57°30'N	180°00'	T/LB	Chum	438	0.2
36	B-0813	NA5633	J759	Magnetic	8/2/14	57°30'N	180°00'	HL	Chum	531	NA
37	G-6551	NA5663			8/2/14	57°30'N	180°00'	HL	Chum	386	0.1
38	G-5499	NA5664			8/2/14	57°30'N	180°00'	HL	Chum	462	0.2
39	G-6560	NA5645			8/2/14	57°30'N	180°00'	HL	Chum	450	0.2
40	G-6552	NA5665			8/2/14	57°30'N	180°00'	HL	Chum	498	NA

Table 2. Continued.

No.	Japan tag #	NPAFC tag #	DS tag		Date	Lat	Long	Gear	Species	FL (mm)	Age
			#	Type							
41	G-6553	NA5666	J760	Magnetic	8/2/14	57°30'N	180°00'	HL	Chum	510	0.3
42	G-6554	NA5667			8/2/14	57°30'N	180°00'	HL	Chum	491	0.2
43	B-0814	NA5834	J762	Magnetic	8/2/14	57°30'N	180°00'	HL	Chum	551	0.3
44	B-0815	NA5635	J767	Magnetic	8/3/14	58°30'N	180°00'	HL	Chum	672	0.4
45	G-6555	NA5668			8/3/14	58°30'N	180°00'	HL	Chum	497	0.2
46	G-6556	NA5669			8/3/14	58°30'N	180°00'	HL	Chum	462	0.2
47	G-6557	NA5670			8/3/14	58°30'N	180°00'	HL	Chum	447	0.2
48	G-6558	NA5671			8/3/14	58°30'N	180°00'	HL	Chum	445	0.2
49	G-6559	NA5672			8/3/14	58°30'N	180°00'	HL	Chum	477	0.2
50	G-6821	NA5673			8/3/14	58°30'N	180°00'	HL	Chum	477	0.2
51	B-0816	NA5636	J765	Magnetic	8/3/14	58°30'N	180°00'	HL	Chum	520	0.3
52	B-0817	NA5637	J764	Magnetic	8/3/14	58°30'N	180°00'	HL	Chum	550	0.2
53	G-6822	NA5674			8/3/14	58°30'N	180°00'	HL	Chum	441	0.2
54	G-6824	NA5675			8/3/14	58°30'N	180°00'	HL	Chum	494	0.2
55	G-6823	NA5676			8/3/14	58°30'N	180°00'	HL	Chum	369	0.1
56	G-6825	NA5677			8/3/14	58°30'N	180°00'	HL	Chum	498	0.2
57	G-6826	NA5678			8/3/14	58°30'N	180°00'	HL	Chum	441	0.2
58	G-6827	NA5679	129839	PSAT	8/3/14	58°30'N	180°00'	T	Chinook	588	1.2
59	G-5500	NA5682	133396	PSAT	8/4/14	58°00'N	175°00'W	HL	Chinook	618	1.2
60	G-6820	NA5683			8/4/14	58°00'N	175°00'W	HL	Chum	534	0.3
61	G-6829	NA5681			8/4/14	58°00'N	175°00'W	HL	Chum	414	0.2
62	G-6830	NA5680			8/4/14	58°00'N	175°00'W	HL	Chum	340	0.1
63	G-6831	NA5684			8/4/14	58°00'N	175°00'W	HL	Chum	476	0.3
64	G-6832	NA5685			8/4/14	58°00'N	175°00'W	HL	Chum	454	0.2
65	G-6856	NA5686	129841	PSAT	8/4/14	58°00'N	175°00'W	T	Chinook	718	x.4
66	G-6833	NA5687	133398	PSAT	8/4/14	57°00'N	175°00'W	T/LB	Chinook	605	1.2
67	G-6834	NA5688	133395	PSAT	8/4/14	57°00'N	175°00'W	T/LB	Chinook	634	1.3
68	G-6836	NA5690			8/4/14	57°00'N	175°00'W	T/LB	Chum	406	0.2
69	G-6837	NA5681			8/4/14	57°00'N	175°00'W	T/LB	Chum	472	0.2
70	G-6838	NA5692			8/4/14	57°00'N	175°00'W	T/LB	Chum	427	0.2
71	G-6839	NA5693			8/4/14	57°00'N	175°00'W	T/LB	Chinook	452	1.1
72	G-6840	NA5694	129842	PSAT	8/4/14	57°00'N	175°00'W	HL	Chinook	620	1.2
73	G-6841	NA5695			8/4/14	57°00'N	175°00'W	HL	Chum	461	0.2
74	G-6842	NA5697			8/5/14	56°00'N	175°00'W	HL	Chum	458	0.2
75	G-6843	NA5698			8/5/14	56°00'N	175°00'W	HL	Chum	426	0.2
76	G-6844	NA5699			8/5/14	56°00'N	175°00'W	HL	Chum	469	0.2
77	G-6845	NA5700			8/5/14	56°00'N	175°00'W	HL	Chum	498	0.3
78	G-6846	NA5701			8/5/14	56°00'N	175°00'W	HL	Chum	491	0.2
79	G-6847	NA5702			8/5/14	56°00'N	175°00'W	HL	Chum	474	0.2
80	G-6857	NA5673			8/5/14	56°00'N	175°00'W	HL	Chum	460	0.3

Table 2. Continued.

No.	Japan tag #	NPAFC tag #	DS tag		Date	Lat	Long	Gear	Species	FL (mm)	Age
			#	Type							
81	G-6848	NA5704			8/5/14	55°00'N	175°00'W	T/LB	Chum	313	0.1
82	G-6849	NA5705			8/5/14	55°00'N	175°00'W	T/LB	Chum	457	0.2
83	G-6850	NA5706			8/5/14	55°00'N	175°00'W	T/LB	Chum	424	0.1
84	G-6851	NA5707			8/5/14	55°00'N	175°00'W	T/LB	Chum	431	0.2
85	G-6852	NA5708			8/5/14	55°00'N	175°00'W	T/LB	Chum	356	0.1
86	G-6853	NA5709			8/5/14	55°00'N	175°00'W	T/LB	Chum	343	0.1
87	G-6854	NA5710			8/5/14	55°00'N	175°00'W	T/LB	Chum	376	0.1
88	G-6855	NA5711			8/5/14	55°00'N	175°00'W	T/LB	Chum	441	0.2
89	G-6858	NA5712			8/5/14	55°00'N	175°00'W	T/LB	Chum	455	0.2
90	G-6859	NA5713			8/5/14	55°00'N	175°00'W	T/LB	Chum	592	0.3
91	G-6860	NA5714			8/5/14	55°00'N	175°00'W	T/LB	Chum	329	0.1
92	G-6861	NA5715			8/5/14	55°00'N	175°00'W	T/LB	Chum	427	0.2
93	G-6862	NA5716			8/5/14	55°00'N	175°00'W	T/LB	Chinook	377	1.1
94	G-6863	NA5717			8/5/14	55°00'N	175°00'W	HL	Chum	463	0.2
95	G-6870	NA5718			8/5/14	55°00'N	175°00'W	HL	Chum	530	NA
96	G-6869	NA5719			8/5/14	55°00'N	175°00'W	HL	Chum	438	0.2
97	G-6868	NA5720			8/5/14	55°00'N	175°00'W	HL	Chum	477	0.2
98	G-6864	NA5721			8/6/14	54°00'N	175°00'W	HL	Chum	520	0.2
99	G-6865	NA5722			8/6/14	54°00'N	175°00'W	HL	Chum	487	0.2
100	G-6866	NA5723			8/6/14	54°00'N	175°00'W	HL	Chum	451	0.3
101	B-0821	NA5638	J766	Magnetic	8/6/14	54°00'N	175°00'W	HL	Chum	519	0.3
102	G-6867	NA5724			8/6/14	54°00'N	175°00'W	HL	Chum	430	0.2
103	G-6881	NA5725			8/6/14	54°00'N	175°00'W	HL	Chum	428	0.2
104	G-6882	NA5726			8/6/14	54°00'N	175°00'W	HL	Chum	465	0.2
105	G-6835	NA5689	129844	PSAT	8/6/14	53°00'N	175°00'W	T/LB	Chinook	604	1.2
106	G-6883	NA5696			8/6/14	53°00'N	175°00'W	T/LB	Chum	470	0.3
107	G-6884	NA5728			8/6/14	53°00'N	175°00'W	T/LB	Chum	498	0.2
108	G-6885	NA5729			8/6/14	53°00'N	175°00'W	T/LB	Chum	519	0.3
109	G-6896	NA5730			8/6/14	53°00'N	175°00'W	T/LB	Chum	546	0.4
110	-	-	129840	PSAT	12/17/14	53°55'N	166°37'W	HL	Chinook	790	-
111	-	-	142195	PSAT	12/18/14	53°55'N	166°37'W	HL	Chinook	670	-

Table 2. Recovery reports of high-seas tagged salmon in 2014 and 2015. 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. DS tag, data storage tag; PSAT, pop-up satellite archival tag; FL, fork length (mm); BW, body weight (g).

No.	Japan tag #	NPAFC tag #	DS tag # (type)	Release						Recovery							
				Date	Lat	Long	Species	FL (mm)	Age	Date	Lat	Long	Gear	Sex	FL (mm)	BW (g)	Location
1	D-0927	NA5579	-	8/1/13	57°32'N	179°59'W	Chum	526	0.3	9/29/14	43°56'N	144°38'E	Trap net	M	635	2740	Shari, Okhotsk Sea coast, Hokkaido
2	-	-	129843 (PSAT)	12/18/13	53°56'N	166°37'W	Chinook	850	-	4/9/14	50°41'N	145°37'W	Satellite	-	-	-	Central Gulf of Alaska
3	G-6833	NA5687	133398 (PSAT)	8/4/14	57°00'N	175°00'W	Chinook	605	1.2	8/15/14	58°34'N	178°00'W	Satellite	-	-	-	Central Bering Sea
4	G-6834	NA5688	133395 (PSAT)	8/4/14	57°00'N	175°00'W	Chinook	634	1.3	10/21/14	56°23'N	165°36'W	Satellite	-	-	-	Eastern Bering Sea
5	-	-	142195 (PSAT)	12/18/14	53°55'N	166°37'W	Chinook	670	-	12/28/14	53°56'N	166°37'W	Satellite	-	-	-	Eastern Bering Sea
6	-	-	129840 (PSAT)	12/17/14	53°55'N	166°37'W	Chinook	790	-	1/7/15	54°58'N	165°42'W	Satellite	-	-	-	Eastern Bering Sea