

**Recoveries of High Seas Tags and Tag Releases from
High Seas Research Vessel Surveys in 2018 and the Winter of 2019**

by

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

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

Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

April 2019

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:

Working Group on Salmon Marking (WGSM). 2019. Recoveries of high seas tags and tag releases from high seas research vessel surveys in 2018 and the winter of 2019. NPAFC Doc. 1839. 7 pp. WGSM, Committee on Scientific Research and Statistics (Available at <https://npafc.org>).

Recoveries of High Seas Tags and Tag Releases from High Seas Research Vessel Surveys in 2018 and the Winter of 2019

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

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

Keywords: high seas salmon, tag release, recovery

Abstract

In late July and early August 2018, tagging operations were conducted in the central Bering Sea by the Japanese R/V *Hokko maru*, and 36 chum salmon were released with FAJ/NPAFC disk tags and archival tags (AZBL, Biologger, DST-magnetic or Pop-up tags). During the Gulf of Alaska Expedition with the Russian R/V *Professor Kaganovskiy*, two coho salmon were captured by trawl operation using a live-box, and released with NPAFC disc tags into the eastern Gulf of Alaska in March 2019. During January to July in 2018, archived tag data were retrieved via the Argos satellite system from 10 pop-up satellite archival tags that were attached to Chinook salmon in Unalaska Bay, Alaska in October–November 2017.

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 2018 and reports recoveries of high-seas tags by the Parties, covering information updated since the previous report (WGSM 2018).

Releases of High Seas Tags in 2018

The Japanese R/V *Hokko maru* conducted trawl and hook-and-line operations at 17 stations in the Bering Sea in the summer of 2018 (Honda et al. 2019). During the research cruise, 36 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 AZBL (n=19), Biologger (n=12), DST-magnetic (n=4), and Pop-up tags (n=1). AZBL tag (manufactured by AI Technology, Tokyo, Japan, size 14 × 35 mm; weight in air, 9 g) records seawater temperature and depth. Biologger tag (manufactured by Biologging Solution Inc., Tokyo, Japan, size 20 × 76 mm; weight in air, 40.8g) records seawater temperature, depth, and ambient light level data. 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. Pop-up tag (model Iridium Pop-up Logger, manufactured by Biologging Solutions Inc.) is 300 g in air and 30 cm in overall length (maximum diameter 8 cm, tag length 15 cm), recording depth and seawater temperature (every 10 minute) and ambient light level (every two minute).

Releases of High Seas Tags in the Winter of 2019

An international cooperative winter survey (the Gulf of Alaska Expedition 2019) was conducted in the Gulf of Alaska during February and March 2019 by chartering Russian R/V *Professor Kaganovskiy* (NPAFC Secretariat 2019). During the expedition, two coho salmon (*O. kisutch*) were captured by trawl operation with a new live box which was provided by TINRO Center (Figures 1 & 2). The coho salmon were tagged with NPAFC disc tags and immediately released in the eastern Gulf of Alaska (Table 1).

Recovery of High Seas Tags in 2018

No recovery of disk and archival tags released in the summer Bering Sea was reported in 2018. In addition, we could not obtain any data from the Pop-up tag, which was attached to chum salmon and released in the Bering Sea in the summer of 2018. During January to July in 2018, archival tag data were retrieved via communication through the Argos satellite system from 10 Pop-up satellite archival tags (model miniPAT, manufactured by Wildlife Computer, Redmond, Washington) that were attached to Chinook salmon in Unalaska Bay in October and November 2017 (Table 2).

Acknowledgements

The authors wish to thank Dr. Vladimir Radchenko (NPAFC) for providing the information of live-box, which was used for the Gulf of Alaska Expedition 2019.

References

- Honda, K., T. Sato, S. Ueda, Y. Matunami, T. Abe, I. Tachioka, S. Sato, and K. Suzuki. 2019. The summer 2018 Japanese salmon research cruise of the R/V *Hokko maru*. NPAFC Doc. 1825. 16 pp. (Available at <https://npafc.org>).
- NPAFC Secretariat. 2018. Preliminary cruise plan of the R/V *Professor Kaganovskiy* to study the ocean ecology of Pacific salmon in the winter in the Gulf of Alaska. NPAFC Doc. 1807 (Rev. 1). 20 pp. North Pacific Anadromous Fish Commission (Available at <https://npafc.org>).
- Working Group on Salmon Marking (WGSM). 2018. Recoveries of high seas tags and tag releases from high seas research vessel surveys in 2017. NPAFC Doc. 1758. 5 pp. WGSM, Committee on Scientific Research and Statistics (Available at <https://npafc.org>).

Table 1. Release of high-seas tagged salmon in 2018 and the winter of 2019. AZBL, seawater temperature and depth record tag; Biologger, seawater temperature, depth, and ambient light level record tag; DS, DST-magnetic tag; Pop-up, Iridium Pop-up Logger; G, sampling gear; HL, hook and line; LB, 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. Research vessels: *Hokko maru* for #1-36, and *Professor Kaganovskiy* for #37-38.

No.	Japan tag #	NPAFC tag #	Archival tag		Date	Latitude	Longitude	G	Species	FL (mm)	Age
			#	Type							
1	E0581	NA5923	AZ01	AZBL	7/23/18	56°00'N	175°00'E	HL	Chum	444	0.2
2	E0592	NA5930	BL01	Biologger	7/24/18	55°00'N	175°00'E	HL	Chum	580	0.3
3	E0597	NA5936	J1124	DS	7/24/18	54°00'N	175°00'E	HL	Chum	445	0.3
4	E0587	NA5927	AZ02	AZBL	7/24/18	54°00'N	175°00'E	HL	Chum	485	0.3
5	E0582	NA5924	BL02	Biologger	7/25/18	53°00'N	175°00'E	HL	Chum	523	0.3
6	E0580	NA5922	BL03	AZBL	7/25/18	53°00'N	175°00'E	HL	Chum	447	0.2
7	E0584	NA5926	AZ03	Biologger	7/25/18	53°00'N	175°00'E	HL	Chum	542	0.3
8	E0583	NA5925	AZ07	AZBL	7/26/18	53°30'N	180°00'	HL	Chum	433	0.3
9	E0579	NA5921	P-01	Pop-up	7/26/18	53°30'N	180°00'	HL	Chum	527	0.3
10	E0598	NA5940	AZ04	AZBL	7/26/18	53°30'N	180°00'	HL	Chum	443	0.2
11	E0599	NA5937	BL04	Biologger	7/26/18	53°30'N	180°00'	HL	Chum	504	0.3
12	E0591	NA5935	AZ05	AZBL	7/26/18	53°30'N	180°00'	HL	Chum	437	0.2
13	E0594	NA5939	J1122	DS	7/26/18	53°30'N	180°00'	HL	Chum	490	0.3
14	N4770	NA5839	J1121	DS	7/26/18	53°30'N	180°00'	HL	Chum	455	0.2
15	E1675	NA5878	AZ06	AZBL	7/26/18	53°30'N	180°00'	HL	Chum	435	0.2
16	E0596	NA5941	BL05	Biologger	7/26/18	53°30'N	180°00'	HL	Chum	534	0.4
17	E0585	NA5928	BL06	Biologger	7/27/18	54°30'N	180°00'	HL	Chum	492	0.2
18	E0590	NA5934	AZ08	AZBL	7/27/18	54°30'N	180°00'	HL	Chum	550	0.2
19	N4792	NA5857	BL07	Biologger	7/27/18	55°30'N	180°00'	HL	Chum	548	0.4
20	E0550	NA5889	AZ09	AZBL	7/27/18	55°30'N	180°00'	HL	Chum	448	0.3
21	E0559	NA5890	AZ10	AZBL	7/27/18	57°30'N	180°00'	HL	Chum	464	0.2
22	E0553	NA5885	BL08	Biologger	7/27/18	57°30'N	180°00'	HL	Chum	537	0.3
23	N4779	NA5853	AZ12	AZBL	7/27/18	55°00'N	175°00'W	HL	Chum	474	0.3
24	E0556	NA5888	AZ13	AZBL	7/27/18	55°00'N	175°00'W	HL	Chum	452	0.2
25	E0571	NA5908	BL09	Biologger	8/1/18	54°00'N	175°00'W	HL	Chum	525	0.3
26	E0574	NA5917	AZ14	AZBL	8/1/18	54°00'N	175°00'W	HL	Chum	448	0.2
27	N4768	NA5837	AZ15	AZBL	8/1/18	54°00'N	175°00'W	HL	Chum	495	0.2
28	E0557	NA5892	AZ16	AZBL	8/1/18	54°00'N	175°00'W	HL	Chum	487	0.2
29	E0561	NA5918	AZ11	AZBL	8/2/18	55°33'N	178°49'E	HL	Chum	485	0.3
30	E0568	NA5905	BL10	Biologger	8/2/18	55°33'N	178°49'E	HL	Chum	574	0.3
31	E0569	NA5914	AZ17	AZBL	8/2/18	55°33'N	178°49'E	HL	Chum	435	0.2
32	N4783	NA5851	AZ18	AZBL	8/2/18	55°33'N	178°49'E	HL	Chum	478	0.2

33	E0575	NA5919	J1095	DS	8/3/18	55°29'N	174°13'E	HL	Chum	521	0.3
34	E0562	NA5906	AZ19	AZBL	8/3/18	55°29'N	174°13'E	HL	Chum	453	0.3
35	E0573	NA5909	BL11	Biologger	8/3/18	55°29'N	174°13'E	HL	Chum	594	0.3
36	E0548	NA5882	BL13	Biologger	8/3/18	55°29'N	174°13'E	HL	Chum	565	0.2
37	-	NA6001	-	-	3/15/19	48°42'N	134°23'W	LB	Coho	420	TBA
38	-	NA6002	-	-	3/15/19	48°42'N	134°23'W	LB	Coho	420	TBA

Table 2. Recoveries of high-seas tagged salmon in 2018. DS tag, data storage tag; PSAT, pop-up satellite archival tag; FL, fork length (mm).

No.	DS tag		Release				Recoveries			
	#	Type	Date	Latitude	Longitude	Species	FL (mm)	Date	Latitude	Longitude
1	172907	PSAT	10/22/17	53°52'59"N	166°37'12"W	Chinook	820	01/06/18	54°35'59"N	166°00'58"W
2	172913	PSAT	10/31/17	53°53'24"N	166°36'43"W	Chinook	800	01/11/18	55°59'17"N	170°48'32"W
3	172905	PSAT	10/16/17	53°55'52"N	166°31'44"W	Chinook	760	01/13/18	54°19'16"N	164°43'16"W
4	172917	PSAT	11/3/17	53°55'19"N	166°34'19"W	Chinook	710	02/02/18	54°32'55"N	161°04'12"W
5	172908	PSAT	10/10/17	53°53'06"N	166°36'50"W	Chinook	800	02/20/18	56°19'49"N	162°03'43"W
6	172910	PSAT	10/27/17	53°59'13"N	166°35'53"W	Chinook	760	02/26/18	59°17'33"N	139°52'30"W
7	172901	PSAT	11/3/17	53°55'16"N	166°34'19"W	Chinook	830	04/02/18	54°33'55"N	160°25'05"W
8	172912	PSAT	11/3/17	53°55'19"N	166°34'19"W	Chinook	820	04/11/18	54°39'23"N	164°51'54"W
9	172904	PSAT	11/2/17	53°54'50"N	166°34'55"W	Chinook	770	05/02/18	57°50'34"N	145°18'40"W
10	172906	PSAT	11/3/17	53°55'19"N	166°34'12"W	Chinook	700	07/23/18	55°12'02"N	163°49'01"W

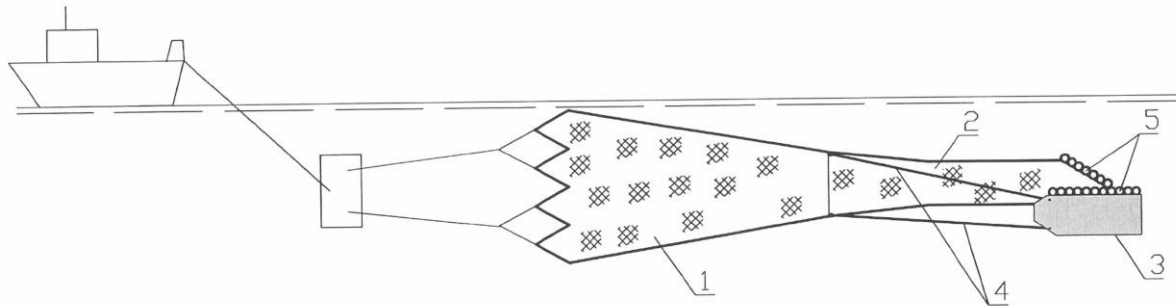


Figure 1. An illustration showing the trawl net operation with a live-box. A live-box is an aluminum box that is attached to the cod end of a trawl net for tagging and release of live salmon at sea. 1, a trawl net; 2, a passage net connecting the trawl net and live-box; 3, live-box; 4, ropes towing live-box; 5, floats.

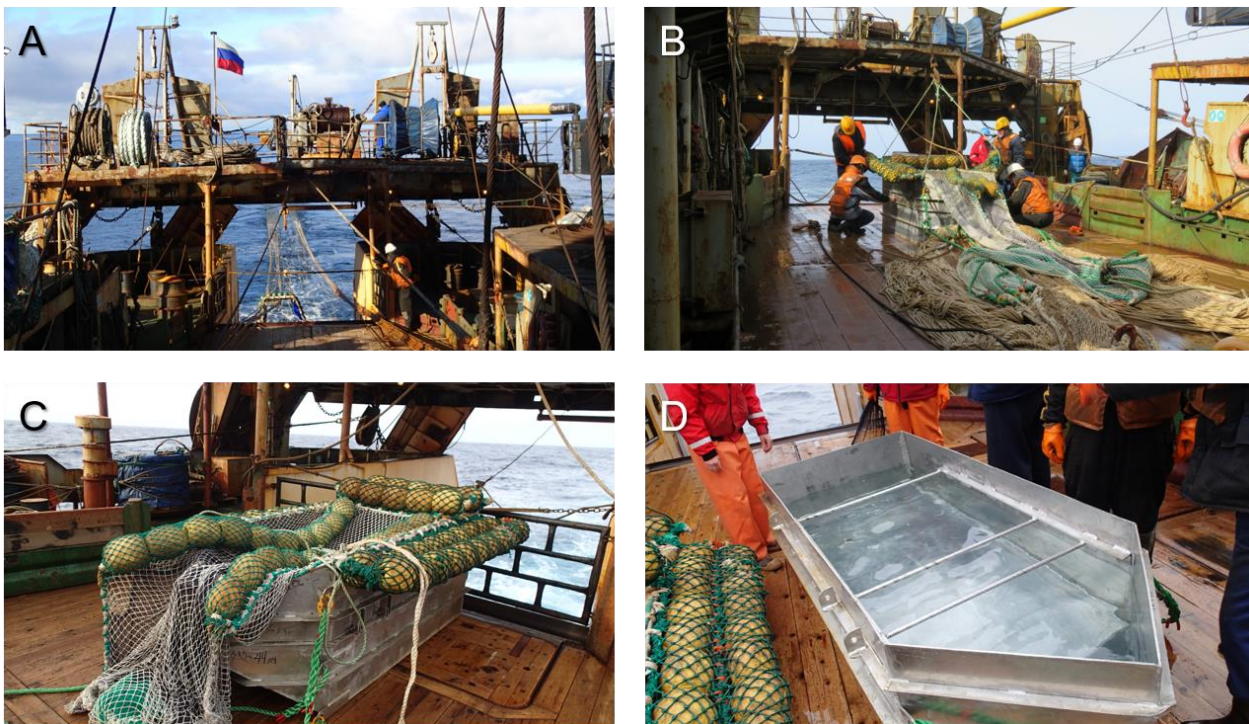


Figure 2. Trawl operation with a live-box conducted by the R/V *Professor Kaganovskiy* during the Gulf of Alaska Expedition 2019. A, deploying the trawl and live-box; B, live-box retrieved on deck; C, entire view of live-box; D, live-box without a cover. Photo credit: S. Urawa (FRA).