

**Recoveries of High Seas Tags and Tag Releases from  
High Seas Research Vessel Surveys in 2016**

by

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

S. Urawa, E. Akinicheva, A. Bugaev, L. Campbell, J. Guyon, C. H. Jeon, J. Holmes,  
J.K. Kim, M. Koval, M. Kuwaki, D.H. Lee, D. Oxman, S. Sato, A. Tompkins,  
V. Volobuev, R. Walker, and A.C. Seitz

Submitted to the

**NORTH PACIFIC ANADROMOUS FISH COMMISSION**

April 2017

**THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:**

Working Group on Salmon Marking (WGSM). 2017. Recoveries of high seas tags and tag releases from high seas research vessel surveys in 2016. NPAFC Doc. 1706. 4 pp. WGSM, Committee on Scientific Research and Statistics (Available at <http://www.npafc.org>).

# Recoveries of High Seas Tags and Tag Releases from High Seas Research Vessel Surveys in 2016

The Working Group on Salmon Marking (WGSM)

The Committee on Scientific Research and Statistics (CSRS)

S. Urawa, E. Akinicheva, A. Bugaev, L. Campbell, J. Guyon, C. H. Jeon, J. Holmes,  
J.K. Kim, M. Koval, M. Kuwaki, D.H. Lee, D. Oxman, S. Sato, A. Tompkins,  
V. Volobuev, R. Walker, and A.C. Seitz

**Keywords:** high seas salmon, tag release, recovery

## Abstract

In August 2016, tagging operations were conducted by the Japanese R/V *Hokko maru*, and 12 chum salmon were released with tags in the Bering Sea. Among them, two chum salmon were equipped with DST magnetic tag. In March 2016, another tagging experiment was conducted by US scientists, and 20 Chinook salmon were tagged with PSATs and released along the Gulf of Alaska coast (59°N, 151°W) off the Kenai Peninsula, central Alaska. A high-seas tag released in the Bering Sea on August 3rd, 2013 was reported from a chum salmon caught in the Okhotsk Sea coast, Hokkaido, Japan on November 4, 2013. In addition, archival tag data were retrieved via data communication through the Argos satellite system from all 20 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. 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 2016 and reports recoveries of high-seas tags by the Parties, covering information updated since the previous report (WGST 2016).

## Releases of High Seas Tags in 2016

The Japanese R/V *Hokko maru* conducted trawl and hook-and-line operations at 13 stations in the Bering Sea in the summer of 2016 (Honda et al. 2017). During the research cruise, 12 chum salmon (*Oncorhynchus keta*) were tagged with two (FAJ and NPAFC) disk tags and released into the Bering Sea (Table 1). Among them, two chum salmon were equipped with DST magnetic tag.

In addition, a spring tagging experiment was conducted along the Gulf of Alaska coast (59°N, 151°W) off the Kenai Peninsula, central Alaska. Twenty Chinook salmon caught by hook and line were tagged with pop-up satellite archival tags (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 miniPAT, manufactured by Wildlife Computer, Redmond, Washington) weighed 60 g in air, had an overall length of 30.5 cm (maximum diameter 3.8 cm, tag length 12 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 ten seconds. On a programmable date, the PSATs automatically released from the fish and summaries of 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 ( $\pm 5$  m) for more than 3 days.

### **Recovery of High Seas Tags in 2016**

A female chum salmon which was tagged and released in the Bering Sea (53°57'N, 174°57'W) on August 3rd, 2013 was recovered by a set net along the Okhotsk Sea coast of Hokkaido, Japan (44°N, 144°E; the exact catching location was not identified) on November 4, 2013 (Table 2).

In addition, archival tag data were retrieved with data communication through the Argos satellite system from all 20 PSATs that were attached to Chinook salmon (Table 2).

### **References**

- K. Honda, Sato, S., T. Sato, T. Morishita, M. Ogawa, and K. Suzuki. 2017. The summer 2016 Japanese salmon research cruise of the R/V Hokko maru. NPAFC Doc. \*\*\*\*\*. 15 pp. (Available at [www.npafc.org](http://www.npafc.org)).
- Working Group on Salmon Tagging (WGST). 2016. Recoveries of high seas tags and tag releases from high seas research vessel surveys in 2015. NPAFC Doc. 1659. 6 pp. WGST, Committee on Scientific Research and Statistics (Available at <http://www.npafc.org>).

**Table 1.** Releases of high-seas tagged salmon in 2016. DS tag, data storage tag; PSAT, pop-up satellite archival tag; 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.

No.	Japan tag #	NPAFC tag #	DS tag		Date	Latitude	Longitude	Gear	Species	FL (mm)	Age
			#	Type							
1	G6897	NA0460			8/5/16	54°00'N	175°00'E	HL	Chum	513	0.3
2	G6898	NA0654	J1041	Magnetic	8/6/16	52°30'N	180°00'	HL	Chum	550	0.4
3	N4753	NA5828			8/8/16	55°30'N	180°00'	HL	Chum	500	0.2
4	G6891	NA3940			8/8/16	55°30'N	180°00'	HL	Chum	396	0.2
5	N4752	NA5829			8/8/16	55°30'N	180°00'	HL	Chum	411	0.2
6	G6893	NA2564			8/8/16	55°30'N	180°00'	HL	Chum	480	0.3
7	G6895	NA2916	J1045	Magnetic	8/8/16	56°30'N	180°00'	HL	Chum	609	0.4
8	N4757	NA5826			8/8/16	56°30'N	180°00'	HL	Chum	484	0.2
9	N4761	NA5896			8/8/16	56°30'N	180°00'	HL	Chum	359	0.2
10	N4760	NA5893			8/8/16	56°30'N	180°00'	HL	Chum	355	0.1
11	N4758	NA5897			8/10/16	57°00'N	175°00'W	HL	Chum	510	0.3
12	N4759	NA5899			8/10/16	57°00'N	175°00'W	HL	Chum	490	0.3
13			159001	PSAT	3/8/16	59°41'12"N	151°52'11"W	HL	Chinook	690	
14			159002	PSAT	3/8/16	59°41'15"N	151°47'41"W	HL	Chinook	840	
15			159003	PSAT	3/10/16	59°41'1"N	151°52'21"W	HL	Chinook	740	
16			159004	PSAT	3/10/16	59°44'12"N	151°51'39"W	HL	Chinook	950	
17			159005	PSAT	3/11/16	59°40'46"N	151°52'1"W	HL	Chinook	720	
18			159006	PSAT	3/13/16	59°41'46"N	151°52'27"W	HL	Chinook	750	
19			159007	PSAT	3/13/16	59°40'51"N	151°51'29"W	HL	Chinook	730	
20			159008	PSAT	3/14/16	59°15'41"N	151°59'21"W	HL	Chinook	710	
21			159009	PSAT	3/14/16	59°16'7"N	151°59'23"W	HL	Chinook	780	
22			159010	PSAT	3/15/16	59°15'36"N	151°59'20"W	HL	Chinook	720	
23			159011	PSAT	3/15/16	59°15'18"N	151°58'58"W	HL	Chinook	770	
24			159012	PSAT	3/24/16	59°39'26"N	151°44'29"W	HL	Chinook	810	
25			159013	PSAT	3/23/16	59°37'19"N	151°34'44"W	HL	Chinook	740	
26			159014	PSAT	3/28/16	59°37'44"N	151°36'44"W	HL	Chinook	700	
27			159015	PSAT	3/29/16	59°35'41"N	151°25'14"W	HL	Chinook	760	
28			159016	PSAT	3/24/16	59°37'16"N	151°34'44"W	HL	Chinook	740	
29			159017	PSAT	3/28/16	59°39'44"N	151°44'18"W	HL	Chinook	740	
30			159018	PSAT	3/28/16	59°40'45"N	151°50'53"W	HL	Chinook	720	
31			159019	PSAT	3/25/16	59°15'42"N	151°59'19"W	HL	Chinook	720	
32			159020	PSAT	3/22/16	59°40'41"N	151°51'48"W	HL	Chinook	710	

**Table 2.** Recoveries of high-seas tagged salmon in 2016-2017. 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 tag; AS, Argos satellite; FL, fork length (mm); BW, body weight (g).

No.	Japan tag #	NPAFC tag #	DS tag # (type)	Releases						Recoveries							
				Date	Latitude	Longitude	Species	FL (mm)	Age	Date	Latitude	Longitude	Gear	Sex	FL (mm)	BW (g)	Location
1	D-0931	NA5814		8/3/13	53°57'N	174°57'W	Chum	550	0.3	11/4/13	44°03'-04'N	144°16'-17'E	Trap net	F	560	1800	Abashiri, Okhotsk Sea coast, Hokkaido
2			159001 (PSAT)	3/8/16	59°41'12"N	151°52'11"W	Chinook	690		3/18/16	59°48'44"N	152°12'59"W	AS				
3			159002 (PSAT)	3/8/16	59°41'15"N	151°47'41"W	Chinook	840		4/6/16	59°47'1"N	152°14'44"W	AS				
4			159003 (PSAT)	3/10/16	59°41'1"N	151°52'21"W	Chinook	740		4/14/16	60°0'36"N	152°2'58"W	AS				
5			159004 (PSAT)	3/10/16	59°44'12"N	151°51'39"W	Chinook	950		3/22/16	59°39'31"N	152°0'60"W	AS				
6			159005 (PSAT)	3/11/16	59°40'46"N	151°52'1"W	Chinook	720		4/20/16	59°26'50"N	153°36'26"W	AS				
7			159006 (PSAT)	3/13/16	59°41'46"N	151°52'27"W	Chinook	750		4/22/16	59°53'32"N	152°10'17"W	AS				
8			159007 (PSAT)	3/13/16	59°40'51"N	151°51'29"W	Chinook	730		4/3/16	59°58'38"N	152°11'22"W	AS				
9			159008 (PSAT)	3/14/16	59°15'41"N	151°59'21"W	Chinook	710		4/25/16	59°35'14"N	148°6'13"W	AS				
10			159009 (PSAT)	3/14/16	59°16'7"N	151°59'23"W	Chinook	780		4/24/16	59°46'48"N	148°33'54"W	AS				
11			159010 (PSAT)	3/15/16	59°15'36"N	151°59'20"W	Chinook	720		3/27/16	57°49'43"N	154°57'48"W	AS				
12			159011 (PSAT)	3/15/16	59°15'18"N	151°58'58"W	Chinook	770		5/1/16	59°43'33"N	152°12'34"W	AS				
13			159012 (PSAT)	3/24/16	59°39'26"N	151°44'29"W	Chinook	810		5/3/16	59°49'45"N	152°18'39"W	AS				
14			159013 (PSAT)	3/23/16	59°37'19"N	151°34'44"W	Chinook	740		4/16/16	59°43'21"N	152°5'32"W	AS				
15			159014 (PSAT)	3/28/16	59°37'44"N	151°36'44"W	Chinook	700		6/5/16	59°36'46"N	151°26'53"W	AS				
16			159015 (PSAT)	3/29/16	59°35'41"N	151°25'14"W	Chinook	760		4/15/16	59°32'37"N	151°42'9"W	AS				
17			159016 (PSAT)	3/24/16	59°37'16"N	151°34'44"W	Chinook	740		5/26/16	59°43'48"N	151°2'50"W	AS				
18			159017 (PSAT)	3/28/16	59°39'44"N	151°44'18"W	Chinook	740		5/2/16	58°10'33"N	137°18'3"W	AS				
19			159018 (PSAT)	3/28/16	59°40'45"N	151°50'53"W	Chinook	720		6/20/16	59°37'17"N	151°49'51"W	AS				
20			159019 (PSAT)	3/25/16	59°15'42"N	151°59'19"W	Chinook	720		5/5/16	59°25'31"N	152°59'21"W	AS				
21			159020 (PSAT)	3/22/16	59°40'41"N	151°51'48"W	Chinook	710		4/28/16	59°13'35"N	152°45'31"W	AS				